

Bruce Marcot Oral History Interview, July 27, 2017

Oregon State University

Interviewee: Bruce Marcot

Interviewer: Sam Schmieding, Interviewer

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TRANSCRIPT

SAM SCHMIEDING: Hello, this is Dr. Samuel J. Schmieding, Oregon State University, College of Forestry. I am here with Dr. Bruce Marcot, Research Wildlife Biologist for the U.S. Forest Service. We are in the Tualatin National Wildlife Refuge, and we are going to do an oral history interview today that is part of the Northwest Forest Plan Oral History Project. We're going to focus on the Northwest Forest Plan and related issues. We're also going to talk a little bit about his biography and related things that have to do with training and perception, and how Dr. Marcot came to be as a professional and as a biologist, how he came into the Northwest Forest Plan process, and how he sees that today. So, anyway, good day, Bruce.

BRUCE MARCOT: Very good, good day. And it is a good day here.

SS: It's always a good day in places like this, right?

BM: Quite.

SS: Like I think you said before we started this, it's nice to do this out in beautiful nature rather than a sterile office.

BM: We're sitting here among beautiful Oregon white oaks, and some Douglas-fir, grand fir, and lots of birds around here, so a beautiful place.

SS: I usually like to start with biographical information. Tell me where you were born and raised, how you grew up in nature, around nature, to appreciate and love nature, and what led you into science and biology.

BM: Okay. Well, I was born in Lynchburg, Virginia. I was there for a very short time, a year. And our family went a couple places in central New Jersey. That's basically where I grew up as a child, a small town called Bound Brook, a small town indeed. So, we were able to get out on our bikes, go out for the day. The back door was always open at the house. You know, it's the classic, typical early days of growing up when you didn't have to worry about crime and concerns. Across the street was a wood lot where I always would hike to and catch snakes, even as a little kid. I always had an interest and love of outdoors. During high school, about halfway through, we moved from Bound Brook up to Wayne, New Jersey, up along the New York state line. Behind our house was miles and miles of hardwood forest. Just beautiful. There, I truly got into trying to ferret out, understand what the plants are, caught snakes and lizards, and brought them into the house, where at times, they would get loose and my mom would find them in the closet, being concerned about that. From there, most of the way through high school, we came out to Irvine in southern California, Orange County, which was quite a culture shift.

SS: How old were you when you moved out here?

BM: How old was I? I was in third year of high school.

SS: Okay. So, your formative years were definitely in the Northeast.

BM: That's right. But regarding high school, I finished up in Orange County, California, and started college. Actually, I finished high school a year-and-a-half early, and started taking college courses then. I was really interested in physics and astronomy, and I started at UC-Irvine in physics and astrophysics, and did a couple years there. During that time, I started to do summer solo travels on my Honda across the continent, basically. I would head out for a month or two or three, camping. I went all through Canada, one summer rode up to Fairbanks and back. Part of that was to visit astrophysical sites and labs, and find out what

astrophysicists were actually doing. I started to realize that I really enjoyed camping out and exploring forests and parks along the way. So, that really got my interest back into the earth. But at the same time, I realized, as an astrophysicist, I would not be able to make a substantial contribution to the science until at least a post-doc level, truly, in sort of the area that I was interested in. So, I got very interested in stellar evolution. And I realized that I could make substantial observations, even at a sub-graduate level in college in the area of ecology. And indeed, that's what got me shifted over.

So, in 19-oh, when was it? 1974. I got sick and tired of southern California and all the density there, and I packed up everything I had into a trailer, hooked up to my 1964 Dodge Dart and went up to Humboldt County, way up in the north coast of California. I had no place to live, no certain plan, other than I wanted to go to Humboldt State in some area of natural resources, wildlife management. So, I found a place to live there, started off, backed out and got my Associate of Arts at College of the Redwoods up there, because a lot of the physics and math that I had had really didn't help to transfer into an area of biology.

SS: So, you had to get the prerequisites for the earth sciences?

BM: That's it. That's right. So, I got the AA, Associate of Arts in Biology. Then went to Humboldt State University and did the bachelors, in I think, a couple years, and I did the masters in a year in areas of natural resource planning and interpretation, and then ecology with an emphasis in forestry. At that point, I was working in part on contract work for the Forest Service out of Humboldt County, and up in the hills in of the Klamath Mountains area there, a beautiful area, very unstudied at that point in time. So, that's circa 1974-78, virtually no studies going on. So, I did studies both for the masters, and then, ultimately for the doctorate, under-paid work through the Forest Service, looking at, first of all, at limnology of pond habitats on some of the National Forest land. Of what value are these ponds to wildlife? What sort of, physical, chemical, biological attributes did they have? Nothing known there, so that was interesting.

SS: What were the land management debates in that region at that time?

BM: Since the National Forest was being heavily cut, clearcutting, extensive clearcutting was starting to rear its head as one of the issues. At that time, I think there was regulation on some of the National Forest lands that would limit clear-cuts to 80-acre sizes. However, when you have an 80-acre clear-cut, and then you wait a couple years to plant it, then it's okay to cut the adjacent 80 acres of land. So, you end up with vast areas of very young forest. We started to realize that the old forests up there were being sort of phased out.

SS: And this was of course the same time when the last debate over the Redwoods was happening.

BM: Oh, that's right.

SS: I'm just trying to make a parallel, and this is not the Redwood area, but you're close.

BM: Well, if you want a personal insight into that, I first visited Humboldt County in 1973 when I rode my motorcycle from southern California prior to heading out there in '74, and I found a side road off the Avenue of the Giants in Humboldt County, where the last, or not the last, but extensive stands of old growth were found there, redwoods. And I found this one little side road grove at dusk that I threw the sleeping bag down on the ground. I found birds in the area. It was beautiful. Old iconic trees all around, a beautiful spot. When I moved out there in '74, I went and found that exact same spot and it had been clear-cut. It broke my heart to have seen what happened. It was just a vast area of downed wood, slash, the soil was turned over. In fact, the stream itself was gone where I had been. So, that was kind of a shock. And that sort of opened my eyes to what could be the influence that type of cutting had on land on wildlife. **SS:** That must have been pretty traumatic to be there after it had been such an important place early-on.

BM: That's right.

SS: And then, my goodness, did you know it was going to be that way, or did you hear about it, or - ?

BM: No, no. I went thinking that it was still there, that it was still this beautiful old-growth forest. And bam! It was gone. Yes. So, that's a sense of the issue I was facing on Forest Service land from studies I was doing from '76 through, oh, '79, even into about '84 for both the masters and the doctoral work, dealing with early-successional stages following clear-cutting. I wanted to study what actually is up there, what you gain, what you lose, and what the landscape features are when somewhat sensitive areas are cut in that way.

SS: So, having grown up in New Jersey and then coming to California, having this East-West thing, you told me about the crowding and pollution in Los Angeles. What about what you saw growing up in New Jersey impacted how you viewed the man-nature relationship and the responsibility of the land manager, and how we develop policies and implement them? Kind of the context of East to West, the learning curve, and kind of how you matured into your professional and intellectual selves?

BM: First of all, I was really glad I did have that kind of a culture shock switch from East to West, because ultimately, it really helped to educate me as to the cultural implications of how people, not scientists or decision-makers, but everyday townspeople, view the land. The small towns that I was in, in Bound Brook, and then up in Wayne, back in Jersey, were in a suburb area, but it was spread out. Each house had a lot of land, and people just naturally assumed that that's how they should live, that there should be extensive green areas between houses, behind houses, and so on. A quick side point. I recently got on Google Earth and looked at the spots where I had grown up in, those houses. Bound Brook was pretty much the same, but Wayne was now impacted with this massive suburb incursion. So, the forest that I had explored as a kid now was all dense housing.

SS: This is kind of the outgrowth of the greater New York/New Jersey area. Correct?

BM: It's got to be, that's right, yes. Just like the area, the city here [refuge in Tualatin], is becoming more and more part of the urban area of Portland.

SS: How would you compare that to Los Angeles? You weren't there long and I suppose your foundational experiences maybe were more important to you, but Los Angeles still is a takeoff point for what you would study later on, just because of the insanity of the Los Angeles basin, for instance.

BM: Well, I was actually south of L.A., in Orange County.

SS: In Irvine, yes.

BM: But the whole area I saw was rapidly becoming increasingly occupied. Every inch. On one of the bike trips that I had taken, I was gone for three months, camping across the continent. Got back, and one evening, I tried to find a little spot, just to sit on the side of a hill, and I could not, because every side road was fenced off. I had to break through a fence, barbwire fence, to go sit in some farm field. It was right after dusk. And I'll never forget, as I was sitting there wondering if I should stay in that area at all, a large buck deer came right up to me, then sauntered off, out of the dark. It was quite an encounter. And I felt like we were both lost there.

SS: Nature still being resilient in its own way?

BM: Well, hopefully. But at that point I felt like I should find a venue and place to live, and to leave the area of physics and go into ecology, which at that time was a very, very soft science.

SS: Now, when you were still involved and interested in astrophysics because of where you were, I would anticipate that you went up to Mount Palomar on more than one occasion.

BM: Oh, yes, sure.

SS: And that 200-inch giant telescope, I remember.

BM: The Hale Telescope. That's right, yes.

SS: I remember reading about that as a kid, about a mirror 200 inches across.

BM: That's right.

SS: So, you're talking about how you became interested in the places around these sites.

BM: That's right.

SS: Was that also true for the Palomar Observatory and the mountains over there?

BM: Oh, the chaparral, yes, definitely. **SS:** Yes.

BM: Chaparral is such an interesting system. It's fire-adapted, which a lot of people are building in it, but they really didn't seem to grasp that when fires would happen, they would break out and be very intense, and tons of fire would go up slopes and hit houses up on the top. They expect their homes would be fire-free. So, it struck me that some people were not understanding what kind of an ecosystem they were in - what had come earlier, and then, what the dynamics of the system are. I saw that also in some of the floodplains back in some of the Midwest area, where folks would constantly build and rebuild in areas that would flood annually or every so often. Why would folks want to build and live in areas that are prone to and adapted to these sorts of intensive catastrophic events?

SS: Human hubris and arrogance?

BM: No. I think it's just lack of understanding, lack of knowledge, really. So, in that sense, I wanted to do something where I could provide some insights, scientific understanding, like from the standpoint of studying cut-blocks and clear-cuts and what comes afterwards, instead of just assuming it has no influence, either good or bad.

SS: Now, who would have been your scientific heroes in your early years, but also in your early professional years? If you want to say a couple astronomers, and maybe a couple biologists, people that you would have looked to or you would have always read what they wrote?

BM: How about the 19th century philosopher, Henri Bergson, because he was one of the very few, very first, who wrote about evolution from a philosophical standpoint. And that really hit home, too.

SS: Was that post-Darwin?

BM: No, that was pre. [Post-dated Darwin by a little - Marcot corrected].

SS: That's what I thought.

BM: I don't know if Darwin had tapped into that or not. But, I was definitely into understanding the roots of philosophy. Philosophy of science, and especially of nature, and how folks evolved their thinking, to better understand where we are now. Otherwise, we're doomed to repeat it and all that.

SS: And there's a couple things I picked up off your website and some of the things, and we'll talk about that near the end of the interview.

BM: Okay.

SS: But along the lines of philosophy of nature and perception, and things like that.

BM: Okay, okay.

SS: Darwin, I don't know about, philosophically. His father was a minister.

BM: A poet, also.

SS: Yes, but he read--

BM: Erasmus Darwin, yes.

SS: But right before he left [on the "Voyage of the Beagle"], he read a lot of Charles Lyell's uniformitarian geology stuff.

BM: Yes.

SS: Basically, the historicization of geology led directly to him seeing biology in a very long duration, historical way.

BM: Lyle was a uniformitarianist, right?

SS: Right, right.

BM: Which basically says that things had been always as they are now, right?

SS: Or the processes. [Consistent geologic processes/effects over time.]

BM: Right, right.

SS: The processes are similar enough to where you can judge, based on looking at [current processes], that you could take it back in time and interpret the past. Just like an anthropologist would say, here's how these people lived, and then look backwards in time. Although, you can be accused of what they call the "presentist viewpoint."

BM: Good, right.

SS: But still, yeah.

BM: Yes, and the flaw there is that it did not take into account things such as tectonic plate shifts and continental drift. One of my favorite books, and this is really quite a side point here, but one of my favorite books is by a fellow named Darlington, published I think in 1957, on zoo-geography of the world, in which he looked at where groups of animals are. You find similar animals, say, in the southern part of South America as you do in the southern part of Africa. Why? His explanations for that, and borrowing from others, too, was entirely self-consistent and was pre-tectonic plate theory.

SS: Which is actually fairly recent in terms of being accepted as a paradigm, the truth paradigm, and by that, I mean like 60-70 years [Early 1960s].

BM: That's right. But the lesson there is that science at that time was self-consistent, was able to explain what seemed to be anomalous observations. You have the same species or same taxa found in completely different, distinct parts of the Earth. Why? Well, not understanding about plate drift and that sort of the thing, the explanations were cogent, they were consistent. It made me think that, well, science does this. Then, you know, Thomas Kuhn, with the structure of scientific revolutions, says that every so often there's a paradigm shift, and that's kind of overstated. But in that case, that's what happened, too. It taught me to be real careful about assuming an explanation is always correct, if it's consistent with observations. Because you can come up with a consistent cogent explanation that is consistent with observations that's wrong.

SS: Observations can be very simplistic. They can be not eclectic enough, not pluralistic enough, not

historical enough, not geographic enough. I mean, we all have our own lens of where we came up, or where we live or where we formed as a person, and that's always going to be the filter. I think it depends on how we get outside of that and look at all the other evidence.

BM: That's good. And that's sort of why I was really influenced by studying philosophy of science. The early days of Carnap and others back in the early part of the 19th century, who were called the logical positivists, posited that there are such things as absolute facts, absolute data information that we can basically understand everything if we have adequate observations. And it was almost kind of an ultra-sort of mechanistic viewpoint. Whereas, in the '60s, there was a real shift in philosophy of science, what's called the, I think it was the "new wave" of philosophy of science, where folks were talking more about context of observations. Not so much that things are arbitrary in our understanding, but they're relative to context. That always made a lot of sense to me. So, just like the Darlington book, pre-tectonic plate drift theory, explaining species distributions in a very, very cogent way, sort of how the "new wave" would say it's okay if there are shifts in understanding and shifts in explanation. So, that really hit home as I got more and more into ecology.

SS: The same thing happened in my discipline where the objectivist paradigm of history, where you can always find facts and its objective, and you can create a "real" picture of history, whatever you're writing about, wherever you are. And the post-modern era, or the '60s and after, or however you want to call it, exploded a lot of those notions, to where it said, no, you don't know everything, and everybody's got a filter, and it's not the only filter. So, it made my field, as I was growing up professionally in school, incredibly pluralistic, almost to the point of being relativistic where you didn't know where you stood sometimes. But nonetheless, I think the old paradigms you were talking about in your sciences and in my field, they had to be challenged, and maybe exploded and reassembled.

BM: Yep.

SS: If that makes any sense.

BM: It does, it does. Almost like realizing that Newtonian physics does not explain everything.

SS: Hey, Newton got a lot of things right, but there's a lot of things he just didn't know because it was the 1700's.

BM: Sure, that's right. (Laughs) This is true.

SS: So, you're at Humboldt State and you had the experience you told me about regarding the Redwood groves. What particular mentor, classes, experience, disciplines, could you say, that shaped you from that point on, that you would then take and that would be the most, not, I won't use the term determining factor, but the most influential on your career?

BM: Humboldt State. That's only a four-year college, so I got the Masters of Science there. When I finished that, I was offered a job for a year-and-a-half to fill in a sabbatical leave. So, I taught full-time there in wildlife ecology. I was given a completely free hand to teach anything I wanted, so I taught "Introduction to Wildlife Ecology," "Population Science" and "Ecology." I taught a course or two over in math on application of modeling and quite a few things. The person I filled in for, who was my de facto advisor, a very-good friend, a professor named James, or Jim Koplín, K-O-P-L-I-N. He was not very well-liked, because he was really gruff and had this very rough, sand-papery sort of attitude. And once you got past that and sort of challenged him, he was kind and he would take time, and just a wonderful, wonderful experience to interact with and to learn from. He was always there for me. Yes, so, that meant a lot. He passed away some time back, so I was very, very sad to hear of that.

Also, a fellow named Ken Lang, L-A-N-G, who was in the biology department, ended up being my senior prof on my thesis work, even though I got the thesis in the Department of Fish and Wildlife. Somehow, Humboldt State was open enough where I could actually craft my own degree. I was able to draw on

ecology from Ken, and yet draw some of the wildlife management part from Koplín, even though he wasn't really formally on my group committee. So, there were certain courses like ecology, I took from Ken Lang. That was outstanding and insightful. I took a limnology course that was very interesting. It got me so interested that I was asked to teach the lab, even though I was taking the course at the same time because of the study I was doing on ponds.

But there were several courses in philosophy I took there. I've always tried to advise students, don't just take courses in your field of study, be broad, look at language and art, philosophy, history. Because that will really help you understand better whatever field you actually focus on. Since then, I've done so much work in other parts of the world. I'm really glad I had a spattering of first, all sorts of languages, history and so on.

SS: It sounds like Humboldt State was the perfect place for you, rather than if you'd gone to one of the big-name universities, and you would have been locked into a particular canon and tract, you would have had probably some really strong-willed, famous scientist on your committee, and you would have been more trapped, instead of free to form your own paths?

BM: Absolutely right. Yes, I was given a free hand to craft a thesis, craft a project. Work any way that I had an interest, as long as it conformed to sound science. But you're absolutely right. Back in UC-Irvine I recall sitting in physics classes of 300-400 students plus, sitting in the back, you could hardly see the prof in front. There was no way you could ask anything. There's nowhere to go in after hours. Yes, Humboldt was much, much better, much more interactive.

SS: Yes, I went to Arizona State.

BM: Oh, yeah? I spent time there.

SS: And it was huge when I was there as an undergraduate. I mean, an economics lecture hall with 350 students.

BM: There you go.

SS: I think I only had one other one that was just like that, but ASU had 50,000 students, so they had to pack them in somewhere.

BM: Yes, right. **SS:** Where did you do your Ph.D.?

BM: At Oregon State.

SS: At Oregon State.

BM: University in Corvallis.

SS: Right, and tell me how you came to come up to Corvallis.

BM: That's good. I haven't thought about that for years. I was doing a contract, temporary [employment status] in the Forest Service. I had finished up thesis work on the M.S. at Humboldt State, and was doing a project for the Forest Service on clear-cuts, looking at birds in the early seral stages of vegetation succession in the Klamath Mountains, a study that hadn't ever been done. I was on a temporary stint with the Forest Service, and it was Jack Ward Thomas and Jack Capp, who worked at the Region 5 office, in San Francisco, California, who had interests in sponsoring me to go for the doctorate. They knew I had a real strong interest in the Forest Service, and doing science helpful to planners and folks in management.

SS: And this was the time when the "-ologists" [scientists] were becoming more and more integrated into the Forest Service, in the '70s and '80s. The agency wanted to do that, but then saw it as a necessity, because of all the new environmental laws, and they needed evidence to do whatever.

BM: That's right. They set me up with a contract, which I wrote the science part of a clear-cut study, post clear-cut, to study mid-stage vegetation growth in the Klamath Mountains, looking at birds. They directed me to speak to a fellow named Charles Meslow, who was Professor at Oregon State in the Department of Fish and Wildlife. I hopped on my bike, my Honda, from Humboldt, rode up to Corvallis and saw Chuck Meslow there. He, rather begrudgingly, accepted me as a student, and the Forest Service was going to essentially pay for my stint there. I showed up in his office, had my helmet in hand and my bike jacket on, my boots, and long hair, and the first thing he asked me was, "Do you hunt or fish?" Because at that point, I realized that's the department I was in. It was going to take some interest on my part to bring more of the hardcore math and physics and science and modeling that I had learned early on into this field, at least at that point and in that place. Eventually, Chuck Meslow and I got along just great. He was so helpful with everything, always there for me.

SS: At first, you were wondering if you were going to receive a good reception, because you were the "biker hippie" from California, right?

BM: Exactly, right. That's right. **SS:** By the way, just for the record, what CC Honda did you have that went all over the continent?

BM: It was the 450.

SS: It was a 450.

BM: Scrambler, high-pipes. A couple times, I had semi-knobby tires, because I would take off on extensive dirt roads. You know, I rode the Alcan up to Alaska, of course, through the Yukon. And that was when it was all dirt, dirt and gravel, too. Yes, so, a 450.

SS: Had to know for the record, the bike we're talking about all the time.

BM: No fairing, no shield, anything.

SS: Those were reliable [Early Hondas were known for their reliability].

BM: Oh, man.

SS: Till the end?

BM: No, no. I put 80,000 or 90,000 [miles] on that bike, which at that time, was a lot of miles. It was a dual-vertical twin, double-overhead cam. I did all my own tune-ups, work on it and everything. Tuned the dual carbs by ear, like that.

SS: So, you're in Corvallis now. And you're studying under Meslow and some other people.

BM: Right.

SS: Tell me about that experience and how that augmented, changed, altered, or just added, to what you'd already done, or did you change them?

BM: Both. I think. Oregon State was tough for me because it was like going to a rigorous, confined-sideboards [situation]. I did not have the latitude that I had at Humboldt State. For instance, I recommended trading out some of the mandatory courses people said I had already done or known for other things, like art history, and they said, no, I can't do that at all. So, I ended up at the doctoral level, just being a student at the back, or not back, or inside a class, having to parrot back what the prof said. It was very, very scant interaction with other students, and almost none with any of the profs. So, I just wanted to finish up and get out as soon as I could there. I just kept my head down and I was able to make some shifts and changes inside the department I was in. I was instrumental in talking Chuck Meslow into, and bless his heart, buying

the very first PC ever for that school. It was an IBM PC. I think it was like 1982, that it had just come out. This was the XT version that had a 10-oh, boy, it had a 5-1/4" floppy disk and a 10 Meg hard drive on it. And Chuck said, "What are you going to use that for? We have the main frame." Well, I ended up doing the thesis work on it. I did all the stats on it.

SS: You got involved in computer work fairly early on, didn't you?

BM: Well, back East, my folks, God bless them, would always give me science kits. I built a computer, a plastic working digital computer, I think I was 12 or 13 at that time, from a kit by Edmund Scientific Company. And it actually worked. There were sliding plastic bars, you could put in pins to program it a certain way. It had a digital, zero-one output. So, that's the way I learned, very, very early on.

SS: So, during this time, you got your doctorate in '84? Am I correct?

BM: Yes, that's right.

SS: And everything is changing in the late '70s, early '80s, regarding forestry and the Northwest. All the things are either happening or building toward the Forest Wars, the debate over how we're going to manage our land, clearcutting, everything that would define the next 10-15 years and even to the present day, but especially up till the [Northwest] Forest Plan itself. What do you remember about that process as you were coming of age intellectually and professionally, coming up from Humboldt, you had your traumatic experience of the Redwood grove, you come up, you see what's happening in Oregon, you see the lawsuits are starting, the owl is starting to be discussed as an endangered species, but not listed yet. Tell me how you came into that process -- and you're back in the Forest Service again?

BM: When I worked for Six Rivers National Forest in California during the mid-'70s, I built for them the first wildlife habitat information base system that set up a database on all vertebrate species, including data for each species and their micro-habitats, niche attributes, and key ecological functions. And I did that on a Tektronix 4050 micro-computer. Remember, this is early, this is like circa '76 or so, '77.

SS: I remember when Tektronix opened their plant up here by Portland.

BM: That's right.

SS: It was like, wow, all the smart tech people are in Tektronix.

BM: Silicon Valley of Oregon, yeah.

SS: Right, right. Before the modern digital age.

BM: Yes.

SS: The mechanical computer age, would that be a better way of saying it?

BM: Well, no, it was still digital.

SS: Well, anyway.

BM: It had 8-inch or 10-inch floppy disks, and streaming tape for backup; that was new. I programmed it in a series of languages, like Basic A. I wrote a compiler for it and a data entry system. Then, I wrote a program where you could do freeform Boolean query. This is for the Forest Service, that would allow managers to ask things like, if I was to change a habitat, change a forest type, or change an age class of forest, harvest it and take out snags, or leave snags, to bring in deadwood, or not; what species could be adversely or positively influenced by it, by querying this information base system. That was one of the first times that had been done.

I finished up the doctorate, and then, my wife and I, late '84, came up to Portland and I started at the regional office [Region 6] of the Forest Service. And so, I brought that experience of trying to look at wildlife systems as a whole, of not just all the species, but also all the habitat attributes that they need, and all their ecological processes and functions, which species tend to pollinate, which species tend to disperse seeds, and on and on. I brought that into the realm of old-growth management, as we started to worry about the loss of old growth from folks like Jerry Franklin and others. So, I built one of the first information bases looking at old-growth species. And that was pre-Forest Plan in a project called the Scientific Analysis Team, or SAT, that was led by Jack Thomas.

SS: That was even before the ISC Report [Interagency Scientific Committee] came out. Right? And that would be late '80s?

BM: Correct. Yes.

SS: How would you describe Forest Service culture in the '70s and the '80s, with the traditional management class vis-à-vis the "-ologists," the science, the people that are coming in, their ideas are swirling around, and the new ideas, and this is what the agency needs to consider? What do you remember about the culture and how receptive or not receptive it was, and how that started to change?

BM: Well, I'll just speak for myself. I tried hard to work with silviculturists and foresters, and I have worked at the Pacific Northwest Research Station (PNW) of the Forest Service, out at the [ranger] district offices, at national forest supervisors' offices, a couple regional offices, and the Washington D.C. office. And really, always tried to get along with silviculturists, foresters, planners, when out in the field. I felt that they had the greatest power, in a sense, to really influence what's going to happen out there.

SS: Especially in that era.

BM: Yes, that's right.

SS: I mean, you hadn't had the paradigm shift occur, the one that became more inculcated as it did another generation later.

BM: That's right. But still, in spite of the fact that I tried to work closely, and there were some who were wonderful at the regional office in Portland to interact with, and out on the national forests and within individual offices of the forests. There were others, and I don't want to bring up any certain names, who viewed me as an outsider, someone who was trying to cause harm to their interests and thinking. I felt compelled to tread carefully in certain offices with certain people. On the spotted owl, there was one person who was put in charge of the spotted owl project at the regional office, and again, I don't want to bring up names, but he was apparently ousted from his national forest for having illegally obtained firewood off of his own forest. Whether that's true or not, I don't know. But he clearly had an "attitude," as did the regional forester at that time, that the "-ologist" coming in was someone to have to train, to direct.

SS: Almost like breaking a bronco, right?

BM: Well. (Laughs) Maybe an ass, but that's rhetorical.

SS: Okay, you brought it up.

BM: That's okay. Oh, there were times when I probably was.

SS: I didn't want to go there, but I'm trying to make a point about, well, you brought up Thomas Kuhn earlier, that you can even extend the theory of scientific revolutions in different areas, as he talks about "normal science," scientific revolution is the buildup to the paradigm shifts. You can even take that analogy to human psychology in the institutional behavior in terms of how the energy builds up, something then cracks, and then, something goes forward. And I think that's a good model you could use to describe a lot

of things, institutional, and cultural, and technological.

BM: Very interesting. What causes the crack then? Is it science, is it sociology, what causes the crack? Social psychology?

SS: I think it's everything. It's like we were talking about studying ecosystem science, a holistic, eclectic, scientific discipline of disciplines, really. And we can also look at what we're talking about from any one of those angles, psycho-analytic theory, sociology, history, political science theories, etc., and they all have a part. They all have different languages, in explaining really the same process, just from a different angle with different descriptive mechanisms of the subjects. If that makes any sense?

BM: Yes, it does. That's good.

SS: I've heard from a lot of interviewees in this project, and others regarding the new ideas and new people, and I don't want to use the word threaten, because some people viewed it that way, as it was challenging the established order. With the Forest Service, especially in the post-World War II era when industrial forestry got rolling here in the Northwest, it was an established order. There were the timber people, there were the managers, and a good-old boy network. It really was good-old boys, because there wasn't too many women, if any, in some of those areas.

BM: Exactly right, yes.

SS: And so, it was a culture of society.

BM: I'd like to say, though, shall we? (Airplane noise)

SS: We're going to take it off just for a sec here. [Break in audio]

BM: The point I wanted to finish with was, at the regional office in Portland, back in 1985 through the late '80s, in the Fish and Wildlife section, the director of the Fish and Wildlife section there was Hugh C. Black, who was prescient. He was absolutely wonderful. He was part of the old school, part of the old, good-old boys. But he clearly saw that quantitative science looking at information bases, bringing science into management, was essential. He gave me so much help and support, ensuring that I'd be hired on. If it wasn't for him, the earlier folks, Jack Thomas and Jack Kapp, I would have probably not gotten nearly as far in my field as I had at that time and afterwards. So, Hugh Black was a very, very thoughtful and forward-thinking "old guard."

SS: I'm going to ask you a two-part question, and I'm thinking on my feet here as we're going through this.

BM: Okay. **SS:** Now, Oregon State University, and especially at that time, if you'd gone mostly into forestry, it was kind of old-school forestry at that time. It was becoming challenged, but it was still kind of old-school forestry? Correct?

BM: I did a minor in silviculture and forestry. So, I took courses over there and they had no interest in someone coming in from cross-discipline interests. They were there to learn forestry and forest operations, period. Okay.

SS: No, that's okay. I was just saying, you already had a perception and practice because you went to school down in California, but also you needed to work out in the field in a more eclectic, interdisciplinary way. So, you had a different perspective on land management than maybe regardless of what they would have tried to have taught you at Oregon State. Am I correct?

BM: Yes, right.

SS: But you're still going to have your other views. How did you reconcile those two?

BM: Patience. Honestly. There were quite a few times in the '80s at the regional office of the Forest Service, where we would present things to the regional forester or to other departments and groups, where introducing the idea of having a cross-discipline approach to managing landscapes, to managing old forests, as important, not just socially and culturally, but ecologically, was met with disdain and old-school attitudes. There were wonderful people like Hugh Black, who, thank God, they were there to help. But I recall sitting in quite a few times on some of the early sessions of the regional forester in his office, and others there, and I'd be called upon to help explain what I was doing looking at the suite of species associated not just with spotted owls, but the other attributes of ecological functions of old forest systems. It would be met with silence. Then, the director, the one who was less than ethical, like I brought up earlier, would turn to the regional forester and say, "We'll fix this." Intending to mean that there's nothing that I was going to do that was going to get in the path of their interests, of timber harvest first, basically.

SS: How do you remember the conversations going on as the momentum and the energy built up during the '80s? You were there, really the last half of the '80s, leading up to the lawsuit by the Seattle Audubon Society, the Dwyer injunction. [Over northern spotted owl/Endangered Species Act.]

BM: Sure.

SS: What do you remember about the "old guard" reacting and even adapting, and how people like Black and other people started saying, well, we need to start going this way? How do you remember that dynamic?

BM: Just extreme tension. Back in physics, I would have called it a high mu value, which is the coefficient of friction, basically. That's what it was among many of these people. I gave a talk at an old-growth conference. It was held at the Arlene Schnitzer [Performing Arts Center, in Portland].

SS: Concert Hall.

BM: Concert Hall, that's right, downtown Portland. I was on the last of the day, and I talked about how different people view old-growth differently, so you can end up with inventories that seem to be different, and that could be explained according to attributes they used. But toward the end, I sort of injected my view and said, regardless of what you use, you're still dealing with these astounding, iconic, unique systems, which, if your interest is to preserve the full suite of all ecological attributes out on forest lands, there's nothing like them. I found out much, much later from a colleague who was sitting in the audience that a forester or two sitting next to him, started to "harrumph" and growl, about how dare this scientist come up there and tell us something about sociology or cultural values of forests. He's stepping outside of his scope. Yet, there was Jerry Franklin doing that as a matter of course, among others. So yes, there was that tension, friction, that was very, very obvious, personally, and then inside the culture of the agencies, plural, so including BLM, principally, inside the Northwest area.

SS: So, I take it that Jerry Franklin and what became called "New Forestry" during the '80s and the early '90s, was not met with open arms initially, except for a few open-minded people?

BM: Uh--

SS: Or was that too generalized?

BM: No. I think Jerry was trying to introduce new ideas. We have to mention Hal Salwasser.

SS: Hal Salwasser from Oregon State? [U.S. Forest Service before OSU.]

BM: Yes. I knew him way back in Humboldt County era. He had a strong interest in helping me early in my career, which I think he saw would help him, too, at the Forest Service regional office in California. He introduced the idea of "New Forestry," or, I'm sorry, "New Perspectives." That was his idea. That was the program inside the Forest Service, both at the regional and finally at the Washington office levels, he was

trying to introduce that would integrate a lot of Franklin's New Forestry ideas.

SS: In the archives I am curating now, from the late '80s and early '90s, there's a lot of documents on the New Perspectives program in the Forest Service.

BM: Good. I give Hal Salwasser just great applause and kudos for having done that. So, he was on sort of the contrary side to the frictionists, if you will.

SS: Frictionists? (Laughter) Is that a political party?

BM: No comment.

SS: Now, tell me a bit more about how you developed as a biologist in terms of the species of the most interest to you? Obviously, you studied a suite of species, but you became known for certain things. How did you become attached to certain species, more interested in birds or whatever?

BM: I have always tried to stay general and broad. I studied birds for the Ph.D. dissertation. But it was all birds out there that I could find. And then, elsewhere, I studied soil invertebrates and algae and mammals, and just, you know, all plants, all the taxa, so that I could just learn about systems. So, I see myself more of a systems ecologist than a species specialist.

SS: And a wildlife biologist, because people generally get tracked into a certain group.

BM: Which we need, and that's good. Absolutely. I did an early survey and study of the northern spotted owl in the Klamath Mountains. That was under a contract for the Forest Service. I was doing that at the same time I was doing the early stage of my dissertation and teaching at Humboldt State; actually, all at the same time. That was '76, published, I think, in '77. I also studied the flammulated owl at the same time, again up in the Klamath Mountains. This really got me into owls, as part of my "severe [intellectual] disease" of wanting to study everything as an ecologist, so many things that I have not wanted to focus on one thing as a specialist.

SS: What is the strength and what is the weakness of focusing on one species, for instance, the spotted owl, the murrelet, as indicator species -- politically, ecologically, or management-wise?

BM: Well, strength-wise, it's important when you can collaborate with others who have a different context. I was a biological advisor for the first round of the Northern Spotted Owl Recovery Team [U.S. Fish and Wildlife Service] work, and parts of that team were spotted owl experts. Marty Raphael spent time doing studies of marine species, resource selection, that sort of thing for that species. I think the strength is to have both of us on the same team. I've always sought out working on teams with others who have complementary skills and interests. So, I'm not sure what pros and cons there are of each, being a generalist versus a specialist. And early on, I didn't want to become a generalist in the sense of having just a spattering of knowledge of --

SS: Everything?

BM: A lot of things superficially. I made up the term "frictionist." No, I made up the term "comprehensivist," to be sort of comprehensive. You still want to focus on a certain system or ecosystem or geographic area. But then try to learn much about it, even in some cases, extending out to socio-ecology. So, I've done work in India and the Congo, the Russian Far East, northeast China, Bolivia, Australia, New Zealand, in Canada, and elsewhere too, formally. I've done lots of traveling elsewhere, but trying to understand the ecological systems, in cultural and human historic contexts; I think it's very important. That's all part of being a "comprehensivist," if you will.

SS: If you were going to, and this is a take-off on that, and might you say that you were just saying it right to me now in another way. How would you define ecosystem science - if you were going to define it in a

paragraph?

BM: Traditionally, it focuses on flows of substances and energy at the ecosystem scale. That's really what an ecosystem is. That's different than community ecology, which focuses on how species interact, diversity of species, in a system.

SS: Charles Elton's model, right, to some early stuff?

BM: Yes, MacArthur's, and others, too. An ecosystem is the combination of the abiotic realm with the biotic realm, which means you have to look at flows of energy, flows of substances, hydrology, cycles of nutrients, all that sort of thing. That's what a true traditional ecosystem science would focus on.

SS: And you talked about the SAT study. [Scientific Advisory Team]

BM: Yes.

SS: And you also talked about Jack Ward Thomas. How did you get involved in the Northwest Forest Plan, and I mean the predecessor studies and planning, and the whole dynamics leading up to that, and its personalities? If you want to just kind of take us into that?

BM: Jack Thomas was my major professor for the doctorate. He was at that time an affiliate or adjunct at Oregon State, even though at that time he was a senior scientist [USFS] at LaGrande, Oregon, over on the east side.

SS: He was doing his wildlife stuff back there.

BM: Yes, elk on Starkey [Experimental Forest, in eastern Oregon.]

SS: Right, Starkey.

BM: Yet, he agreed to be my major prof. Well, actually, that's not true. Chuck Meslow was formally my key prof on that committee. But Jack Thomas was on the committee, and he and Chuck sort of served, arm-in-arm, for me. I used that to become familiar with Jack, and he with me. I went up to the regional office [Forest Service] and got involved in the spotted owl program, and when it came time to establish the Scientific Analysis Team, the SAT, with Jack Thomas at the helm, he knew of the work I'd already done on compiling autecology information on full suites of species at the systems level. He asked me to come in on that project and to do that for the old-growth focus the SAT project had, and after that, with the ISC, the Interagency Scientific Committee, on spotted owls.

SS: Which was like a year or two later?

BM: That's right, tiered off the SAT, and he asked me to help on doing some of that work. I was not one of the formal authors on that [SAT], but was on his work crew. So, bit-by-bit [was more involved with NWFP process]. Then, when FEMAT, the Forest Ecosystem Management Assessment Team was formed at the direction of President Clinton, Jack was the head of that, too, and he asked me to come head up defining information data-bases on other species, focused on old growth. I decided we should extend that to all taxa of plants and bryophytes and lichens, and lots else there. And I came up with processes to hold rigorous expert panels, to bring in experts to help fill in information gaps through their knowledge.

SS: This was during FEMAT?

BM: FEMAT, correct, yes.

SS: During the, as I like to call it, the "90-Day Slumber Party."

BM: Oh, geez, slumber party?

SS: I mean, people were almost "camping out" there for like two or three months?

BM: Oh, that's right. "Big Pink" was the name of the building there that we occupied.

SS: Well, "Pink Tower," or whatever. ["Pink tower" used most often.]

BM: Yes.

SS: So, that's what you called it? Big pink, huh?

BM: We called it the "big pink," that's right. And I forget what floor we were on, the 14th floor or something.

SS: I think it was the 14th.

BM: Oh, god, I'm having flashbacks.

SS: I was going to wait a little bit to get to that, but since you're in the train of thought, let's talk about the FEMAT experience, because that's, I don't know if I'll say it, a one-time thing, because we really haven't seen something exactly like that happen again, where you had a presidential summit, immediately followed-up a campaign promise with action. (Laughter) That's not sarcastic, it's actually unique in the way it happened.

BM: Okay.

SS: Clinton shows up, they have the big summit, and you're charged, you get sixty days, and then "they" said, we need thirty more days. You were basically given three months to do this massive synthesis of all these things. [Clinton admin. gave 30 days to create better alternative].

BM: Right.

SS: So Jack was your conduit, he's the one that pulled you in immediately? Correct?

BM: Yes, right.

SS: And did you have to drop what you were doing elsewhere and just go full-time with that for a while, like a lot of people did?

BM: Well, no, I was pretty much doing the same thing, looking at sort of multi-species planning approaches.

SS: Okay.

BM: We could not have done that part of FEMAT if we hadn't already done the SAT work and the ISC spotted owl work. Because that all served as a vital basis, not just a concept, but in fact for databases through their efforts and we built on them. So, I think Jack saw that he needed to build on that, use that, and why not bring in one of the people who was instrumental in framing all that earlier work? So, that's how I got in.

SS: Tell me about that experience? You've got all these science people and really a minimum of management people. Tell me about the experience conceptually, but then also if you've got some anecdotes and experiences, throw those in as well.

BM: In concept, we each had our focal areas up on the 14th floor, had our sections, on this open, very open space, where we had the wildlife folks here, we had the aquatic and fish folks over on the other side,

but they certainly would direct a lot, too. Basically, from the wildlife end, there was Marty Raphael, who ended up being vice to Jack Thomas on the whole project. He was there with his outstanding expertise and information. Richard Holthausen, who went by "Holt," someone else I need to unendingly herald who helped me in my career, and a friend. He's retired now. He was part of that, and several other folks, too. It was not a small team of folks dealing with wildlife, and we all got along well. We realized this project had to be done in short order, and we all had the same vision. If we had not had that, this thing would have folded. So, I'm just really grateful we had the team there that we did. We were able to parse out different tasks among ourselves. I would stay around just to help the framing and structure, the expert panels, and then, how to consolidate their information into queriable tables of information databases. And then, the different sectors, whether it's the aquatic or forestry or economics.

SS: Social science?

BM: In our group, social science, had some time to interact, but I drew up parallels to that later when I was lead ecologist for the Interior Columbia Basin Ecosystem Management Project, over on the east side. That's another project which was massive and huge. So, FEMAT maybe served as kind of a template for that too, in some respect.

SS: Some of the people I've talked to consider it a template in a sense, the idea of a collective, intense energy, and a focus on something.

BM: Yes.

SS: In that sense, I think.

BM: Now, during FEMAT, every few days there would be a consolidation meeting we would hold with selected sort of heads of each of these specialty groups; the aquatic group, our group, social science, and so on. There was a round table where Norm Johnson and Jerry Franklin would invite discussions to try to figure out how best to knit all of our findings. What are the tradeoffs, basically? That was one of the key things. In order to provide for greater amounts of old growth to be preserved in various kinds of reserves, and what kind of reserves. Then, what are the tradeoffs with timber that could be harvested. What are the social implications, and so on. Some of those round tables got a bit testy, as I recall. I don't want to aim this at any anyone, just that under such a short time frame, I felt that, especially Norm and Jerry, bless their hearts, knew and felt that they had to be sort of part scientist and part manager, too, to think ahead as to what would be more acceptable.

SS: But somebody had to make those decisions.

BM: Well--

SS: Because sixty to ninety days is not very long to come up with a product.

BM: To clarify, the FEMAT team was charged with coming up with alternatives. We were not charged with making the decision, or even pointing out which is the correct choice for conservation and forestry planning.

SS: From the "green dream" to a more timber harvesting-friendly layout? [referring to range of "alternatives" in FEMAT].

BM: Yes, and there's a side point about that. Back to the project. There was a management team instituted toward the end of the FEMAT science team, the management team charged with deciding what recommendation to make to the directors, the heads of Forest Service and BLM. It's the management team, essentially, which amended our option, Option 9 ["alternative"], which ultimately became the Northwest Forest Plan.

SS: Right.

BM: So, the Northwest Forest Plan was not directly taken from any of FEMAT's options. They amended and slightly updated Option 9.

SS: You're talking about the Record of Decision that came later?

BM: Yes, correct. So, that was a point of policy, a point of decision-making, a point of sociology, separate from the science. So, the FEMAT team and science, and yes, it was a very intense time, but I thought we had the easy part there, to look at tradeoffs and outcomes. In a sense, it was easier doing that in a clinical fashion than then having to take the tough choice to entertain, from the decision end, what your decision risk is? Risk attitude, what you think is playable politically at that point-in-time, culturally, socially acceptable, and so on. That was the tough part for them.

SS: How do you view the spotted owl, the northern spotted owl, as a biological entity, as a philosophical entity, and as a political entity?

BM: It's iconic and an icon in all three of those, definitely. Traveling around the world, it's surprised me, how many folks have heard of it. You know, this obscure, fairly small raptor here in the depths of dark old-growth forest, that many folks have heard of because of the controversies and sociology involved. So yes, it is iconic in that sense. It's also iconic in the sense of raising tremendous hatred and ire in those early days. You know, we saw bumper stickers on how to fry a spotted owl. I think, of course, the media sort of had a role in over-simplifying things of "owls versus jobs." And this is the point I want to come back to.

SS: You'd often see headlines, "Owls Versus Jobs," literally those words.

BM: Exactly right.

SS: And so, anyway.

BM: There were two alternatives the FEMAT team came up with that were virtually identical in terms of the amount of timber to be harvested. But one had substantially greater conservation value than the other one did. And I've always pointed it out. So, it's not that we tried to grade everything that you were saying earlier, from "save it all," to "cut it all," but the cutoff line is that the bird is saved versus the bird goes extinct. Somewhere in there toward the center was an option for being able to provide the same amount of timber, but have a higher conservation outcome. Not just for owls, but for everything else in old growth. That was the difference that I thought was really, really interesting.

SS: To give you an idea of the legacy of that simplification is next to our house down in Eugene. We just had the lot, the vacant lot disappeared, and a house went up. The builder, a nice guy; we started talking about stuff and I told him I worked at Oregon State, and it led to a conversation about his family and logging. He said, "And well, had to go into construction because of the god-dang owl." (Laughs)

BM: There you go.

SS: I mean, twenty-some years later, it's still that simplistic, dual-viewpoint that you talked about in the media headlines, for instance.

BM: Yes, yes.

SS: And you and I know the complexities behind the history and the owl and the biology, and that's really one key factor, and it was actually a political lever, if anything else.

BM: Quite, that's right.

SS: And it still is.

BM: Yes, if you look at how much of the owl's old-growth forest environment is left, Franklin says it's four or five percent, since we had that. So, what is the incremental opportunity cost of that? You know, folks can't or don't care to think about that sort of thing, as long as it's out there, it's still a threat to living and economy. What if we go ahead and take all the old-growth out, and therefore were left with a glut of very early-seral stage forest, you have to wait till that comes back online, so you have to start to buy more, perhaps from Canada or elsewhere. And so, there are definitely higher order dynamics of this thing that you have to think through.

SS: Now, we're going to go back to the planning stuff, but I want to segue into the broader point; why are old-growth forests important?

BM: For what?

SS: Biological, philosophical; however you want to answer that.

BM: Each of those contexts has an answer. Where do you want to start?

SS: Where you would like to start.

BM: Historically and ecologically. There is this wonderful scientist from the University of Washington, Linda Brubaker, a forest and paleo-ecologist who researched the geography of old-growth in Pacific Northwest forests back through time. In "Climate Change and the Origin of Old- Growth Douglas Fir in the Puget Sound Lowlands," she identified Douglas-fir old-growth forests as having been present in the region for about 6,000 years.

SS: Post-Pleistocene? [Holocene]

BM: Yes. Right, so, that puts a long-term perspective on things. And folks who now argue we shouldn't worry about climate change, because if you go back millions of years, the climate has always shifted and cycled. And no, I don't think they are actual cycles, per se, but it's always gone up and down. So, the same thing with old growth is, one could argue that it has short-term paleo-ecological value, but in the long-term, there was other stuff here. There were cycad forests and all sorts of things. Why should we be led to trying to preserve and to fix a condition which itself over the long term, is labile? Alright. Okay, so I'm not sure if that's the history.

SS: That's a great answer.

BM: In the shorter-term, ecologically, in our own lifetimes, yes, these forest systems host and hold organisms and processes, resources of interest to us people, ecosystem services you don't find or find very scantily in other forest types or young forests. So, there are definitely some physical, biological, ecological attributes that are different and unique. If there's an interest in maintaining the full suite of nature, all species and functions and processes, then they definitely play a role. Socially and culturally, if you look at their role in aboriginal interests, and here I'm casting kind of a global view, in that sense. It's not just Native Americans. There is definitely great value in themes and stories, cultural venues, where old forests are very, very special. I've lived and studied a lot of these places, for instance, what's called the psycho-biology of the Garo Hills tribe in northeast India in the state of Meghalaya, a very isolated far--

SS: Close to Bhutan?

BM: Far west, south of there. Yes, in the Garo Hills. The Garo Hills tribe there, apparently originated some 8,000-9,000 years back from kind of some sort of Mongol source, and are very different in language, culture, everything. I've studied what's called "Jadoreng," the socio-ecological religion of the Garos prior to the Welsh coming in the 1800s and trying to convert them to Christianity. They held reverence to spirit ghosts, their old-growth forests, old forests of conifers, and hardwoods and oaks.

SS: There's something majestic about knowing that a living thing has been somewhere for so long of a period of time.

BM: On an individual organism scale, yes. Then there's the system in which that occurs, and how that tends to interact with everything. When I was working last time in New Zealand, I was asked to spend time with one of the Maori elders there up on the North Island. And they were trying to bring back some of their old-growth Kauri, K-A-U-R-I, forests. **SS:** Is it on the North Island or the South Island?

BM: North Island, back into some of the Maori ownership, and set it up as a big park. We talked about a metaphor of how Kauri trees, it's been observed that the roots will share nutrients with surrounding trees. And so, I talked about how that could be sort of an analog, for Maori culture on itself, and helping to share an understanding of the spiritual value there, of some of these forests with other cultures, essentially with the European culture, if you will. So, anyhow, I'm getting off the continent here. But yes, I've seen how old-growth forests play many, many important roles in cultures and ecologically, sociologically around the globe.

SS: So, the trees back East were much smaller, generally. I mean, there were a few groves that you would maybe have found when you were younger?

BM: When?

SS: When you were growing up.

BM: Right.

SS: Did you ever remember going to New England or somewhere, where there was still some "rump" big stands? Do you remember anything like that?

BM: That's right.

SS: In Pennsylvania, or anywhere, up in Appalachia, for instance?

BM: Exactly. My folks would take us, they were just great. They would take us on cultural trips to visit historic places where you would see these gigantic old hardwoods, oaks and maples and beeches, but nothing like the groves that I've seen out here, or elsewhere.

SS: Yes. I still remember going to the tree that you drive through, and I think it's in the Avenue of the Ancients in California there?

BM: Sequoia.

SS: Well, there's one in the redwoods, too, or there was. [In both places.]

BM: There was. I think it fell.

SS: I think you're right. But I remember when I was a kid and went through the Sequoia one, and even though today [chronologically-speaking], it's like, well, don't put a hole in such a big tree. I mean, that's our view today. But back then, I was like, wow, that is so cool.

BM: That's right. **SS:** It's the majesty of it all. The other analogy to living things and age is the oldest tree in the world, the bristlecone pine, which aren't physically big.

BM: That's right.

SS: You go up there on the White Mountains [eastern California], it's not like you're looking at a 300-foot-

high sequoia and a redwood or whatever, but you realize how many rings there are, like 4,000-5,000. The "Methuselah Tree," I think is 4,700 years old, something like that. It's just amazing.

BM: That's an icon of persistence, if you will. If you look at how gnarled and sort of wind-spun those trees are, it's iconic, not for the Greek column feel that you get walking through some of them, but it is just sheer persistence.

SS: Yes, like when you think about the redwoods or the big firs, you think about the majestic poetry of Bryant [William Cullen], or you think of John Muir, but when you go to these gnarled things there up high, I remember when I was taking pictures and it was near sunset, and I thought more of Edgar Allen Poe, you know, Gothic, weird kind of twisted, gnarled shapes and things like that. It was "beautiful," but when you reflect on the age, it takes you to a different space, I don't even want to call it, non-poetic space, but just a different place. It's an existential space.

BM: Yes.

SS: I think that's what. Yes. So, any anecdotes or stories in particular about the FEMAT experience? Pretty much everybody I talked to says a once-in-a-lifetime experience. Some people say, highlight of my career, was the whole forest plan thing, FEMAT was a big point, etc. Any particular anecdotes or experiences that were really profound? You talked about some of the meetings in general.

BM: No, as I also feel that way about the Columbia River Basin Project.

SS: In the Columbia Basin?

BM: Yes. I was in quite a few big projects. So, I really don't view it [NWFP] as the pinnacle of my career. I viewed it as an outstanding opportunity to contribute.

SS: Yes. Continue going wherever you were going.

BM: Where was I? Just saying that I see the FEMAT experience as extremely important to my understanding and career and productivity and contributions. But, it's just one of a whole suite of teams and projects that I've been on and am now. **SS:** How would you rate the product that came out of FEMAT in terms of what you were charged with, what came out of it, as it almost seems like an impossibly difficult synthesis in a short period of time? But how would you rate the product, in retrospect? How did you feel about it then, and how do you feel about it in retrospect?

BM: Product, meaning the FEMAT report, the science report?

SS: Yes, the science report.

BM: Or the Northwest Forest Plan that resulted from it?

SS: We'll get to the forest plan, too, but just the report itself.

BM: At the time, I was moderately pleased. I thought we could have done more and better to ensure greater rigor in the expert panel evaluations of species' viability. I thought that some of those, to me, seemed a bit rushed and a bit less rigorous than they could have been. And I learned a lot from it. Looking now back at it, I realize that we didn't, at least I didn't have the insights, as to the kind of rigor I could have brought to it that I have now, having run many other sorts of projects with those kinds of panels. Where I've sort of evolved from that point to a framework that I think has far more rigor. So, looking back, I think we did a fine job, whereas at the time, I thought we could have done more, if that makes sense.

SS: Yes, exactly. You being a computer guy from very early on, that was one of your specific skillsets you added to that process, your ability to model and analyze and crunch numbers and synthesize things on a

large scale. Correct?

BM: Yes. Although the FEMAT information we had to work with was very qualitative, categorical information. It's not like we had absolute amounts of size population, population densities, and viability quantified for all the species. So, I really wasn't able to bring forward those kinds of skills, you know, sort of an advanced statistical or computational skills.

SS: What would you say the strengths are and what the weaknesses were of that analysis, that document? [FEMAT]

BM: Well, strengths were that it was amazingly comprehensive in terms of the set of all the species and the taxa in looking at tradeoffs with many other resources. That's the strength, the comprehensiveness of it. The weakness was that a lot of it was indeed built on fairly soft qualitative information coming from species experts, at least from the species end of it. One might call it "expert opinion" or "expert judgment." I prefer not to do that. I'd like to think that it was expert knowledge, it wasn't just arbitrary opinion. Opinion is defined as in some ways sort of faith in something, not necessarily founded on fact. That's not what I wanted to do in expert paneling and that sort of thing. So yes, the adverse or perhaps the con side of it was that it was based a lot on information that was qualitative, fairly fuzzy, not validated through rigorous field studies.

SS: Or peer-reviewed stuff?

BM: Correct, that's right.

SS: Well, you can only do so much.

BM: That's right.

SS: And this was twenty-five years ago, so since then, there's a lot more things that have been done.

BM: But the decision was to tilt toward being comprehensive, instead of toward focusing only on information from peer-reviewed studies, which would have really sort of narrowed the field of what we could even speak to. I'm glad that we tilted toward comprehensiveness.

SS: Now, you guys finished the charge, then the Record of Decision [guidelines for implementing NWFP] is put together by a different team?

BM: Correct.

SS: Although there's a few people that might have been the same, but I'm not sure about that. There's a lot of moving parts.

BM: I was not part of that at all. So, I don't know.

SS: What do you remember about the Record of Decision, or opinions from your colleagues of what came out of that in terms of the actual implementable document?

BM: In terms of what my scientist colleagues were thinking - is that what you're asking?

SS: Or even the managers, either class. I mean, you're obviously, your close colleagues are science people, but still, you knew people from both sides.

BM: At that time, I think there was enough division in the old guard vs. new-way thinkers, if you will, that there were some who saw it as the beginning of the end of the economy of the Northwest, and others who saw it as a herald of the beginning of explicit attention to critical conservation needs. So, I can think of some folks on sort of each side of that span.

SS: Now, I want to ask you about one particular part of the Record of Decision that being, "Survey and Manage." The reason I ask you that is because you talked about how you wanted to study everything. You wanted to study the whole suite. And I've heard it discussed from various people in this project and outside of it, that, even though that's conceptually great, on a practical level for managers, it was problematic.

BM: Yes.

SS: And so, tell me about the dynamic for you, as a person who really loves to study it all, but then this document goes out there. And then there's real time and space in the field, and just kind of how do you do that?

BM: Well, the Survey and Manage Program and the standards came from the management team, again, of which I was not a part. When the Survey and Manage Program was instituted, it meant, in part, holding annual sessions with a ten-person evaluation panel consisting of five managers and five biologists. They would review biological survey and scientific information of certain species, be they lichens or tree voles or anything, as to whether they belong on the list of species to garner special attention for monitoring, and for study beyond what the aegis of the Northwest Forest Plan would do. Those species not on the Survey and Manage list were deemed to be adequately cared for under the general guidelines of the Northwest Forest Plan, the late successional reserves, the aquatic areas. The whole point of it really was try to find a way to straddle both coarse- and fine-filter approaches. This was and is still deemed part of the forest planning process. This is for the National Forest system, not BLM.

SS: Some people mentioned that balance between a coarse and a fine filter.

BM: That's right.

SS: And so--

BM: The Survey and Management Program was the fine filter.

SS: That's what I meant, yes.

BM: For species.

SS: Norm Johnson's the one who brought that up to me. He said in some cases it would be better if we used a "coarse filter," but many times a "fine filter" gets applied to this particular management aspect. **BM:** What did he mean by better? Better for what? [Effective management.]

SS: I'm not sure.

BM: Okay.

SS: I'm just taking words out of his mouth, and I'm just trying to remember how he exactly captured it.

BM: I'm sorry. I didn't mean to put you on the spot. I guess my point is that "better" can mean very opposite things. If you really scale back the intensity and degree focused on individual species and their viability, it makes it easier to do coarse-filter, broad-scale, landscape planning.

SS: All right.

BM: It doesn't necessarily mean that if you assumed such species not on the list are automatically and fully taken care of, then that's valid. So, what is "better"? That's what I was getting at.

SS: I probably threw a "value" word in there that didn't necessarily come out of Norm's mouth.

BM: Let's strike that part.

SS: Okay, that's fine, that's fine. Okay. Now, I brought up Survey and Manage, the management method -- how would you describe that? What would you call Survey and Manage?

BM: Survey and Management Program.

SS: Very well.

BM: Was a process to identify which old-forest-associated species would need special attention for monitoring and study outside of what the basic guidelines of the Northwest Forest Plan would otherwise authorize.

SS: Describe the details of that program and how it was implemented.

BM: Survey and Manage species would fall into one of seven categories. And the seventh is taking the species off the Survey and Manage species list. But the other six pertained to what sort of inventory and what sort of monitoring should be done based on knowledge of the species, its life attributes, its occurrence in old-growth forests, its abundance, and other factors. The Survey and Manage Program process was one whereby this panel of ten would convene every year. **SS:** Ten Forest Service people?

BM: No, not necessarily,

SS: Oh, no?

BM: Forest Service and BLM.

SS: Okay.

BM: I'm trying to think if any were actually outside of those two agencies.

SS: Like the State of Oregon and State of Washington, for instance?

BM: It could very well have been.

SS: Or Fish and Wildlife Service?

BM: Yes. I think it tended to shift slightly year-to-year, so some could have come after. The point was to have five managers and five biologists on it, an even balance. They would evaluate information on species, either brought forward to them for possibly being added to the Survey and Manage species list that weren't already on, or to evaluate species for which new information, new scientific or monitoring information, had been gathered to re-evaluate whether the species should stay on the list or should shift categories on the list.

SS: Okay.

BM: Now, I was brought in as they started up the program as their onsite scientist advisor.

SS: This would be '95, '96, '97, somewhere in there, a year or two after the plan was actually accepted?

BM: Give or take a decade or two, yes.

SS: Oh, really?

BM: I'm not quite sure of the year. I'd have to go back to my notes.

SS: For the record, remember, it's been 24 years since FEMAT, and 23 years since the final plan [NWFP-was accepted], so it's been a while.

BM: Quite.

SS: We're all grayer.

BM: And thicker. I was brought in as the scientist advisor and I would sit on the side and help guide the facilitator, which at that time was Russ Holmes, who was a botanist. He did an outstanding job, very careful in the process of the Survey and Manage paneling scheme. I was there to help advise him on ensuring that rigor was followed in how information was brought in, and how the panel was given equal opportunity to express their opinions and information, and how decisions were finally made. I actually built a template model called a "Bayesian" network model that was built on the guidelines for Survey and Manage species determination. There were six main things that the panel had to think about. One was the species; was it inside the Northwest Forest Plan area? And if it's not, then it's off the list. If it is, go on to step two. Is it associated or found in old-growth forests? Now, if it is known to not be, then it's off the list. If it's unknown and there's some uncertainty, you could enter that uncertainty into this overall scheme, and that certainly would carry through. But you can then go on to step three, and then four, five, six, and then dealing with things like what's known about the inventory, and is it "inventoriable" to start with? Is it feasible actually, to inventory the species at all?

SS: Because some of them would be either so small or so difficult to find and locate on a quantitatively provable level, correct?

BM: Correct, that's right. And some, like hypogeous fungi, which tend to sprout under the ground. They're very hard to find unless you dig and know where to dig. Every five years, it might sprout above ground, when the sporophytes that are released. So, those are very hard to find. Anyhow, so the whole series of these guidelines were in the Record of Decision instituting the Survey and Manage Program. So, I basically took that rigorously and put it into this simple system folks could kind of step through, and then insert their collective answers into this model up on the screen. Then we would save that at the end for each species.

SS: So, it was kind of an interactive model?

BM: Quite so.

SS: How interesting.

BM: Then you would save it for each species, they'd have the species name on there, and say, this is the collective judgment of the Survey and Manage Panel for a certain species, and here is the outcome. The outcome would show you probabilities of the species falling into one or more of those seven outcome categories, with the seventh being that it's off the list. Sometimes, given uncertainties that feed in, you would end up with probabilities in perhaps more than one outcome. So, you could say, sixty percent probability that a species fits Category A, maybe twenty percent fits B, and so on. So, the team would have an opportunity to evaluate that and see if further information and certain inputs, would help to tilt it one way or the other, or qualitatively change the outcome. It was sort of a decision-aiding system. I published that whole scheme in a journal. And not to focus on that here, unduly.

SS: This is important, though. I want to know more about it and I think the record wants to hear more about this, so this is fine.

BM: Okay. Well, basically, this served to bring repeatable rigor to the panel scheme and process. Again, that's something that I sort of learned from FEMAT where we did not have that in FEMAT. In FEMAT, we basically sort of pulled individual experts on each species' viability expert panel, what do you think the viability level is of this species under each of our FEMAT planning alternatives, one, two, or three.

SS: Kind of a synthesis and creating a probability calculus, if you will.

BM: Good. I like that.

SS: Is that? Yes, okay.

BM: Yes.

SS: I mean, but a probability calculus that would be a little looser around the edges than a real quantitative scientist would want in the long run?

BM: Are you talking about Survey and Manage?

SS: No, I'm talking about the FEMAT.

BM: FEMAT was not couched in terms of probabilities, really. It was just --

SS: But I'm using that as a conceptual [point], kind of saying, you took a mean and a synthesis, and you tried to create a probability "thing" that you could put into this document in a short period of time, that would not maybe hold up under scientific rigor, if you really took it to its logical extreme?

BM: Well, I guess so.

SS: That's what I meant. Maybe I'm getting a little loose with my words there, but yeah.

BM: Well, I was going to say that the FEMAT panels were even more qualitative than that.

SS: Right.

BM: Really, did not try to gauge the level of probability of viability of a species, didn't do. Just basically put it into very simple categories.

SS: Now, how did the Survey and Manage seven-step process apply to the different zoning types in the forest plan? You had the late successional reserves, you had the riparian reserves?

BM: Aquatic Conservation Areas.

SS: Aquatic Conservation Areas, excuse me.

BM: Sure.

SS: You had the Adaptive Management Areas.

BM: That's right.

SS: And the Matrix. So, how did you apply or how were you, how did that apply to the different types of zones?

BM: Basically, it was to look at the LSR's, the Late Successional Reserves.

SS: Just those?

BM: Because we did not address fish, or strictly aquatic species found in streams inside of aquatic conservation areas. We assumed that the aquatic conservation area guidelines were themselves fully adequate to conserve all the species associated with that part of the plan. So, this was more of the non-

aquatic conservation areas. And the adaptive management areas, that's a completely different story there. And we can go on afterwards, if you want. But this, Survey and Manage, really was focused on the LSR's, I think. And also, to guide again, the outcome of the category to species under the Survey and Manage program, A, B, C, D, E, F, or off the list. Also guided to what extent pre-disturbance surveys would have to be done, if any. If there was a managed late-successional reserve where some thinning was going to happen, for instance, some of the categories would guide as to whether there would be mandated late-successional, or studies and surveys for that certain species prior to disturbance, prior to thinning or prior to timber harvest, or burning or road-building or anything else.

SS: So, did you ever do any modeling going back in time? (Bird singing) **BM:** Flicker.

SS: Not paleo-ecological, but more recent, where you tried to rebuild past habitats and use that as a matrix for making the decisions to couch your assessments?

BM: I'm not quite sure what you're getting at. You're asking me if species we would have deemed species to be more or less resilient. Is that what you're after?

SS: No. I'm just trying to ask, did you try to postulate how things were, pre-disturbance going back, modeling back in time, historically? Or was it mainly taken from what happened until now, and then we're going to look at it going forward?

BM: Looking at Survey and Manage, is that the context that you're asking?

SS: In general, but also Survey and Manage.

BM: Well, Survey and Manage was really intended on looking at the current state of things.

SS: Right.

BM: Because looking back in time should not influence what the evaluation would end up being. Even if you were to say that, well, the species was always rare or it was once very common and now it's rare, that shouldn't have altered how the evaluations would be for the current state out there, if that makes sense.

SS: Right. What surprised you the most about what you discovered during Survey and Manage?

BM: I thought the process was well-done. It was rigorous. It was also very involved and turned out to be extremely expensive, much, much more than I ever envisioned. Early, I didn't think that holding those sorts of panels and looking at species information would cost the agency so much. And that was part of the downfall of it, just the cost.

SS: The same reason that studying the totality of nature is so hard. And also, it's kind of like the knowledge of all the different disciplines. I like to use the example of post-Alexander Humboldt. In other words, Humboldtian Holism, when "geography" was kind of everything [discipline-wise], then you take it forward as the disciplines we know today have formed [post-1840s], and the stovepipes [each discipline] got fuller and fuller and fuller.

BM: Yes.

SS: And within your discipline and between your peers, and you had to know what was in that stovepipe.

BM: Right.

SS: But also, how they connected to ecosystem science. How do you do that in real time and space with limited amounts of money? I'm trying to make an analogy to that, because "Humboldtian Holism" is a great model for me. I love what he tried to do. I mean, he tried to do it in the Cosmos [5 volume tome] at the end

of his career, where he had, what, five books? He died trying to do the whole planet, and doing it as a three-decade-long project. I'm just making analogy to the difficulty of doing these wonderful ideas in real-time and space. It's hard, and it's expensive.

BM: Well, in terms of Survey and Manage, it was this balance between coarse and fine filters, to put it very simplistically. Just the cost of doing fine filter work to ensure individual species were being cared for, conserved or preserved correctly, is costly, especially if you have to go out and do surveys for them. Species that are very difficult to find that can be very rare, that we know scant anything about. So, where is the balance? I see that more, as much a question of policy and social interest, as it is science.

SS: Okay.

BM: Yes. Pre-Humboldt would have been a fun time for comprehensivists to live, I think. Because back then, being a naturalist meant that you had to know kind of something about everything.

SS: I know, it would have been your dream, right?

BM: Yes, yes.

SS: No, that's why, not being a biologist or whatever. I'm well-versed in it [biology/sciences], but I love to read some of those old scientific tracts because they're romantic [style] and easy to read. I mean, sometimes they're not, but usually, you really see how the naturalist, the generalist, thought, and you were living in nature and were a romantic figure.

BM: Well, the heart of ecological science now is quantitative and cold and computorial. It really has its origin and its heart in 1800s' natural history. If you don't know natural history, then you really can't understand ecosystems and ecological systems and processes.

SS: So, anything else you want to talk about Survey and Manage, how that evolved and what you saw? You told me about the positives, but you also told me about a potential problematic aspect, the cost. How did that play out over 10-15 years? Also, in terms of how it affected management.

BM: Well, management chose to abolish it. It was reinstated by the courts, and then, I think it was abolished again. I forget what the actual history is. I'm currently writing one of the chapters for the Northwest Forest Plan science synthesis.

SS: The twenty-year one, right?

BM: Correct. And the chapter I'm doing is on all species except for spotted owls, fish and marbled murrelets.

SS: Murrelets.

BM: Right. So, I cover everything from soil micro-organisms up through birds of prey and mammals and carnivores and all sorts of stuff. And in there, I actually have a section that tracks the history of the Survey and Manage Program in and out of the courts, and how it evolved to the "Inter-Agency Special Status and Sensitive Species Program" that straddles the Forest Service and BLM in Washington and Oregon. That's where the Survey and Manage theme now is currently housed. They don't actually do an annual Survey and Manage assessment, but they have taken over the heart of the duties of that program. If it would help, I can even send you an extract from the chapter that has that history in it.

SS: Yes, I'd like to see that.

BM: Okay.

SS: Thank you.

BM: In fact, I did send you a GTR that I had done with Jack Thomas sometime back that traces the history up through the ISC. Did you get that from one of the early emails?

SS: Yes, I have one.

BM: Okay, all right.

SS: So, Alternative 9 was adopted. How do you think that the plan, the goals and hopes, came, matched or didn't match the actual results, over, now we're looking at twenty years, and we can start to see change? And if things have changed, and if you can make assessments at a generation. How would you assess the twenty-year report card for the LSRs?

BM: Not just LSRs, but the whole, both?

SS: Alternative 9, and you can break it down, however you want.

BM: From the standpoint of the scientists, I think FEMAT was [essentially] one of their alternatives that was slightly amended to become the Northwest Forest Plan. And I'm saying that sort of clinically, because I don't think that we had any one alternative that we were trying to root for, per se. You know, if you're very, very conservation-centric, you would want that which has the greatest area of land of old growth conserved, but that would have greater adverse impacts economically.

SS: Wasn't that alternative 10? Weren't there 10 alternatives? It was called the "green dream," right?

BM: Yes, yes.

SS: But "Alternative 9" was a little less than that [fewer acres in reserves]?

BM: Yes.

SS: But anyway, complete that thought. I apologize for the sidebar.

BM: No, that's fine. But other parts of it, like the Adaptive Management Areas, part of the program, just never got underway. I did some early studies on old growth patches up in the Cispus AMA, did some studies there.

SS: Up in the Gifford Pinchot National Forest? [Washington State]

BM: Correct. That's right. Aside from that, I don't recall studies going on in other AMA's, at least not the spirit and the extent that was intended, to have these areas be essentially used as "silvicultural test" areas.

SS: Laboratories, yes.

BM: Sort of like extensive experimental forests to test "alternative forestry" and New Forestry ideas, thinning, all sorts of things. That part of the program, I think just died flat. The second part of the forest plan that died flat, was the intent to have a comprehensive biodiversity monitoring program, which never took shape. That would have extended beyond the Survey and Manage species level, just to decide which of the fine-filter species needed special attention.

SS: But that would be more on a landscape or sub-regional level, right?

BM: I'm not quite sure what you mean by that. It would comprehensively be the Northwest Forest Plan area.

SS: But it would literally be looking at, shall we say, "landscape chunks."

BM: Not necessarily, well, maybe part of it.

SS: Okay.

BM: Parts of it might deal with fine-grained attributes of ecosystems, as we were saying earlier. What are the energy flows? What are the food web sort of attributes? How that's influenced by fire or climate or harvesting? Anything like that. Just look at it from a comprehensive systems level. That really never took shape. I guess I can understand that because it was never really well-specified. And it would have been extremely costly, too, to really implement in full form. But still, it was in there as one of the attributes of the plan that, you know, simply didn't take form.

SS: Why do you think the AMA's fell flat? I've heard different people say different things. I think a couple of them did okay for a while, and then ultimately the synergy and the energy just kind of, it didn't go anywhere. [Applegate AMA in southern Oregon, the Central Cascades AMA near the H.J. Andrews Experimental Forest -- experienced some successes.]

BM: I think the attitude from management was we've got enough land tied up in the LSR's, we've got so much in the LSR's, in the aquatic areas, especially, the LSR's. We don't need or shouldn't have to tie other areas up, too, in some fashion. So, I think that was a large part of the attitude.

SS: We haven't talked about the interest groups, the activists. And I'm thinking of industry and environmentalists? Going on in the '80s, the "Forest Wars," and the Forest Service was caught in the middle of this cultural battle. How do you see that happening when you were coming up before the [Northwest] Forest Plan? Go back a little bit, and then state how that dynamic played out after the Forest Plan was implemented?

BM: Well, let's include BLM in this, too.

SS: I was going to ask you that later on, but for the record, I'm going to re-ask an earlier question and come back to one I just asked here. One of the things that I think was a positive from the Northwest Forest Plan process, was interagency collaboration where the BLM and the Forest Service, were forced to come to the table and interact to do something proactive that maybe they'd never done before. How do you view the dynamic before, during, and after, between BLM and Forest Service?

BM: BLM on O&C lands in Oregon, at least, has always been on a different track. They're in a different department and have different mandates, some of which do overlap that of the Forest Service. But well and good, that's part of a legal charge. It was the overlap areas that I think worked very, very well in FEMAT. There had been cooperation prior to it, but at this scale, though, trying to do a landscape plan, this was I think the first of its kind for those two agencies, in this area, definitely. Since then, BLM has little fits and starts as to what degree they want to participate in the full intent of the Northwest Forest Plan. In other words, they were interested in coming up with their long-term, old-forest, conservation plan, basically, which they assert would tend to meet the intent of the Northwest Forest Plan, yet still allow a different kind of a layout pattern. Certainly, I can understand the checkerboard ownership they have, with alternative sections of federal BLM land, versus private and state lands.

SS: State land. Right.

BM: Is a nightmare to try to --

SS: Yes, the checkerboard thing is a challenge. When teaching students in environmental history classes, it's easy to explain how the checkerboard thing came to be, but how to realistically manage that, is another matter.

BM: That's right, that's right. So I give them credit for trying that, and I've worked with biologists in BLM a lot.

SS: Yes.

BM: But just the very essence of the different sort of charges [laws/mission] that each agency is based on, means that there's just a subset area that they truly overlap. The Northwest Forest Plan helped to emphasize that. But I think that since the plan was instituted, there has been greater interest to have BLM kind of steer back to--

SS: The old way?

BM: An "old-ish" way. And that gets at, I think, one of the major perceived failings of the Northwest Forest Plan, is that it simply did not produce the timber harvest it promised under Alternative 9, or Option 9.

SS: What is your interpretation of why that happened?

BM: Perhaps you should be asking an economist this.

SS: Well, I have. But I am also asking you.

BM: As a non-economist, I would hazard it had to do with changes of resource values in the culture, what sort and sources and quantities of wood that we want. Also shifts, regionally or nationally, shifts of international trade, sources of import and export. That had shifted. It could be that perhaps it was unforeseen how much of the timber land was going to be sequestered, if you will, under the Northwest Forest Plan. I'm not trying to second-guess any of the economic studies of the time, but just that I think a lot of people in the public didn't quite grasp at the onset how much of the area would be in LSR's, given the tiny fraction remained of what old growth had been there originally. So, those are some of the factors.

SS: But do you sense that the collaborative aspect forced by the situation, over the long haul, improved the relationship between the agencies? The reason I say that is the Forest Service is one of the great institutions of American government. It's got the legacy of Gifford Pinchot, the multiple-use paradigm, that even my wife, a forester from Peru, said they adopted to their needs in South America. And so, I think sometimes there could be tend to be a little chauvinism built into an agency with such a proud tradition. And the BLM, is kind of a "step-child" sometimes. I'm just saying how it's viewed in the cultural lexicon and how history views them, and how the attitudes of various agencies interact with each other. And that you may not have found that to be true. But, I'm just wondering how that worked in terms of, or how you perceived that dynamic?

BM: I didn't. I was not involved in high-level, decision-making venues where the two agencies had to grapple with common guidelines like that. So no, I'm not going to agree with that characterization. Just from my standpoint as a scientist working with biologists from BLM, it's always been positive, it's always been collegial.

SS: I'm speaking more long duree, or "historical."

BM: Okay.

SS: Yes, not necessarily what the present is.

BM: Okay. I'll speak only for the Forest Service and not to point it out as a singular case-in-point, but as you well understand, any large organization, be it governmental or private or whatever, that's very large, has incredible inertia, which means in the second law of Newton, it's very hard to change its course. It takes a long time. Maybe that's one reason the AMA's never really entirely took off. It's very, very hard to change a large organization or institution to have a very different approach or attitude, in this case, its lands, or you

could say, the taxpayers' lands; they're all public lands.

SS: That's a pretty good way of looking at it. Because the science people devised the concept, but the managers, who were kind of on the periphery [planning process], were the ones that at least in part had to implement it.

BM: That brings up a really important side point. And I'm getting us off on another.

SS: No, go, go.

BM: Tentacle here.

SS: But go on, go for it.

BM: I worked a lot in decision-science, and structured decision-making. The decision process including analysis of risk, the science part of it and so on, works best when the decision-maker is involved at the very onset. And involved in some way in each stage, at least being informed and helping to provide perspective. The Northwest Forest Plan was set up where you had the science team silo-ed off from any of the managers, as far as I saw.

SS: Yes, it was intended that way, though, right?

BM: Yes, that's right.

SS: They basically separated them, as if you were a manager, you had to wear like a pink badge [orange vest] or something to come in the building?

BM: That's right.

SS: I remember, I've been told that.

BM: Oh, there were other things worse than that. The whole point and way it was set up, was because they wanted the science to be perceived as being "pure," not being tainted by management and policy, as doing their own, pure, honest science thing. Then, that gets turned over to decision-makers. Looking back now from what I've done and known in terms of the separate science and decision processes, it would have been fair to have a decision-maker at the onset come in and say, here is my expectation, whether it's the chief of the Forest Service or whomever, saying, here is my expectation, here is at least a starter kit of my decision criteria, things I want you to analyze that I can afterwards apply, to know the outcomes under each option. That didn't take place. So, the management team who had to come up with the Northwest Forest Plan based on FEMAT, had one hell of a task. I sort of honor them for doing what they did, not having been part of those round tables inside the FEMAT team, and hearing the internal discussion and debates were there.

SS: That's a very interesting point. That's one of the things I've thought about, if a class of managers, or the managerial class, if they were involved and invested from the start, there would have been an automatic or intrinsic interest and investment.

BM: That's part of it, too.

SS: I think that's what you were talking about.

BM: That's right, that's right.

SS: I've thought about that, but you're the first one in these interviews that have put it in such clear, specific terms, so I thank you for that.

BM: That being said, the chief of the Forest Service did visit the "big pink" building ["pink tower"] early on. It was basically a quick preview or review, since the work was just starting. But that was the only time I recall seeing him there.

SS: Was that Dale Robertson at the time?

BM: Yes, it was Dale.

SS: Right. Now, Jack became the chief after him, correct? Or was there one more after him, before Jack Ward Thomas?

BM: Did he follow Dale Robertson? It was Max Peterson, Dale Robertson, and I think, Jack Thomas.

SS: I think you're right, yes.

BM: Over the years, I have met and interacted with half a dozen chiefs, as they're called. I forget the exact sequence, but I think that's right.

SS: Want to continue along that line?

BM: That's pretty much it. You know, again, in a successful structured decision-management and decision-science framework, you would want the decision-maker to be involved right up front with defining the objectives, defining decision criteria, having an input into maybe the spread of options and alternatives to be analyzed, and then having a toe in and being informed throughout the whole analysis of steps. Then coming in again at the end to assert the decision criteria and to be very explicit and open about what those are, and then how the decision is made. And from there, that could feed into something like "adaptive management" learning, or in visiting some of the options and alternatives, and having a feedback loop there, too. Anyhow, that whole kind of decision-process is not what happened in FEMAT. It was not a classic framework like that. The science team was separate from the management team that came in afterwards to take the science team's work and adapt it in a sense.

SS: Do you think it was kind of a classic pendulum swing dynamic where for the previous decade-and-a-half, the scientists felt not listened to enough, and all of a sudden, okay, now it's our time? So, the pendulum swing went there, and then the pendulum swung, but it didn't get grabbed by both sides. Do you understand the metaphor?

BM: Yes, but I don't think that was the engine that really started the Northwest Forest Plan interest and Clinton's Summit. I think it was just the expectation of economic values from forests of the Northwest that was not being met.

SS: Did you go to the Summit?

BM: No, I could not go there. There was a host of us sitting at the conference room at the regional office viewing it through closed-circuit feed.

SS: What do you remember your impression of that event?

BM: It was impressive. Clinton and his staff were sitting equally at an oval table with Jack Thomas and others, selected to represent different facets of science, timber, forestry, economics, and so on, of the Northwest, including the timber industry and academia. They were each in turn called upon to provide their input, their ideas and views, and I felt were given adequate time to do so. It was impressive.

SS: Now, what do you feel that the timber industry didn't get out of all of this?

BM: A seat at the table in FEMAT, and even this part of FEMAT. I don't know if others had told you about

the day or two where Jack Thomas gathered up representatives from each of the national forests throughout the region, to bring in maps and to delineate on these maps where important old-growth forests were. [Gang of Four planning process in 1992, a year before FEMAT, but part of same process]. It was in a large room at the Convention Center in Portland, and the tables were laid out roughly as the national forests are found geographically throughout the region. The timber industry was there, relegated to an adjunct room with a closed door. Jack Thomas had them sit there, and invited them in only for short intervals, so they could interact with some of the forest teams doing the old-growth mapping. It got to a point where Jack would quip about this, and he put on an orange vest and drew a target on the back of the vest to quip that he was being the target of controversy. I don't know if you heard about that from anyone else.

SS: I heard a different version of it, but tell me a little more, as that's very interesting.

BM: No, that's all I can say on that.

SS: Oh, okay.

BM: He wore that [traffic vest]. At one point I was sent in to the adjunct room to bring the timber industry fellows, who were all male, into the room. I think it was after the first round of all the old-growth, forest-stand mapping had been drafted on these maps. They were brought in to see what the product was at that stage. You asked the question -- what did the timber industry get or not get out of this? And again, a seat at the table at FEMAT, a seat at the table in drawing, defining and drawing old-growth stands on forest maps. I think BLM was part of that, too, with their maps. I'm not quite sure. So, anyhow, there was that, also.

SS: What would you say happened to timber harvest? Most federal lands were already locked up because of the Dwyer Decision and all the lawsuits that were going on before, but in terms of long-term, do you think the relative exclusion of timber interests was almost a predictor of how the projections for timber harvest just didn't happen, and it fell far short?

BM: Saying that, I guess, timber industry was not part of the process.

SS: Not literally why, but symbolic or a predictor so you might say timber harvest projections were not going to be met? Mainly because of the cultural weighting that we're witnessing here [Culture/values].

BM: I guess, I'm not entirely sure what you're asking. Are you implying that the timber harvest projections were biased high because ...?

SS: No, just that they weren't met. I'm just saying, because they [timber industry] didn't have a seat at the table, perhaps Alternative 9 wouldn't have been chosen, it might have been a different alternative. And perhaps the zoning thing would have been tweaked slightly differently. I'm not saying it would have, it's just a speculative question looking backward. If they were more a part of it, do you think that would have made a difference, or do you think the world economic forces and environmental activists would have had play out the same way? **BM:** I think we would have ended up with a different forest plan, if they were part of it.

SS: Right.

BM: In that sense, if it would have met more of their interests, perhaps they would have played a greater role in trying to realize it in terms of how it played out. I don't know. I don't know.

SS: What about the environmental activist part of things? What do you remember, meaning you as a scientist and person with heavy conservation leanings? What do you remember about watching the "industry" of environmental activism grow up and mature in the '70s, '80s and '90s?

BM: Well, I'll tell you from a personal perspective, inside the agency. I felt that a lot of the special interest groups active missions were as equally vitriolic to work I was doing, as I felt from, say the industry side.

SS: Interesting. Now, what about environmental activists? The role they played in all of this and your experience in interfacing with them, even going back to Humboldt State and on to OSU and the forest plan?

BM: Yes, unfortunately, I think, as well-intended and good-hearted as some of those folks are, it served to create the image of "owls versus jobs," [simplistic dualism] to keep kind of a wedge split there, as if there had to be either environmentalism and preservation versus exploitation.

SS: During my work in the Southwest, I saw it [environmental debate] through a different lens. It was trying to preserve all the red rocks, versus the trees. Even though I agree with most preservation goals, the attitudes and self-righteousness and uncompromising nature of it, I found problematic, even though I am generally very sympathetic of that ilk. But it's the passion and the unwillingness to compromise, I think that is a problem.

BM: But what is the purpose and the charge of an environmental activist group?

SS: It depends on what group it is, but, yeah.

BM: Well, generally, it is to be just that.

SS: Exactly, exactly.

BM: It is to be extreme and uncompromising.

SS: Right. I'm trying to get your assessment of the last twenty years and different factors that played out under the forest plan, in terms of the timber harvest not working out, various factors and your opinions on that. There have been lawsuits by timber interests, lawsuits by environmental activists, even on small sales in Matrix lands. Everything's been problematic, even within the context of the plan supposedly operating in the way it did, or was supposed to.

BM: Right.

SS: If that's okay, I'm trying to get you to answer kind of a holistic question regarding that?

BM: I really don't have anything else to add.

SS: Okay. Now, aside from Survey and Manage, how were you a part of the monitoring efforts over the last twenty years? What was your involvement in the various aspects of that?

BM: Virtually nothing. That was relegated to the National Forest system. The Pacific Northwest Research Station, of which I am a part, has seen for quite some time that monitoring is not really a research activity per se. There are three kinds of monitoring that's pretty much parsed out, and it was made fairly clear in FEMAT, too.

There's implementation monitoring, where you check to see if the managers have implemented projects the way they were intended. There's effectiveness monitoring, which is to determine if what they did had the intended effect. It's not if they did it, it's when they did it, and did "it" actually have the intended effect. If you were to monitor a variable thinning operation intended to retain enough canopy closure for red tree voles, you go find out whether you still have tree voles in there, and if the nests are still active. Validation monitoring, a third part, is intended to research the underlying causes of effectiveness. If there are tree voles or not, how or why, and what's happening. Is it that the canopy is too thin, is it that the species moved out because some predator came in; these sorts of factors. So, there's three kinds, and it's always the last of those that really falls into the aegis of research. But the other two really are relegated to National Forest system management. Under the Northwest Forest Plan, essentially all of the monitoring was the first two kinds. What would have been the third, validation monitoring, was through scientific studies.

SS: Not just number counts, but real analysis?

BM: Yes, would have been done on the AMA's, the Adaptive Management Areas.

SS: Okay. **BM:** That's where I started doing work on the old forest remnants study on the Cispus [AMA], on Gifford-Pinchot National Forest. So that answers why I wasn't involved in follow-up with the Northwest Forest Plan.

SS: You clarified some things, too, that I wasn't quite clear on until right now. Thank you.

BM: Okay.

SS: You mentioned, because you traveled so much around the world, that people heard about the owl. How many people in different countries, managers and scientists, are interested in this forest plan process, and how many of them really knew what it was, and wanted to know if it was something that they could adapt or model, not necessarily copy, because every ecology and society is different? But the concept, in general?

BM: Early on there was greater interest. I think by this point, there's been enough turnover of some of those other positions, where folks currently in charge, either haven't heard of it or have deemed it to be not as interesting or relevant. But yes, earlier on, there was strong interest, especially from Canada. Canada had a real strong interest.

SS: Especially, in western Canada, right?

BM: Yes, right. I was going to say.

SS: B.C. and Alberta, right?

BM: Especially, B.C. I worked closely with folks up there on a series of projects, science and science management interfaces. They're very, very interested there. Also on Vancouver Island, a part of B.C. No longer in play now, but Weyerhaeuser had a series of forest areas in the north end of the island. They were doing a series of test cuts using variable density thinning and variable retention cutting, and different sorts of enclosed islands of older forest retention. And some of the scientists up there, biologists such as Bill Beese and Glen Dunsworth, did a Herculean effort up there studying things and getting information over to Weyerhaeuser. Since then, I'm not quite sure what happened. Weyerhaeuser either sold out or they changed the management operations and plants, and the last time I flew over it, it was kind of all cut-blocks again. So, all these areas had been cut out as far as I saw. But anyhow, Canada, yes, was one of the key areas that had a strong interest in the plan from early on.

SS: I've even heard that there was some interest from "down under," in what was here, even though, obviously, Australia and New Zealand are ecologically very different?

BM: Yes, I started working in both those places last decade, late last decade. So, I wasn't there during the early implementation phase of the forest plan. But yes, there were folks. I'm trying to think of their names. CSIRO [Commonwealth Industrial Science and Research Organization] is one of the government research institutions there that had a very strong interest, and was interested in adapting it to their unique old forests there, which are basically eucalyptus forests.

SS: If you were going to give an assessment of the Northwest Forest Plan at 20 years, or it's actually 22 years now, but you're writing up the 20-year report. How would you grade it in the specific area that you've been charged to analyze, and anything else that you'd like to comment on?

BM: I think it's done what it set out to do, provide environments and habitats for a specific species, provide for opportunities for various types of forest management like to manage late successional reserves. I would

give it close to an F for the Adaptive Management Areas part of it. But it pretty much has met all the others. And also, I'd give it a very low grade for the overall biodiversity program that was intended.

SS: Okay.

BM: So, aside from that, everything else seems to have been met. Now, the question now, and I sort of find it a job ahead here is to what extent is it still relevant?

SS: There's a yellow jacket. [Wasp flying]

BM: Is it adequate? Okay. How well is it serving to meet the challenges of changes that were unforeseen or poorly seen during its [NWFP] creation. Climate change, change of fire regimes, intensities, frequencies (if there was a nest here or not). But okay.

SS: We're battling a yellow jacket, that's for the record, what we're making comments about here. I think it's gone.

BM: All right, we're fine. Okay, so I'm not sure if you're going there eventually, but just to poke ahead a bit there. **SS:** No, elaborate a little bit more along that line?

BM: Okay. Support of what I'm doing in currently the final draft of Chapter 6 for the 20-year Northwest Forest Plan Science Synthesis, is to look at the bulk of all species, and what's been learned about ecosystems. And reporting from published scientific work summarizing, synthesizing that. A lot of work does speak to what was poorly foreseen or unforeseen, or perhaps you could not foresee back in the institutional days of the plan, was the possible effects of climate change, and how that changed stressors on species, on vegetation types, on intensities and frequencies of fires. So, a lot of work in that subject area inside the Northwest Forest Plan area is speaking to perhaps late successional reserves, or not necessarily going to permanently meet intent of the plan through time, given all these shifts and changes. And that perhaps additional reserves or ways to connect some of these old forest areas across the landscape or especially into higher elevations, especially in the dryer forest types where fire is prone, these kinds of things might be considered as adjuncts to the plan now. So, rather than to abolish the plan, there are other ways to think about trying to bolster it to meet the challenges of all these other changes happening.

SS: How would you approach bolstering the plan, if you had a say or you have an idea you wanted to throw out there? Can you see an area or areas where it could be amended, augmented, adapted?

BM: Not an easy answer because the way we have done fire suppression, especially in the dry forest types, has radically changed. I think the ignition probabilities of forests, probably increased the propensity of the forest to burn, how they burn and where they burn, stochastic [factors]. We know that more areas will burn and that fire regime type is going to shift, shifting more of the dry types further north. So, all these things will have to be considered.

SS: Well, just look at the fire season they had in Washington last year?

BM: Yes, what is happening now. And trying to project that forward. What do we need for the next decade? Is that viable for year fifty? Is that viable to the end of the century, especially if we allow climate change to continue on its current path? I think we're already over or fairly close to the tipping point of a two-degree C increase over pre-industrial levels.

SS: And if we continue to lose the ice, the albedo reflection dynamic may start a positive feedback cycle that will make it worsen faster than we could have thought?

BM: That could be true, perhaps in the Cascades, not just the Arctic. Anyhow, that says to me that having ongoing feedback from an adaptive program integrating management and science, would be the way to go, the way to ensure we can do the best we can, given knowledge, given uncertainties. It's still up to

management and decision-makers whether it's the regional forester, BLM state director, chief of the Forest Service, director of BLM back in D.C., whether it's up to them as to how to balance social and economic cultural costs and interests. At least having a program that can look at the dynamics around this whole thing, this whole system, and try to keep our analyses and models and all current. That's a challenge. But I can see an inter-agency program right there to do that. So, that's a long, rambling, fuzzy answer to your very interesting question.

SS: That was actually a very interesting answer. I beg to differ. So, now, one of the criticisms that not just the forest plan [NWFP], but also the Endangered Species Act, come under in the following years has to do with the northern spotted owl's new competitor, the barred owl. And what does that tell you about the limitations of human planning and nature being nature? Do you want to elaborate on that?

BM: Sure, I can envision some detractors of Northwest Forest Plan saying, see, the forest plan's not working. It's not serving to protect the viability of the northern spotted owl. And yet, I would argue back that if you don't have habitat, you don't have viability, but habitat alone is not necessarily going to guarantee viability. So, the Northwest Forest Plan might at this point be essential, but inadequate, to ensure the continued existence of the northern spotted owl, at least throughout its range. So, enter controversy, such as [U.S.] Fish and Wildlife Service and their program to shoot barred owls in certain areas. That's a tough one, socially and ecologically.

SS: What's your feeling about that?

BM: Perhaps as test cases in certain selected areas, it would be of interest to know how the spotted owl spawns. In areas where it has been done in the redwoods, spotted owls seem to respond very favorably and fairly quickly, too, if there's still any in the area. The thing is, once you start doing that, you have to keep shooting barred owls because they will come back in the area, just like the cowbirds control program back in the Midwest. It's a nest parasite that takes over the nest or tends to lay eggs in nests of endangered songbirds. So, you go and shoot the cowbirds, they go back in, you constantly have to have this shooting program going.

SS: The same principle for me is with the sea lions by the dams.

BM: Right.

SS: To me it is playing God, and sometimes playing God sometimes doesn't work very good.

BM: So, you asked early on, off the record here, what is an invasive species?

SS: Yes, I said, how do you define invasive species? Why don't you elaborate on that for the record?

BM: Well, invasion of a species typically is defined as that which is facilitated by human introduction and/or transport or spread. So, the question is, how direct of an introduction does it have to be? It's been at controversy a bit as to why the barred owl spread west across Canada and parts of the northern states, and then south down the Coast Range and Cascades and into the Klamath area of California. Some say it's because of climate change. I've read that. I don't think that's the case, or I don't think that's the primary factor. Others say, and I tend to agree, that it's probably because humans have altered vegetation physiognomies, structures so much across the plains states, across Canada, and then down through all the clear-cutting forests.

SS: That's the whole food chain.

BM: A food chain that also creates early successional and hardwood stands that barred owls seem to select for. Barred owls, I've found them in sort of lowland swamp basswood forests in the Southeast. I've found them in little mahogany hammocks, little islands of trees in the Everglades. In fact, they do like sort of open riparian, swampish, low-land, valley areas, where they tend to invade first, and then perhaps they

spread upslope. Are they an invasive species? Did humans cause their invasion? I don't think humans actually physically transported the barred owls from east to west.

SS: Like for instance, the classic one is the rabbits in Australia, right?

BM: Well, that's a little different. That was actually a physical introduction.

SS: That's what I mean.

BM: Humans brought them in. Yes, right, right.

SS: That's my point. I was making a point about, just they were brought in and they all ran wild, like, if you ever read the book, *They All Ran Wild*.

BM: That's right, or *The Rabbit-Proof Fence*.

SS: Yes, right, the 3,000-mile one (Across whole Australian continent).

BM: European starlings were introduced, I think, fifteen of them back in the early 1800's in Central Park?

SS: Right.

BM: Because the introducer thought it would feel more like home back in Europe.

SS: Right.

BM: They spread coast-to-coast, of course. Okay. So that's different, though. Barred owls, if they spread because of human alteration of the land, are we still part of the problem?

SS: Kingfisher, I think [Identifying bird near interview place].

BM: Oh.

SS: I think.

BM: Flying, perched, where?

SS: I think he's on the ground. Oh, was that a jay? We're going to take a break for a bird. Okay, so, continue on that track?

BM: So, are barred owls invasives? And if so, is the cause human alteration of the environment which causes their invasion? The question is not just academic. It cuts to the heart of the Endangered Species Act, too. That if we are the cause, then we should be part of the recovery of spotted owls, perhaps by shooting barreds or doing something else. I know it's a tough choice. Personally, I saw it at the onset as a very interesting ecological experiment.

SS: The barred owls?

BM: The barred owls coming in. I sort of envisioned them as this early flush of an invasive that will eventually peter out somewhat and retract to more optimal centers and habitats for them, where spotted owls will find their centers and perhaps suboptimal environments higher upslope, and they would be able to coexist.

SS: Or maybe that the barred owl is a more of a generalist, might become more of a specialist, and vice versa. The spotted owl is more of a specialist in terms of habitat and it might be forced to become more of a

generalist over time?

BM: No, I don't agree with that.

SS: No, okay.

BM: Because that means you're predicting evolution, there's going to be an evolutionary shift. I don't think that's going to happen, at least in the short term.

SS: Okay.

BM: And perhaps over the longer term.

SS: Okay, I think that's what I was saying.

BM: But as far as travels around the world, I've seen quite a few places where you have sympatrics occurring in the same place, two species of owls of the same genus, *Strix*, as with barred and spotted. Somehow, these pairs have been able to coexist in kind of a broad region. And that's where I look at the barred/spotted case, where maybe we're seeing the very early stages of that. And they will somehow sort it out. Spotted will probably end up occupying a subset of their range. But, eventually, they might sort out into somehow a sympatric coexistence. That's a hypothesis derived from my natural [history] observations elsewhere, to be put to the test.

SS: That's certainly a good question.

BM: Yes.

SS: And time will tell.

BM: And time's ticking fast, though, because barreds are having a real strong impact everywhere now. So, anyhow, that was one of the factors that the Northwest Forest Plan did not foresee.

SS: Was the barred owl?

BM: The barred owl. And how fast it was going to spread, and either directly outcompete spotted owls in certain areas, or hybridize or even prey on them in some cases. That's again one of the factors like climate change and fire regime shifts, that the forest plan when instituted did not foresee, and probably could not to any extent. So again, I would call for kind of an interagency team of managers and scientists to reevaluate the conditions and the dynamics of the ecosystem, and how well the plan is working and to tie into some of the monitoring of selected species and elements to keep the spotted owl demographic studies going. They have long-term value to know the extent to which the Northwest Forest Plan is or is not adequate at this time. It is necessary, I think, for the goals of old-growth conservation.

SS: Do you think there's any appetite within the agencies involved to revisit the forest plan in any foundational way?

BM: No. Next question. (Laughs) No, I don't think so, given the costs that it took, you know, social costs, the administrative costs and everything. Unless there was very, very strong public sentiment for that. And I don't see that happening under our current administration.

SS: No. I don't think so, either, even though there are certain people that are afraid of a super-reactionary push in a lot of environmental management areas. It's a lot more complicated than just turning a switch.

BM: But environmentalists go out in the streets and protest, as we've seen protests. So far in this last half year, they haven't done anything to turn the tide of any administration I've seen, so I don't think that'll be a

factor.

SS: Talk to me about some of the work you're doing now aside from the forest plan, it may relate to it or it may not but?

BM: I'm involved in a diverse array of projects, again striving to still be kind of a comprehensivist involved with lots of different topics and themes and species and locations and nations. One is a project by Scion, S-C-I-O-N, which is the Crown Research Institute of Forestry in New Zealand, which invited me in 2014 to go start and help them with assessing conditions conducive to a spread of forest insect pests in their plantations, the radiata pine stands there, which take up a significant portion of the north island. A lot of that area has been converted to pine, and they do extensive exports, especially to China, there. They have to be sure that the logs that they export are clean and free of insect pests, otherwise, entire shiploads get sent back and there is massive economic impact. It's for the national biosecurity program for the country, New Zealand. We have a paper currently in prep on that in which we've analyzed field data and think we understand what causes some of these insect pests to explode and to fly, and to spread. So, that will hopefully feedback and help them control that.

SS: In New Zealand? Because just like Australia and New Zealand, they're very susceptible to introduced species wreaking compete havoc?

BM: That's right.

SS: In various areas.

BM: Yes, you're right. So, that's one project. Another is one that I've been working on the past couple years, invited by U.S. Fish and Wildlife Service back in their office in Washington, D.C., to come up with a decision-aiding tool to look at invasive species, especially to determine when freshwater fishes that could be introduced to the U.S. might get established, get spread, and cause harm. To identify what species, they want a list under what's called the Lacey Act, that goes back to the early 1900's, the act that basically lists species to exclude from allowing be imported into the U.S. We're starting off with freshwater fish, and from here, we're going perhaps to invertebrates and then, to other taxa. If you have a tool, actually, it's similar to the one I was describing earlier for the Survey and Manage program to look at species. This takes into account various ecological attributes of a species found in its native environment, like fish. Do they cause harm? Do they prey on other species? What's their climate envelope, in a sense? And do they find the same kind of climate in the U.S., and to what extent is that possible? Everything's done in kind of a probability setting. At the end, you end up with a statement of the probability of an introduced fish being able to be established, to be able to spread and cause harm, and collectively, be injurious. And therefore, that would be presented to the director of the Department of Interior, I believe, for consideration to list under the Lacey Act. Okay, so that's a whole decision framework there. That project is well-under way.

I've got half a dozen others. I'm looking at the vocalizations of great-horned owls throughout their range, to see if they do vary. There's a tenet in ornithology, especially owl ornithology, that owls have fixed vocalization patterns that they do not vary, that subspecies of all kind of speak the same. And I'm finding that's not true, especially in South America. I'm finding strong evidence that the subspecies down there, *Bubo magellanicus*, the Magellanic owl, is actually a separate, full species.

SS: Down in Chile, right?

BM: Yes.

SS: Argentina, Chile, right?

BM: Correct, that's right. Probably is a very different species. The American Ornithologist Union at present does not accept that. So, if we add some evidence there. I find that there's a transition of owls, and this is really off the topic here, we're getting to your wife, of all things. Peru, the Andes, there's a transition of great

horned owls there. There is *B. virginianus nacurutu*, to the north, and there's Magellenic [*B. virginianus magellanicus*] to the south. And somewhere in the Andes of Central--

SS: Peru.

BM: Peru, I've found only one study there where a person has a very small sample size and suggests there's even a separate species there. I'm not quite sure from that study, but it's such an interesting spot.

SS: What is their elevational gradient in the Andes?

BM: Oh, excellent.

SS: I mean, it would change from north to south based on how close they are to the equator, I think.

BM: Excellent, that's right.

SS: But I just, from what you know, just tell me. I'd be interested in that.

BM: I've found nests in Argentina around the Barros Luco area that's called Los Huecos. It's an inland lake. What's the elevation there? Probably, 5,000-6,000 feet. They probably range, I guess, up to 9,000 or so? Just thinking where the corihue [southern beech] forests down there range further south.

SS: You're getting on to the Patagonia interface?

BM: Yes, that's right.

SS: Okay. Because in Peru, for instance, everything is higher. Snow and everything. I don't know how that affects the life zones of various species, but you're right.

BM: Yes, yes. That's right, that's right.

SS: I mean, you've got to go to 17,000 feet to find the snow. (Laughter)

BM: Just wait, in a decade, it'll be gone, probably.

SS: Well, a lot of early glaciology [observations] there are now being used for evidence of climate change, were based on comparative photography [plus observations-scientists/alpinists] in the high basins of the Peruvian Andes?

BM: Yes.

SS: Because they had such problems with floods and hydrology, and controlling them on the extreme gradient of the Andes, they did all this work. And there were alpinists, too. So, you had those two sets, and then of course, the tropical glaciers are going just like everywhere else, right.

BM: That's right.

SS: So.

BM: What value the early photos have. **SS:** I mean, they don't tell you everything, but they do tell you a lot.

BM: Incredible, a heck of a lot. That's right. Speaking of glaciers and climate change, a different project that I've been doing off and on, a series of projects since 2007, is up in Alaska in the Arctic and the Sub-Arctic. Earlier, I was asked by USGS Alaska Science Center to go up and help assess the global status of polar bears. That led to us going back to D.C. where the International Polar Bear science team at that time, gave

a series of talks to the White House, Department of Interior, EPA and others, that led to the polar bear being listed as threatened, globally. So now, I'm doing a follow-up study looking at climate change impacts more in the Brooks Range area in the central part of the high Arctic, setting up a study looking impacts of climate change, shifts of vegetation up there. It has spruce forests and shrubs that tend to shift upslope and further north, and then to look at the influence on predator-prey systems, food webs.

SS: Now, polar bears are having more and more trouble finding ice, aren't they?

BM: Yes.

SS: And some of them are drowning, aren't they?

BM: Yes.

SS: Because they're just too far from where they want to go? They're strong animals, but they have limits.

BM: That has happened, right. It's forcing them more and more, trying to find alternate food sources there. And that's been, I think, greatly overstated in some articles where it's been expected or concluded polar bears will now feed on seabird eggs and things like that. There's no way energetically they can get enough out of that. So, anyhow, the Brooks Range climate change study is now starting up. And I've got a whole series of other sorts of statistical and various kinds of modeling studies going on, too.

SS: Tell me about the ecology plexus?

BM: That's one phase of the overall plexus website that I did. That's just one part of it.

SS: Yes, I know, there's other ones. I'm just saying, if you want to elaborate on that?

BM: It's a website I started back in 1996, I think, and it's been on there since.

SS: Back in the old days of the web, of the internet, right?

BM: Boy, it was hand-cranked, yes. I write all my own HTML, XML code and that sort of thing. You know, because you had to back then. There were no interfaces for that stuff. And it's a website I do at my time and dime; it doesn't have anything to do with the Forest Service. It's a place where I can post and share various interests and all. The ecology part of it deals with posting, having a place to post a lot of my publications, some data, results of studies, speculations on other things.

SS: How, in your view, how has the Forest Service changed in the thirty-plus years you've been with it? How would you characterize it? Obviously, you've got your scientific corner of the agency, but also in general, if you want to answer that?

BM: It's become more scientific. And I'm not just saying that from my biased side. I worked the first half of my career in the Forest Service inside the national forest system arm, not in research. And I worked at the district level, supervisor's office, national forest level, and a couple of regional offices. So, I've seen it essentially from the bottom up, and worked as kind of an in-house advisor or scientist/techno-geek. Over the years, it's become far more accepting of incorporating science and realizing it is important to have science that is credible, reviewed, and can stand up to scrutiny with the public and other scientists. So, it's become more rigorous, which has been very good to see. The culture of the Forest Service has radically shifted. When I first started, there was definitely a good-old boy, white male, dominant culture with a lot of sexism in it. I remember many statements made by others, not just in bars after hours, but in formal meetings, that has radically shifted, which has been great to see. Both sexes equally represented, there's a very, very strong LGBTQ program going on now inside the Forest Service, at least inside our station [PNW], trying to bring tolerance, awareness, and equality of opportunity there. So yes, culturally, it is nothing like what I first saw.

SS: So, just talk to me a little bit more about the Columbia Basin project? You mentioned it, but you didn't really go into it, so kind of segue off the forest plan into that, and how it led to that, and just kind of how you see that having proceeded and in your career?

BM: I think it was an interest to do something at the scale and scope of the Northwest Forest Plan for the interior of the Northwest. That led BLM and Forest Service at the national scale to collaborate, and come up with general directions for what was called the Interior Columbia Basin Ecosystem Management Project, ICBEMP, or "icy bump", as some people put it. Difficult to pronounce, otherwise. It was an incredibly extensive area, like you say. The study area was the size of France, or bigger, and included land from the crest of the Cascades east [within Columbia River basin], and included portions or little corners of seven states, a big area.

SS: So, it included the Snake River Basin and the Columbia Basin, right? **BM:** Oh, that's right, that's right. Essentially included all of the Columbia River drainage east of the Cascades and south of the 49th parallel, that is south of Canada. I was on a further study after this that actually included Canada, and that was not Forest Service, but a different agency I was asked to help with. Anyhow, the Interior Columbia Basin project really helped to provide some science to help national forest planning, some of the BLM planning, and then what was of interest in Canada afterwards. The program itself was massive, the Interior Columbia Basin. It ran on a couple years, two or three years, I forget the exact extent. The agencies rented a windowless huge quonset hut in Walla Walla, Washington.

And every month, we would drive out or fly out and spend seven to ten days in there collaborating with other resource areas. It was the direction provided by the Washington offices of both agencies [that it] was to be innovative, to be forward-thinking, to bring in new ideas and new science. As it turned out, that's not really what was of interest, actually. What I found, they still wanted to partition viewing each of the resources as landscape ecology; you had fisheries/fish, you had timber and wildlife, and economics and sociology. They were each still out in their little corners physically, inside this quonset hut. The interest to do something truly forward-thinking, innovative, was not well-thought out. I tried to bring lessons I had learned from multi-species work I did in California, the Scientific Analysis Team, Interagency Scientific Committee spotted owls, FEMAT, and then others into this project, and to look at things from a holistic systems standpoint, to be able to sort of integrate otherwise very pedestrian, coarse- and fine-filter approaches. And to move well past that in a truly integrative way, and to look at ecosystem functions and how species interact and how people interact with landscapes and species. I had a very, very difficult time sort of "poking a skewer" into these other resource specialty areas, even though I knew the people and had worked with them. The director of the program at last just decided that was not where they wanted to go. They wanted to keep things really simple and just look at things in old-fashioned ways, basically. You know, what's the viability of each species period, though expert paneling, the same thing that was done way back in FEMAT, instead of really thinking forward.

SS: Futuristically?

BM: Yes. So, physically, it was in a difficult spot because everyone had to funnel into Walla Walla. They put us up in the Econo Lodge, which was just horrible there. It was dirty and just not well-kept, and there was no place to eat. And it was kind of a difficult thing to be excited about.

SS: So, it kind of fizzled out for various?

BM: Well, we, as a cooperative team, came up with the first draft of an EIS for the Interior Columbia Basin area, this huge area that would serve both BLM and Forest Service. I don't believe there was a "Record of Decision" [like after FEMAT] from that or a final EIS study. I think at that time there was a decision made back in D.C. basically to scrap the program and to not come up with a plan at that scale for those agencies.

SS: So, it included in all energy flows, hydrological flows, species, all those things within that area, as much as you could?

BM: Well, that was sort of my vision, to do something from a holistic systems standpoint. But it ended up being, you know, chapters in the EIS that dealt with fish and fisheries, and a chapter on landscape ecology, and everything was still sort of parsed out into its own traditional headings.

SS: So, when did that kind of fizzle out, in what year?

BM: Good question; '97 or somewhere around that.

SS: Oh, so it was quite a while ago.

BM: Yes, it was, it was. However, a lot of the science that came from it was published in agency reports. There was a series, I think, in Conservation Biology. There was a series in other journals, too. And that was picked up on and used by various factions and forests and others there, so the science was good, science was used.

SS: What was the most poignant thing that you learned scientifically from that work?

BM: Scientifically? That one can look at such a vast area from a standpoint of what I called macroecology. That's a term that has been used. I senior authored a [report] on environment, a General Technical Report, called something like "Macroecology of the Interior Columbia Basin Project."

SS: Could you go on with what you were saying about the Columbia project?

BM: Yes. That's one of the things from science, from the standpoint of trying to direct a program, massive in terms of geography, the area, and massive in terms of all the topics this team was trying to cover. I guess the lesson is to learn how to orchestrate integrating the sub-teams from the start, and starting off with a common vision of what was intended to be innovative. I think everyone had a different idea. Many were kind of leaning back on old standard ways of analyzing habits and species and that sort of thing.

So, just from an operational end, I learned a lot that, if I was ever truly put in charge of that scale of an effort, I would start off on a very different tack. The director also had each of us heading up a different venue of it, like I was the lead terrestrial ecologist. He had us attend public hearings and sessions where we'd each get up and tell what our vision is for what we wanted to analyze and why. And that was kind of difficult because we really didn't have a collective vision of how to innovate and what the innovative aspects of this were, so everyone was just talking from their corner of the resource, if they were brought in to head up. And worse than that, when we had science, integrative-science sessions, round-tables, a number of them were open to the public, who would come in and sit in chairs in a circle outside of ours. Many of those were reporters, they were industry folks; they were not interested public "off the street." They were folks who had a stake in things, and they were searching for key words and key phrases, things they could use. So, that made our science interaction extremely stifled.

SS: Because you were afraid that any word could be perceived as being "loaded" in some manner or another?

BM: Correct. And when it would get back to your supervisors or the agencies, it would be all turned upside down.

SS: But there's an example of why maybe the Northwest Forest Plan-FEMAT process wasn't all that bad of an idea, in terms of just having science people?

BM: Oh, right.

SS: I mean, I'm just going back and inverting the situation, saying, yes, you can criticize it, but it did allow a lot of freedom, at least in terms of the intellectual and the scientific?

BM: Okay. I'll come back at that and say that just because it would have been easier to do, doesn't mean that it would have been as efficacious and adhering to the spirit of decisions by not involving interested outside entities or associated decision-makers from the start.

SS: You finished up talking about the Columbia Basin project and where it could have gone, and what you would have learned from it. This is a final question. Anything else you would like to add to the record about your experience with the Northwest Forest Plan, the science in the Northwest or in general that you'd like to add as a capstone answer?

BM: Well, it really helped open my eyes to the need to understand more than just science, and more than just the little corner of science that I do, to really try to look at the system as a cultural system, an ecological system, a social system, economic system, historical system, all of that. And I don't know that we're really trained as -ologists to do that, to be very honest. I think the experience with the Interior Columbia Basin project, which was intended to be holistic and integrative and forward-thinking, had a good heart in wanting to do that, wanting to have that holistic view, but it too, failed. And I think that is symptomatic of how we learn and how we train in universities, which are often anything but universal. We were talking earlier about Humboldt and pre-Humboldtian holistic views. That's what I circle back to. That's really one of the lessons, I think, I got out of the Northwest Forest Plan. Yes, the establishment of late successional reserves was cutting edge and inspired quite a few others, and also served a strong social wedge to create dissidence in some factions, but beyond all that, it really taught me to do better, to look holistically, at entire human earth systems, if that make sense?

SS: I think that's a great way to finish the interview. Thank you, sir.

BM: My pleasure, my honor.

SS: You bet. Thank you. Signing out.

[End of Interview - Part 1]

[Start of Interview - Part 2]

SS: Okay, this is Sam Schmieding, again, back with Bruce Marcot. Same day, same place, different bench, actually, than where we started. (Laughs) We're in the shade now. But we're going to answer like one more question, as Bruce brought up something after we signed off last time. He said, "Oh, I was involved in that, would you want to know about that?" And I said, "Yes." So, Bruce is going to talk a little about what we call the "Gang of Four," which was Jerry Franklin, Norm Johnson, John Gordon, and Jack Ward Thomas, plus Jim Sedell and Gordie Reeves, the original group that got involved in testifying in Congress and were actually involved in writing one of the official reports before FEMAT. So, anyway, kind of fill in the gaps there where we didn't cover?

BM: Actually, the Gang of Four was Jack Thomas, Jerry Franklin, Norm Johnson, and-this is terrible, I forget his name, from Yale.

SS: John Gordon.

BM: John Gordon, yes.

SS: My fault. Jim Sedell and Gordie Reeves were the "Plus Two." I screwed up my intro.

BM: And I never heard of "Plus Two," so. [Lingo used in Forest Service.]

SS: That's what they call it in the Forest Service, people in there. They call it the Gang of Four - Plus Two. The aquatics guys are the Plus Two.

BM: The aquatics, I guess, I was a "plus three" or something then.

SS: Yes, or somewhere out there.

BM: Anyhow, I was brought in to help on that project, which tiered off of the string of the other ones, the Scientific Analysis Team, and directing the Science Committee for Spotted Owls, and then, the Gang of Four. I was brought in to look at the array of species in old growth which could be favored by having an old-growth conservation plan in the project. We really didn't come up with a Northwest Forest Plan type or guidelines from it, but still, it was something that politically was an important presage to FEMAT. At one point, when we finished our report, I accompanied the gang. I forget who else was there; Sedell, possibly Gordie. Then back to D.C., where we did a day's briefing to congressional staffers.

SS: So, you were in that hearing?

BM: Yes.

SS: Okay, this is an important omission then, and thank you for remembering.

BM: Oh, okay.

SS: I just figured you weren't there.

BM: Except, it was only the Gang of Four who was sitting at the front table, and the rest of us were in the peanut gallery in the back.

SS: Do you want to tell me about that whole experience?

BM: It was positive. I thought the aides that were asking a lot of the quick questions, they asked some very poignant ones, but not leading questions, either way. So, I felt like what was presented was appropriate and honest and accurate, and what was asked by the aides was very well-done. It was not slanted toward trying to tilt the table, either toward environmentalism or toward the industry side. It was very clear. And I thought that each of the four [Gang of Four] did an outstanding job in presenting clearly. I learned something about that. You know, that I've since been in that kind of a stance back in D.C. especially with the polar bear work, in presenting my corner of that work on the International Polar Bear science team, back in late 2007. So, that really helped me see the best way to present things in a factual, clear, vigorous and strong fashion.

SS: Now, do you remember the line of questioning at all?

BM: Vaguely, to be honest. But it dealt with how sure are you about what you've evaluated. What are areas of key uncertainties? How certain or uncertain are you in terms of possible economic impact? Did you take into account social interests in old growth? What about alternative ways to meet some of the ecological goals?

SS: Now, do you remember the moment, or was it during that hearing, or maybe at a back room, where they added the aquatics "wild card" into it? Because initially, it was just terrestrial. And then somebody brought up, but don't forget the fish, or something along those lines? Do you recall what I'm talking about?

BM: I don't think it happened during, at least, at the hearing I was at.

SS: Okay.

BM: Yes. I think it was prior because I think that Sedell, in fact, I'm sure he was there. I'm sure he was there because he was sort of joking around. And I had to point out that Jim, the room is full of live mikes, so.

SS: I heard he liked to speak extemporaneously.

BM: He did well at it. Yes. (Laughter)

SS: I did not get to meet Jim. He passed just before I started this project.

BM: Bless his heart, but yes.

SS: Unfortunate for me. Big picture question; the Gang of Four Report, the ISC, the SAT, FEMAT, the whole evolution, big-picture; How would you characterize the evolution of the knowledge and science in that continuum from the beginning to the forest plan and even beyond?

BM: Well, it's really interesting thinking as to where we are now. I'm not sure. I think up to this point, the evolution has been very positive, and there's been great strides toward ensuring harder science, and that science can talk to management, and vice versa. That's really played out well, like in the Survey and Manage Program I was involved with, with the inter-agency special status and sensitive species program that I've also been advisor to. I am also advising on the development of lists for species of conservation concern under the 2012 planning rule for the Forest Service, now at the regional level, involved in coming up with viability assessment tools for species lists. So, it's evolved step-by-step toward greater and greater rigor and science focus. Where things go from here is uncertain. I feel like almost we're at a climate change tipping point where the system might tilt one way or the other. I can't cite any certain circumstance or event on this, but my feeling is that with the administration where it is, things can suddenly take a left turn or perhaps right turn.

SS: Or a downturn.

BM: A downturn, yes, that's really implied.

SS: Well, very good. Anything else along that line?

BM: Yes, this whole sort of lineage as you put it, I think built on all the prior progenitors, if you will, and it's been really, really positive seeing that. I've been really fortunate to be part of this line. And lots of us, as you know, are retired or gone. So, we're hoping to be able to sort of pass on the spirit of it all.

SS: Well, that's what we're doing today. So, once again, for a second time, I say thank you.

BM: Super thank you.

SS: Okay.