TRANSCRIPT
INTERVIEWEE: **Bill Sheffield** (BS)
INTERVIEWER: David Todd (DT) and David Weisman (DW)
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(misc.)
DT: My name is David Todd. I'm here for the Conservation History Association of Texas. And it's March 5, 2008. We're outside of College Station, Texas. And we're at the home of—of Dr. Bill Sheffield who is an ecologist who received his PhD from—from Texas A&M and has done a variety of work in Texas and—and other states but has a special interest and—and expertise in—in exotics. And we were hoping that we could visit with him about that as well as some of his other work. And I want to thank you for taking time to talk to us.
00:01:52 – 2439
BS: Certainly.
DT: I thought we might start by mentioning your—the two books that you worked on. Nilgai Antelope in Texas and then later a book called Exotics on the Range. And I was hoping that you could tell us why it was you decided to write these books and—and maybe tell us a little bit about the process of writing them and what you found out.
00:02:19 – 2439
BS: The monograph on Exotics in Texas was a compilation of four initial studies done in the United States on nilgai and on free ranging nilgai antelope. I did the food habit study but I helped coordinate the other studies. And then I left the university, came back as a research associate and to satisfy some of the requirements of the grant we were under, the Caesar Kleberg Research Program and Wildlife Ecology, that's—that's King Ranch. We were prod—produced the results of our studies and I—and this was a compilation of those four initial studies on the—on exotics, nilgai particularly in Texas. There were other studies, there were other man—monographs, white-tailed deer, I mean, and axis deer, black buck antelope and a few other studies that weren't actually hooved animals, hooved exotics that we were done un—under that program.
DT: Just to—to give some context to this, I guess your—your study on nilgai was based on research that you started in 1969, is that right?
00:03:47 – 2439
BS: Yes, I came to the University, A&M, and wildlife science department in '69 as a candidate, a PhD candidate and I was offered the opportunity to study nilgai on Norris division of the King Ranch in primarily their food habits and feeding interrelations with cattle and native deer. So that's how I got involved initially with exotics and that was my first effort. And that was the first good habit study done in the United States on free ranging nilgai.

DT: Well, maybe you can help us find a—a starting point for understanding nilgai and—and all the other exotics that—that might have been found in Texas at various points by turning the clock back and—and telling us, when were the first introductions of—of exotic animals to Texas?
00:04:40 – 2439
BS: To Texas?
DT: Yes, sir.
00:04:43 – 2439
BS: Most—most records reflect that it was—1930 was a popular time. There had been some animals purchased by various ranches in Texas even prior there, probably back in nineteen—the twenties. Nilgai refers to the east in the 1930's as were a number of other exotics that were purchased by private ranches and then released on their properties and included some of the more popular ones now, the axis deer, the black buck, let's see, aoudad—aoudad sheep and a few others. They were—mouflon—they were some of the first animals that were actually studied in detail as a result of their release in Texas.
DT: And can you tell us the sort of context for what was going on in habitat and wildlife in the late twenties, early thirties that might have influenced these ranch owners to release these exotics?
00:05:45 – 2439
BS: Well, of course, most of the hill country ranches where most of the animals were released and probably still are today, were livestock operation, primarily cattle. There was an interest in hunting of course and initially I think they were purchased and released just as a matter of interest in something different, something to show people or something to enjoy, it was different than our native populations. And from that they be—the industry began to increase, the number of animals began to increase and they began to find other uses primarily hunting for exotics. Then it evolved as more and more exotics came on the scene, some very prolific, then their—I think that initiated a need to find some other way to deal with them to—to
00:06:45 – 2439
control their populations. In addition to hunting, they began to consider meat sales, recreational opportunities such as drive thru parks, photographing the animals, and that's primarily what they're used for today, other than just private enjoyment of the ranch owners.
DT: I've—I've heard stories that—that in the late twenties, early thirties, a lot of the native wildlife had become quite scarce and there was some interest in trying to repopulate the Texas landscape with—with something and it happened to also be that's when these exotics were also introduced at the time. Is that—was there a connection with the fate of the white-tailed deer in particular?
00:07:34 – 2439
BS: Well I think that's kind of two questions. One is I think you're right, example—classic examples I think are introduction of aoudad sheep in New Mexico, in the Colorado River gorge and again in Palo Duro Canyon in Texas. Those people were seeking another game animal to hunt. And I think maybe in New Mexico, they had some of their principal big game animals had declined and they were looking for something to substitute and—and so they began to primarily in—introduce aoudad along with some other species I think gemsbok and I don't remember what all they ended up releasing as free ranging animals in

new Mexico and then aoudad is free ranging animals in the Palo Duro Canyon in Texas.
DT: Can you tell us how they decided which animals might be viable here in Texas to import and introduce?
00:08:33 – 2439
BS: Yeah I think primarily it was a comparison of their native ranges with similar ranges in Texas, ranges that—that were—had mild climates. Most of them—most of the animals that had been released here, at least animals like black buck, nilgai antelope; they can't tolerate extreme cold weather so they did quite well in South Texas. And then black buck as well as other animals were released on ranges that had a temperature range and an environmental range and—and food supply that was pretty well suitable and matched some of their ranges in their native countries.
(misc.)
DT: Can you tell us what areas a lot of these exotics typically came from? You're talking about sort of the climate and the—the type of habitat. What—what countries were they from?
00:09:42 – 2439
BS: Primarily Asia for the—for the deer species which there are many, and Africa. That's where most of the—most of the animals came from. The most successful ones seem to have come from Asia and Asia Minor and the less successful ones, with exception of a few, are—were from Africa. Most of those that came from Asia and Asia Minor were deer species and antelope species and those that came from areas such as Iran and North Africa are—were the sheep and goat species.
DT: And were some of these animals becoming rare in their native countries? Is that one of the reasons they were brought here (inaudible)?
00:10:33 – 2439
BS: Well, yeah, yes, that's one reason given. The black buck is an example. They say now that there are fewer black buck in India than there are in the United Sta—than there are in Texas. And their ranges have—were destroyed, have been reduced from development and so they're declining as well as nilgai antelope. They're declining in India where they're primarily from and in Pakistan and some of them were released in Nepal. And part—particularly in India and Pakistan their habitat is—is being reduced and they're being hunted and over-utilized, despite the fact that nilgai, for example, are—are in the Bovidae family, they're in the same can—family as cattle and then, of course, in India cattle are sacred animals. But even so they're declining and they're being probably hunted and use—over utilized.
DT: Maybe you can walk us through how some of these introductions were done, how the—the animals were captured and then transported to the United States.
00:11:46 – 2439
BS: Well, I don't know how they captured them in the foreign countries. They were shipped to the United States and—and for a number of years, they've had to go into quarantine. And that problem for private landowners has some—been somewhat bypassed by bou—by acquiring animals from zoos and that is a principal rea—source for animals being initially imported in the United States, certainly in more recent times. They came from zoos and some directly from foreign countries but those are the ones that had to go into quarantine. And—and I think there's a law now that says once a hooved animal, a herbivorous ungulate comes in the United States from a foreign country, it can never leave quarantine, only the

progenies. So zoos have some exemption for that and consequently, a lot of animals have been acquired from overpopulations of zoos.
DT: And—and are some of the folks who or the origins of these animals, are they paid for selling these animals to—to the private landowners or are they gifts or how are they transferred?
00:12:59 – 2439
BS: I think it's probably both in the United States and I'm speaking of animals that come from the zoos. An example is Norris division of King Ranch. The King Ranch acquired nilgai antelope primarily from San Diego Zoo in California. And they were gifts. They were somewhat overpopulated I think with nilgai. And the owner of the San Diego Zoo who was William Randolph Hearst was good friends with Mr. Caesar Kleberg who was one of the prominent people for the King Ranch in those days and Mr. Kleberg envisioned stocking the Norris division of the King Ranch with an animal whose food requirements and ecology was intermediate between their livestock and their native deer. And William Randolph Hearst recommended to him nilgai and in fact, they are intermediate in size and in food habits and what have you. So they
00:14:00 – 2439
began to stock the Norris from the San Diego Zoo with small numbers of nilgai. To—to carry this farther and to get beyond your question, the first introductions were in small numbers, four and six animals shipped from California and—and they were released on the Norris and they didn't—they didn't take, they disappeared. So finally after several introductions, they acquired about twelve animals and pinned them in—in a corral and kept them together there for—for quite some time and then opened the gate and let them leave on their own accord and from that release, all the nilgai antelope in Southeast Texas (inaudible) evolved. And that's—that's—that was a gift initially. Other animals are purchased I—I'm sure.
DT: Well, maybe you can elaborate a little bit more about how these animals would get released and established because it seems like they're—they're moving—say they came from a foreign country, it's probably new forage or they've come from a zoo where they probably had food brought to them.
00:15:12 – 2439
BS: That's true.
DT: Or pelletized or something. How did they make that change?
00:15:15 – 2439
BS: Well what I understand is, and an example I'm familiar with, is that these animals are first confined and—and sort of settled and—and get to be acclimatized and then—then they're released sort of allow—allowed to move out on their own. A lot of the exotics have a tendency to—to travel. Once they're released, they just start exploring the countryside looking for a habitat, I guess, that they—they require. And where ranches are or where or where ownerships are under high fence, that's no problem but where they're not, these animals can escape and be free ranging onto contiguous ownerships and that's how a lot of exotics have expanded throughout the hill country, particularly in South Texas.
DT: Maybe you can go into that a little bit more. I—as you say these exotics started in isolated ranches, I guess, in South Texas on the King properties and then in various ranches in hill country. How did they spread? Where did they go? What are their numbers now?
00:16:33 – 2439

BS: You know, their numbers have definitely increased. I don't have any current information. I've been retired for quite a while. But the last information I got, which probably relates to populations in the mid eighties, were probably, for one thing, probably fifty or sixty percent of the State of Texas has animals now. So they expanded, a lot of them expanded on their own. They moved and moved and moved and crossed fences and what have you until they found habitat that suited them. I don't know if I'm answering your question direct but that's one way they expanded. Then, of course, there were private sales where one ranch or one owner—ownership would acquire animals from another and transport them to their properties and—and
00:17:28 – 2439
they would build a population and then they would expand and so on. And I really don't know the total number of exotics, but it's well over two hundred and some odd thousand in Texas alone now. And about fifty-five or sixty percent of—percent of the counties have them and the species, I always just have to take a wild guess and say there are probably twenty-five or thirty species or more. And—and—and more recently, animals have been released that weren't among the herbivorous ungulates, that were first popular such as nilgai and black buck and axis deer. They—there's been an effort to establish a commercial enterprise with exotic birds, ostrich, emu, rhea from South America from Ar—Argentina. Those efforts failed but those are some of the more recent exotics that were intro—introduced into the States. We have so many now, so many species probably don't need to go (laughs) outside the United States to get more.
DT: You said that some of these animals were successful in their release. They got established, they—they have viable populations and survive on their own. And then some failed. Can you help us understand why some might have been successful and some failed?
00:18:53 – 2439
BS: Well I think it primarily had to do with—with—where they were released. There was such a di—disparity between their native environments or when they came from zoos, they were just unable to—to develop a viable population. Another thing is some of the species are more prolific than others. Black buck—doesn't take much to get a heck of a black buck population going and the same way with nilgai, they're very prolific. Same way with aoudad sheep. Some are just hardy, more prolific animals then when they're released into an environment that's mild—with a mid climate and adequate vegetation, then they're successful. Others that have been released in—into Texas, in environments that just either the weather gets too cold or gets too dry or they just didn't make it.
DT: I'm—I'm confused about something that I hope you can help me understand better. These exotics were—were largely released by private individuals?
00:20:06 – 2439
BS: Initially.
DT: Or were there also state releases?
00:20:07 – 2439
BS: No, no they're—it's mostly been by private individuals. And—and in fact the state is more concerned about native species and—and—and is probably concerned about the exotics and their impacts on native species. And so most of the releases, in fact, just about all of the releases have been by private individuals although there's an example of that aoudad sheep in Palo Duro Canyon where there was enough influence by landowners and in the counties contiguous to the canyon who wanted some exotic animals, some additional

species for hunting coordinated with the state and the state was involved in that release. But they're not in many, I don't think, that they were involved in.
DT: And—and what sort of roles does the state have now in—in ownership or game regulation for these exotics?
00:21:06 – 2439
BS: As I understand, they've changed it. At one time it reached a point where certain species such as axis deer in Bexar county and Kindle County and some of the other counties, were the free ranging ones, the ones that escaped from their ownership—owner's land were protected. You had—had to have a valid hunting license and—and—and you could hunt them then. I understand now that there has been so many in order—and in order for the state to control these—these exotic species, that they have lifted that restriction and that all you have to have now is a valid hunting license and permission from the landowner who's—who has the animals to take animals any time of year. They're not treated as—our—our native game animals. They're treated more as a private property of the landowner as are livestock.
DT: You said that—that the state attitude about these exotics has been some—somewhat of concern about the impact on native animals. I was hoping that you could explain what the concern is about how exotics and—and natives interact.
00:22:32 – 2439
BS: Well, for one thing, exotics can out-compete—and when we say native animals primarily we're talking about white-tailed deer in Texas. There's some, you know, maybe some mule deer out in West Texas but where most of the exotics are in hill country in Edwards Plateau and in South Texas, we're talking about white-tailed deer primarily as the—the principal hunting animal, native. And exotics can out-compete white-tailed for food. And on ranges where there—it is—that are overstocked, white-tails suffer. They can out-compete white-tail for two reasons. One is exotics don't have the fidelity to their home range that white-tailed deer do. White-tailed deer have been known to starve to death rather than leave their home range to go to other areas and find food. Exotics don't have that problem. They're—they're
00:23:26 – 2439
perfectly willing to travel to find food if—if food is scare on their range. Another problem is that white-tailed deer don't have a lot of feeding flexibility. They require high quality food and they're pretty selective. Exotics are not. If their—if the preferred foods of the exotics run short, they don't have a lot of problem to switch over, in other words, if they're grass eaters and the grass runs short, they don't have a problem to go to browse or to forbs. White-tailed don't have that flexibility. So where ranges are overstocked and the carrying capacity is low, white-tailed deer are going to suffer. And as the exotic game population expands, the more and more, the more dense the species get and the more diversity in—in species, the—the worse it is for white-tailed deer.
DT: You talked about the—the interaction between some of these exotic ungulates and the white-tailed deer, is—is there any interplay between the predators, the mountain lions, bobcats, coyotes and some of these exotic ungulates or…
00:24:41 – 2439
BS: Well, I'm sure that these predators you mentioned prey on—on sick animals and on young animals. But I—I really don't know the de—the intensity, the degree by comparison with white-tail. Of course, white-tail are native and our predators that prey on them are

native and I would imagine that—that they're—they tend to prefer to go for young animals and—and white-tails, for example, coyotes and deer, than some of the other—some of the exotics, many of which are pretty large animals. An animal would have a hard time pri—bringing down a 700 pound nilgai but maybe not the young.
DT: Another aspect that occurs to me about how there might be competition or some kind of influence between these exotics and natives is—is parasites, viruses. Are there things that the exotics might play host to would have a bad impact on the native wildlife?
00:25:51 – 2439
BS: This has been studied and I don't know all about that. I can give you my personal experience with nilgai antelope on the King Ranch. One thing I did was to—we collected these animals and we necropsied them and we took samples of their viscera and we observed for ectoparasites, ticks and so forth. We sent those to vet school at A&M and the parasitologist there examined them and actually there was not a high number of—of endo or ectoparasites among the nilgai. One can—one thought is that these exotics are—didn't evolve with these—our local parasites. They're not natural hosts. So they're—for the most part they—they're not apt to be infested. I found a couple of species of ticks on nilgai but I never found any sick
00:26:54 – 2439
ones that were apparently sick as a result of some disease. And another thing, we have protection. We have—these animals are required to go to—into quarantine when they're shipped from other countries and they can never leave if they're herbivorous ungulates. And that is a protection. And I think, in general, I'd be safe to say that the exotics really don't pose a serious problem and don't carry the dangerous diseases that they do in other countries such as rendered pests, and—and among animals and—and—in Asia and places like that.
DT: One other connection that comes to mind for me at least is—is that there might be hybridizing going on between some exotics and—and natives. I think I've read about mouflon and red deer having possibility of…
00:27:59 – 2439
BS: Not mouflon (inaudible). Red deer can hybridize with elk, our native elk; they've been known to do that. Fallow deer, no sika deer, have hybridized with elk I think. But in—in a natural environment and among free ranging animals and animals that have domestic livestock and—and whatever, I think hybridization other than those examples is—is pretty rare. And now there've been attempt—there have been hy—there have been hybrids produced by capturing animals such as banteng cattle—hybrid—the native Europ—Asian animal that's endangered. They have crossed that animal with livestock cattle successfully. And—and let's see, what else. They have crossed buffalo. Of course buffalo are—are not exotics, they're native. But those—
00:28:59 – 2439
there's been hybridization there and some other cases but that's not prevalent on a open range where they're free ranging animals. That's mainly among animals that are pretty well confined. Let me back up and mention one more thing. You asked about parasitism or diseases. They—these animals might—parasitism and disease might increase as dens—as these animals' density increases on—on given areas. You know, diseases are density dependent. So we don't know what is coming in the future where there is a high density of—of exotics and native animals.

DT: We talked about the—the connection between exotic wildlife and native wildlife and I was wondering if you could talk now about the connection between the wildlife, exotics and the habitat in North America. I—I've read people's—who've said that—that with the loss of a lot of the Pleistocene large mammals that there was a niche that was opened up for introduction of more kinds of wildlife, large—large mammals. Do you see truth to that?
00:30:29 – 2439
BS: Well, with the decline of—and I've read that the wooly mammoth, for example, possibly became extinct because of over-hunting by prehistoric man. There's a possibility that these animals can be ju—bringing in new animals, foreign animals to occupy the niches of animals that have become extinct in this country that have some justification and some consideration. I don't know much about that.
DT: Something else that I've thought would help us give some context to this is that I imagine a lot of the exotics that are here in Texas are—are actually livestock as opposed to free ranging animals. Is there any way to compare the impact of these exotic ungulates that—that we've been talking about earlier and say cows or sheep or goats or horses?
00:31:29 – 2439
BS: Yeah, in—in the first place, they're not livestock (laughs). They—they—animals influence the vegetation complex and animals that come in and utilize vegetation classes and—and parts of vegetation classes can influence what evolves there in the way of plants. So, you know, these exotics, if they're heavily grazers or something, they may reduce the grass pop—grass classes—classes of grass and something can supplant that and first thing you know that system, that ecosystem has changed from the standpoint of vegetation complex and that can have an impact on native animals. I guess that's as close as I can answer that one.
DT: I think that there have been concerns about these exotics exceeding what their habitat can support in some places and there've been efforts to—to control them or even remove them. Can you talk about some of those (inaudible)?
00:32:42 – 2439
BS: Well, yeah. Uses is the main thing, you know, find some use. And it seems to me—it seems to be that the most successful or the most feasible use is hunting and that ha—and that's how a lot of these ranches have evolved toward selling hunting, either lease hunting or guide hunting, to augment their livestock income, for example, as well as to help control the number of animals (?) ungulates on the range—on the ranges. The—there have been other uses. Meat studies have been done and it's been found that a number of the exotics by comparison with the livestock have nutritious lean meat that's—that's a benefit for today's meat market. But it just seems that—and there is some of—there are some entities that process
00:33:46 – 2439
exotic meat and sell them—sell it. Axis deer, by the way, is the most popular and the most palatable. But they're—they're—they don't take enough animals to be that—to have that much impact on—on the reduction of the species. I would imagine if someone could come up with a system whereby surplus animals, exotics, could be captured, processed and fed to organizations that take care of needy people and things like that, that would—that would be something that I don't think a lot of—is done a lot now, but that's a thought. But it's a problem and right now it seems that hunting is the most effective way to re—to control the numbers.

DT: I think when we were speaking off tape earlier you were telling me about trapping, the fur trade with respect to—to nutria. Can you explain your experience with trying to find a use for those animals and…?
00:34:53 – 2439
BS: Well, we're talking about Louisiana now and nutria are an exotic that became leased—released in the Louisiana marsh as a result of a hurricane from the famous—what is it, the—the—what's the name of that salt dome? Adri—Avria—Adria…
DT: Avery?
00:35:19 – 2439
BS: Avery. They first had nutria pens and it's said that nutria inoculated the Louisiana marsh as a result of the storm that tore the pens up and the animals escaped and nutria are very prolific and they began to take over the marsh and they out-competed the—the popular muskrat fur animal. And subsequently, we're just—they're quite a pest, quite a pestful exotic in the Louisiana marsh. And it was decided that unless they could develop a fur industry or a meats industry, that—that—that could use the muskrat, I mean the nutria fur, they would have a real problem and they did. They found a way to process nutria pelts so that now they're very valuable. They developed factories that processed the meat for animal foods and those are the uses in Louisiana that have been made of the—of this exotic. It was really proliferating and plaguing the Louisiana marsh.
DT: How do they taste?
00:36:29 – 2439
BS: Great, taste like rabbit (laughs). Love them. When I was a student at LSU, I had to—I was in a class with a professor, a marsh ecologist, whose chore was to find out—to develop an in—a market for nutria, that was one of his projects. And we used to have to go to the marsh and trap nutria and we examined them for endo and ectoparasites. Incidentally, they were found to be one of the cleaner animals in the marsh and that aided the—the effort to sell them for meat. And our professor used to tell us that unless we tested those animals and ate them when we were camped in the marsh, that we'd flunk (laughs). So—so we were forced to do that as students and come to find out, they weren't bad eating. But I don't think a lot of that's done now. Mainly it's used for dog food—for animal foods and I understand nutria pelts make one of the more valuable fur coat—fur coats.
DT: Another exotic, I believe it's exotic that we haven't talked about in much detail yet is—is the feral hog.
00:37:43 – 2439
BS: I hate to talk about the feral hog (laughs). It—in my opinion, and I don't think I'm by myself, is undoubtedly the most detrimental exotic that was ever released into this country. They, of course, are crosses between domestic hogs and European wild boar that had been brought in and introduced into this country. And they have just—they're very prolific and they have just expanded everywhere throughout the south, all through Texas, all through Louisiana, Mississippi I'm sure and into Arkansas. And it is a tremendous problem to control their numbers now. In fact, I don't think they can ever be eliminated. They can only be controlled. So that is a major management effort in Texas to control feral hogs. And they—they are
00:38:43 – 2439
omnivorous. They eat anything. So they're—they're competitive with our native animals. They destroy crops and they—they render some pastures and what have you in pretty bad

condition. It looks like they've been plowed in some areas where hogs have come in and eaten. And they're very wily. They're—they're—have become mainly nocturnal and they're difficult to control and hunt. But it—it's—it's a popular sport. I'll add this, a gentleman named Mike Hughes who processes and sells exotic game animals at Ingram, he has a company there or he did, I guess he still does. One day I asked Mike of all the animals he processed and sold which—which species did he sell the most of? He said feral hogs (laughs). But the most popular is axis deer for meat and they're sold in gourmet restaurants all over the country. And that's about all I know about that.
DW: And how does that one taste?
00:39:55 – 2439
BS: Huh?
DW: Axis deer, can you tell us a little about (inaudible)?
00:40:00 – 2439
BS: About the taste?
DW: Yeah, if you can.
00:40:02 – 2439
BS: Axis deer, it's—it's a good meat and it—it's not a dark meat like our venison. And it's—it's tender and it's—it's very—it's—it's—has—it's high in protein. It's—it's—it's the most palatable meat among people who have been—who—who ask about it and have tried it. I have. I've tried it in a gourmet restaurant in Houston and I found it was excellent. Nilgai meat is not bad but if you don't process it right, being Bovidae, in the Bovidae family, nilgai meat looks a lot like beef but it can be tough. And I think most of the mistakes that probably individuals make processing game meat is they overcook it and you have to cook nilgai meat just right, better to get younger animals. But it's not bad but it doesn't hold a candle to axis deer, the tenderness, the—the—and nutritional quality, the taste, the appearance is—is good.
DT: Well, we've talked so far about everything from nilgai to axis deer to fallow deer and then some of the other animals that maybe don't fall in that—that large ungulate category, the feral hogs and the—the nutria. I was hoping that you—you might have some comments about some of the other exotics that have become part of the Texas landscape. One is an insect, fire ant. What do you think the role of the fire ant is and—and how did it come to be in this state?
00:41:49 – 2439
BS: That's as tough a question as—as the one about the feral hog. Well fire ant, they have what they call the Formosan and I think it's the most fierce. It's the big, black one that can really sting you. And they—they're the ones you see so prolific and so expansive over a lot of the pasturelands and what have you and along the gu—the coastal states. Fire ants are—I don't think we'll ever eliminate them. I think we can only control them. They came from South America, some other species. We have a native species. It's not good but it's not—it doesn't just cover large areas and—and present the problems that—that the Formosan does. They're a problem for our li—our wildlife and particularly ground nesting birds. And often in South Texas and along the coast and in Louisiana where they're so prolific, they're given major
00:42:52 – 2439
credit for the demise or the reduction in numbers of bobwhite quail. And they no doubt have an impact. But they're—they're not the only impact on the—has reduced bobwhite

quail in the south and in a lot of Texas where they've been extirpated. I think land use practices by man have done the biggest damage, farming, large scale monocultural farming, foreign grasses on pasturelands, those don't do—those don't do quail much good. And—but fire ants are one of the many predators that ground nesting birds have.
DT: You mentioned the grasses that are found. I imagine that some of them would fall into the category of the exotics some of these turf grasses…
00:43:46 – 2439
BS: Yeah, most of them.
DT: Most of the old world blue stems. Can you help us understand what the role of—of these grasses might be?
00:43:52 – 2439
BS: Well, these grasses such as species of Bermuda, varieties of Bermuda, bahiagrass—these are real popular pasture grasses for livestock but they're not productive. They don't—they don't produce se—seeds and—and they don't—they're—they're not usable by our native deer and—and birds. They just—they take good care of cattle but they don't take good care of our native animals and so they're—they're undesirable as far as o—ecologists are concerned, wildlife ecologists.
DT: Do—do you know the origins of things like the K.R. bluestem and…
00:44:39 – 2439
BS: Well, King Ranch bluestem came from Africa so—so does Kleberg bluestem I'm—I'm sure. Johnson grass, I think it's a South American grass that's a popular weed species. K.R. [King Ranch] bluestem was disseminated significantly in Texas as I understand it as a result of the highway department planting that grass along the rights of ways because it doesn't get high in it's uniform height and you don't have to mow it as much and so it cut highway maintenance expense. The problem was that it—it expanded into contiguous pastures and it spread and it—it can compete—out-compete native grasses and—and is not a valuable wildlife food plant. So, in essence, for wildlife it—it has not been productive.
DT: Well, you told us some about exotic mammals and insects, vegetation. How about birds? You mentioned quail and—and I understand that—that there are some exotic birds and I would think of English sparrow, house sparrow, starlings, can you explain from the view of an ecologist what that means to the native birds (inaudible)?

00:45:58 – 2439
BS: Well, yeah, they compete for food and space and nest sites and they're very prolific. Most of them—the ones you mentioned such as the house sparrow which used to be called the English sparrow and starlings, a bird form England, were brought over here to—I think out of sentiment for people who were immigrating to the United States and wanted something of their original homeland. And they brought these birds over and they did quite well here and they became very prolific and they exist in urban areas as well as wild areas and they compete with our native an—birds for food. There is an animal that I don't think is exotic. It's the brown-headed cowbird. It's parasitic on nest sites. It moves through the countryside and
00:46:55 – 2439
lays—the female lays eggs in other birds' nests and let the other birds hatch them and then they move on. And the—it tends to be larger—the young tend to be larger than some of the native young birds, hatchlings. And they sometimes boot the younger birds out (laughs).

And—and the surrogate parents end up raising the brown-headed cowbirds instead of their—instead of their own kind and—and this has caused a lot of detriment to a lot of our valuable songbirds. I think the bluebird, Eastern bluebird is one that has suffered from parasitism by the brown-headed cowbird but I don't think it's native—it's exotic. I think it's a native bird. I may be wrong, I was wrong once. That's when I thought I was wrong and I wasn't. You might want to strike that.
DT: Well, we've talked about exotics in—in a number of regards the—while we're talking about exotics, I was hoping you might be able to tell us about undergrowth in—and some, I guess, small trees and the ones that come to mind are things like Chinese tallow and ligustrum, nandina. Do you know much about their history and their impacts?
00:48:22 – 2439
BS: Well, they're exotics of course and—and the Chinese tallow, I think came here as a garden variety or—or a landscape tree for yards and you see a lot of it. And it produced—is very productive of its—of seed. A lot of birds like it. Someone I know, a biologist who did a little study on the use of tallow trees seed by birds and it found that about thirty-five species of birds in the East Texas area use the seed and they would disseminate those seed, those hard seed and that—that causes it to spread and it competes, of course, in—in dense stands with more productive plants and native plants. It's—it does real well along Texas Gulf coast prairies where in some areas, it just literally has taken over. And in Louisiana where they've had to—had to spray the trees to kill them back to get their pastures back and their native species.
00:49:27 – 2439
Well, actually ligustrum there's—there are two, three species of ligustrum. There's Chinese ligustrum, wax leaf ligustrum, I guess there are others. They're used, too, in landscaping in yards as hedges and—and what have you. I see they're—they've escaped here on my property, I see a lot of Chinese ligustrum here and it's pretty prolific, it expands, it grows, it competes with sp—for space and water and light with native plants. So I don't think there are very many exotics that were brought here that have—had—where we've had positive results. There are so many examples of plant and animal exotics that—that have also been—been detrimental to the ecosystems.
DT: What would you say about—about plants in particular that are—that are native but maybe it's spread because of land use changes. The one that comes to mind is maybe ash juniper, maybe huisache or mesquite or (inaudible).
00:50:31 – 2439
BS: Well, yeah those plants—some of those plants have become increasers as—as the range science people say as a result of land use practices. And some of them that are—that are not resistant to fire, for example, such as yaupon in East Texas primarily. In the absence of fire and with woods cattle grazing to reduce the low—low vegetation, it has—it has just taken over in some places. There are other species that have done it. I don't know about ash juniper but the eastern red cedar, juniperus virginiana is not fire tolerant. So where you have an absence of fire, landowners have tended to keep fire out. These trees have begun to proliferate. I know there are a number of varieties like mesquite comes in as a—as an increaser on—on habitat that's been overgrazed or abused by—by overgrazing in a lot of
00:51:44 – 2439
areas. Mesquite will come in and just take over and it's an opportunity for these plants to—without competition from other plants to—to proliferate and that's usually—often can be

attributed to poor land use practices.
DT: When you—when you look at the landscape or wildlife populations and you see exotics or—or formerly native trees and creatures that have been able to expand their niche, do you say well that's—that's just a dynamic landscape or does it have some sort of other meaning to you?
00:52:26 – 2439
BS: The meaning it has to me is I envision so many ownerships, so many ranges that have been abused by overstocking. And when I see all these varieties of animals, I tend to want to take a look at the balance between forage production and the classes of forage and animal demand and—and where animal demand is exceeding forage production. In other words, you don't have—you're not meeting carrying pests then you have detrimental effects. You—you have animals that are not getting what they need. You—you have invader species coming in that are undesirable. It all relates to poor land use practices.
DT: I believe you've done some studies even quite recently about models that help understand what carrying capacity allows. And can you explain the idea of carrying capacity and these models (inaudible)?
00:53:32 – 2439
BS: Yeah, shortly after I take a break.
(misc.)
DT: When we broke we were talking about carrying capacity and trying to model what—what's acceptable or not.
00:53:45 – 2439
BS: Well, it—it's been a practice that—carrying capacity for ranches primary recommendations had—had cattle in—native—and our livestock in mind. And most livestock are grass eaters and some of the exotics are but some of them aren't and our native deer are not grass eaters. So when you base carrying capacity on a—on a piece of property that is—has a variety of herbivorous ungulates, it may not be accurate if you base it on grass eaters alone. So we've come up with a way to take into consideration the various food requirements of the different species of animals and model that so that you can say well if you have this particular species of animals and you have this much production, forage production, grasses, forage and browse, your major forage classes, then you can have x number of these critters and x
00:54:51 – 2439
number of those critters and x number of these critters. And that is a more accurate way to determine carrying capacity because you're taking the food habit requirements—the food requirements of all the species that are on a given area. And that model is being worked on and it will come out some time next year I guess.
DT: Well while we're talking about species, I'd like to ask you a couple of questions about—about some of the exotics and (?) some unusual animals that are—that are making end roads on Texas landscape and one group would be the—the—some of the African or I think Australian birds, the ostrich and the rhea birds.
00:55:37 – 2439
BS: Emus.
DT: Emus. Can you tell about how those got introduced and they had their spike and then the industry has had in trouble since?
00:55:47 – 2439

BS: Well I think they were introduced by private purchases or maybe—and either from individuals, other individuals or from zoos, with the idea that they could be used commercially. And in fact I don't know if you're familiar with ostrich leather but it is a—you know they make cowboy boots out of ostrich hide and—and I've had belts and billfolds and it is very durable, much more durable than—than cattle—cowhide. But apparently there wasn't enough demand to keep the industry going and it just faded away. I don't know of any other—I don't know of any other sources other than local stock using maybe foreign animals. They probably don't have the problem getting foreign birds in he—into this country that they do with herbivorous ungulates because the quarantine restrictions. Birds probably can eventually, after quarantine and proven healthy, can—can be—can be handled or sold or bought.
DT: There's another class of animals that I was curious about your opinion on and—and they're pets that have gone feral. I understand that—that dogs that are, you know, when they become wild and they move in packs, can have quite an impact and that cats as well can have an impact on bird populations. Can you talk about those two aspects?
00:57:33 – 2439
BS: Well you mentioned dogs. Dogs can pack—become feral and take up with coyotes and—and the—the hybrid that comes from that is called co—coy dogs. And they're—they're considered to be every bit as predacious and maybe even more so than—than the coyo—than a pure bred coyote. With respect to cats, they're hunters. Cats are natural born hunters and—and they take a toll of our bird populations particularly and are considered to be a major enemy, a major predator on bobwhite quail, particularly where they're contiguous to urban and suburban developments. So cats—cats are considered to be a top predator on bobwhite quail and where—bobwhite quail are diminishing rapidly in—in our country except possibly for South Texas but through East Texas and Southeast Texas and in Central Texas
00:58:36 – 2439
bobwhite quail has just declined tremendously. And part of it is probably because of development and the cats and pred—and pets that are associated with—with these developments.
DT: I—I've got sort of an ethical question for you. I—I had read recently that there was a birder who lived out on Galveston Island who got concerned about the effect of feral cats on piping plovers. And so he started trapping and shooting these cats and the humane society and some of the friends of the cats got upset. But then there was another group, sort of bird lovers, who felt like, well, these are endangered birds, you know, you need to protect them. How would you come down on a—an issue like that?
00:59:28 – 2439
BS: I'd take care of the cats (laughs). I—I believe that—I'd give first priority to—to, of course, our birds but I can understand why people wouldn't want to lose their pets but I would admonish them to keep their animals at home and—and keep them at a reasonable population density and that might require some close coordination among the two factions. We've had a similar problem and few years back where sandhill cranes were beginning to leave the Aransas Wildlife Refuge and here and there, not all of them but little groups and—and the feds got—the Federal—The U.S. Fish and Wildlife Service got particularly concerned because they were afraid if they got off of the protected Aransas—the federal refuge that they might begin to lose some of the birds. So they offered to—to purchase

lands where these birds seemed to be going,
01:00:32 – 2439
these offshoot groups. And that became—became a point of contention between the state and—and the fed—and the U.S. Fish and Wildlife Service because the state didn't want to just indiscriminately bop here and there and—and sell land—land to the federal government. You know, Texas has the fewest—the least amount of federal—federally owned land I think of any of the states and they have a thing about that. So it was finally—some of the ecologists began to realize that what was happening, for one thing, was that the vegetation was changing on the Aransas Wildlife Refuge and it was getting more dense and it was more difficult for some of the sandhills, I mean the whooping cranes to feed and nest and so that was one reason they were—some of them were moving to other areas because the ecological
01:01:30 – 2439
change and I think they might have gone in and tried to—tried to correct that. But that was several years ago and I don't know what the outcome is now, although the birds are increasing in numbers I think.
(misc.)
[End of Reel 2439]
DT: Dr. Sheffield we—in our previous tape, we talked about animals and vegetation and interplay between exotic species and natives. And I was hoping that—that on the second tape we could talk a little bit about your research and management activities on various private lands and—and public lands. I thought perhaps we could start by talking about the—the time you spent working for Humble Oil and Refining where they—they had lands I believe in—in Louisiana and East Texas over 300,000 acres, I think, where you were in the late fifties and—and—and into the sixties and you were a Forester and Land Manager for them. What—what sort of issues did you come across? What kind of work did you do while you were there?
00:02:04 – 2440
BS: Well in Louisiana, it's a different breed of cat than in Texas. And Louisiana for years was what they had—called open range. There—there—they didn't have restrictions on the public using the land. You could stop your car anywhere and walk out in the woods and go hunting and it was not fenced and—and on those lands all over there were own—owned by private entities. They had—they were used by the public so it's kind of a unique situation as compared to Texas. But where lands are open to the public with no restrictions, we were suffering—you can suffer detriment from timber theft, wildfires, over—over-hunting and that could occur here except for the laws that make ownership more private. Private ownerships they—the land
00:03:11 – 2440
doesn't have the ecological protection that it does on lands owned by governmental entities. Usually lands owned by governmental entities, the decision for their use and—is made by people who are trained in agriculture or wildlife science or rain science or something to that effect so that they can protect the land and then they're supported by laws, federal and state laws. There're not as many federal and state laws that are applicable to private lands with the exception of some such as the Endangered Species Act, where no matter whose land it is or where you can't—you can't cause anything to adversely affect endangered species. So there's more protection on private land, I mean on fed—on

governmental protected—government land. There is less protection in some areas on private lands. Those kinds of things
00:04:18 – 2440
are—are the—are the differences. There's a matter overriding—there's a matter of personal concern for the resources. Some people, regardless, want to protect their lands and they—they value our living, native resources and they do what they need to to protect them and they find out what they need to do. If they don't know they hire people who do know to manage their lands or establish management practices that will protect our native resources. There are other people who couldn't care less and there are other people who might care if they knew anything about it, about how to do it. So those are my experiences with respect to public, private lands in two different states.
DT: You've been called in from time to time as a consultant to help with wildlife and land management, questions on private lands in the hill country. And I was curious if you could sort of give us examples of why somebody calls you and what you do when you go there? What sort of reaction do you get from the advice you give them?
00:05:32 – 2440
BS: Well I'll give you one example and it has to do with anthropocentricism, I guess, someone who's more concerned about his pleasures than—than protecting the resources of—a man who was a business person in San Antonio acquired some property near Pipe Creek, Texas, near Bandera. And he called me and he said I've got livestock and he said I—I want to stock some exotics and he said I want you to come out and look at my place and tell me—he said I particularly want black buck and I want you to tell me how many black buck I can have. That was his general question. So I go out there and we tour the land and it looked more like it was growing rocks than forage. It was literally denuded practically just with his livestock
00:06:23 – 2440
And—and his native deer and I told him that and he said well how many exotics can I put on here, I mean how many black buck? And I said well sir, if it was my land, I wouldn't put any. He didn't like that. And what I've found in a lot of cases, attitude wise among people who have land like that is that they have an idea of what they want to do and what they want and if you go out as a professional and tell them something that's not in line with their ideas, either you don't know what you're talking about or they don't want to listen to you. Now that's not a real common case but I've had that experience. So—and people just—they just think about themselves and how they want to enjoy critters and have those critters and they don't think about all the ecological implications. They don't plan, they don't, you know, to see
00:07:21 – 2440
what is appropriate, what will take care of the land and yet let them have at least some of what they want. There's another example of where a lot of absentee landowners in the state now, I think there are getting to be more of them, that buy a piece of land and stock it with livestock in order to enjoy the agricultural exemption from taxation on that land. And they stock more and more in—in addition to say our native animals, deer, that land becomes overpopulated and—and it's—the land is somewhat degraded, becomes degraded and it's all in the—in the interest of reducing taxes. I'm bitter about those things (laughs).
DT: I think that you had also worked for—for state agencies on public properties and one that I understand you—you did an inventory on was—was in the area that includes Caddo

Lake. And I was hoping that you could tell the story of that inventory and how sometimes private prop—property interests, government interests can affect a publicly owned asset like Caddo Lake.
00:08:45 – 2440
BS: Well that—that project started—it was administered by the U.S. Army Corps of Engineers and a couple of major businesses and one in Dangerfield, Texas where the headwaters of Caddo Lake—Caddo—Big Cypress Bayou empty—came and then emptied into Caddo Lake and then on into Red River at—at Shreveport, Louisiana. Some of these private companies conceived of the idea that they would like to have Big Cypress Bayou channelized so they could get commercial traffic, barge traffic and what have you into their areas of business and—and it really, you know, Caddo Lake is probably the only natural lake left in the entire State of Texas and it really got a lot of environmentalists up in arms. And so the Corps of Engineers was required to
00:09:48 – 2440
do a study to determine the impacts and they hired Parks and Wildlife. They im—they had a contract with Texas Parks and Wildlife and they in turn hired me to do a ecological recognizance to—to establish what's there in the way of plant and animal species and—and then there was some backfire. Some of the landowners said well if we can't be involved and reap the benefits of jobs and what have you from this—from this channelization, prescribe something to us that will—that will augment that. So we said well you could lease lands for hunting, you could begin to manage your lands in such a way as to make them more productive. And so there was a proposal
00:10:43 – 2440
written to address those things and then there were other ancillary things such as setting up a school to teach you environmental concepts and advise people on—as to how they might manage their lands in a productive but yet environmentally sound way. Those kinds of things were created out of this project. And I'm not sure where it is right now, that's quite—I—I left that pro—I finished that project in about 1969 so I—and I haven't kept in touch. But at least one thing they did was stop the channelization of Big Cypress Bayou. That was—that was—that was eliminated.
DT: What were some of the…
(misc.)
DT: When we left off, we were talking about Caddo Lake and this reconnaissance that you did and that fortunately the channel was not approved. But what were some of the major natural assets that you—you found in the Caddo Lake Basin and—and what were the some of the concerns, some of the impacts that you were worried about?
00:11:53 – 2440
BS: Well it—it has—a minimum of urban development. It—it's farm land a lot of it, pasture land. There was—there were nice wildlife population and quite a diversity of native species which encouraged—the Bayou is quite scenic as well as Caddo Lake. It offers a lot of good fishing, fishing resources. So it—it's a wonderful natural area and it's valuable because there's not another ecosystem like that in the State of Texas and we wanted to protect that and channelization would have gone right down to the middle of it. And so the—there would have been a lot of changes in—in wildlife use, fisheries particularly and—and probably in some land uses and concerned every conservationist in—in the country and they all fell upon that and

00:12:56 – 2440
had their—their in—input and then coordin—cooperation with a local senator who favored protecting the resource. And at that time, even Ann Richards was—was governor and she even came up there for some meetings. It—it was—and we had a lot of positive input that, very refreshing to me, favored the resources and we were able to put all that together and present a program that would—that would help augment any losses or at least a lot of the losses of salaries and incomes and jobs by doing other things that were less environmentally detrimental, but they would also produce income.
DT: What was the concern about? Was it the channel itself or was it the—the barge traffic or tug boats?
00:13:56 – 2440
BS: Well it was—it would have caused drainage for one thing of Caddo Lake, a lot of drainage. And then there was the dis—disturbance of the res—of the areas that the lake—that the Bayou transected and—and the actual development of the thing, probably pollution would have been introduced into the lake from various sources. That country—one thing we noticed all through that country there—there are trailer houses and—and small homes and producing trash and what have you and dumping it into the bayous and the tributaries and—and we came up with a way to get that reduced, protection. So by going through that system and taking a look at it and seeing what was there and reporting what was there and suggesting activities that could—that would—that could be a tradeoff between complete destruction and production, we were able to protect the resource.
DT: You've given us some examples of the kind of work you've done for Humble Oil and Refinery and for private landowners in the hill country and, you know, some of these public lands that include Caddo Lake and also the private properties that have bought it. And in all these cases, you've spent time in the field. And I think in some regards that—that kind of field biology experience is—is an unusual one as—as more and more students do lab research and maybe computer simulations and so on. I was wondering if you could explain why you've taken that tact and why perhaps many students of—of nature sort of taking the other track and what the consequences might be.
00:16:00 – 2440
BS: Well by comparison with students today who are—who use—who are computer wise and use—use a lot of electronic and tech—technical equipment, we didn't have that in my day (laughs). You know, about the fanciest thing I could use was a mainframe at LSU where I did some of my initial graduate studies and we'd use punch cards and then we'd take them over to the mainframe and that was as close as we got to our PCs now. And another thing is about the fanciest piece of equipment I had as a field biologist living in the field and stationed in small towns was a Monroe Calculator (laughs). We didn't have computers. So we didn't have that equipment and we didn't—we spent more time in direct contact with the resources. We spent less time developing models that we—so we could approximate
00:17:01 – 2440
what was going on. We got out into the field and we learned technique and we learned first hand how to manage the resources. And at the university level, for example, I went to school in—at LSU in Louisiana in—in the fifties, early fifties and there weren't the students there then. You know, at LSU there were about 10,000 students and we thought that was a whale of a number of people. You know, now there are about forty some odd thousand. So these students don't get the benefit, I don't think now, of being able to get into the field and

labs and what have you and learn the practical applications of their technical knowledge because there are so many they just—they can't go to the field with 150 students. You know, in the lab we had six (laughs) so we were constantly in the field. As students, we worked from
00:18:05 – 2440
the waterfowl areas in Stuttgart, Arkansas all the way to the Louisiana marsh all the time and when we got out of school, we knew what we were doing. We didn't have to then learn how to apply our technical knowledge.
DT: Can you give us some examples of field studies that you did whether it's transects or surveys or banding efforts, anything that—that might have taken you in the outdoors?
00:18:34 – 2440
BS: Well I—I think I touched on it earlier when we were talking about nutria in the Louisiana marsh. I had a course in marsh ecology and like I said, our professor was trying to create a market for those animals or some way to control their populations. So we would go to the marsh and stay at the Federal Rockefeller Refuge where they had a dormitory for students and we would go into the field and we would trap species of an—marsh animals, nutria, otter, muskrats, raccoons. We would bring them back to the vet school at LSU and examine them for endo/ectoparasites determine what—what diseases they might harbor and we learned to trap and we learned to necropsy animals and do a good bit—a good bit of lab work. That is—that's an example.
DT: Well tell me about trapping and how you'd lay out your traps and what kind of traps you'd use.
00:19:36 – 2440
BS: Well the thing of where we were, there were a lot of canals in the marsh where we worked a good bit. And so we would use boats with small motors and go through the canals and then get out on the levies and walk out into the marsh and—and set trap lines every so—every so often. We would determine the acreage that we wanted to cover for the area we wanted to cover and then—and then we had our traps and we determined the percentage of that area we covered and interrelate that to what we could expect in a large area of the marsh as in the way of population, populations of the species. And we—we learned to stretch pelts (laughs) and we—we learned a lot about the Cajuns in the Louisiana marsh (laughs) and how to be
00:20:29 – 2440
diplomatic with the landowners. Give you an example, I went to—after I got out of school and shortly after the company that was headquartered in Houston sent me to Louisiana to acquire leases from people who were squatting on our lands, who had never—never had to do that. And they were suspicious and they didn't want to sign anything. So to give you an idea of—of—of good old field biologist thinking, went to the local priest, most of that country where those people were catholic and explained my problem, told him what I needed to do to just get these people to sign a tenancy agreement. So he goes with me and all those people who wouldn't sign up, signed up immediately (laughs). So that was an example of practical application of—of experience.
DT: So this was before stock laws, I guess (inaudible)…
00:21:32 – 2440
BS: Yeah, yeah, that was—in those days they had what they call open range. Anybody could—and the—and the company at that time wasn't concerned with—with the service of

the land. They were concerned with their mineral production and their mineral interests and they just let—the land squatters came in and set—squatted on the land, built their homes on the land, cut the timber and sold it, put livestock in the woods, cattle and hogs and just used it as though it were theirs. Well then when—when taxes increased and value of land increased to the point where the company realized that they could make some money from the surface of the lands primarily by—through agricultural means, forestry, farming, wildlife management and so forth, then they began to tighten up on the use of the lands and began to be more concerned about squatters. In Texas, it's a problem, in Louisiana it wasn't. A person had—would have to squat on the land for a number of years before they
00:22:33 – 2440
could make any kind of claim. But in Texas, they have a shortage of five years statute in those days, I guess they still do, where someone could go in and put a fence around a piece of—a piece of land and put a cow or two in it and go to—go to a lawyer and get him to fix out a deed and then start paying taxes on the land and then in five years, he could own the surface of that land and so Humble and the oil companies were particularly concerned about bringing their lands under management in Texas and then later in Louisiana.
DW: Before we leave the Louisiana marsh, you say it's the early fifties this time and it's Humble Oil. As part of your training, were you shown what's now a very famous documentary film called Louisiana Story made by Humble Oil about—were you shown that film at the time or do you recall that?
00:23:29 – 2440
BS: Yeah was that the one where they interviewed Dan Lay and—and Jim Teer?
DW: It was an old black and white film made in the forties.
00:23:38 – 2440
BS: De—it's familiar to me but boy, that's been years ago. I—I went to work for Humble in 1955 and left them in fif—in '69 to come to the graduate school at A&M.
DT: You—you had said that you, as David mentioned, were spending time in Louisiana in the marsh studying animals but I was curious as somebody who has this formal training from LSU and later from Texas A&M, if you also learned about the wildlife from the people who lived there, some of these Cajuns and Creole people living there?
00:24:16 – 2440
BS: Yeah, we learned a lot. I learned from trappers.
DT: What did you learn?
00:24:23 – 2440
BS: Well I learned their—their—their lifestyle, the way they lived and—and—and their history, how—how industrious they were, how self-sufficient they were. The history of the Cajun, the Acadian is in—is very interesting in Louisiana. They—and that—that's another story. But those people are very self-sufficient and early on, they stayed in the marsh. They made everything they needed. I have a duck call that was made out of a pocket comb and a piece of—piece of cane. They made their own boats, their canoes; they made their own traps, they—they ate just about everything in the marsh (laughs). They were kind of like feral hogs, they would eat anything. And—but some of that cooking was something else. And so I learned about the people. I learned diplomacy. I learned how to deal with people and how to go on land and try to sell them into taking better care of it and it pretty well has paid off.

DT: Well maybe you can explain how you do convince somebody to take better care of their land, whether it was fifty years ago in Louisiana or, you know, more currently when you go to consult with somebody in hill country?
00:25:43 – 2440
BS: Well I'll give an example of what we talked about in Caddo Lake Project. We proved to people using an early version of this model I was telling you about, how they could make appreciably more money from leasing for deer hunting and consequently taking care of their land so it would support deer than they could from their cattle operations. There was no overhead in—in taking care of deer. They were enhancing their land and we had a ecol—an agricultural economist at A&M calculate, for those times, the net profit from a cow on a piece of land up in that piece of country. It was twenty-three dollars by the time they paid everything and all the medicines and they did all these things. From deer, they could lease the land for four dollars an acre, which is paltry by comparison with what land is leased for in
00:26:46 – 2440
the hill country. In fact, they sell the animals by the animal now and not necessarily by—by the acreage. At four dollars an acre, as I recall, we proved to the landowners they could make around 1600 dollars a season from deer leasing, as opposed to well twenty-three dollars an animal and the—the average stocking density was about fifteen animals if you kept within carrying capacity. So it—it showed that you can make more money from managing wildlife but if you manage both properly, you can make even more money.
DT: So many times, it was kind of an economic argument that you made rather than an ethical argument.
00:27:37 – 2440
BS: Economic and—and—and dem—demonstrating to them that proper care of the land will ultimately increase the value of land and improve the quality of the habitat so they'll be more productive.
(misc.)
DT: Dr. Sheffield, you—you've worked in various parts of the state on different kinds of wildlife, different kinds of ecosystems and—and I was wondering if you could give us kind of an overview of what you've seen and that how things—the condition of—of—of ecosystems in Texas, how they've changed and how attitudes about natural systems have changed?
00:28:28 – 2440
BS: Well I'm concerned because with more and more development, there's more and more habitat loss. Ao—and we're losing species pretty rapidly. They're declining. A lot of species are declining with human development and human activity and land use practices such as large (?) areas, grasslands that are exotic grasses only good for cattle. So I'm concerned about the future for wildlife. I think they're—I think they're declining because of human activities. I think humans exist at the expense of all other higher forms of animals because we're just using more and more—more and more of the earth and as our population increases and that
00:29:20 – 2440
concerns me. And I don't see—I shouldn't be negative but I—I don't see a lot of improvement in that respect. I think there—there are more and more entities and probably more and more individuals that are concerned about the resources and that's a kind of a

diverse response to what I just said but—but whether they can have the influence, whether people concerned about the resources can have sufficient and strong enough influence to overcome our concern for making money and developing areas and things like that, I—I—I think it looks pretty bleak. I am—I am enc—encouraged by the fact that people are more knowledgeable about what's needed and—and it could be that some point—at some point in time, we can have some amount of what's left of our native resources.
DT: Do you see it as—as mostly a problem of just sheer numbers of people? I mean I remember you said that—that there are many problematic exotic animals but that humans are the worst exotic.
00:30:44 – 2440
BS: Correct, we—we get concerned—you know the average livestock man, a good one, he knows—he's—he realizes the importance of maintaining his animals within the capacity of the—of the—of the land resource to support them. We—we biologists know that it's not good to have an over-population of deer. The deer suffer and the habitat suffers but we don't apply the same principles to ourselves and there are too many taboos, too many concerns and beliefs about human population and human control—population control and unless that comes about, unless we begin—become very conscious about human population control, I think other resour—the wildlife resources are in trouble.
DT: Well do you think it's—it's principally that, just the sheer number of people or is it also the level of consumption that (inaudible)?
00:31:46 – 2440
BS: Well as a sheer number of people are the root—are the root of the problem. We're u—ek—our shortage of gas and our increase in the cost of gasoline is a classic example of using a resource—it—it's finite. At some point we're going to run out of hy—hydrocarbons, petroleum products and—and all you got to do is go uptown and see all the streams of cars moving in every direction and realize—and multiply that by all the cities and towns in the United States and elsewhere and you begin to wonder how our resources have held up as long as they have. And it's increasing. The—the demand is increasing and you say, well we can come up with other energy sources and we can come up with this and we can come up with that, but I don't see
00:32:32 – 2440
how we're going to come up with—without reducing certain production with quality of the air, the handling waste products, things—things that are—go along with our population and our population increase. So unless we can control ourselves, I don't think we're going to have a lot of luck maintaining—helping maintain our living, native natural resources.
DT: You—you had mentioned hydrocarbons and air and—and it makes me want to ask you, what do you think the—the impacts of—of climate change are on—on native systems?
00:33:21 – 2440
BS: Well my personal opinion is it's realistic and it's—it's going to happen because of what we read about in the way of decline or reduction in our frozen north and south pole, ice sheets or whatever you call it. And so I—I think that we are going to suffer a climate change. I believe in that—what scientists have said so far is—is accurate that it's going to affect water levels, it's going to affect quality of water, it's going to affect temperatures, environmental temperatures, they're going to rise. We're going to find it—it's going to be more uncomfortable as time goes on unless we come up with a—some way to slow these things down that—that are causing climate change. Our reduction in trees—you know a lot

of people don't realize that
00:34:27 – 2440
in a very basic, common way, that these trees that we're cutting down by the millions, by the acres, actually contribute to our life. They take up carbon dioxide and they produce oxygen. And the less—the less vegetation, the less green plants we have, or the fewer green plants we have, the more likely our environment is going to become imbalanced with respect to our exchange between what we produce in the way of carbon dioxide and what the plants are able to absorb and put back in the form of what we use, oxygen.
DT: Let me ask a follow up question. A lot of your work has been as a scientist and a researcher, manager that makes for a fine career and an intellectual challenge but I'm curious if you could put your finger on why you—you followed a career as an ecologist? What is—what has been the appeal? What—what is important to you rather?
00:35:32 – 2440
BS: I just—I just love the—our living, native resources. I—I love the animals, I love the trees. I think they have as much a right to be here as we do and I am interested in making some minor contribution albeit to protecting them and keeping them here and keeping them healthy. That—that was a major interest to me, it is still.
DT: You mentioned off camera that you've got grandchildren. How—how would you explain your interest in this and—to them and what protecting natural resources might mean to their generation?
00:36:15 – 2440
BS: I have trouble because my grandchildren are all strictly urbanites and they've been impressed by development and—and commercialism and things like that. And they really aren't all that interested in listening to my preaching so I don't do a lot of it. But I—they're intelligent enough to realize that—that our native resources are important but they don't bother themselves about being involved that much or trying to resolve or solve the problem.
DT: Well, to the extent that—I've read somewhere that eighty-percent of Texans live in cities and so I imagine that—that your grandkids have got a lot of—a lot of partners in their attitude. How can people of that background be impressed with the importance of what you've done in the field and in more rural areas?
00:37:14 – 2440
BS: Well they can be more impressed with conservation of our resources by being educated. My daughter, my oldest daughter, has taught ecology at a school for disadvantaged kids in Houston, some of them, most of them had never been off the streets of Houston, never—probably never even been in a park. And she began to explain to those kids some ecological concepts and they were responsive, even though they didn't know anything about anything, as far as the resources, the native resources. And so there's hope there but I don't think we're spending enough effort, I don't think we're doing enough to educate these young people and—because I don't think enough adults are—concern themselves with protecting resources.
00:38:13 – 2440
They only concern themselves with making money and being comfortable and having two, three boats and four or five cars, a yacht or two or something like that. I don't think they're—they want to give up anything which they might have to economically to accomplish what we need to accomplish to really preserve the resources. And—but I think

they might if they begin to be educated in it. You know you can stop the average guy on the street in a small town in Louisiana where timber industry is important and he can explain to you pretty well, no matter how little he knows, how important income from that timber industry, from that sawmill or whatever is. But if you ask him, well what about the ecological implications, he'll think you're cussing
00:39:08 – 2440
him. He don't have the faintest idea of what you're talking about and that pretty well—that's an—that kind of explains our whole society. We don't understand—people don't know enough of about—care enough about the resources because they don't really realize how valuable they are.
DT: You mentioned your daughter and—and her teaching of these—these urban kids. I—I read that there is a book called Last Child in the Woods that Richard Louv came out with couple years ago and it talks about kids of that kind who are urban and they don't have exposure to the outdoors and—and that they are missing something that is sort of integral to—to people's development that, you know, we grew up over thousands of years in connection with nature and that this is the first generation that doesn't really have access to a farm or a ranch or even a vacant lot. Do you see that as being an important thing or a real thing?
00:40:13 – 2440
BS: A minor example, in my daughter's teaching this basic ecology to these kids, one thing we did—I would go—she would take them to the state parks and what have you, sometime. They had never seen anything like that. And I'd—I'd go and we'd walk through the woods and explain this, that and the other and I thought, man what a waste of time initially, but I was amazed at how interested those kids were.
DT: Well maybe you can remember, what—what were one of those walks through the woods (inaudible)?
00:40:46 – 2440
BS: Well, for example, one place we liked to take them is over to Lake Conroe and walk areas around Lake Conroe and talk about why these plants were there and what their value was and what they were and—and—and then we would go to some of the state parks, Huntsville State Park primarily because it was convenient to Houston, and walk through those parks and discuss the systems and talk about the animals and why this owl lived in this hole in the tree and all those kind of things and what—and how valuable those trees were because they produce oxygen which we breathe and—and boy, they were responsive.
DT: Were there questions that you recall that they would ask or things that they showed a special kind of interest in?
00:43:33 – 2440
BS: Well I remember one time when some of them got onto a yellow jacket's nest (laughs) and they were asking us how to get relief. No, I—I don't remember all the questions. They were usually—they were directed to my wife, I mean my daughter and some of the other teachers who would go along but they would want to know about, you know, what kind of plant is this and what kind of animal is that and what are they good for, things like that.
DT: And were the questions that kind, what are they good for, not rather, you now, that they're good just for themselves? (Inaudible)
00:42:12 – 2440
BS: Yeah, they—they, you know, in other words I think what they were getting at was what

is this animal's role in—in life, you know, what does it do? How's it live? So, that was a worthwhile contribution and—and that made me realize how valuable and yet how difficult a cl—a chore it is to begin to educate people in the right—in the direction of protecting the resources. And we set up a lab at this school and they called it the Living Learning Lab and we would collect plants from mesic systems, aquatic systems, xeric systems and plant them and create those systems in—in a microcosm and re—and require them to take care of those systems and kind of preach to them as we went along. That went over pretty big. And then we would
00:43:14 – 2440
take kids from algebra classes and history classes, bring them together in that lab and tell them how all these things related, you know, how ecologically and how history and mathematics and the whole schmear related, came together under an ecological concept to protect these—some of them would—responsibility was counting the number of plants as they grew, those were the mathematicians I guess. And it related to their particular courses they were more interested in—history, you know, what's the history of these plants and, you know, and that's the way we tried to—and I think that was successful. I don't know if it's still going on, that's been several years ago.
DT: You—you mentioned taking these kids to Huntsville State Park and taking them on nature walks. I'd be curious if—if you were to select a place to take yourself for a—a nature walk just to get outdoors and enjoy it, where would you go?
00:44:26 – 2440
BS: There are a lot of places I like. I don't think I know of an ecosystem in Texas, and there are twelve, that I don't like. There's some I wouldn't want to live in but I like to visit. And I'm particularly like—enjoy going into the Big Bend area and looking at the desert ecosystem there and the plants. I—I like, I guess if I had to live—pick a place I'd prefer to live, it'd be somewhere in East Texas but I'm so familiar with the piney woods ecosystems and the old savanna ecosystem and all, that—and I'm not that familiar with the desert systems. So it's fascinating to me to learn more, to go out there and that's where I would spend a lot of my time if I could. And I've been to Big Bend a good bit.
DT: Can you tell about one of your favorite trips out there?
00:45:19 – 2440
BS: Well it's—it's a little diverse. I got interested in the history of Texas trails, Texas historical trails, so my wife and I bought a RV and we did a little research to find out where they went and we traced them. And one of the interesting trails to me was to trace the Great Comanche War Trail across Texas and it went down in through the Big Bend country and out into Mexico. And so I got to spend a lot of time down there tracing those trails and seeing where the, you know I—and then I got associated with the ecosystems there and the prehistoric remains found there and all kind of natural things that—that enthused me.
DT: Well did some of these trails follow particular springs or—or easy crossings of mountain ranges?
00:46:15 – 2440
BS: Yeah. Yeah the Great Comanche War Trail went from water source to water source. Also it varied depending on the—the—the game, presence of game, you know, sometimes there were deer or so, or whatever they fed on they were more plentiful in one area and they'd alter the trail a little bit. But most of the time it followed—we followed it from Palo Duro Canyon to—to—to the Rio Grande and Big Bend National Park. And most of the time, it

went from spring to spring or water res—water source to water source.
DT: And how would you find traces of these very ancient trails?
00:46:52 – 2440
BS: Well researching the literature and—and gathering data from the Texas Archives and re—reviewing historic maps and reading infor—publications by people who—who did different things along the trails and just mainly literature research and then just getting out and tracing. And then along the trails, you could find traces and you could find historic markers and what have you that verified, well yeah this is where—this is—this is where the Butterfield Trail came right across here, you know, and we would be confident that we were on the right track.
DT: Well did a number of these trails later become major roads or highways?
00:47:38 – 2440
BS: Yeah. A classic example is Highway 21, El Camino Real, goes right through here, right above Bryan. Comes from—it crosses at Yule Pass, comes on up along the Balcones Escarpment through—near San Anton, through San Marcos, by Austin and right on up to some—oh well when it hit 21, it came to—it actually came through Bastrop and then on into this country and into East Texas and on into Louisiana and all the way to Florida.
DT: And was the El Camino Real, I guess was a colonial trace but—but was there and Indian trail that might have been (?) near it?
00:48:36 – 2440
BS: Well it was—as I gather, the trail was initiated, parts of it, was initiated as game trails, buffalo and elk and what have you. And then the Indians followed those game trails. Then the Spaniards when they came along they—they followed the Indian trails and then expanded them to go to places of their interest. And then we came along and built roads over some of them.
DT: Well, good, well you told us a great, long history from, you know, days before the Spaniards all the way to the current day.
00:49:11 – 2440
BS: Well the life of the biologist is—is interesting.
DT: Well thanks for sharing with us. Is there anything you'd like to add?
00:49:19 – 2440
BS: No, except that I—I appreciate being invited to give this interview and—and I'm enthused about your use of that data, not only mine but other people you interviewed.
DT: Well our pleasure. Thank you so much.
00:49:32 – 2440
BS: You're welcome.
(misc.)
[End of Reel 2440]
[End of Interview with Bill Sheffield]