Oral History Cover Sheet

Name: Dr. Chuck Henny
Date of Interview: February 24, 2012
Location of Interview: Albany, Oregon
Interviewer: John Cornely

Approximate years worked: 38 ½ (1970-December of 2008 and worked for Fish and Wildlife Service, National Biological Survey/Service, USGS during this time)

Offices and Field Stations Worked, Positions Held: Migratory Bird Populations Station at Patuxent, Maryland; Denver Wildlife Research Center, Colorado; Patuxent's Pacific Northwest Field Station in Corvallis, Oregon; Forest and Rangeland Ecosystem Science Center, Corvallis, Oregon.

Most Important Projects: Osprey Survey for Chesapeake Bay, Study on effects of DDT sprayed for tussock moth control, Cyanide studies in Nevada related to gold mines, Mercury studies on the Carson River, Peregrine falcon research, Surveys in Mexico.

Colleagues and Mentors: Howard Wight, Scott Overton, John Wiens (all three professors at Oregon State), Maura Naughton, Joe Chapman, Kahler Martinson, Al Geis, Walt Crissey, Chan Robbins, Lucille Stickel, Eugene Dustman, John Rogers, Alexander Wetmore, Ken Burnham, Mort Smith, Milt Friend, Tom Scott, Larry Blus, Ray Glahn, John Cornely, Dave Lenhart, Bob Hallock, Bob Grove, Jim Kaiser, Nancy Laybourne, Russian biologists worked with include Vladimir Flint, Vladimir Galushin, Sergei Ganusevich, Andrey Kuznetsov, Alexander Sorokin.

Most Important Issues: Contaminants, Population Studies

Brief Summary of Interview: Dr. Henny discusses growing up in Oregon and attending Oregon State University before joining the Fish and Wildlife Service at Patuxent's Migratory Bird Populations Station. He would start his career working on waterfowl banding studies and osprey surveys before taking a job at the Denver Wildlife Research Center where he would work on contaminant issues. Dr. Henny worked on many projects dealing with contaminants such as DDT, Famphur, cyanide, and mercury. He would also make several trips to Russia to work with biologists on raptors. Dr. Henny worked for three different agencies during his career as research was moved out of the Fish and Wildlife Service into the National Biological Survey/Service and then to USGS.

JOHN: This is John Cornely with the U.S. Fish and Wildlife Service Heritage Committee. It's the 24th of February, 2012 and we're in Albany, Oregon at the home of Dr. Chuck Henny. And he is going to share with us today the highlights of his life and career as a research biologist both with the U.S. Fish and Wildlife Service and with the USGS. So with that, Chuck, go right ahead.

CHUCK: Okay. I guess I'll start with the beginning. I was born March 20, first day of spring, 1943 in Salem, Oregon. And was brought up on a farm, small farm that had onions and strawberries and typical things for here in the Willamette Valley; farm was located about eight miles north of Salem. And pretty much in my earlier years on the farm I was a pretty avid hunter and watched the birds a lot, and shot quite a few pheasants and ducks in my day. And went to high school in a small town, Gervais, Oregon; there were about 150-175 students at the high school. And my senior year I was the student body president, and from the get go I knew that I was going to go to Oregon State University. And I can still remember there was a dictionary at home, and even when I was a little kid, written in the back of the dictionary, it said Oregon State 1961. So it was sort of predestined that I was going to go to Oregon State and I started in '61, and majored in fisheries and wildlife and proceeded through the undergrad curriculum. And during that time period Howard Wight had a pretty important role in my future in terms of education. He came to Oregon State from the Migratory Bird Populations Station at Patuxent in 1964, and that was my senior year. And actually started working on a project, as a senior, I spent a lot of time checking hunter-killed geese. There's a gun club about five miles outside of Corvallis to the east, Glasser's Hunt Club, and these guys were shooting a lot of dusky Canada geese. And we could go out there, in fact there were three of us undergrads and we rotated days, and ended up checking at least a hundred geese a day for sex and age and weights and various measurements etc., as a senior. And then eventually, I got involved in working on the goose for my master's degree as a result of that, kind of an early start as a senior.

JOHN: When you started with that work, there at Glasser's, that was before there were refuges.

CHUCK: There were no refuges in the valley at that time. They were talking about it, and I think Finley NWR came into existence a year or two later.

JOHN: I'm thinking mid-60's.

CHUCK: '65 or something like that. And there was concern that, the limited number of hunters that were out there virtually every day, were shooting their daily limits. And they had an interesting approach to their hunting activities in that they would only hunt to about 10 o'clock, then they all leave. So the geese would not really leave the area, they knew they could come in and feed after 10. And I think one of the most interesting things we saw, in doing those bag checks, was the last few days of the hunting season, they were not getting very many geese. Usually what they were shooting was the young geese that were "hatch year" birds. And toward the

tail end of the season, they were getting very few geese, so they decided they were going to open hunting up all day for he last three days of the season. And they just slaughtered the adults during that process. I mean the adults had it figured it out, there was a regime going on here, this is the way you do it, don't go in there in the morning, and you wait until such and such time and then you go in and eat. And they just killed hundreds of them, those last three days. And that's all in our *Wildlife Monograph* that was published by the Wildlife Society in '69, on the dusky Canada Goose.

JOHN: So back in that period of time, later on I know there were a lot of other geese, different subspecies, but weren't there mostly duskies?

CHUCK: They were probably 95% duskies at that time, and the fall flight was 25,000 or something like that. Now there's, I don't know, 200/300,000 geese in the valley. And later, on the same subject to kind of jump a head a little bit since we're talking about geese. There was an interest in all this short stopping of geese and Maura Naughton was a biologist at Finley NWR; I think this must have been in '90 or something like that, I'm not sure what year it was.

JOHN: Well she would have started; she was working on her graduate work when I left in '88. So about '89 she would have become the biologist.

CHUCK: Well one of the things I was really interested in was to try to understand what was leading to this short stopping. And it seemed pretty obvious to me what was happening, as the acreage of grass seed increased in the valley, you know all a sudden you've got all this green grass in the valley instead of the old natural grass that's brown. So you've got this luscious food source for grazing by geese. So Maura and I wrote a paper, it was in one of the status reports; I can't remember what year, I can find the details later [1998. Status and Trends of the Nation's Biological Resources, USGS]. But what I did, I went over to the Ag. Experiment Station on campus to determine the annual acreage of grass seed going all the way back to the '40's. And I plotted that information out against winter counts of geese and they just paralleled each other. So as the grass seed acreage increased, we just lured more and more geese into the valley including a lot of them that were short stopped that usually went down into the Central Valley of California, several different subspecies. So that's kind of the end of my goose information. But I also remember an interesting point, when we did publish the monograph back in '69, Joe Chapman was one of the guys also working on the field data; I was working on the banding data. I remember we flipped a coin to see who was going to be the senior author of the Wildlife Monograph, and Chapman won [laughing]. But that was sort of my master's project. And then during the summers of those years I started going back to Patuxent with the Migratory Bird people, went back there in '66, and worked with Kahler Martinson, Al Geis, and Walt Crissey.

JOHN: These were like summer jobs basically?

CHUCK: Yeah, it was a summer job but it kind of got me in; and then they ended up funding my dissertation work, which was an analysis of population dynamics

of 16 selected species, including several raptors that I had a particular interest. There was a big concern at that time about a number of species that were declining. We knew that the production rates were low, they seemed low, but we didn't know what they should be. What kind of productivity would be necessary to maintain a stable population? So we looked at the banding data to estimate survival rates, and then we had some information on age at sexual maturity. And, some models were developed to estimate that ospreys ought to be producing about 1 to 1.3 young per breeding age pair to maintain the stable population, and that was some of the findings that came out of this project. The Migratory Bird Populations Station at that time was at Patuxent, on the Center, but it was considered separate from Patuxent. So I was at Patuxent, but I was part of the Migratory Bird group, which included Chan Robbins, who was a non-game guy, and had a lot of waterfowl folks that were basically collecting data and analyzing surveys, production counts, etc.. They had several surveys going on and all that data would funnel back into this Migratory Bird Populations Station to put together for hunting regulation meetings in the mid-summer, or late summer.

JOHN: So were they part, then, were they considered, do you remember, part of refuges or I know at one point—

CHUCK: I don't think they were part of the refuge system then. It was research pretty much.

JOHN: But it was just separate from the Center.

CHUCK: Yeah, yeah. we had a separate director, Walt Crissey.

JOHN: Okay, yeah.

CHUCK: Whereas Stickel and some of the earlier folks, Dustman, were Center Directors there. So we were located in the same building [Gabrielson Lab] but with two different management regimes. Actually, speaking of Gabrielson, I actually went back to Gabrielson Lab for its dedication in '69; I was still a student out here at Oregon State, but some of my data analysis was completed and presented at the dedication symposium. And, Ira Gabrielson was present [first Director of the USFWS], which was a neat deal, and I met him and I took my *Birds of Oregon* book back and had him sign it; still have the book here in the house.

JOHN: So besides, what were some of the other birds besides raptors that you included in your analysis?

CHUCK: Brown pelican, and great blue heron, black crowned night heron, cardinal, blue jay; I meant it was a gamut of stuff. Basically got the banding data files, and at that time, here we're talking in the late '60's, it was pretty hard to work with that data. I mean electronically it was not very easy, plus I had access to all the original banding schedules that were submitted, the paperwork was filed. So you could actually go back into those files, and I spent a lot of time doing that, going back to these records and finding out how many young they were banding per nest. Many of the banders had pretty good records, it wasn't just the band number and the date, there was other information, so I used a lot of that

information plus I corresponded with many of these banders that banded large numbers to try to synthesize all of that information. And so then I got my PhD in 1970 at Oregon State with Howard Wight as my major prof., Scott Overton was a minor prof. John Wiens was also a minor prof.

JOHN: Was Wiens in biology or was he fisheries and wildlife?

CHUCK: He was in zoology.

JOHN: Zoology, okay.

CHUCK: He was in zoology, yeah. And he's now back in Oregon; he came back to Corvallis just recently, not too long ago. So anyway, I got my degree in '70 and was hired by the Migratory Bird Populations Station there in Maryland. So traveled back to Patuxent, and started working primarily with waterfowl; that was the big deal. I mean the old story was, with Fish and Wildlife Service in those days, if it didn't honk or didn't quack, it didn't count. A lot of the work revolved around waterfowl.

JOHN: And what was your, when you first went back there, what was your position and what were you asked to work on?

CHUCK: Well I ended up doing a reward band study; that was one of the first things. And there was a big concern about what percent of the bands that hunters obtain that they actually send in. And so associated with the banding operations throughout mallard range I mean most of it is Saskatchewan, Manitoba, and Alberta; there also was banding in Ontario. So went up and put these reward bands on, I can't remember if it was 1 in 10 or something like that got an extra reward band that said, "Reward $10" right on it.

JOHN: Was it the same color and size basically?

CHUCK: It was anodized green and placed on opposite leg of the regular band. Therefore, the bird had two bands.

JOHN: Okay.

CHUCK: So was involved in getting those bands attached and spent some time out in the prairies as the new man on the block, Walt Crissey always made a survey up through the prairies in May just to—

JOHN: Introduce.

CHUCK: Yeah, I was the new guy. So Walt Crissey was the Director, John Rogers was the Assistant Director and me being the new guy got to go with them. So there was this old Beaver down at Annapolis that Crissey would fly. And I don't think it was flown much, except—

JOHN: The annual spring tour.

CHUCK: Well he may have used it a little bit on other things too, and I'm not sure if other people used it or not. The flight was one of those deals where we would land at an airport, I remember we took off from Annapolis and seemed like our first land fall was somewhere in Indiana. And I remember Crissey saying, "Fill it with oil and check the gas." The oil was leaking out of the big old radial engine the Beaver has, and I mean the oil was just—

JOHN: Streaming.

CHUCK: — coming back onto the windshield and what am I getting in for here, and that was kind of the story. And then we ended up at Portage la Prairie near Delta, Manitoba, went in and met some of those guys, and I liked Alex Dzubin and I remember him in particular. And then they gave us the tour around Delta, the marsh and everything. And we went to take off at this little dirt strip near Delta, and we got up I would say about three or four hundred feet and the engine popped, the prop stopped; I'm on my maiden voyage here. And Crissey was just as cool as can be; I think he was an old World War II pilot. And he was fiddling around with knobs and so he got that thing started before we hit the ground. I remember that day as long as I live. We could have been piled up right there at Delta Marsh.

JOHN: How close to the ground did you get?

CHUCK: You know, I'm not really sure. They kind of glide pretty good, those big Beavers, I mean they've got big wings and everything. We might have come in pretty smooth, but we might not have come in very smooth. It was just a pop and then I saw the prop just stopped. And he said, well I think he said something about carburetor heat or something that wasn't turned on, you know some detail like that.

JOHN: Weren't those things pretty loud, so it probably got very quiet when that propeller stopped.

CHUCK: Oh yeah. And we went on, it was sort of like nothing happened but really I don't know if that there was a near kind of a report or anything ever filed, probably not in those days; here we're talking, this is 1971, like May 1971. But it was really interesting to go out and see all of these areas. And then we stopped at Northern Prairie and saw all the people there that were working in the Dakota's.

So the other thing that I was working on, spent a fair amount of time, on a series of mallard reports that were published. I was assigned to work on the initial report, which was a review of all of the historic data on mallards.

JOHN: So what series, I mean was it one of those blue {Resource Publications]?

CHUCK: Yeah, it was a Resource Publication [No. 105 in 1972]. And eventually, there ended up being eight volumes; I've got a copy in the office that's actually bound. So I was involved in the first three of those, but the first one was historical and then showed the, plotted out breeding range information. And one of the things I was interested in was, who first banded mallards in more of a systematic way. So here I was with the Bird Banding Lab located on the floor below me, so I went to talk to the guys. And they said, "Well, it's Alexander Wetmore." Out of Bear River in like 19--, it was in the teens, he was doing some botulism work out there. So here I was in '70, '71 and picked up the phone and called Wetmore. He was still alive down at the Smithsonian. And he says, "Oh yeah, I'll send you a reprint." So a couple days later I got a signed reprint of that paper that he did on Bear River, and that, I think, was the first real serious banding of mallards.

JOHN: Were they banding mallards produced there at Bear River or some other time a year? Because I know they had duck production there, but they also had a lot of wintering.

CHUCK: I don't know, I mean it was associated with the botulism die off, so is that a summer activity?

JOHN: Yeah.

CHUCK: So it was probably breeding ducks I would think.

JOHN: That would make sense because then you could try and assess some portion of the ducks fledge, that died.

CHUCK: Anyway, that was kind of fun, interesting to talk to Wetmore and I've made a few trips down to the Smithsonian during those years. And Wetmore was a real tall guy, I think he was in his 90's at that time, I think, and he must have been 6'4 or 6'5, thin guy, really interesting person to talk to. And he always ate lunch there, brown bagged it, and if you were down there he would be there for lunch and talk to him about anything, and he was wide open to all kinds of questions. He did a zillion things in his career, so just meeting somebody like that and spending a little bit of time was most interesting. Kind of to move on with the story, one of the things that I was interested in, at that time, was trying to get a little broader perspective at the Migratory Bird Populations Station. And, I purposed the idea that we should do an osprey survey for Chesapeake Bay to figure out how many we've got, how they're distributed. And talked to the upper level folks there and I talked to the pilots, and at the time that survey would be done, there was no conflict with duck surveys; these pilots were always interested in flying. So in 1973, we went out with a couple planes, and surveyed all the Chesapeake Bay for ospreys. And we basically did it in a similar manner to the way duck surveys were conducted. We surveyed the whole area by air, and then had a smaller portion where independent ground surveys were conducted. Actually, there were people doing detailed studies in some portions of the bay that became our ground counts. And, we could compare areas with both air and ground data and come up with a visibility rate and the associated variance. There were some neat statisticians there that I was able to work with including Ken Burnham, who actually was one of Overton's students at the same time I was at Oregon State; he was in statistics and I was in wildlife. We both ended up at the Migratory Bird Populations Station.

JOHN: Do you remember who the pilots were?

CHUCK: Well Mort Smith was one of them. And I think maybe Doug Benning or Ed Ferguson.

JOHN: Oh, Mort was one, okay.

CHUCK: Yeah. Mort was out there at the Center and he was one of the pilots.

JOHN: But both of them stationed there at the Center.

CHUCK: Yeah, they were from that general area. They may not have been right on the Center, but in that vicinity. They might have been down in D.C. or nearby.

JOHN: And what time; was that earlier than the duck surveys?

CHUCK: Yeah, it was earlier. And for that latitude, it is 38 degrees or something like that, nesting a little earlier. So we did that survey and then I compiled all the information, but before we did the survey I talked to two people and asked a simple question. "How many pairs of ospreys are nesting in Chesapeake Bay?" Two old timers, I asked Chan Robbins and I asked Alexander Wetmore. And both of them had been around for a long time. And the estimates they both came up with were between 200 and 400 pairs. I can't remember which one said 200 and which one said 400, but it was in that 200 to 400 pairs. So when we did the survey and adjusted the information for visibility, and the visibility changed depending on what ospreys were nesting on; had a little less visibility, less percentage seen from the air if they were in trees, a pretty high percentage if they were on off shore duck blinds or channel markers. We had visibility rates calculated for these different types of nests, and put all that together and the bottom line was 1450 pairs in Chesapeake Bay in 1973.

JOHN: Wow.

CHUCK: Nesting in Chesapeake Bay, now that's Virginia and the Maryland part; that's not out on the ocean side, but that's just Chesapeake Bay itself, but includes the rivers, like the Potomac with 300 pairs. And, the Rappahannock and others, but I don't remember the specific numbers. And they enjoyed doing that, the pilots were excited, and I think it was very good data and it was kind of a baseline data for that time period. The ospreys, of course, in most of the country had declined dramatically, so this survey became a baseline for the low point. Now, the latest counts that I've heard, there's at least 3500 pairs or something like that in Chesapeake Bay; don't hold me to the exact number, but it's in that ballpark. Some folks at William and Mary have been doing surveys in recent years.

JOHN: And we don't have any idea what way back?

CHUCK: No, only bits and pieces for small segments.

JOHN: Of the survey that you initiated would have been pretty close to the population low.

CHUCK: I think it's pretty close to the bottom. And I think that some of the river populations were pretty much decimated, especially if there was agriculture associated with the river. And the high spot was probably in the Bay itself, out in the middle of the Bay where there might be a little more dilution going on. Chesapeake Bay got the survey started. And the next year, in '74, we surveyed coastal North and South Carolina. And they didn't have any count areas where anybody was intensively doing it, so we had to get some folks to do some ground counts down there too but we did North and South Carolina in '74 and the same basic procedure. And in '75 we went to New Jersey and Delaware and the coastal part of Virginia to cover that stretch.

JOHN: So like the Barrier Island stuff.

CHUCK: Yeah. And so we have this base that was done in a systematic way

and led to a series of papers published over those years. And then in ’74 I had the opportunity to head back west.

JOHN: Explain a little bit about how that opportunity came to pass.

CHUCK: Okay. Denver Wildlife Research Center had an opening for somebody to deal with forest environmental studies. The person that had done that before had changed jobs or retired or whatever, so there was an opening. I applied for the job and got it, and so in ’74 I moved to Denver.

JOHN: And who was the director at Denver then?

CHUCK: It was Tom Scott.

JOHN: Tom Scott. And did you work for him?

CHUCK: No, no I didn’t. I worked for, the guy that became the director of the health lab in Madison, Milt.

JOHN: Milt, Milt Friend.

CHUCK: Milt Friend, he was in charge of the group. So yeah, I worked for Milt Friend. And he brought me out, and at that time in ’74, DDT had been banned in the U.S. in ’72 by EPA. But the U.S. Forest Service got a special dispensation to spray a little over a half million acres in Oregon, Washington, and Idaho for tussock moth control. And part of the contingency associated with that was some studies of the effects on non-target species. So we got some funding, I don’t remember the amount, but it was a pretty good amount of money for those days. And we did a six year study on the effects of that one spray at, I think it was three quarters of a pound per acre. Over that half million acres, we put out about 300 kestrel nest boxes to get kestrels into various areas, in the spray area and at various distances away from the spray area. And then we looked at Cooper’s Hawks, Goshawks and Sharp-shinned Hawks, as many nests as we could find. I had crews in a number of National Forests that their soul objective was to find these nests and monitor the kestrel nest boxes. So we followed that through for six years and we saw the DDT/DDE residues build up and saw the egg shells get thinner--pretty much just like you would expect. And actually I was in Denver for two years, part of this study, and then there was a reorganization. I think they called it, at that time, a change of function. What was going on, prior to this change of function, Patuxent operated east of the Mississippi River; Denver, west of the Mississippi River for contaminant work and Animal Damage Control work. So what they ended up doing was putting all of the contaminant work under Patuxent, at least the bird projects, not fishery projects. And all of the animal Damage Control went under Denver. So with this change of function, I was told, “Okay, you’re going to become part of Patuxent and you can go to the Pacific Northwest, and you have a choice of where you want to go.” They wanted me to go to a town with a wildlife department at a university. So I had a choice, basically the University of Idaho in Moscow, University of Montana in Missoula, or Oregon State in Corvallis. And of course I moved to Corvallis, since that’s where I was from; my folks were still living at that time. So I got back home after about seven years in the east. I really liked Denver, but this change of function changed almost everything.

However, I continued work on the DDT projects evaluating the impact of that that one spray. But moved out to Oregon and basically established what they called the Pacific Northwest Field Station of Patuxent in Corvallis. And I was later joined, maybe a year and a half later by Larry Blus, who came out from Patuxent. And we had that association with Patuxent as the Pacific Northwest Field Station until, I think, 1993 when NBS came in and then we later became part of USGS, and they started a new center here in Corvallis. So I continued the osprey surveys that we started in Chesapeake Bay and actually in '75 I did northern California, same kind of double survey. Actually flew with Ray Glahn, pilot out of Portland Regional Office. So we flew northern California in '75, we flew Oregon in '76; we flew all major rivers, lakes and reservoirs. And then in '77 we surveyed northwest Mexico; all of coastal Baja, Sea Cortez (Islands), coastal Sonora, and coastal Sinaloa, all the way down to Mazatlán. And Ray Glahn was the pilot for those three surveys, and the '77 Mexico survey was Ray's last survey.

JOHN: The Mexico survey.

CHUCK: The Mexico survey, yeah. And he retired shortly after that survey. And that was a long survey; that was 80 hours of flying time at two, three hundred feet. And then we had worked with some Mexican counterparts down there where they had some intensive study areas and did the same kind of air/ground comparisons. And that survey in Mexico was the one that ended up really being followed up over time. We did it again in '92 and '93, we flew half of it one year ([topped survey due to factory recall on an engine part] and half of it the next year; '92 and '93 with the pilot out of Albuquerque, and then we followed up in 2006 and surveyed it again. So we had the counts and the distribution and just some neat data over time (1977 to 2006) in that area. For example, in '77, the first time we surveyed, I think 4% of the nests were on manmade structures. And they were primarily channel markers around Scammon's Lagoon where they had markers for the salt boats and a few on power poles. And then by the last survey in the 2006, 26% of nests were on manmade structures. So ospreys had adapted to a lot of change in northwest Mexico. Many power lines were going in as Baja got developed and a lot of the powerlines were right along the coastline. And I remember one series of poles, where I think 18 in a line had ospreys nesting on them.

JOHN: Was anybody putting up nest platforms specifically for ospreys or other raptors?

CHUCK: Down in Mexico?

JOHN: Yeah. Of course it doesn't sound like they needed it.

CHUCK: Not really, maybe a couple. You know the Mexico situation is really different than here because you have roughly a third of them in cactus, you've got a third of them on cliffs right along the coastline, and you've got a few, well you've got about a quarter of them now on manmade structures as the area is getting more developed. Initially there was a fair number of them on the ground on small islands that had no mammalian predators, but now there are very few ground nests. But for numbers, I think we had about 800 pairs down there in

’77 and it got up to around 1300 or 1400 by the early ‘90’s, and it stayed at about that level the last time we did it.

JOHN: And who were your pilots on the last two surveys?

CHUCK: They were John Winship in 1992-93 and Jim Bredy in 2006. They both flew a twin engine Partenavia and were stationed at the Reginal Office in Albuquerque. They both had a good time, enjoyed the survey work and spent a lot of time in the air. During the first survey, there were many small airports where you could land and get gas. And by the last survey, those little airports didn’t have gas. So you really had to plan your survey to get to some of the areas that were far away from airports with fuel. And it was pretty difficult to develop some of those plans. And it was all drug related changes at small airports. When you land at these small airports, you’d be met by guys with automatic weapons, it was kind of the way it was.

JOHN: So Mexico was done three times over a 30-year period; what about the other ones that you initially started?

CHUCK: No, the other ones have never been followed up, at least not by the Fish and Wildlife Service. Chesapeake Bay has been done a number of times by other investigators in the area, but not exactly the same way we did it. I think our numbers represent the population lows, the low at that time in the mid to late ‘70’s. When I got out to Oregon, we began more intensive studies with ospreys in various river systems. And we ended up with aerial and ground/boat surveys looking at ospreys in the Columbia River and the Willamette River for several decades. Also, ospreys up in Puget Sound as kind of a sentinel species to see what was going on in the contaminant world over time in these systems and if there were still problems associated with various relatively new contaminants. So that work continued through until I retired actually, looking at various kinds of contaminants including the flame retardants and things that had come on the market. And as some of these old pesticides that were banned faded away, there ended up being some new things showing up that were a concern.
But the initial thing when I got out here, I spent a couple of years going around to most of the refuges in the northwest, in Oregon, Washington, Idaho, and even northern California. And we collected samples, usually eggs of herons or egrets, just to get some feel for what the situation was after I arrived back on the scene in ’76. Yeah, we had the DDT project going on up in forests, but we were still looking at other issues.

JOHN: Had anybody done any contaminant work on those herons and water birds previously?

CHUCK: Not much, just not much. And one of the problems, analytical costs, you had to have some kind of a source or ability pay high analytical costs. And Patuxent at that time, they had the chemistry capability, I mean it was all done in house. The interesting thing at that time, was you write a study plan, you go through a review process, the statisticians look at it and some other biologists look at it, and usually we went back to Patuxent once or twice a year associated with that, made presentations on our findings and current contaminant issues, and presented new study plans. And once we got the study plans signed

off, you just conducted the study; you didn't worry about money.

JOHN: If they signed off on it, the money was going to be there.

CHUCK: The money was going to be; that was the way it was. So when you got a project to study contaminants at three or four refuges in the Pacific Northwest, well the study was conducted, e.g., you, Steve Thompson and me at Malheur NWR. I don't remember what year, but it was probably late '70's, maybe '80, I don't know.

JOHN: Probably '80/'81 maybe. I bet it was '79/'80, I'm guessing [Note, It was '80/'81].

CHUCK: Yeah. I went down to Tule Lake NWR, got some samples there with the biologist in that system. Went to Ruby Lake NWR to work with those guys with black-crowned night-herons and snowy egrets, and basically trying to get some understanding of what was there. And we collected data, sometimes for several years to try to get some feeling for it, and wrote a number of reports with a lot of these other folks on the refuges and became part of the record what the situation was back in the '70's and '80's. The other thing we did was collect seabird eggs along the Oregon coast--that was a big unknown too. So went out and got storm petrels, a couple kinds of storm petrels, and cormorants, several species of cormorants, murres and just to see what was out there and what might be more contaminated; what species what might be of concern. So there's a lot of that kind of activity initially, just feeling your way along and seeing where there might be some issues if there are any.

JOHN: One thing about some of those seabird species, and even some of the water bird species, there were some egg collections, private egg collections, maybe even some university collections so you could compare eggshell thickness with samples from the pre-DDT era.

CHUCK: We did. I spent some time at the museum at the University of Oregon which had an egg collection at that time. Also went to the Western Foundation in L.A. and met with Lloyd Kiff and those guys at that time, got some information on egg shell thickness and then of course measured our own eggshells to see what was going on now. And as I recall, the storm petrel had some of the higher DDE/DDT concentrations, and I think the fork-tailed storm petrel. So we looked at that and then we had some other things happening, we had Canada geese dying at Umatilla NWR.

JOHN: I kind of remember that.

CHUCK: They were dying on the islands when they went out to nest. And we sent some of those carcasses back to Patuxent, and they died of heptachlor poisoning. And heptachlor was being used as a seed treatment on wheat by the Pendleton Grain Growers. So Larry Blus basically did the Canada goose studies, and he took a sample egg from a series of Canada goose nests, just like we had done on a number of studies. And then we used the old kestrel nest box approach, put a bunch of nest boxes out through the wheat country. And indeed the kestrels were accumulating heptachlor, they were eating—

JOHN: They were eating rodents.

CHUCK: Rodents that were eating the treated wheat seeds the farmers planted, yeah so it was going into the kestrel food chain. And we had some really detailed information, after about a year or so we had about 50% use of our nest boxes by kestrels, so we had a big sample of kestrels to understand the relationship between the concentration in a sample egg and the ultimate success or failure of that nest. Then we figured out where the break points were. I remember we did that for three or four years, and I remember we then had a meeting in Pendleton that Fish and Wildlife Service called. And I remember Dave Lenhart was the regional contaminant biologist at that time, him and some other higher ups in the organization there in the Regional Office, I can't remember who all, but Lenhart was our contact guy at that time. And they presented our data to the wheat farmers, and I mean it was a pretty tense meeting. Eventually, I had some of them say, "I can't believe you guys collected that amount of data showing the issue." And it seemed like the kestrels were much more sensitive to a given egg concentration than the Canada geese. It seemed like it took about 10 parts per million in the goose eggs before they'd fail, and maybe 1 or 2 parts per million in the kestrel eggs. And they could look at the categories, we had them broken out into different concentration groups, and the percent of the nests there were successful or the number of young that fledged from each group. I mean it was obvious what was going on. And the USFWS essentially got heptachlor use stopped, and changed over to some other treatment of the seed. And then we followed it and within a year or two, the residues dropped back down in the eggs and everything was okay. The other thing that we did, we concentrated on the kestrel, that was our raptor, where we thought we could get numbers so we could say something with statistical significance, you know something was happening. But we also got miscellaneous raptor eggs, a few prairie falcons, a few red-tails, a few burrowing owls, and some long-eared owls and short-eared owls. Heptachlor was going through the whole system, all these raptors had it in them. And that was the other point, we have got a problem with kestrels but we've got all these other species that were being exposed. That was really, I think, one of the best examples I could give where the researchers and the management folks in the Regional Office put the data together, presented it, and got a change made at the local level.

JOHN: Corrected the problem.

CHUCK: Yeah. And the Pendleton Grain Growers said, "Alright." They had apparently just spent a bunch of money re-tooling, they had a certain kind of equipment developed to treat the seeds with heptachlor, and they had to change it to a different kind of procedure to treat the seed with whatever alternative they were going to use. I don't remember the name of the alternative. It cost them some dollars, but in the end the change was made and heptachlor residues declined shortly thereafter. It was one of the high points where I saw research leading to an immediate response to solve a problem.

JOHN: True applied research.

CHUCK: Yeah. We looked at a lot of things over the years, but that project was clear cut. One of the other projects that I had actually started working on

when I was in Maryland was the peregrine falcon. We started taking blood samples from peregrines during migration. I didn't spend a lot of time trapping peregrines and talking blood samples, but there were people that enjoyed doing it. We primarily worked with people from Aberdeen Proving Grounds. We started fall trapping them at a time when the peregrine was in pretty dire straits in the mid-'70's. And I think we first started bleeding those birds in about '76 at Assateague and then we got involved down in Texas on Padre Island with the spring migrants. We were really concerned about what these birds had in them when they migrated back from Latin America. Peregrines winter throughout Latin American, some of them go as far south as Argentina. So we started in Texas, I think it was in '78, when that migratory population coming back in the spring was discovered. And there was periodic sampling over the next several decades and we saw the DDE residues just drop, drop, drop, drop following the 1972 DDT ban. And that was an interesting project and there were other bi-products. Satellite transmitters were attached to determine where they were going and much other info. But the blood sampling for contaminants was just one part of the peregrine studies. When we started in Texas, Laguna Atascosa NWR provided a vehicle from the refuge so we could get started. So that was a long term project looking at residue trends basically. These were primarily Arctic birds coming out of Arctic all across North America based on the satellite transmitter information. And I think one of the neat things about the project was that it continued for decades. It started when things were really bad and we continued to monitor the recovery. The last time the peregrines were sampled and analyzed for DDT and other kinds of contaminants, there was virtually nothing in them on their way back from Latin America. And people keep saying, "Yeah they're still using DDT down in Latin America and it's really bad." And the peregrine data says that's not true, just not true, that long term data set is pretty hard to argue against.

JOHN: Well it's, even though there was obviously a super serious problem, but as you know we lack very many of those long term data sets to be able to make any kind of a comparison and decision. So it's wonderful in these cases, too bad that it was driven by contaminants, but by the same token we learned a lot that we never would have learned otherwise too.

CHUCK: I don't want to go through all of these studies over my career. And I ended up working 38 ½ years for the Federal Government with Fish and Wildlife Service, NBS, and USGS, I retired basically December 2008; I've been retired for about three years now. Fortunately USGS has a Emeritus option, so I still have an office and I go in there several days a week, but I usually don't spend a whole day. I have access to their computers and the literature electronically, so I still continue research (mostly with old unpublished data). But what I was going to say, there was one project where there was actually some real concern for the health of the people that were conducting the study. The project dealt with cyanide at gold mines in Nevada.

JOHN: Oh wow, I was going to ask; I knew you guys did some mine related

work, and I was going to ask you about that.
CHUCK: Yeah, well it was the cyanide study down in Nevada. And we had heard rumors that migratory birds were flying into these ponds associated with mining activity where the cyanide was being stored and recycled.

JOHN: I know that I've read something about heap leach, and are these related to that?

CHUCK: Yes, a heap leach operation. The heap contains low grade ore (not high concentrations of gold). They pile the ore in a big heap, underneath they've got some kind of a plastic or rubber, supposed to be impervious to water.

JOHN: So it's not a membrane, it's a liner.

CHUCK: A liner, yeah I guess you could call it a liner. So they put this liner down and then they stack all this ore on top of it, sometimes they crush it. And then they've got either a drip system or a sprinkler system where they put this cyanide laced water on it, it kind of percolates down though and pulls off the gold. And then it gets into the solution that goes down to the bottom and then I guess there's some troughs or something that goes into what they call a 'pregnant' pond and it still has the gold in it. And then they run it through a process to pick the gold out, and then you've got this other pond that still has the cyanide in it, but not the gold.

JOHN: So it sounds like these ponds, whether they had gold in it or not, could attract and kill birds.

CHUCK: Especially if you're out in desert country like Nevada, you've got migratory birds flying through, be they ducks, shorebirds, whatever. And we watched a number of birds fly into these ponds, and I actually recorded the time and how many drinks they took and all the particulars. I saw birds die within five minutes. That was the situation; and I hesitate to say exactly what year that was [it was 1990-91]. But there was concern about what concentration of cyanide that you can keep in these ponds and still be safe for birds to drink. The Fish and Wildlife Service never really wanted to be tied down to a fixed concentration. I think at the time period that we were doing this study, gold was about $200 an ounce instead of $1800 an ounce like it is now. I don't know what the gold situation is right now in Nevada, but I think like a lot of things that were happening at that time, the mine operators felt like the more cyanide to put on the pile—

JOHN: The better.

CHUCK: —the better it's going to be.

JOHN: And faster it would work.

CHUCK: Yeah. And in reality, I think they found out that they really didn't need to use as much, probably save themselves some money in the process. But it was real difficult to conduct those studies, because there was a network out there and they knew when we were in the area. And I'm sure they were calling their buddy up the line to the next mine. So we tried to veer off course so there'd be no plan, not going to A, B, C, D, we dart down to Z or some other place out of sequence.

JOHN: On these studies or any of the other studies, were you ever accompanied by Special Agents?

CHUCK: Yes, yes. A Special Agent from Reno, I can't think of his name right now, but he was a cool guy. Yeah, he was with us for a couple of days. When we would arrive at the mines, we would go in and they would say, "Well you have to view our movie. And you have to put on—"

JOHN: Like a safety show.

CHUCK: Yeah. And certain kinds of clothes and all that this stuff. Meanwhile, you can see the dust rolling up where some vehicle is headed down to the pond to pick up all the dead birds. That was the kind of the stuff we were dealing with. And the agent, the one thing that I remember about the agent was that he had a lead that somebody was selling eagle parts in Winnemucca and we were in the Winnemucca area. And the eagle guy worked at some, I can't remember what kind of a store it was, I think maybe it was a restaurant. So before he left Reno, he took out of his safe this big medallion that on the outside had talons of a bald eagle. And then it had some kind of a gold jewel or some damn thing in it. I mean it was a big necklace type of thing. So his big deal there was he was going to walk into that store and just see what happened [laughing]. I don't think anything happened but that was his plan. That was about my only interaction with a Game Management Agent.

JOHN: So you mentioned that concern about human health with this cyanide stuff. Were you talking about you guys, researchers?

CHUCK: Yeah, the researchers. I mean the health of the researchers that were doing this study. The interesting thing was to keep the cyanide in solution, they had to keep the pH of the water, seemed like at 10 ½ or 11 to keep it in solution, otherwise it'd gas off. Certainly the mine operators wanted to keep it in solution because cyanide was expensive. And if it was gassing off and you were in the area.

JOHN: Not good.

CHUCK: Not good, not good, yeah.

JOHN: Wow.

CHUCK: Yeah, it was different. The Fish and Wildlife Service guy I worked with in Nevada was Bob Hallock and he was stationed in Reno. And so I'd go down and we'd meet there and the two of us were working on this project together.

JOHN: Any other types or specific projects over time out here that you think were really interesting or made a big, very important contribution that you haven't talked about?

[Pause in interview]

CHUCK: Let's start now with a different contaminant that we got involved with, and this again started I think in the early '80's. A friend of mine with the Oregon Department of Fish and Wildlife actually was a rehabber, rehabbed injured raptors. He happened to have a great horned owl at his house in La Grande and was gone for the weekend and his wife was looking for something to feed the great horned

owl. So she looked in the freezer, well here's three or four dead magpies, magpies that were bagged up and frozen. So she took one out and fed it to the great horned owl. The next day the great horned owl was dead. And the biologist told me the story and I said, "Where did you get those magpies?" And he said, "Well we were over in a feed lot where they had just been treating their cattle with Famphur, an organophosphate insecticide that they pour on the backs of their cattle." You just take about a quarter of an ounce or quarter of a ladle, I can't remember exactly how much. You pour it down the backline of the cow, you get it into a squeeze shoot and you pour it on. And it kills the warble larva in the bloodstream. So you don't get these warbles coming out of the back which probably knocks down their body condition. And he said they treated their cattle the day before and "All these magpies were dead, I just picked them up."

JOHN: Was his intent to take them home for the owl?

CHUCK: No, no, no. I think he was going to save them.

JOHN: Something was wrong.

CHUCK: Something was wrong. And I'm sure he was going to make that phone call over to me to talk about problem. And I think eventually, I mean we were good friends; knew him from school, and he would have called. When the owl died, he called me immediately. And so I said, "Well that's really curious." And eventually we set up a study over in the tri-cities area of Washington in 1982. And we got, I think, three or four small ranchers and we bought Warbex [trade name for Famphur] for them, and we were there when they applied it at the recommended rate, and then we watched. We ran magpie surveys, and then we checked the fields, watching the fields, and magpies starting dying.

JOHN: And they were applying this according to the label and everything.

CHUCK: Absolutely, absolutely and nobody really said much about that. In fact one of the rancher's dog even died, and he buried the dog and we were, nah, we're not going to dig that dog up to see if that's what killed it, but it could have ate a magpie or something that died. Magpies starting dying the day of treatment. We actually saw magpies fall out of the air and they were dead before we got to them. We opened them up and they all had ingested cow hair. And we talked to several physiologists and they said, "Hey, the protein in the hair does it no good at all." So apparently they ingest this hair maybe to form a pellet to cast or something, we're not sure. I mean to this day we're not sure why they eat cow hair. And when we set up the study, we pulled hair from cattle at weekly intervals just for analyses. And we saw the decay curve over time, there was still residue in the hair a hundred days after treatment. And we still had a few birds dying at that time period and the magpie population declined in our survey area. Well we analyzed the brains of these dead magpies and they all had Cholinesterase depressed 70 to 90%, They were killed by an organophosphate. And there were residues in some of the stomach contents and we verified that it was Famphur. And we had two interesting cases that kind of go back to the great horned owl

story. We had a red-tail that died in the study area 10 days after treatment and another that was found sick a little later. We took a blood sample from the sick red-tail and blood Cholinesterase indicated exposure to an organophosphate. Brain Cholinesterase was also depressed in the red-tail that died. So we had the whole story published in the *Journal of Wildlife Management.* And then we were always on the lookout for samples, mysterious kinds of happenings.

JOHN: So is Famphur banned now or was there ever anything done about it?

CHUCK: It has been banned in some areas, but I'm not sure that there's total ban on it; I'm not really up to date on that. There is one thing that not a lot of people know about. When this study was going on, or shortly thereafter, all a sudden there were three or four California Condors in California that mysterious were gone; they just—

JOHN: Disappeared.

CHUCK: —disappeared. I told the guys down there in California, and Department of Agriculture, I said, "You're using Famphur down there." I said, "All it would take would be these three or four condors to find a carcass," where the cow had died within a hundred days of being treated. And I said, "Nobody would ever find it." I, to this day, don't know if that's what happened. The California Department of Agriculture banned the use of Famphur within the range of the California condor. I know that for a fact, and they did that pretty quickly. So later there was a number of at least perceived records of misuse of Famphur where they would pour it on carcasses of whatever to kill eagles, probably eagles mostly. And there was a number of examples published within a couple years after that initial paper came out. And so that's the Famphur story, the organophosphate, which was somewhat "unique". The fact that the magpies were ingesting cow hair, and got exposed, and it's kind a unique set of circumstances that led to that whole project. I know that I ran a survey, as I was driving through eastern Oregon, and counting magpies and cattle, like in ten mile increments. And usually where you had cattle at that time, or the more cattle you had, the fewer magpies. I mean I don't think that would stand up statistically but that's what I saw.

JOHN: But normally you would think the more cows, the more magpies.

CHUCK: Yeah.

JOHN: Because they would be picking warbles, picking seeds out of cow pies, and stuff like that.

CHUCK: And then the secondary aspect, you know the raptors were getting it too, which was pretty unique in terms of the secondary poisoning. I think a lot of people did not really think that these organophosphates could kill in a secondary way like they did. So that was a unique finding we made out here. After the study, raptors were routinely evaluated for organophosphate poisoning.

One other series of studies that I did, I want to discuss a little. I went to Russia four or five times to do some contaminant work.

JOHN: To actually go over and help them do some sampling.

CHUCK: Yeah, we sampled eggs from twenty some different species of hawks, owls, and falcons. My first Russian interaction was with scientists that were coming over to Patuxent in the early '70's on a fairly regular basis to interact on various wildlife issues. And then in 1973, I published a paper that discussed transcontinental movement of pintails from North America into Siberia associated with drought years in the prairies. And this was based on banding data and population information and other material that I had access to when I was a duck guy. So I published this paper and with years like '61 and '68 (really drought years) and you could figure out how many banded pintails were in the population, and then they had this spring hunt over in Siberia. And in a normal wet year or an average year, you may get a few band recoveries in Siberia that would go through their regular process and get delivered to the U.S. but in those drought years, all a sudden you were getting fifty, sixty, seventy bands. The prairies were dry, and pintails were overflying, and continuing on across into Siberia. So I published that paper and quite a few people got interested in this subject and then I have this friend that I mentioned earlier, Alex Dzubin with Canadian Wildlife Service. He was involved with sitting up a conference in 1976 in Novosibirsk, Russia. And he invited me to give a talk, mainly looking at banding data, what kind of species were moving into Siberia, and the whole concept was aimed at diseases and transmission of diseases. And I submitted an abstract, in fact I have the list of abstracts that resulted, there it is in English. But I never got approved to attend.

JOHN: From your end?

CHUCK: From my end. Fish and Wildlife Service was not going to let me go. I'm not sure about the details, I was a young biologist at that time, and only working for them for five or six years. And I had the official invitation and the whole shooting match. And, I was ready to write that paper on who was flying across and the circumstances. And I know the only reason they asked me to attend was because of the pintail paper published in '73.

JOHN: So, the one time that I've been to Siberia, there was a Russian waterfowl shorebird research biologist that picked us up in Irkutsk. And got us on the train and then; picked us up at the airport, got us on the train, and then picked us up off the train, took us to the hotel when we were on our way back home.

CHUCK: What year was that about?

JOHN: 2001, because on September 11, 2001, we were in southern Siberia. But he was working in wetlands on the margins of Lake Baikal. And from what we could tell—

CHUCK: That's pretty close to Novosibirsk.

JOHN: I think that maybe it is.

CHUCK: It's kind of in the interior.

JOHN: Yeah, and it's as far as we could tell, you know there's always language issues and everything, but that is the

major area that there's waterfowl hunting out there, and there's others I'm sure. And we found, actually, a decoy out south of there almost to the Mongolian border next to some saline wetlands; there was a funny looking, I've got pictures of it somewhere. My colleague thought I should have picked it up and taken it home, but I left it out on the Steppe where I found it.

CHUCK: Well the bottom line on the Russian deal, I didn't get to Russia until 1990.

JOHN: So it's quite a few years after the first invitation.

CHUCK: Yeah, 24 years, well no, 14 years later. And this was after the Berlin Wall had come down.

JOHN: And things were starting to change.

CHUCK: And there was trying to be more interaction from a contaminant perspective. So I went over in '90 to Moscow and I met Vladimir Flint, who wrote *The Birds of the USSR* and his number two guy, a guy named Sorokin. And then I met the number one raptor biologist in that country, Vladimir Galushin. And we were over there for about two weeks, and took some tours outside of Moscow, not very far. It was more of a get to know you.

JOHN: Okay, and where was it centered on, was it Moscow?

CHUCK: Yeah. I went to Moscow. And I let them know what I wanted to do. I was trying to obtain raptor eggs; peregrines and ospreys and anything else, eagles for contaminant analyses in the U.S. So we met and we discussed, and we discussed, and it got to the point we were getting down to the last day or so and I think that's the way they had it designed. They were not going to make any early decisions and got down to the last day and a lot of vodka drank; there were three of us that went over and the other two guys weren't really researchers. But finally they said, "Yeah, we're going to do it. You're going to work with Galushin," the raptor guy, he was from a University in Moscow, and he had ex-students all over. And they could figure out where these nests were and if the season was before I got over there, they'd collect some eggs and keep them refrigerated until I got there, and that was kind of the way it started out. And then there was another guy, a guy named Sergei Ganusevich, young guy. And they said, "Well next year (1991) you're going to go up to his study area in the Arctic on the Kola Peninsula and will collect some peregrine falcon eggs." And I said, "Great." The next year came, went over and they met us at the Moscow airport, young guy Sergei and his wife, and we took off in a Aeroflot jet of sorts and flew to Murmansk, way up above the Arctic Circle, then took a big Russian helicopter to this little village on the Ponoy River. And they dropped us off, said, "We'll be back in two weeks." So it was the three of us. And we got a boat from the village; but he'd been doing this, him and his wife, for years.

JOHN: So he knew the—

CHUCK: He knew the lay of the land.

JOHN: —and the people.

CHUCK: And where the birds were and everything. And yeah, we spent two weeks out in the back country fighting mosquitoes and black flies, and ate reindeer and a lot of Atlantic salmon from the Ponoy River.

JOHN: So are these like ground nesting, where did they nest?

CHUCK: They were in kind of piddly little cliffs, I mean walk-in cliffs.

JOHN: Yeah, like some of the ones at Malheur where we had occasional Prairie Falcons that the nest was at eye level.

CHUCK: Yeah, yeah, it was not a big climb or anything like that. So we got some eggs and he also had white-tailed sea eagles in his study area. And we got one sea eagle egg and field processed them in Russia and brought them back and analyzed and wrote some papers jointly. Then one of the years, I don't remember if it was the next year, went after osprey eggs on the Volga River.

JOHN: Oh, cool.

CHUCK: So we took a boat up the Volga River from Moscow to the Darwin Nature Reserve, a Zapovednik.

JOHN: Yeah, right. I was on the Buffer Zone of one of those nature reserves out there.

CHUCK: Yeah. And we collected a series of osprey eggs there on the Volga. It was upstream of Moscow and probably less polluted than further downstream. The osprey eggs were fairly clean. The peregrine eggs from the year earlier contained some fairly high levels of PCBs but generally low DDE/DDT. And the interesting thing about the peregrines was that we didn't know what subspecies they represented. Do these peregrines go to Western Europe or do they go to Middle East, we weren't sure. So the next year, a couple of the guys that I know from the Padre Island peregrine trapping, went over and put some satellite transmitters on these birds. And they went to Western Europe, they wintered in France, the Netherlands, and Spain. And so all a sudden Sergei Ganusevich's study area became pretty—

JOHN: Important.

CHUCK: Yeah, and Falsterbo is a migration site at the southern part of Sweden, and those Russian peregrines went right past there at the peregrine peak migration time; they've got records for decades of whats moving through, so it all kind of fit. And the other couple times I went over, went into the Steppe Country, saw Steppe eagles.

JOHN: Yeah, that's where I spent my time over there was on the Steppe.

CHUCK: Yeah, so a lot of different species and into some of their Ag. lands where they grew their wheat, that bread basket region, saw red-footed falcons and a lot of harriers.

JOHN: Incredible raptor diversity. We were there in September and we were down right on the Mongolian border; we saw Steppe eagles and we saw all kinds of things.

CHUCK: I think we collected eggs from about twenty different species of raptors over the four/five years that I went over

there. And published the papers in various journals and symposiums, really had fun working with these guys; they were pretty amazing trips. The last year I was there was in '95, and Galushin and I went to the Caucasus Mountain Region, and that was at the time that Chechnya was kind of blown up. And Chechnya was not very far from where we were; the city we went to was Stavropol. And there was a university guy there, one of Galushin's old students, and they were taking us around and said, "Well, we have to go to the police department." The police chief said, "I want to show you some of our equipment". And they gave me a gun, a bulletproof vest, and an AK-47, and I've got pictures of me holding this stuff. And the old police chief said through, Galushin told me, said, "Police chief says that this guy that works for him can speak English." And the guy wanted me to test him out to see if he could speak English. Somehow I seem to get in the middle of these deals. He could speak good English and I told the chief that. But they also had these vehicles, these water nozzle things—

JOHN: Water cannons that can knock people over.

CHUCK: Yeah, I mean they had to show us all of that stuff. And it was just, I didn't know what to think.

JOHN: Different culture.

CHUCK: It was different, yeah it was different.

JOHN: Well, you've covered many highlights of work that you've done, and I know you've done a lot more but that gives us a really good flavor and you've published a lot. How many publications, up to this point because you're probably still working on stuff?

CHUCK: Well I think there's two in press right now, and that makes 200 over forty years, or a little over forty years. So that averages about five a year for forty years.

JOHN: Very good. Well the last thing I'd like you to do is talk a little bit about the transition from being a field station of Patuxent and being in the Fish and Wildlife Service into one new organization, and then I don't know how many twists and turns, whether there were three or just two. And what changes in the way you had to go about your research and your business, if any, occurred because of the change in agencies and that sort of thing.

CHUCK: Well I think the NBS came about, I believe, in 1993; I think it was '93. And initially it was a National Biological Survey and the concept Survey didn't set well with some folks, so after about a year or so, it was National Biological Service.

JOHN: That's correct, yeah.

CHUCK: And this was a Secretary of Interior's baby, and he wanted to create that organization and apparently he did it without Congressional Approval. And Congress said, "You're not going to have legacy like this." And I can't remember the Secretary of Interior's name at that time.

JOHN: It's Bruce Babbitt.

CHUCK: Bruce Babbitt, yeah. Actually he was, I think, the only Secretary of Interior that I ever met.

JOHN: Well he, interestingly enough, his signature is on my PhD diploma from; he was the Governor when I graduated from Northern Arizona University. I don't hang it on the wall anymore.

CHUCK: Oh my God.

JOHN: And actually he was a good, with this exception, he was a good Secretary of Interior; this is a big exception.

CHUCK: Yeah.

CHUCK: First, I was the Leader of a field station of Patuxent in Corvallis. There was also a BLM group in Corvallis, it was kind of like a Coop unit group; I think there were three people. Also, there was a National Park Service Coop Unit there. The concept was to merge those groups sort of into one new center.

JOHN: Which was kind of Babbitt's concept or whoever put him up to this, will take the research out of the individual Bureaus and put it—

CHUCK: Exactly, exactly. And we had a number of meetings trying to work the kinks out of this thing and eventually we got the Park Service folks, which ended up being about three, plus a secretary, and the BLM group. And Larry Blus and I, from the Fish and Wildlife Service, kind of merged into this Forest and Rangeland Ecosystem Science Center.

JOHN: Was there any talk, since there's a Fish and Wildlife Coop Unit at Oregon State, was there ever any talk about; I don't know of any of those that got pulled into these.

CHUCK: No, never was.

JOHN: Okay.

CHUCK: Never was. I never heard a word about those guys joining.

JOHN: And they operated very differently and more independently.

CHUCK: Well the one thing that was kind of curious to me, the Park Service folks and the BLM folks really operated like a Coop Unit, I mean that's kind of what they were doing. They were funneling money, their agencies were funneling money to them to do research.

JOHN: That was the big difference.

CHUCK: And most of the time they weren't doing the research themselves, they were hiring students for degrees to work on 2-year projects. Furthermore, I personally do not believe you can conduct consistent long-term studies with grad students. And, many answers are obtained from long-term studies

JOHN: Right.

CHUCK: So what we end up with is many people at our Center that are basically unit people (except Larry Blus and me from Patuxent). And, most never spent any time at a Research Center.

JOHN: I assume there are newer—

CHUCK: Well yeah, new ones, but there's still some of the old ones that remain. They operate like, hey students

are the deal, we're going to manage a bunch of students and even teach some classes.

JOHN: Well that's one of the things, my research in Joshua Tree was done through the Park Service Coop Unit at University of Nevada Las Vegas. And the thing that I saw very different from the Fish and Wildlife Service, now USGS Cooperative Fish and Wildlife Research Units, is that they had budgets from the big organization. And they, I don't know about the BLM, but the Park Service Units were assigned specific parks. Said, "Okay, you're going to take care of research needs and research in these parks."

CHUCK: Well in the old days when I was part of Patuxent, like I told you earlier, we got study plans signed by the Directorate and we did the work; that was the way it was. And the funds were made available. In these other agencies, especially BLM, they had some pretty good dollars coming into their budgets, I don't know if I want to say on a guaranteed basis, but there were dollars coming in. And we were uncertain under the new regime.

JOHN: Because you're now not part of Patuxent anymore.

CHUCK: No! Actually Patuxent ended up transferring funds over to the new Center in Corvallis. But I'm not sure what ended up being transferred in terms of project funds vs. operating funds. But, when I initially came out here to Corvallis, the Forest Service wanted us out here and provided office space for us at minimal expense.

JOHN: And you were working on that big forest project.

CHUCK: Yeah, in the late 1980's early 90's the Forest Service was shutting down their road building operations and they closed out the office area where we were located on Airport Road, so we had to find another place. But we were working with EPA on some projects, and so moved into an EPA facility south of Corvallis. And, again, at pretty minimal charges. I think the sad part of fracturing us away from Fish and Wildlife Service by NBS or later with USGS, in the old days, we had dollars for projects, we went out and we worked with all the FWS folks. I mentioned how we'd gone to all these refuges, we knew the regional office people, they knew what are capabilities were; there was a lot of interaction going on. And once you get out of the organization, it just isn't quite the same, people start going their own directions. We kept the interchange going, but eventually personnel changes occur and those relationships that you had are no longer there. Now of course I'm retired, so there's a limited relationship with the Regional Office in Portland, not like there was when we interacted and attended meetings regularly, addressed their problems and presented our findings to them.

JOHN: Well this was a little bit different with Patuxent I think, but one of the things that I think with a place like Northern Prairie that was so tied in to refuges and waterfowl productions areas and the information transfer from what Northern Prairie was learning to managing those lands, even though they are still right there in the middle of those refuge people. The interaction has gone totally away, but like you say, as people

retire, the relationships go away and pretty soon you've got a whole new generation of researchers that don't even know how it was.

CHUCK: Right. And the other thing is that all a sudden you've got to charge them, they've got to pay whereas we were all kind of part of the same system. And then you get pretty astronomical overheads, it stifles a lot of agency interaction.

JOHN: Just basically it all kind of went the way of Coop Units and being university research.

CHUCK: Yeah, and you know also spending a fair amount of your time competing for money instead of doing what you should be doing.

JOHN: Well it seems to me too, you've talked a lot about long-term research and large data sets.

CHUCK: You can't do that anymore.

JOHN: That's what I was going to say, because you're chasing money.

CHUCK: Right, right. You know the last study that we did, that I didn't mention earlier, was a ten year study on the Carson River on mercury; mercury from the old Comstock gold mining days in the 1850's, '60's, '70's. And again I think I've been fortunate on some of these really long-term studies, but we had ten years of data. We had residue data from eggs and blood of young birds and reproductive data. And at the same time, in addition to working on the Carson, we worked 250 miles east over around Elko on the Humboldt, another colony; same species, same years exposed to the same drought if there's drought in the Great Basin (a reference area). The neat thing about this study was we started out with wet years, and in the middle we had five years of drought, and then the water came back. And then all a sudden when the water came back, it validated exactly what we saw ten years earlier. So then you really felt confident in what you're seeing and how it all works, but it took ten years to fully understand. And the way that study was funded, we were funded on a year to year basis by EPA out of San Francisco because the Carson River was considered a Superfund Site or a potential superfund site because of the mercury. And after we published our first paper, then EPA research said, "Hey, this is interesting stuff." And they funded our concept to conduct more detailed studies and to put radios on birds and evaluate post-fledging survival and movements. Basically all that, it was EPA, it started with the operational project out of San Francisco and then moved over to Research out of Research Triangle Park in North Carolina. But again it really took a ten year study to really understand what was happening, and you would say, alright in drought years are you going to have higher residues? Intuitively you say, hey there's less water, you're going to have higher residues in your birds. Not the case. The higher residues were in the good water years when there was a lot of water rushing down the Carson River and exposing old sediments near the river and adding it back into the system and flowing down the river.

JOHN: The mercury was there the whole time, but it was kind of innocuous because it wasn't in contact with the water.

CHUCK: Yeah, the contact with the water that rushed and cut into the banks and moved mercury on down the system, a new amount of material including mercury. And the other thing out of that study that we really couldn't understand without ten years of work, was in good years the birds could tolerate a higher concentration of mercury and still produce young. In the drought years, even though they had lower concentrations, they were less successful. And I think food availability, the adults were probably stressed, they would abandon sooner, but you see that kind of relationship, they can tolerate maybe a part per million in the eggs in good water years, but they can't do that in bad water years. Earlier I thought that critical concentrations were pretty much fixed for a species. You figure it out for a species and that is the answer. But it gets modified a "little bit" by the conditions that these birds are faced with and if their stressed out, they're going to bunch it and abandon the nest or at least some of them. So that's the advantage of, again, long term information. I guess wrapping this up, I feel like I really saw the golden years of contaminant research when I got there at the right time when things from a contaminant perspective were really bad.

I went to Patuxent's 75 Year Reunion, the Center was created in 1936, and had a reunion this past year and invited some of the old duffers back to give talks on various subjects. And I was assigned or asked to present a paper on raptors and contaminants over the years at Patuxent. I was still a student when the classic eggshell thinning paper came out 1967, and that put a new twist on a lot of things. And that became part of trying to understand reproductive effects and with my old thesis back in those days. And then I got into doing all of these surveys that now provide baseline information. And then we studied the alternatives of these old chlorinated hydrocarbons with a number of different studies on some of the more modern pesticides. And then flame retardants and all this other stuff that's come along in recent years. And got to do a fair amount of traveling going to a lot of international meetings, and got to meet a lot of researchers from a lot of different places to talk about a lot of projects. So it was a really interesting career. And after you do this for 38 ½ years, you can't really just cut it off. So fortunately with the Emeritus Program, I still go to the office, I don't go in everyday, but I'll go several times a week and spend a morning or whatever working on papers that I'm still trying to put together. And one of the things I did after I retired, I spent a lot of time writing a paper on the osprey numbers and North American contaminants that reviewed that last 50, 60 years of data and what happened and tried to put things into perspective.

JOHN: Did you ever imagine, when you were a graduate student working on waterfowl at Oregon State, that you would spend all those years working on contaminant issues? I know you spent some time, when you were back at the Migratory Bird Populations Station back in those days when you went back and you worked at the Center.

CHUCK: I was always interested in raptors and raptor populations, and that's what kind of brought me into the pollution/contaminant issue. And even from the early start trying to figure out how many young birds should be

produced, what's the norm? Nobody knew the norm. Production looked lousy and so it was a first crack at trying to use some of the banding data that's in the files that the government spent a lot of time collecting. Trying to put that data to good use. You always hear that you want to do what you like to do. And if you like doing what you're doing, it's not really considered work, and in my case I think it definitely is the way it worked out.

JOHN: Plus I think you'd always like to make a difference in the work that you did, a lot of the work you did made a big difference.

CHUCK: Yeah, you feel like hey this was all worthwhile and that's kind of the bottom line.

JOHN: Yeah. Well I think we can wrap it up right there, and think you very much for your time and sharing your experiences with us.

CHUCK: You bet.