Jane Lubchenco Oral History Interviews, October 6, 2014

Title
“From Newport to Washington, D.C.: A World Leader in the Marine Sciences”

Date
October 6, 2014

Location
Cordley Hall, Oregon State University.

Summary
In her first interview, Lubchenco discusses her family background and upbringing in Colorado, her early interests in science, and the contours of her early education, including her undergraduate experience at Colorado College. In discussing this period of her life, Lubchenco stresses the importance of her involvement in the Ford Independent Studies Program and her participation in a summer enrichment program in marine biology held at Woods Hole, Massachusetts.

Lubchenco next recounts her master's studies at the University of Washington, noting the impact of her mentor, Bob Paine, and the circumstances by which she met a fellow graduate student, Bruce Menge, who would later become her husband. She then notes a year spent in Santa Barbara before describing her and Menge's move to the east coast, her time in the Harvard University Ph.D. program, and the research that she conducted with Menge in coastal New England.

From there Lubchenco describes the extension of her and Menge's research to a tropical environment in Panama, as well as her two years on faculty at Harvard. The unique manner by which Lubchenco and Menge relocated to Oregon State University and a description of the OSU Zoology Department at that time are also recalled.

Lubchenco's survey of the research that she and Menge have conducted at OSU comprises a major component of the interview. In reviewing their work, Lubchenco highlights the duo's studies of the ecology of Oregon's seashores - in particular their work analyzing interactions between the rocky shore and the near shore ocean - and the geographical extension of this work through the formation of the Partnership for Interdisciplinary Studies of Coastal Oceans.

The path that Lubchenco took toward increasing involvement in science policy is another key aspect of the session. In this, she mentions her crucial involvement with the Ecological Society of America's Sustainable Biosphere Initiative, her growing concern with environmental decay, and her creation of both the Leopold Leadership Program and the Communication Partnership for Science and the Sea as a means to empower other scientists to add their voices to the science policy dialogue.

The interview concludes with a synopsis of Lubchenco's recruitment as head of NOAA and her four years leading the administration. She also lends her thoughts on the current direction of OSU and expresses enthusiasm for its budding Marine Studies Initiative.

Interviewee
Jane Lubchenco

Interviewer
Janice Dilg

Website
http://scarc.library.oregonstate.edu/oh150/lubchenco/

Transcript

Janice Dilg: So, today is October 6th, 2014. My name is Janice Dilg; I'm the oral historian for the Oregon State University oral history project. I'm here with Dr. Jane Lubchenco in Dornfeld library in Cordley Hall on campus. Good afternoon.

Jane Lubchenco: Hi Jan, it's great to be with you.

JD: Well, thanks for taking the time and participating in this project. I think it's always good to perhaps anchor an interview with a little bit of just background of where you're from and a little about your family and perhaps your early interests in life; how you started your trajectory to this place.

JL: I grew up in Colorado, in Denver. I was the eldest of six daughters. We had just a fantastic family. My mom and dad were so wise. They really encouraged each of their daughters to learn, explore, give back, be family, love, and we did a lot together. And in an era of pre-title IX, both of them believed strongly that it was important for girls to have athletic opportunities, so we did a lot of both individual as well as team sports, which in hindsight was actually really good preparation for a lot of the rough and tumble world of science and the politics that I've been in, but also learning how to pick yourself up when you fall down, how to set goals, both as an individual as well as in a team. They encouraged us to find what we were passionate about. Intellectual pursuits were very important to them, but so was being well-rounded, and so we did a lot of extracurricular activities, and I will be forever grateful for Mom and Dad for all the gifts that they gave us. It was pretty special. We spent a lot of time in the out of doors, hiking and climbing and swimming and fishing. I developed a real early interest in natural history and exploring outdoors. We did a lot of girl scouting, all of us, and that was a fantastic opportunity, and it not only gave me a lot of leadership opportunities but places—opportunities to learn about the natural world and to explore science.

Both my parents were physicians. Mom was a pediatrician, Daddy was a surgeon, so we were exposed to a lot of medical talk at the dinner table, and in fact when some people came to visit they would be appalled at some of the dinner conversations that we all just took for granted, but science was something that they valued, but not to the exclusion of other things, and so my sisters and I are all doing different kinds of things. One's an attorney, one's a business person, one was an artist, one is a middle school science teacher, one is a psychotherapist, so you know, they all, we're all doing different things, but that was a gift from our parents to each of us, and we remain very close to this day.

JD: That's great. You briefly mentioned in passing this was pre-Title IX, and so while you had this incredibly supportive family unit and your parents, who were encouraging you all the way, was that the same type of experience you had at school and in the broader world, as you developed your interests?

JL: In elementary school we did—the athletic activities that we did were outside of school, because there really weren't opportunities for girls in school. I went to an all-girls Catholic high school, Saint Mary's Academy in Denver, and there were great athletic opportunities for us because it was an all-girls school. So, I played basketball and volleyball and then outside that I was on a club team for springboard diving. I did a lot of diving, swimming and diving early but later just mostly springboard diving, and that in fact was how I earned my college money, because every year during high school I would lifeguard and give private lessons on both swimming and diving at various country clubs around the Denver area. So, it was a great sport to both participate in, but provided a great opportunity to try my hand at teaching, which I discovered I loved, and also make some money for college. So, it was a great set of circumstances.

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JD: And so, it sounds like going to college was a given for all of you, you and your sisters. How did you decide where to go to college and what kind of started you down the science path?

JL: I—there was the expectation that each of us would go to college, simply because that was seen as a way of not only learning about the world but learning about ourselves, and the high school that I went to was a college prep high school and we had spectacular training that really was good preparation. I explored a lot of different potential colleges and universities but was particularly drawn to Colorado College. It had a stellar reputation, small liberal arts school, really excellent academics, and they were in the process of designing some big bold new experiments in higher education, which

I thought sounded intriguing, and I ended up going to Colorado College and participating in what was called the Ford Independent Study Program. In a normal curriculum where most students were going to classes and taking grades the way they do every place else, there were, I believe maybe, I can't remember the exact number, maybe twenty-five of us or so, who were selected to participate in this independent study program. We had no classes, no grades, no tests except one test at the end of two years where we had to demonstrate general competence across a wide variety of fields, and another test at the end of four years that was both breadth as well as depth in our field of specialty. And it was a fabulous program. I loved it. About half the kids dropped out after their first year because they didn't like not having the structure—

JD: Oh, how interesting.

JL: -of classes. They didn't like not having grades to tell them how they were doing. I was not like that. I loved this independent study. And we could go to classes if we wanted, we could do tutorials with various professors, we would, just could go say "hey, I'm really interested in this, could we arrange time together on a regular basis?" We could go to the library and read whatever we wanted, and I had a fabulous advisor who was a Shakespeare scholar, and he was fabulous. He was just really great.

So, I was one of these kids that was interested in everything. I loved every subject that I took, but I began to gravitate toward biology when I was at Colorado College and really got into that and ended up majoring in biology. So, I did some classes but I also did a lot of independent things, and between my junior and senior years, there was one professor, her nickname was Pinky, it was Dr. Alice Hamilton, and she's this very tall, stately woman who is very gruff on the exterior, but she was actually a real sweetie. And she would always be scouting for students that she thought would benefit from some special opportunity, so she suggested that I apply for a class at Woods Hole, Massachusetts, offered through the Marine Biological Laboratory, to spend the beginning of a summer, the first six weeks of the summer, taking a class in invertebrate zoology. So, all of the marine critters—mostly marine, not exclusively—all the critters without a backbone are the invertebrates, and this was just an incredible opportunity for me to be exposed to marine biology and to a whole new world that I didn't even know existed. Most of the students in the class, it was a small class, there were about twenty students, all but two of them were graduate students. So, there were two of us that were undergrads all the rest of these are graduate students, and they were all talking about graduate school; what they were doing for their dissertation, what it was like, and that was a great experience in and of itself. I really fell in love with the ocean. I fell in love with marine biology. Not your typical whales and dolphins that really get most people into the field but really the little critters that make oceans work, essentially. I found them endlessly fascinating. They were exotic, they were diverse, so many different body plans, different ways of feeding, of making a living, of finding mates, of coping in what were really rigorous environments, and it was—I just couldn't get enough and I wanted more.

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So, after the first six weeks was through, each one of the six professors who had co-taught the course—and each one was an expert in his or her own—actually they were only he's—so each of them was an expert in his own discipline. Each one of them chose one student to stay on for the second half of the summer and do an independent study program. So, I was invited by one of the professors, W. D. Russell-Hunter, to stay and do my own research project with him. It's pretty common these days for undergraduates to have a chance to do research. It wasn't back then, and so this was really my first opportunity to do hands-on research, and I discovered I really liked designing experiments, thinking about different possible outcomes, figuring out—essentially just problem-solving, that's what research is, problem solving, and figuring out how to pose a question you can answer in a particular timeframe; how to design it, how to anticipate the kinds of outcomes, how to analyze data, how to write it up, so that was just a great opportunity for me, and that summer really was pivotal. It was a turning point for me in helping me really identify where I wanted to go next, what I wanted to do. So, based on that summer at Woods Hole, I decided I wanted to go to graduate school and I wanted to do so in marine biology. And Gus Hunter, toward the end of this summer, came up to me and said "I suspect you're going to be applying for a graduate school, I'd be happy to write you letters of recommendation, please let me know where to send them and what you would like." So, that's pretty unusual for a professor, to actually—

JD: Great offer.

JL: Yeah, to just volunteer that. So, I was, in looking back over both high school and college, I was exceptionally fortunate in having individual mentors who really took me under their wing and helped encourage me, guide me, provide

role models, and certainly Pinky Hamilton was at Colorado College for me, Gus Hunter was when I was at the marine biology laboratory in Woods Hole, and those kinds of experiences, I think, are really important to young people. So, across those opportunities, a chance to do hands-on science, to discover what worked, what didn't work, learn new things, what you liked, what you didn't like, was—they were great opportunities for me.

JD: And so, off you went, choosing to come back to the west and go to University of Washington, any particular mentors or experiences there that kind of kept—pushed you forward into the next direction?

JL: There were indeed. I went to University of Washington, I was in a PhD program there and this was a time of big transitions in marine ecology. Much of the discipline of ecology had been descriptive. Talking about where plants and animals, be they on land or in streams or in the ocean, where they live, where they don't live, who's associated with whom, and two individuals in particular, Joe Connell at UC Santa Barbara and Bob Paine at University of Washington, really revolutionized the field in making it experimental; showing that you could use, in this case, rocky seashores to do experiments and test ideas, to test hypotheses.

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You can move predators and herbivores around, you can transplant mussels and barnacles from high on the shore to low on the shore, and this ability to test ideas and to distinguish causation from correlation is critically important to the advance of the discipline of ecology. And it turns out that rocky seashores are a model ecosystem for doing experiments. You have gradients from very wave-protected to very wave-exposed, you have a very steep gradient from high on the shore to low on the shore, and so you see the same kind of patterns that you see, for example, going up a mountainside; the different life zones that are there. You see those zones in rocky seashores along both of those gradients, but you can easily remove predators or herbivores; cage them out, cage them in, transplant them and again test to see the importance, for example, of predation, more competition, more herbivory, the importance of the biological interactions interacting with the physical factors to determine who lives where, how diverse they are, how abundant they are.

So, one of the huge advantages in the zoology department at the University of Washington, was this focus on experimentation, experimental marine ecology. The other major focus was bringing an evolutionary perspective to the study of ecology. And Gordon Orians was really the leader in that field in the department at the time. He was a global leader, but this combination of experimental and evolutionary marine ecology was very powerful and opened up a lot of new ideas. It was a time of exposing old myths and developing new ideas, because you could see things through those two lenses that, in hindsight, was very, very helpful. Great students, great faculty, lots of vigorous interactions, everybody was arguing and reading papers and discussing things, lot of camaraderie, and it was a pretty special place and it was one that I quickly discovered I just really like that and it gave me huge opportunities.

So, my advisor, Bob Paine, was definitely a major mentor to me. He had a huge influence on most of his students, and certainly on me, he was a real visionary in the field and very strong ideas, but very supportive of his students, and he was really, really special and is so today.

JD: And you know, this is a time I'm thinking kind of more broadly in the general consciousness, you know the first Earth Day happened in 1970 around this time, and I don't know if there were any technological changes, or was this pretty much kind of an academic, intellectual evolution that was going on in the field?

JL: The major technological changes that have transformed science were mostly yet to come, although they were beginning. When I started graduate school, we had these really, really clunky machines that we thought were state of the art, because you could actually use them to do things that you would normally have to use a slide rule for. And you could do some very elementary, today, crunching of numbers and calculations, and we were just so excited when this came about. And of course it was nothing compared to what was yet to come. We, nonetheless, in the field of ecology, there was a lot of experimentation in Bob Paine's lab, and a few others around the world, to figure out newer and better ways of doing experiments in the field. And so there was sort of a mini technological revolution that was going on, to figure out new materials to use that could withstand the crashing of waves that happen on seashores, you know. Really incredible wave forces. Because if you were going to put a cage down to keep predators out, you needed it to stay on these rocks, and so there was a lot of playing around and there was some very clever graduate students who were trying to figure out all these different ways of doing this, doing that, to do the kinds of experiments we wanted to do.

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So, it wasn't really the same as, you know, the big technical revolutions that we've seen since then, but on a smaller scale, it was transformative for marine ecology, because we now routinely do a lot of things in the field that just didn't used to be possible.

JD: So, also during this time, because life doesn't happen in a vacuum, careers don't develop—there's a personal side to things—you met the person who would be not only a colleague but your husband.

JL: I did.

JD: Perhaps talk about that personal side a little.

JL: Sure. So, my first year as a graduate student at University of Washington was Bruce's sixth year, so he was a fellow graduate student in the same department, same program. Bob Paine was his advisor, and we came into contact, and in fact all the graduate students had individual offices, or offices that they shared with two people, but in sort of a very large room with a bunch of partitions, so they were all sort of in together. The convention at that time was for people to also help each other out in the field, because going out on rocky seashores when the waves are crashing, even at low tide, can be pretty dangerous. So you always had to have a buddy. So we would help each other out in the field and that was a great way for a new graduate student to learn about not only the particular system, in terms of the critters that were there, but learn some of the techniques and get to know some of the students, and the questions they were asking; how they were posing their questions, but at the same time to lend them a hand, because it's also useful to have an extra pair of hands in the field.

So, Bruce and I started dating toward the end of, I guess, the first quarter that I was in Seattle. And we dated off and on. Our first date was going snow-shoeing on Mount Rainier, which is great fun. You know, graduate students are pretty poor and you can't afford much, so we went snow-shoeing. And I have very fond memories of making snow angels, you know, in the snow, and doing fun, silly things like that. So, we dated and had a relationship that was developing, but this was his final year and he was defending, and he was going off to the University of California, Santa Barbara, where he had a real plum post-doc for two years. And I spent—so I spent fall quarter in Seattle. I spent winter; I think winter quarter at the Friday Harbor laboratories, and helped Bruce with some of his field work during that time. And then I taught a class during the summer, also at Friday Harbor, so I was going back and forth between Seattle and the Friday Harbor laboratories that are in the San Juan Islands.

I was helping Bruce out with his project and in the process of doing so, was puzzled by a particular pattern that I saw that nobody could really explain and began taking data on that and looking at it and that's what in fact evolved to become my thesis. Bruce was studying a small sea star that has six arms, six rays, it's called leptastrias, and it is much smaller than the much larger pisaster, which is often called the ochre sea star, sometimes ochre colored, sometimes orange, sometimes purple. And he was looking not only at leptastrias but also how it was interacting with pisaster, and normally you would see big pisaster and very little, relatively so, leptastrias. You very rarely saw little pisaster. There was an area that we knew about that had not really been explored, where there was just a huge concentration of these baby pisaster. And so there was a real interesting question. A lot of what Bruce had studied showed that these two sea stars, whose diets overlapped a lot, they both ate mussels, barnacles, snails, lipids, a lot of the other critters on the rocky shores, but their diets were, the big guys and little guys seemed to be able to coexist easily, in part because of their differences in size. And so one question was how does it work when there are also not only leptastrias but little pisaster of the same size? So, I started taking data on that, began developing more and more information, some hypotheses, and was working on that for just a research project because it was interesting.

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Bruce finished his dissertation, defended it, and was getting close to being ready to take off for Santa Barbara and we decided at that point that we thought we had a pretty good thing going but we weren't ready to make a more serious commitment without spending more time together, because it really hadn't been all that long. So I decided to take a leave of absence from University of Washington and go on leave for one year, go down to Santa Barbara with Bruce and just do independent research and independent—auditing classes, studying. I would go back to Friday Harbor three times so

that I could sample my populations year-round, not just in the summer time that I had been really concentrating on, so with my advisor's blessing I did that and ended up going back and forth, but we also decided during that fall to become engaged, and then we got married in that spring. Bruce had what was originally to be a two-year post-doc, but he realized that there wasn't a lot for me to do in Santa Barbara. I had actually done what turned out to be a great research project on Santa Cruz Island, where we were both doing research in the Channel Islands, and I was auditing classes, but it was actually a pretty challenging year because I didn't have, you know, I was a trailing spouse with no identity other than Bruce's significant other. And the group of students that were at Santa Barbara at the time were very sexist and not very welcoming of women scientists. That wasn't true of the faculty, but sort of the aura—everyone called them the Santa Barbarians, and they really were. They were aggressive and massive and things that today would not really be tolerated in terms of behavior, but you know, that was the way it was then.

At any rate, Bruce decided that he would start looking for jobs, and he ended up taking a job at the University of Massachusetts in Boston that would start in the fall. And so he completed just one year of what was to be a two-year post-doc in part to allow me to continue my graduate work, because in the Boston area there are lots of good universities, there should be lots of good possibilities for my continuing my studies. So, I wrote up what I had done. I had been in a PhD program, but I wrote it up and turned it into a masters and defended that. I remember actually writing much of it as we were driving across the country to do the final revisions on my thesis. So, I actually spent only one year at—in the zoology department at the University of Washington, even though I was enrolled for two, because I was in Santa Barbara for the second. Nonetheless, that year was really an important one for me, in part because of the opportunity to really do my own research, to become immersed in the world of marine ecology, with spectacular faculty and spectacular graduate students; to really internalize this experimental, evolutionary approach to marine ecology, which has truly just spread around the world, because it was so powerful. And to really be at the forefront of sort of a new way of thinking about marine ecology. That was just a fabulous gift.

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So, we moved across country, I finished my masters, we got settled in—oh, I'm not sure I mentioned we got married.

JD: Minor detail.

JL: We got married actually in May, before we moved to the east coast. We got married on the, essentially, the slope of Mount Baker in Seattle. It was an outdoor wedding and it was pretty, by many people's standards, pretty—it was not super well planned, shall we say. We hadn't scouted out the place beforehand, we knew that there was going to be a beautiful meadow someplace, we knew we were going to have great weather and we just kind of went with the flow and it all turned out beautifully. But it was great and it suited us and it worked out just fine.

So, we moved to Cambridge, Massachusetts. Bruce started his job at the University of Massachusetts at Boston, as an assistant professor. This was a relatively new campus and it was an urban campus. I started having some conversations with various possible schools about graduate programs. In parallel to that, we started scouting out opportunities for research sites along the New England seashores. And we had both done research on the west coast but we were interested in comparing how the east coast rocky seashore systems were similar or different from the west coast ones, so we had worked in Washington and in California and so now this was a chance to look for New England rocky seashores and do some comparisons. I became very intrigued by the herbivores in the system and we decided that a great way to proceed with our research was to do parallel projects that were separate but complementary, so we took the whole rocky seashore community. Bruce worked on the predators and the prey, so the sea stars, the crabs and the snails and how they ate the barnacles and the mussels. I worked on the herbivores: the urchins and the snails, and how they ate the seaweeds, and we took a lot of data together so that we could collectively describe the distribution and abundance of the entire community, but then we focused our own efforts on a subset of the whole community of creatures on the rocky shore. So that was a great way to do parallel but complimentary studies.

I started scouting out research sites. We identified some along the coast of Massachusetts and Maine and I actually started doing my thesis work before I was even enrolled in a program, which normally would not work out, but it actually worked out fine. And I started auditing some classes at Harvard, with the blessing of the professors who were giving them. My interactions with some of the graduate programs in the Boston area weren't quite so good. The folks at Harvard were "sure, find anything," you know, "do what you want." And the philosophy at Harvard at the time was that graduate

students really needed to be independent. It was very much a sink or swim. If you had the initiative to get the resources you needed and figure out what you wanted, you were fine. If you didn't, it didn't really work out so well. When I went to talk to the people at some of the other universities, they said "well, our marine program is focused only on Cape Cod and it's based at Woods Hole, and so you would have to work there. And I said "well, there isn't really much of a rocky intertidal community there. There are cobbles and boulders but there are no long stretches of rocky shore and that's what I want to work on," and they said "well, too bad," you know. That wasn't very enlightened as far as I was concerned.

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So, I ended up applying to Harvard, was accepted as a graduate student there, and in what was the biology department at the time. I also had sought out a really stellar scientist, who is now teaching in the Graduate School of Design at Harvard, who had been—he's an ecologist—he had been, Bob Paine, who is my mentor at University of Washington, he had been Bob Paine's graduate advisor at the University of Michigan. So, Fred Smith was his name and he normally took only graduate students from the School of Design, but I went to visit him, because Bob suggested that I do so, and asked him if he would be my co-advisor, and he said "yes of course, I'd love to," so he was fabulous. He was a theoretician and had great ways of thinking about problems. It was really, really useful. My other advisor was Tom Shaner, who is also a superb ecologist, also a theoretician and empiricist, but the system that he worked on were lizards. So, this is pretty typical of Harvard. I was doing marine ecology but I didn't have a marine person who was my advisor. But it didn't matter because many of the questions are the same. The systems are different and you have to know enough to figure out the system and be able to do what you need to do in it. So, that worked out really well.

I had a lot of fun as a graduate student at Harvard. Huge, wonderful community of graduate students with me and great supportive professors, but I had to be pretty independent and my experience at Colorado College and being independent really prepared me for that, so that was just not an issue. I had a National Science Foundation graduate fellowship, so I had support to do that. I had done teaching as a TA when I was at University of Washington and that was a great experience and I knew I loved teaching, but when I was at Harvard I was focused primarily on doing my research. So, I finished my PhD at Harvard, had worked very intensely on the plant-herbivore interactions along rocky seashores of New England, exploring what the dominant herbivore in the system, a snail called Littorina, what it ate, why it ate what it did, so I did a lot preference experiments to understand what seaweeds it was choosing to eat and why. I looked at the kinds of defenses that seaweeds used to keep themselves from being eaten, ‘cause they're just sitting there.

JD: Sure.

JL: So, some have chemical defenses, some have mechanical defenses, some exist higher on the shore than the snails can graze, others are abundant primarily in the winter time when the snails are less active. So, a lot of different strategies, so there's an evolutionary theme in this. So, I was looking at things both from the herbivore perspective as well as the seaweed perspective and had a pretty rich array of interlocking problems that came together very nicely. Looking at zonation patterns, why things are where they are on the shore, not someplace else, doing experience, looking at the role of herbivores in the system in controlling the abundance, diversity of the seaweeds, looking at life history strategies of the seaweeds as well as defenses against grazing.

So, a lot of interesting problems that made some significant advances in both marine ecology as well as algal ecology, and at the same time, together with Bruce's work, gave us a picture of what the whole community was doing. Once we had a pretty good sense of how that rocky seashore system worked, how it changed from high on the shore to low on the shore, from wave exposed to wave-protected, through different seasons, we were then interested in saying "okay, we've got this latitudinal comparison, the east coast and the west coast, how are these systems different from tropical systems that are similar? Rocky seashore systems. And so we began exploring working in the tropics to do some latitudinal—I'm sorry, we didn't—I misspoke earlier. We had the longitudinal comparison before, east coast, west coast; we wanted the latitudinal comparison. And we ended up choosing to work in Panama at the Smithsonian Tropical Research Institute there on the Pacific coast where there is a really robust tidal amplitude of about twenty-one meters, so a little more than seven feet from really good low to really good high tide.

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Nine degrees north latitude, really intense, hot basaltic rock, pretty barren rocky intertidal systems, and everybody had thought that they were barren because of the physical stresses of this tropical sun, hot basaltic rock, but there was a very rich array of herbivores and predators in the system that had to be eating something, and so we started doing experiments. We had a lot of ideas. We started doing experiments, removing herbivores, putting cages down, keeping them out, same with predators, and quickly discovered that in fact these seashores were barren in large part because the grazing and the predation were so intense all the time. Things would just barely start to grow and they'd get nibbled back to almost nothing. If you put a cage down and keep the herbivores out, you get this immediate lush lawn of seaweeds that are growing really, really rapidly and—but getting mowed down constantly. So, it really illustrated the difference between standing crop, what's there that you see, and productivity, the turnover. And so this was a system that was turning over very, very rapidly. It was super productive; it just didn't look like it because it was being mowed all the time.

So, we ended up doing some really interesting, both latitudinal as well as longitudinal comparisons, again focusing on different parts of the system, although in the tropics most of the consumers ate some plants and some animals, so Bruce's and my research began to converge a little bit more. So, as we began to explore the tropical habitats in Panama for research, I had finished up my dissertation at Harvard and was offered a job as an assistant professor at Harvard. I was the first woman that was offered a job in that department and as a beginning assistant professor, and we had some—Bruce and I had some serious heart to heart discussions at that time, because although he liked UMass Boston, he was really homesick for the west coast. He had—he's a Minnesota boy. He grew up in Minnesota, but he really had fallen in love with the west coast and he really, really wanted to return back there, and he had been waiting for me to finish my dissertation, hoping that we would then look westward and find jobs there. And when I was offered this great opportunity to be an assistant professor at Harvard, he said this is too good to pass up, I think we should stay here for at least, you know, a few years, but please, please, please, can't we, someplace down the road, think about heading west.

So, I took the job. I loved teaching. We were doing research both in New England and we started the Panamanian research at the time and we were really enjoying our academic jobs and our lives as academics and with one another. We started to think about having a family but we couldn't imagine how we could have time to spend the amount of time that we wanted to with our kids and still do our jobs, because they were pretty much all consuming, and that's true for a lot of academics.

My mom, who had been a physician, had chosen to work only half-time when her kids were little. She went from being in public—I mean in private practice—to working for the city and county of Denver in low income area well baby clinics, so that she had specific and finite hours. She wasn't on call, she was not dealing with sick babies, so she, when we were in grade school, for example, she would be home when we left for school in the morning, she'd be back at lunch, she'd go off to clinic in the morning and the afternoon and then she'd be back in the afternoon when we were home from school. So, she had modeled for all of her daughters how to do a work-life balance that worked for her. Bruce and I liked that model and it was important to both of us that we spend a lot of time with our kids. That didn't seem to be feasible with the academic world that we knew. Typically what happened was a—for a couple—would be for the man to work full time and the woman to be the full time caregiver, and in the academic world, once you get off the tenure track, it's next to impossible to get back on it, and we knew that and we had seen that happen to many of our colleagues and friends.

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So, we thought about what other alternatives might be out there. We began speaking to a number of universities where jobs were coming up for marine ecologists, about the possibility of taking a single position and splitting it into two separate half time, but tenure track positions. We got really interesting reactions. Some said "you're crazy," others said "but, what do we do about tenure, what do we do about benefits, what do we do if you get divorced?" And much of the feedback that we got was all the reasons not to as opposed to "hmm, there might be these problems, but let's think about solving it." We had a very different reaction from OSU when we first broached this idea. They had one position for a marine ecologist and there was someone in the department, Chris Bayne, who was on the search committee, who really, really, really wanted us, and the dean was really interested in helping support dual-career couples, and he was way before his time. And that inside/outside combination at the university, as well as a willingness to just explore sort of new options, turned out to be really critical for us. We proposed this idea, we said "if you find both of us acceptable in and of ourselves, we want to explore this option." So, it wasn't one person riding on the coattails of somebody else. And, to make a long story short, that's what we ended up doing at OSU, was taking a single position, splitting it into two separate half time positions, so each was independent of the other. This wasn't a joint position, they were split positions. But each was tenure

track. And many of the universities with whom we spoke said "we can't do that. We won't tenure anybody unless they are 1.0 FTE." OSU, because we have Ag Extension and other arrangements, already had the ability to provide tenure to someone who was less than full time, so that wasn't a hurdle. We—so after two years at Harvard I resigned my position there, Bruce resigned his position at UMass Boston and we came here to OSU with that arrangement and were warmly welcomed by the department, by our colleagues whom we had discovered were really, really great colleagues, and they have been so to this day. And that was one of the—you know, we knew we loved the west coast but the caliber of the faculty was a big draw for us. The fact that there were really good people in many different units at OSU, many of whom were working on marine things, was important, but the zoology department faculty was, and remains, really stellar and just a wonderful, fabulous community. We quickly discovered that the students were great too, but we didn't really know that when we came.

So, that's sort of the story of how Bruce and I came to be here at OSU. We had to do it in a little bit of a disjunct way because we had—the negotiations for all this took a while. I had had to commit to a second year of teaching at Harvard before we were final—had finalized the negotiations, so Bruce came in the Fall alone while I taught at Harvard for my second year at Harvard, and then we, and then I joined him the next year. So—

JD: So, let me jump in just a second, and talk a little about what the department looked like, kind of what was its scope, what was its size, I'm not sure if it was in this building, we're in Cordley Hall, at that point, just set a little scene for what you walked into.

[0:50:18]

JL: The zoology department was here in Cordley Hall and most of the offices that the Zo department has have remained the same. We've since changed our name just in this last year, we're now the Department of Integrative Biology, but it's been a Zo department for most of the time that we've been here. I think the faculty at the time was only slightly smaller than it is now. If I had to guess, I would say it was fifteen or sixteen faculty members. I don't recall how many Zo undergrad students we had. I know that we have a lot more now but I don't really remember exactly how many there were at the time. The building hasn't changed much, you know, individual labs have been renovated but it's pretty much the same old, same old and it's a building that continues to age and continues to have a lot of problems because of its age, you know; wiring and all the other stuff.

JD: Although it's a fun building to come into because there's trees and animals and all kinds of interesting things out in the hallways.

JL: That's absolutely the case. You come into the Zo spaces and you know that you are in a place where people study critters and those are wonderful teaching tools as well as great invitations for conversation and just walking in the halls, you know, you see the birds in the cases and it's somewhat of a museum that way and it's really fun because of that.

JD: Sure. So, you've been talking, interesting things about your research, but you mentioned that you love teaching and you figured that out at an early age. Maybe expand on that a little and sort of that aspect of when you came to OSU.

JL: I had done teaching as a graduate student at University of Washington and had really loved it then, but of course when I came to OSU I had also done teaching at Harvard. So, I had offered courses in ecology and similar subjects then. I've taught a range of subjects here at OSU, general ecology, invertebrate zoology, a number of graduate classes focusing on more specialized marine ecological topics, community ecology, marine biology, more generally. And OSU is really fortunate in attracting a lot of kids who are interested in the ocean and interested in some kind of biology, zoology, ecology. That's only increased through time. It's become more and more and more, especially since OSU's reputation in those areas has increased and, as a student body, is more conscious of the environment and wanting to learn more.

When we first came here, we did have classes in environmental sciences. We now have lots of classes in environmental sciences, driven in large part by student interests, and it's something that kids are hungry for, understanding how people relate to nature, understanding what this climate change stuff is all about, what is biodiversity all about, what are global patterns, what's happening at the local, national, international stage, what's the science that underpins our understanding or management and policy decision. So, we have a lot greater diversity of classes now than we used to in those areas. When

Bruce and I first came here, it was very much the traditional disciplines of zoology and we have maintained that focus on the basics while also adding a lot of this new richness as the science has evolved and as student's interests have evolved.

Jan, can I go back for just one second?

JD: You bet.

JL: I want to draw some connect the dots, if you will.

JD: Sure.

[0:55:02]

JL: Across some of the decisions that Bruce and I have made during the time that we've been together, because oftentimes young women and young men say "you guys are a successful dual career couple, you've managed to navigate the challenges of academia together, what advice do you have for us?" And Bruce and I both tell them that first and foremost you need to choose your partner well, and I'm really delighted that I was wise enough to choose Bruce, and he me. But, in addition to that, being able to take turns over a long period of time in making decisions about different job or career options—usually at any decision point, one option is going to be slightly better for one of you than the other. It's not always going to be 50-50 every place along the way, and even though we didn't consciously set out to do this, in hindsight we have sort of taken turns. When I left a PhD program to go down to Santa Barbara with Bruce, I was going into something that wasn't necessarily good for me, and it was fantastic for him. It was a hard year for me. He left the second year of his post-doc to go to the east coast and take a new job so that I would have opportunities for graduate school. He stayed in Boston for another two years when I was offered the position as assistant professor at Harvard. When we came here to OSU, it was obviously good for both us, although I was leaving Harvard and people said to me "you are nuts. Why would you leave a tenure track position at Harvard?" But it was something that was great for both of us. But across those decision points, it's not been consistently in favor of one of us or the other. It's balanced out. And I think that balance and that mutual respect and wanting something that is in the long-term going to work for both is really important to both the individuals, but also to a couple.

JD: Well, and you've also pointed out kind of the intersections of your research, too, and I'm not sure how common a situation like that is, because then you both could continue your research and perhaps this could be the launching off point for what your research has been, which has been robust throughout your teaching career and as a faculty member at OSU as well.

JL: In our case, being in the same field has been a very strong plus. I know of other couples who are in the same field where that doesn't work so well, you know. They try to collaborate and it just doesn't work. And actually Bruce and I have struggled when we write papers because we have very different writing styles. I write very slowly and meticulously and it takes me a long time to get stuff done. Bruce just [snaps fingers], you know, spits it out and it's really rough and I have a hard time with that because I get distracted by how rough it is. So, we've had to figure this out over time. But, that challenge I've seen amplified hugely in other couples, where they try to collaborate and be in the same field and it doesn't work. For others it works quite fine. So, I think there's nothing, you know, that's just a very personal thing. But regardless of whether you're collaborating or not, if you are going to stay together, you have to figure out how to make these career decisions in ways that are going to be benefit—that will benefit both of you in the long run.

JD: Sure. And you've done a lot of study back on the west coast, back on the Oregon coast particularly, where not a lot of, perhaps breadth or depth of research has been done before. Talk a little about what your research has been since you came to Oregon and to the present.

JL: When we first came to Oregon we were really keen to work on the Oregon seashores, in part because there had not been a lot of, certainly, experimental evolutionary marine ecology. The systems were well-characterized in terms of the critters that were there, so that's helpful. And it was clear that some things were the same and some were different from Washington or California, so here was a great opportunity to really take the next step in understanding how these seashores worked, how they're changing and how to think of them in the larger context of up-shore and down-shore, if you will. There is a large rain ecosystem that's off the west coast of Washington, Oregon and California, and this is all

part of the same large ecosystem, so understanding what's similar or different about each of the places along that system is interesting and was an interesting challenge.

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When we first came to OSU, we did a lot of scouting and looked at different study sites and realized that there was a lot of variety from one place to another. We were also doing so with young kids because our first son was born the first year that I was here and then our second son three years later, so we were doing a lot of field work. And we would go out to the coast during the spring and summer and spend time doing research, so our first son spent as many nights in a sleeping bag—we were camping at the coast—as he did in his crib at home, and we've got some great pictures of them in our backpacks and whatnot down on the seashore. So, we were juggling kids as well as research and at the time we didn't have the same facilities that we have at the Hatfield Marine Science Center. We couldn't stay there overnight, so we were camping. So we would, we had a red VW camper van and we would bring our tent and the—so we'd come down with the kids and camp out for a week, because the tides are often, in the spring and summer, are really, really early in the morning. So that's sort of what field work was like, and when we would take our students out in the field to do research, same thing, everybody would camp. So, it's a little different situation and it took a lot longer to drive to Newport than it does now.

So, we became interested in understanding the rocky seashores along the coast here and understanding why some sites are different from others. Those questions led to an appreciation of the interactions between what's on the rocky shore and what's in the near shore ocean, because the near shore ocean delivers food and young onto the rocks. Let's say barnacles; barnacles are sitting on the rock, they reproduce, they send their young out into the ocean and they are transported by currents to another place and then they settle and become baby barnacles and grow up. The same is true of most marine critters, where they are anchored on—most critters—on the rocky shore. They are anchored on the rocks as adults but they spend, when they are young, they spend time in the water and are transported up or down the coast. So, it quickly became clear that the interaction between what was on the rocky shore and what was happening in the near shore ocean was really important. And we began exploring ideas about how that near shore ocean—the width of the shelf, the physical oceanographic patterns that bring nutrients into the system, how those change along this latitudinal gradient from north to south, how all of those are working together to produce the differences that you see from one side to another along the coast.

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To do that, we needed to have instruments that we could leave in place in the near shore ocean, which oceanographers had not really tried to do because it's a messy place from a physical oceanographic standpoint. There are lots of waters going different directions and it's really hard to keep something anchored there, especially during the pretty wild winters that we have along the Oregon coast here. So, we teamed up with some oceanographers, we worked with a great post-doc that we have who is very clever in designing things, and we figured out how to construct moorings that would take data about ocean temperature and salinity and currents to give us a better sense of—a better characterization of this near shore, inter-shore shelf environment that had been pretty much ignored. We've got spectacular oceanographers here at OSU. When they do their research, they typically go out in great big huge ships and they don't come in real close to shore typically. They start—because the ships can't come in that close, so this near-shore strip from right at the seashore out to, I don't know, out a couple miles, was pretty much No Man's Land, and yet it became pretty obvious that what was happening there was absolutely critical to understanding the differences along different parts of the seashore, as well as differences between Washington, Oregon and California.

So, the scale of our questions became larger and the disciplines became greater. We began teaming up with oceanographers, through OSU and we realized that we needed to be studying this near shore and—this coupled near shore and on shore system along this gradient of Washington, Oregon, California. We began talking to other colleagues up and down the coast and posed the idea of doing a collaboration that would be interdisciplinary and link universities where we would each do, take the same kind of data and do the same experiments along our chunk of the shore. Somebody else would do this chunk, somebody else would do this chunk, so we would be able to have a much broader scale of results, much more than any one lab group could do. And we pitched this idea to the Packard Foundation, a program that became known as PISCO: the Partnership for Interdisciplinary Studies of Coastal Oceans, which was interdisciplinary, to look at how the near shore system works and is changing, with the idea of better forming not only our understanding but the

policy and management that is needed to help ensure that it either returns to a healthy condition or stays at a healthy condition.

So, over time our research branched wider than just marine ecology. We included genetics, larval biologists, physical—physiological ecology, biomechanics, physical oceanography and some wonderful partnerships, not only with colleagues here at OSU but with those at UC Santa Barbara, UC Santa Cruz and Stanford University, were the other partners in this PISCO program. And that was a fabulous opportunity to fund students, to have students have exchanges across those universities, to be able to have lots of hands-on field opportunity for research—both of them, undergraduates as well as graduate students—and to collectively really significantly advance an understanding of how large marine ecosystems work and go way beyond just looking at small chunks of seashore, which is what people had historically done in marine ecology.

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So, OSU was a great place to do that, in part because of the strength of our oceanography and the support that we had from the administrators and eagerness of the students to really become involved in some of these collaborative research programs. That PISCO program really was transformative in many ways, but it began many other people thinking about how large marine ecosystems work and how was this one similar or different from other ones around the world. We then began to put together international programs where we and students could compare how this California current large marine ecosystem behaves and is changing to its equivalent in the southern hemisphere off the coast of Chili, which is called the Humboldt current large marine ecosystem. The same thing in—off the west coast of South Africa and Namibia, the Benguela large marine ecosystem, and the same thing in New Zealand. So, we had, at different points in time, lots of interactions, exchanges of students and faculty for these similar types of large marine ecosystems that have many of the same general properties but are interestingly similar as well as different. And those comparisons have led to lots of new advances in the science but are also informing our understanding, for example, of how climate change affects these systems and how management should be, can be improved because of the basic understanding of the workings of the system, if you will.

JD: Well, and as you were talking, you just briefly mentioned policy and development of policy and it seems like about maybe in the mid-nineties you started to do some consultations or testimony before Congress and perhaps doing some guidance and sort of really expanding, I guess, or taking in a new direction the knowledge that you'd been accumulating all these years. Talk a little about that and then perhaps you can just segueway into—I'm assuming it's a segueway—into you being appointed the first female administrator?

JL: Correct.

JD: Of NOAA.

JL: Correct. Okay. Much of this for me started through the Ecological Society of America. That's the professional society that I had belonged to, or still do, for many, many years, and I was elected vice president of the Ecological Society of America. At the time, the vice president would take on a project for a particular year and do it. This was in the late eighties. There was intense frustration in the ecological community across the country because funding for ecological science was really at an all-time low. And it was very, very difficult to get research grants. The president of the Ecological Society of America, Hal Mooney, who was an ecologist at Stanford University, attended the annual meetings of the National Academy of Sciences where the president of the academy at the time, Frank Press, said to the academicians, "the time is quickly coming where the country is not going to be able to afford all the science we all want to do. If we don't weigh-in on what we think the priorities should be, those priorities will be set by default by Congress and the funding agencies. They have a legitimate purpose, but scientists too should voice what they think priorities are." Hal Mooney came back to the ecological society and said "I think we need to have a dialog within our community about what we think our priorities are so that we can weigh-in when the time comes to talk about priorities across all the different disciplines of science." He asked if I wanted to take on that challenge as my project for my vice presidency. I thought it seemed like a really good one because this was going to affect all of our futures. We put together a spectacular team of scientists; ecologists across the country, on what was called the Research Agenda Committee, and they set about creating this study. It ended up with a title: "A Sustainable Biosphere Initiative," and it was a case study for ecology with a very strong focus on ecological causes and consequences of climate change, of biodiversity and of sustainability, and it talked about—it

connected the dots for people between what many would think as very esoteric science and very real problems that are socially important; things that were societally relevant. And that study turned out to be very catalytic in making the case for why the science of ecology is so important. It was embraced by the funding agencies, by Congress, by the society, and really talked about how fundamental advances in the science are also relevant to dealing with very real environmental problems; connecting the dots for people.

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That was my first real foray into thinking about the policy and management consequences of a lot of the science, and like many ecologists, I got into ecology because I just loved the basic science, the really understanding of problems and figuring out how things work. I saw so many of the systems that I had studied be transformed, sometimes very, very dramatically, because they were being degraded unintentionally, but degraded nonetheless because of different activities on land or in the ocean. And I, like many of my colleagues, became increasingly concerned about the depletion and degradation of oceans in parallel to many of the problems that we were having on land, and seeing that science that we knew was not being used to help address some of these problems. So, I became more and more interested in helping share what was known and listening to policy makers and managers and understanding what they needed and taking that back to the science. So, it's a real two-way exchange of information. So, it's not just scientists saying here's the answer, but a real engagement with society.

And the Sustainable Biosphere Initiative was—which was published in 1991—was the pivotal point for me, because once this was out there, many people in the policy world said "we want to hear about this, we want to know more," and that led to my testifying before Congress, to visiting a lot of federal agency offices, talking to Office of Management and Budget, OMB, talking to the Congressional Budget Office, CBO, and really engaging with policy makers. I also was president of the Ecological Society and then later of the American Association for the Advancement of Science, and so had the opportunity to be connecting the dots between science and the policy world and the management world and began doing more and more of this and discovered that there was a real need for it, there was a real hunger for it. Far too many scientists weren't willing to do that, or didn't think they would be very good at it. To do that I think you need to become bilingual, you need to be able to speak the language of scientist when you talk to scientists and speak the language of lay people when you talk to lay people. So, you need to learn to talk without a lot of jargon, you need to do something that is uncomfortable for many scientists, which is to tell stories, you need to be able to listen and understand that this is really two-way dialog.

[1:19:15]

And so I began doing that more and more and I realized that many of my colleague scientists were interested in doing that but didn't feel like they knew how. And as a consequence, I created the Leopold Leadership Program to take environmental scientists—academic scientists—and put them through training to be more effective leaders and communicators of science, more effective people in engaging with the policy and management worlds and the public, and I created that program in part because I never had that training and it was a way for me to help get it along with the Leopold Leadership Fellows that were being trained.

Not too long after that, I co-founded the Communication Partnership for Science and the Sea, COMPASS, which is a sister organization that actually provides a lot of the leadership training for the Leopold Program, but was focused much more specifically on connecting the dots within the marine world of science and policy; science and management; science and the public. You'd begin to do these things and one thing leads to another and I interacted, I was a lot of—I had been elected to the National Academy someplace along the way and both through academy activities, panels, studies of other groups, you get opportunities to do more and more of these things. I served on the Pew Oceans Commission, which was an opportunity to really bring the science to a group of leaders, in this case both politicians as well as business people, philanthropists, mostly non-scientists but focused on oceans. So, to really bring the science to the fore and think about how can we do a better job of taking care of our oceans? And what's the science that's relevant? What does the science say? So, that was chaired by Leon Panetta who later—who had already done a lot, both in terms of his leadership in Congress, as Member of the House of Representatives from California, but then later he was President Clinton's Chief of Staff, head of OMB, head of the CIA, and then when I was at NOAA he was the head, he was the Secretary of Defense.

So, you do these different things, you come in contact with different people, not unlike Leon, and one things leads to another, and I was invited by the transition team once President Obama had been elected in November of 2008. The transition team started calling in December of 2008 and said "would you consider coming and leading NOAA? The president really wants to put together a science team to play a key role in different agencies." And as it turns out, Bruce and I were in Tasmania when we were—when the transition team called. We were doing research down there, interacting with colleagues, and I was, we were driving around Tasmania in this rented car and you go from one cell tower to another and they're pretty far apart, so there's this long time in the middle where you can't connect. So, I had this call, message to return, I called this person from the transition team who said "we'd like you to consider this position," and I said "you know, I've given a lot of thought to this because I know that it's really important to get good people in these positions, and I think this person is who you should look at for NOAA. I think this person would be really good." They said "oh, okay, that's interesting, thanks for that," and we hung up. We'd go out of range, come back in range to another tower, another message, so I'd call again and pretty much the same conversation. It was a different person. This person said "Jane, we'd really like you to consider NOAA," and I said "thanks, I'm flattered, I really think this person is what you want," and we had the same conversation multiple times with different people and finally I was called by John Podesta, who was the head of the transition team, and John said "Jane, my name is John Podesta, you don't know me, but I'm in charge of the transition team, and you're not getting it. The president doesn't want this person or that person or this person, the president wants you. Will you please at least fly to Chicago and talk to him about this job?" I said "John, I'm in Tasmania." He said "so?" I thought okay, now what? And I said "well, let me think about it, I'll call you back in the morning.

So, Bruce and I had some pretty serious conversations that evening along with my son and daughter-in-law who, by then, had joined us, and my sister and her husband who had also joined us, because we were going to spend Christmas down there. And we had some serious conversations. It was clear that Bruce did not, in any way, shape or form, want to move to Washington D.C. It was clear that I didn't want to abandon all the research that we had been doing jointly, and we struggled with how could we possibly manage this. And Bruce said "you know, I'll be willing to take over the research we've been doing jointly and to take over the students that we've been advising jointly because I think this is a really important opportunity for you and I think you'd do a really good job and I think the nation needs you." So, I called Podesta up the next day, I said "John, I'll be happy to come and meet with the president-elect, but you need to know it's summertime down here, it's wintertime in Chicago, I have only field clothes down here, I have nothing that would be appropriate to meet with the president-elect, so my only request is that you put me up in a hotel that's near a department store where I can buy a suit and buy a winter coat and shoes." He said "done." So, I flew to Chicago, didn't have time to go home first, just kind of went straight, although it was pretty meandering, and met with the president, had a fabulous conversation with him. He was very interested; "what were you doing in Tasmania, what were you doing in Australia?" I described some of the ways that they manage fisheries, some of the different ecological things they were doing and he said "do we do those?" And I said "some, but not at the scale we should," and he said "can we do it?" I said "yep, we could," and he said "okay, let's do it," you know. It was just very can-do. Not afraid to ask questions about things he didn't know anything about, not threatened by that at all, deeply curious, not wanting to waste time talking about things, but actually having that lead up to something, which was a decision. So I agreed to go to NOAA and the next day they held an event where they—the president announced his science team and it was the President's Science Advisor John Holdren, Steve Chu, who was the Secretary of Energy, who had already been nominated but was now part of this science team, and the two scientists who were the co-chairs along with John Holdren of the President's Council of Advisors on Sciences and Technology, Harold Varmus and Eric Lander. So, the five of us were the president's science team and the president really wanted to make a statement about the importance of science in his administration. So he was rolling out the science team.

So, that was kind of a whirlwind and then, you know, I went back to Australia, we had our Christmas together and then I had to come back with Bruce and figure out how were we actually going to do this, how are we going to manage it. And at the same time I had to go to D.C. and try to figure out—come up to speed so I can get ready for my confirmation hearing and come up to speed on NOAA and find a place to live and all this other craziness. So, I was the first woman, the administrator of NOAA, the ninth administrator. I was the first marine biologist, the first scuba-certified head of NOAA. So NOAA has a pretty broad portfolio. It's both oceanic and atmospheric, as its name suggests, and so the National Weather Service, much of the climate science that is in the federal agencies, the management of fisheries and federal waters, the—all the national marine sanctuaries, the Coastal Zone Management Program, a research arm that provides good science for all of those, a satellite division that builds an overseas—the weather satellites that provide over ninety percent of the data that go into the weather models. So, pretty diverse portfolio. It was—the budget, when I went was 3.9

billion dollars. It had been flat for four years. By the time I left it was 5.2 billion. So, we grew the budget in a way that would be, we would better able to deliver the science services and stewardship that the agency is responsible for.

Thirteen thousand employees, just spectacular civil servants who are so dedicated and so focused on really protecting lives and property, using science to provide lifesaving services but also be really good stewards of the oceans and coasts. And I spent four years there. I don't regret it at all, even though it was not anything that I had ever thought I would do or sought out, but we had very challenging times. A lot of things just came in out of left field, but we got so much done and it was, I'm really, really proud of all that we were able to do.

[1:30:42]

JD: Great. We've just got a few minutes before I promised you you would be on your way. So, if we could end with just, I think, kind of some final overview thoughts of your time so far, I know you're still involved here at Oregon State University, and perhaps sort of where you see the university's going, and we'll close with that.

JL: Okay. So, Bruce and I came here in part because of the opportunities along the seashore and the great marine resources that are here. While we've been here, we have discovered and helped build up really spectacular marine programs, and there are so many different marine assets that the university has, but they've never been coalesced into something that's more visible. We've got each program is good in and of itself, but there's so much more potential for an integrated effort. And because of the interest of students and because of the needs of the state of Oregon, also the country and the world, to have healthy oceans and coasts, it is very exciting to me that the university is now focusing on a marine studies initiative to bring all the different disciplines together and have a more effective and cohesive marine presence that couples what we do at Newport with what happens here on campus, and indeed around the world, and is better able to not only provide students with a very rich experience, but deliver the kind of spectacular science that's interdisciplinary, that's focused on advancing frontiers of knowledge but also helping solve societal problems as well. And there's real excitement around this, and it could not be more timely and I'm very, very excited to be part of that.

JD: Great. Well, this has been wonderful, hearing your recollections, and thank you so much for contributing to the project.

JL: It's my pleasure, and this is a great anniversary to celebrate.

[1:33:05]