

Molly Graham: [00:03] This begins an oral history interview with Dr. Usha Varanasi for the NOAA Heritage Oral History Project. Today's date is May 3, 2023. The interviewer is Molly Graham. It's a remote interview with Dr. Varanasi in Seattle, Washington, and I'm in Scarborough, Maine. Last time, we left off at a pretty significant point, which was when the *Exxon Valdez* accident happened. I'm wondering if you can talk me through that event and how you and the center were impacted.

Usha Varanasi: [00:40] It happened soon after I became director, and my book had just come out. That's in the [ICES] paper, so I don't need to go over that. I was asked by NOAA to – Bud Ehler was in charge. I think he was an *Exxon Valdez* manager for NOAA. He was in NOS [National Ocean Service]. The first thing was immediate concern about where the oil was going. Of course, NOS is in charge of the response and things like that, but they also wanted to start looking at whether the fish are contaminated or not. There were two parties that were both interested in this: commercial fishing because the halibut season was just about to open in May. This happened in March, late March. That's how I remember; March 24 somehow sticks in my head. There's a lot of panic everywhere. Then, of course, the subsistence fishing villages. There are fourteen of them around Prince William Sound. They have great concern. Did I talk to you about all this or not? No. I've been giving so many interviews. I don't know where I have said what. What happened was that we needed to be immediately in – there were two things going on: the response part of it, which was immediately happening, and it had to be more transparent working with *Exxon*, working with everybody, and a lot of tempers flaring and concern. The other party is the natural resource damage assessment, which kicks in a little later, but people are getting ready. We were starting to be told by the attorneys [and] general counsel's office not to write anything down, not to say anything because all of it can be asked for – the record or something like that. I am a little more of a scientist than – I'm not a political person, and I write notes. All those things were new for me because it was the first time. The kind of work I was doing – and my division of environmental conservation was doing – hardly before this time did not come into any kind of lawsuits. We had a public interest and image because of contamination and all that. But it was these people's livelihood. I think the whole National Marine Fisheries Service [NMFS] is used to going to the council meetings and used to knowing how the different interests – whether it's environmental or fishing interests – and there are always the lawsuits. Right? They are all used to it. But our center didn't have any work with the council because, at that time, it had actually become – it had already become the Northwest Fisheries Science Center, I think. The groundfish work was still being done from Alaska. The Northwest groundfish – or West Coast science was being handled by the Alaska Fisheries Science Center, so we had never worked with the council. I was totally not used to having a lot of lawyers in the meetings when the scientists were planning experiments or things like that. That was one experience of that kind. And then, in every meeting, I have found that when people don't trust each other or don't trust in the capability of scientists or vice versa, there are a lot of people in the meeting. The meetings are attended by everybody because nobody is sure of

– they can't let a person do it. Later on, that was one of the principles or one of the lessons I learned that when the attendance of your meeting gets smaller, it means people are now comfortable with what you're going to do. Do you see what I'm saying? So, it was like mayhem. We were asked to step in on both sides of it; one for the response side, where we will start sampling to see where the oil had reached or not. Just two years before, my work on metabolism and conversion had translated into the methodology. We could quickly analyze from the gallbladder rather than the tissues. But this method was not used by EPA [Environmental Protection Agency] and other agencies, so there was no feeling of how you can use something that's not verified. I felt like this was an experiment I would have done if I was allowed to, and nobody was hurt. Do you know what I'm saying? That is the kind of experiment you need to test your methods. We started taking samples. For the natural resource damage assessment, there [was] a lot of discussion about methods, verification of methods, and all. But for the seafood safety part, people were ready to get anything, any data, so we could do this data part much faster because we were looking at the gallbladder. The [International Pacific] Halibut Commission went to Rollie Schmitt, saying that they really need the center's help in – is it called reconnaissance? – going before the fishing season begins. We were armed with a lot of ships. The Halibut Commission said they would give us a ship to start going and sampling just around and wherever the fish would have come to start seeing if any sign of oil is there, and not analyzing water, but actually looking at bottom fish and doing our standard analysis. It was amazing because we were able to sample as many as a thousand samples a day because it's [inaudible] trays with little vials of bile. You can take the fish and dissect it, take the bile, and start putting it into vials– and the machines are running twenty-four hours. They were small enough so you could actually mount a couple of them in the fishing vessel itself. It was not a NOAA ship, so it was not very stable. At the site, you take the sample, you analyze it, and in an hour or so, you start getting data so that you can tell –the ship doesn't move too far. If there is a sign of some contamination, you can say, "Okay, I need to go take a few more [samples] in case it's false positive." We started doing that. That part was with the fishing industry because the worry was that even if there is – if they show that even one fish is tainted, the whole market can crash. The other side of our work took a little longer, which was how to give information to the subsistence fishers. So, the first thing done at the NOAA level is to get the subsistence fisheries information outside of the natural resource damage assessment. Exxon agreed to pay because it was a huge public image issue. They said they would pay NOAA to get this analysis to the subsistence fishers. There were two parts the division could participate in – three parts. One is commercial fishing, where we didn't need to make any deal with anybody; the Halibut Commission paid for it, and we just went because it was not part of a legal issue. The other two parts were the subsistence fishing and natural resource damage assessment – how many marine mammals – and all that. The subsistence part agreed to stay outside of litigation. Anything that was under the NRDC [Natural Resources Defense Council], the data could not be published; it's all under a shroud. I was told by the general counsel, Tom – I think I told you last time, perhaps. He said, "Usha, can you be an expert witness?" I said that was not something I could do, but I

had some staff who would be very good at it and would like that kind of exposure, and they'll do a good job. But not me because I would not be able to stretch or cast doubt if there is something I will blurt out. I was not suitable to be an expert witness. But I was very interested in taking the responsibility of doing the subsistence fishing, all the samples [and] analysis, so we set up a procedure where all the fourteen village elders came to see us in Seattle to see where this is going to be because they needed to have some faith and chain of custody of samples. So, the NOS people did the sampling and helped us in the sampling because they were in the response part of it. They said they would sample. We will have some of our staff go and show exactly how to sample so it doesn't get contaminated. But Jay Field from NOS was the main person, very, very cooperative and collaborative. He worked with my staff to get the samples. Once the samples came – gallbladder or a whole fish, whatever – and it was all the way from barnacles to deer – all kinds – because whatever they eat, we will analyze. That was the plan. Bud Ehler crafted a special agreement, which is in the book we have published, in the 'Evaluating and Communicating Subsistence Seafood Safety' (*Lessons Learned from The ExxonValdez Oil Spill* Field et al, 1999), saying how the Northwest Fisheries' Environmental Conservation Division will get this money, and we will analyze that. When that happened, what I did was to set up a system where the first thing was that they, village elders and Exxon executives all came and saw that there was a good chain of custody, there was no way anybody would tamper [with] the [data], and I guaranteed everybody [that] nobody's going to get data results ahead of anybody. I think I may have – I feel like I said all this. Maybe I did,. So, the Exxon people who were working on this felt as soon as we got data, we should tell them, and I said, "Not happening." The minute I do that [give data to Exxon Folks or even my NOAA bosses], that's the end of any kind of trust anybody will have, even if they don't change anything. I got a similar bit of push from NOAA, but very little. At that time, Dr. Knauss was the head of NOAA, and being a scientist, he even asked me, "Usha, how is it that people are trusting the National Marine Fisheries Service to do this work?" I said, "I don't know about other parts, but they are trusting us because we have been in this business for a long time, and we'll be here even after we are done and go do some other work. We will be here. And I think we have established credibility." He said he was very intrigued by that. During that period, I got a lot of exposure as a young manager to all levels of NOAA and many agencies across. It's just circumstances. Nobody would have known Usha Varanasi if some crisis had not happened because that gave me a chance to perform and show that I had a certain way of doing business. and it could be difficult on both sides, but that's what we're going to do. The plan was that once a month, we would give all the information to all the parties– because the samples were coming, like thousands of them, right? They were just coming from – because there are fourteen villages. They are seeing the oil practically close to their backyard, where they're doing the fishing. They're just absolutely distraught. We can't wait until – but we had very good quality control and quality assurance. We had the standard sample. We had it all sown, and then we had it also published so that people could feel – and then, all the different people were represented [including] FDA [Food and Drug Administration]. EPA was more in the Natural Resource Damage Assessment. Then Alaska Fish and Wildlife, or whatever

the agency's name is now. Of course, some NOS people. Then lawyers. Lawyers were very much less, but Exxon and people like that. What we did was get the analysis, and then I presented the summary. After the first time I presented, there is a representative of the villagers, but then they want you to go there and present or make sure because, see, they're concerned. Meetings were all held in Anchorage. I was going quite regularly to Anchorage. We found, as our data has always shown, that the fish didn't have any hydrocarbon in their tissues because the gallbladder was getting rid of it. But invertebrates like mollusks, all kinds of molluscan species, of course, barnacles – anything that can't metabolize had very high levels. Because we had brought this spectrum of samples, at least there was more trust. If I had only fish samples, I think they would have thrown me out of their meeting. You know what I'm saying? Luckily for me, I had both sides of it. But people had a very hard time believing that fish were not contaminated, and they were very passionate. Also, environmental groups. I feel that everybody uses a crisis to make a point. It's not just that they want to help people, but they want to make a point because that is survival. If it is the NGOs [non-governmental organizations] who are speaking for the villagers or speaking for the environment, they spin it one way, and then the Exxon-type or industry people spin it the other way. They had scientists on both sides because everybody had hired – all the scientists were hired up. All the non-governmental scientists were hired by Exxon because they pay big bucks, right? I remember my colleagues – I was at a meeting, and one of my colleagues was saying, "How is it that you are able to get all this analysis [when] nobody is available?" I said, "My staff, we are public servants. When a crisis comes, we can't say, 'I have this project going on, and I need to finish it.'" Because part of our mission is service. I had to ask all my staff to drop what they were doing, get on the ship or get in the lab, and start analyzing. People were very much wanting help. One of the things I feel, whether it will be just my signature or my group's signature, is we want science to be used on the ground. We don't want to just do science and publish papers. We have to in order to have credibility because otherwise, it won't be believed. But publishing was not the end in itself. It is how the science is translated into community actions, into preserving or conserving habitat or the species, or giving help [to] our constituents and our partners. Luckily, even when I became science director, that was one of the four – we had four principles that we had crafted as to what [are] the most important things to us. One of the very important ones [was] that our science is used. Our science is used. Not that our science is taught in classrooms, but our science is used on the ground. People were ready to give up their personal lives for four to six months and get on the ships. They all did it. Luckily, by then, because I was director for a year and a half, and I have been the director of the division, and I was coming through the chain, people knew that when I said we needed to do science this way, they would be willing to listen to it. That's another little nugget. We have to have experts in the field as a technical agency. When we don't have subject experts – they can't be experts on everything. But if they are the head of the Science Center, they should be a scientist; they should have enough experience in science. You can't get somebody from business. I've never hidden that fact, although NOAA goes through – depending on who is in the administration, we go through the stages where somebody says if you can run a Walmart,

you can run NOAA because it's business. Business is business. It's not. It's a different business. It may be business, but it's different. I could get people on the ground very fast. I could get data very fast. I understand what that data is saying. I don't need to have somebody else tell me. I can look at it day and night. I poured over the information to make sure we don't make any errors of two positives becoming a negative kind of stuff or two negatives becoming positive. So then we started giving this information once a month at Montlake. The people came, and data were presented. And then, of course, there is always a press release. We had a lot of public relations people from NOAA and things like that. I learned how to speak for television and all where you can't have a long sentence; you have to short one. You can't go on and on because they just want to have a little blip. What else can I tell you? During this period, it became very clear to me – direct experience of people or community under stress. Now, you could say – we did try to say, which didn't go too well, that actually they are smoking fish. They eat smoked fish because the season is there, you just get all the fish, and refrigeration is not very easily available, and [it's] expensive. The fish are smoked or dried or whatever is done. Smoking actually is mostly pyrogenic compounds because it's being smoked, right? So the hydrocarbons in those fish were a thousand times more than what you could get from the most contaminated site in the Exxon Valdez. First of all, my superiors were surprised that they, subsistence fishers gave me those samples, their smoked [fish]. Because I said, "Let me have a look at it, so we can have – we know zero, but we don't know what's a high amount you are eating." It was amazing that I was able to get samples. We negotiated. Of course, it showed ten thousand times – or whatever – more hydrocarbons. But the thing I learned when I presented this to them first at the big meeting because I knew Exxon would say, "See?" What the subsistence community said is there is a difference between voluntary risk and involuntary risk. If they decide to preserve their food in a certain way, even if they are putting some chemicals in it, they know it, and then they know how to eat it. When their area is contaminated at the whim of industry, they have no control [over] it; they are giving them B.S., and that is involuntary risk and death. That's the first time – I had never thought about it, but that is very true, how powerless we feel when somebody or some outside situation makes us do certain things. We may be doing even worse things to ourselves, but we are in control. That was another lesson I learned. I learned so many lessons. As you are going through it, there are things that change you, and I would say the *Exxon Valdez* oil spill truly changed me into thinking of science, not only [as a] technical thing; it made me realize that I, NOAA, and scientists have power over affecting lives, and we cannot use that power arrogantly which we have a tendency to. Because we have a tendency to say, "Uncertainty. We cannot tell you what the data means. There is this and this." I tell people, "We cannot do that. We have to give them the best information, explaining that it's uncertain, but we realize you need it." Compassion in delivering your information is something I had inside me, I'm sure, but I had not had the chance to experience it or exercise it, and this Exxon Valdez and working [with] the subsistence [fishers] truly made me a better manager in the future because then when I started working as a center director, which we will come to next, I was able to understand both sides of it: people who are fishing is their livelihood, like the commercial

fishermen, and the people who are trying to protect their animals and trying to protect habitat. Everybody is so full of contradictions, like this smoking fish and then getting very upset at a slight increase in the contamination, or wanting salmon to be worshiped and worshipping it and not taking it all out of the system. But then, on the other hand, it weakens the system by sending all these small fish in from the hatchery, which actually weakens the wild fish because it just goes so fast. I could understand that that's how these contradictions are in people's lives. So what do you do? We will talk about it. What you do is tell people how to make hatcheries better because they are never going to not have them. I'd say if we don't have hatcheries, we can really have good wild fish. I was told, "Don't you ever say that in public" because it will kill me. [laughter] But in New Zealand, for example, they have amazing fish – salmon – but they seeded them, and then they closed all hatcheries. Then, those fish slowly become wild because their pool is not weakened by hatchery fish.. That's what I was told by one of the people in NZ– anyway, EVOS was where the Environmental Conservation Division's big – what you call? – baptism by fire. Is that correct? I don't know. There are some words like that. That's exactly [what] happened. I was thrown into it, and I found all kinds of strengths. I found allies, like Bud Ehler, [who] actually was a very strong personality, but somehow, he could see what was needed. I learned a lot. I don't think everybody becomes a friend, but they become good partners. I also had to learn between good partners or allies and real friends.

MG: [30:10] Yes. I want to ask you more about that. But really quickly, what was the correlation or connection to looking at liver cancer in fish?

UV: [30:20] Right ... If you look at the [ICES] paper, there is a picture in there. What happens in all mammals and in fish when we take hydrocarbon that goes into our system, whether it's by smoking, whether it is smoked food, caught up in a fire hazard, whatever, once that goes into our system, in our blood or in our stomach, the hydrocarbons are not soluble in water. They're not hydrophilic; they're hydrophobic. They are not soluble in water. They are what we would call fat soluble. They are soluble in fat, so they are lipophilic, lipid, or fat. They are soluble in fat. So that's how we take in our food, right? And then they get into – the liver is our detoxification organ, which is where all the detoxification happens. So when hydrocarbons or hydrocarbon-like compounds – there are many other compounds we ingest – are hydrophobic and very complex, the liver has a system of putting in oxygen, so there is a double bond between two carbons. If there is a double bond between two carbons, it's a little more – what they call – labile. The enzyme, which is called cytochrome P450 – there's a whole set of enzymes called cytochrome P450 that activates this double bond and puts oxygen on it. Once the oxygen is inserted, two things can happen. One, because it's really reactive at that stage, it's like a free radical; it's very reactive. It can attack the DNA, parts of DNA – one of the nucleotides – or water can connect to it. If the water connects to it because there is the second – so, then it has a hydroxyl group, and then there is another set of enzymes that make it conjugated and make it very water-soluble. [If] it becomes water soluble, it can go into the gallbladder. The scale may

not be right of what I'm saying, but [for] every ten thousand molecules of hydrocarbon being converted into a water-soluble molecule, one goes and attacks the DNA. It just attaches to the DNA, any one of those nucleotides. What happens most of the time [is] our DNA – we have a system to continuously repair it. Just because a few of them attach doesn't really mean anything. We continuously can repair it, and we are okay. But if there is an onslaught of it, or we are not well, and our enzymatic system is not working well – it depends on whether there is a temperature difference in cold water fish. I mean, there are many stress factors that can affect the DNA getting damaged but not repaired. And once that happens, it's the first step leading to cancer. It's the first step of carcinogenesis. Then you need lots of promoting agents. Why do people exposed to the same environment and the same concentration of the toxic [inaudible] one gets it and another doesn't? As we know, it's a genetic strength, but it's also what they're eating and what their stress level is. All those are what they call promotional agents. If the promotion happens the right way, it starts to have more and more DNA damage and then [inaudible]. So, the message to the protein and the cell formation is that you have lots of malformities cancer cells. Once the cancer cells, as we know, are totally – they can eat up all the nutrients. The reason why people become emaciated is that all the nutrients get taken out. So that is the connection between oil spills – oil spills actually don't have as many carcinogenic compounds, but when the oil goes into the water, a large portion of it kind of gets oxidized and evaporated and even solubilized. But it is that concentrated – the part that's carcinogenic, compounds like benzopyrenes – a very small amount, but it slowly starts to get concentrated in sediment. Then industrial discharge and then all those railroad ties with creosote and petroleum that's very highly concentrated in carcinogenic compounds – they all sit in the sediment. Most fish that get cancer are the bottom fish. The fish that are moving around, there is more oil actually when it is there. They get contaminated in the surface and gills, and they may not be able to breathe, and they die, but they themselves are not generally damaged too badly, the midwater [fish], except the marine mammals, and all because they have a different system. The ones that are in the bottom, they're just continuously – it sits on the sediment. Then there are PCBs [polychlorinated biphenyls] in the sediment, and PCBs have a very high promotional activity if there is already a – and there are many other chemicals. That's the mechanism why fish get liver cancer when they are in contaminated areas. But most current work that's coming up shows that bigger damage to the fish is to the young. To all of the animals, it's the young animals because they have not developed their immune system, so their heart gets damaged early on. People who have less ability to pump blood start to get scoliosis. Quite a lot of data is now coming up. We used to think that it is the oil that caused scoliosis, but it is actually oil that causes the expansion of the valve and the size of the heart. That is what eventually ends up causing scoliosis. The studies are done using zebrafish because you can't study that kind of stuff in the environment – so, that's all the science. One of the things is [for] any one of these huge catastrophes, if you are prepared, you can learn a lot. You can learn so much, and you can advance science, but it's very hard to advance science while people are at your door every minute [saying], "Is it done yet?" One of the saddest parts or hardest parts is that it's during crises [that] our budget expands exponentially.

But then, we are not able to absorb it to do long-term work. The reason we were able to do this amazing work in the Exxon Valdez oil spill – amazing responsive work – is because we had a steady amount of money for a period of almost eight to ten years because of OCSEAP, Outer Continental Shelf Ecosystem Assessment Program. That money was given for futuristic – the crisis hasn't happened, but what if those pipes were leaking? If they leaked, how would we know? That is why we developed – I was hired because of that. There was money to hire chemists and biochemists. We came, and we did this work, front-loading the science before the crisis [occurred]. We have never had that opportunity after. That is one big example where science was actually ready to be used. And then, everything else we had to learn during a crisis. One of the things was what do we do with – they were washing the rocks with hot water and all, and they killed lots of microfauna– they found that that was actually not a good way to do it because all these very delicate ecosystems were damaged. So the other thing is, let us disperse the oil. If oil gets dispersed, it's like – what is it called? The solution to pollution is dilution. So, dilute it. But the thing is, dispersants themselves have a damaging [effect], and nobody has studied. We had not studied. We still haven't really studied because when Exxon, BPA, or any other company is using dispersant, they don't give you their formula. This is one thing: our society is very litigious. So we never get information. There's no transparency because everything is hidden because there's going to be a lawsuit. That part of the agency was a very hard lesson for me to learn. I learned it. I understood that, but it never sat well with me. I guess that way, I am more of a scientist. I had to make sure that we had funding and that we provided the science. But transparency makes science much more usable.

MG: [41:57] You also alluded to finding allies, and in some of the materials you shared before this interview, you talked about connecting particularly with female leaders around this time, such as Estella Leopold and Vim Wright.

UV: [42:11] During this time, I'm doing the work [on] *Exxon Valdez*, but also, Puget Sound has all these things[pollutants] . What happened is, at the University of Washington, there was the center – now trying to remember what its name was. I have to think about it. I forget. Academic institutions have academics, but they also have this – the University of Washington has three hundred centers. Those centers have more research or very specific research funded by specific funding, things like that. There was this group. At that time, it had botany and zoology as two different departments– now, there is the Department of Biology. Anyway, there were people who were more – Estella Leopold is one of the fantastic scientists of fossils. She is a plant scientist. She has done a lot of work on fossils. She had gotten to know Vim. I don't know how they knew each other, but they knew the Colorado beds of fossils were going to be removed for development. They learned the power of activism, that you need to – especially women. Nobody believes that they will stand up. They got all dressed up in pearls and all that, and they stood in front of bulldozers. They said those fossils were so precious. Once gone, they will never be – we will lose the history of mankind. I think they were very scared to death that they



would be in jail. I don't know if they went to jail or not, but eventually, the governor and the other people – and that area got protected. They had learned that, and then they moved to Seattle. Estella Leopold was a very big scientist because her father was Aldo Leopold and there was a tradition of doing great conservation science. They were getting interested in seeing what was happening in Puget Sound. And because I was a university-affiliated professor, I had gone to give a talk in one of their centers, and they thought the way I was talking about Puget Sound – because there is a woman, Kathy Fletcher, who also I have mentioned – she was the head of People for Puget Sound, which was a nonprofit. I was asked to be on their inaugural board; they needed some scientists. They needed, of course, others. At that time, NOAA didn't have any objection [to] my being on that because it was supposed to be neutral. Nothing can remain neutral. Anyway, they all liked my way of speaking. They believed that if I said, "Science is this way," it would be that way. They decided they needed to have more voices of women. So, Christine Gregoire, the governor – at that time, she was the Head of the Department of Ecology. I met her. I just started to meet her. But Estella and Vim became very good friends. They truly became my mentors. The interesting thing was I was very hesitant to meet legislators because I did not know how to speak with them. There was always this legal thing about what is the federal – what you can ask and what you can't ask. I asked Vim Wright, who knew everybody. She believed in one thing. She believed that unless opposite views were brought together, we would only be talking to the choir. She had, on one side, an environmental group [and] on the other side, farmers, agriculture. She had this style of bringing different groups together because if you have friends on the other side who start to see the truth, you can understand their truth. That was a very big lesson for me. I said to her, "Could you introduce me to some government officials, state government officials, or legislators?" You know what she said? She said, "Usha, you got to go and make your own connections because if I take you to meet with somebody, you will be tainted by my views, and then they will never know the total of you." I think that's a very powerful thing. Who doesn't want to give advice and take you and show off, "I have this big scientist I am introducing?" Instead, she said, "I shouldn't do that. If I do that, I will limit you. You need to show what you can do, and you need to be your person." So, those are people I believe are true friends because they are not doing something – allies are those who come together for a project or something, but they also have some stake or skin in the game. When they are giving you something, they kind of want something back. And it's okay; it's a partnership, it's an alliance. I have lots of alliances, but I have very few of what I call lifelong mentors and friends who would do things just because it's right for me. I learned [to do] the same thing for younger people as they came, not always [did] I want to be the person introducing. I want to be the person – no, I want to give them a chance to flourish on their own and take the back seat, which they did. So, Estella and Vim were very good friends, best of friends. They formed a small group of women mostly in politics, but mostly, the idea was that if we were trying – [if] we can go as a convincing group to talk to the legislator or the governor, we could protect the environment. We understand that – protection is too harsh because nothing changes, but we can speak [about] conservation, and we can say [that] some progress, some

development can happen. It just needs to happen with the understanding that they're affecting the ecosystem. So, I learned quite a lot. We used to have regular meetings. We were not a formal group or anything; we just met for tea [at] somebody's house. And they became – if Estella says something about me anywhere, I become immediately known. She never was a politician. She never took politics. She, I think, recommended me – I have a few people, like Alvin Kwiram – I would call him my friend, definitely, and a mentor, although we learn from each other. Estella is definitely my mentor. She always said, "Dear Usha, you don't need to call me mentor," but she is my friend. You know what I'm saying? That was a period where there were a number of very powerful, brilliant women. The Bullitt Sisters – Harriett and Patsy Bullitt – were fantastically big philanthropists but environmental philanthropists. There is activism underneath as to how to preserve certain streams. I learned more about the inside of Washington State, not just the coastal things. Because National Marine [Fisheries Service], most of it is coastal – or even not coastal, it's all marine waters. You see, the waters are connected, and animals don't know where the state line is. I had difficulty with headquarters about why I'm spending my time – and not only my time but my people's time – on Puget Sound because it's a state's responsibility. But the thing is, there's so much science we could learn; it was like a laboratory in our own backyard. One of our principles is if we have the science, somebody can use it. We aren't going to say, "Oh, we are National Marine Fisheries Service. We can't give you that science." No, it's not going to happen. So, I had to use the influence of people, including the governor or Bill Ruckelshaus, to actually talk to NOAA that Usha's center should be giving help where it is needed. You can't say all those scientists can only work on this, although one can get carried away, and we have to have priorities. But that's how those women came into my life. And, of course, there is Nancy Foster there. But these women [were] very powerful that one letter of recommendation could get us somewhere, that kind of stuff. But I used [it] very judiciously. It's not always when I go – I want to know what I can do for them just as much as what they can do. Another thing I learned as I was doing this is that people have – and may have said this to you before – people have a tendency to pay it forward but not pay backward. And you have to take care of your mentors. As they get older, they have less power of influence, and seventy percent of people were there only because they had a title or they had a stage. Once you are off the stage, they are gone. People need you. Those people who actually change your life, you should be helping them. So, that's one of the things. I'm still very much in touch with Estella. She's ninety-six. She just had her ninety-sixth or ninety-seventh birthday. She's still writing books. Vim Wright passed some time ago. Anyway, those are the women in my early career as a manager. As a scientist, I had met women, but they were not all helping each other. They were all competing just like other people. But these people really helped me and made me into the manager or the director I am.

MG: [54:23] Can you talk about that next step and becoming science director? What had to happen for that to be an opportunity?

UV: [54:32] It's quite late now, right? What time is it?

MG: [54:33] Do you want to pick up there next time?

UV: [54:36] We can, or I can just tell you. I think it's already 10:30. Do you want to speak a little more?

MG: [54:44] It's up to you.

UV: [54:45] Yeah, let us just get it started, so I don't have to say any of this [next time]. So, what happens [is] I am in that position in 1987, and then 1988, the center comes. Then, in 1988, the new center director – we talked about him – Dick Berry, and there were three divisions that were sort of like – he let us do whatever. But he was very supportive. He was so proud of me, like a father, when I did things for the *Exxon Valdez*. He never felt like, “Oh, I need to do it. I should be ...”. He also knew that he was going to stay only for three years. When the center was formed, there was no – it was formed from Adam's rib. [inaudible] is not given to it. It's just a rib, and let's just see how it survives. Everybody thought the center would fall [at a] certain time because nobody was giving them resources. But what happened is that *Exxon Valdez* gave us resources. There were some crises in the salmon, so the hydropower people gave resources to another division. In 1991 or 1990, there was this huge breakout of biotoxins. The first time domoic acid [was] on the West Coast, it crashed the crab industry. The seafood safety and utilization group also got some money. Then, the center was given three years of – I forget his name. I shouldn't forget his name – one of the NOAA Corps officers as the deputy director. But there was no money for a deputy director. God, I must remember him. Dick Berry was slowly building the thing, but not very much. Warren Taguchi was a wonderful man. NOAA Corps officers get a land assignment. So, he had that land assignment for two years or something like that. During that time, the center director was looking for deputy directors. He came and told me, which is a very interesting thing. He said, “Usha, I am looking for a deputy director, but you are not deputy director material. You are center director material. You will be bored to death because there's so much administrative stuff a deputy director has to do.” But that's what he told me. He said, “I didn't even apply.” He kind of told me, “Don't even apply because you should be looking for bigger things. Also, you will fail in doing this job.” I tell you because I'm not good at strategic plans. I'm not a good planner. I am not a good financial – I know how to bring money, but I need somebody to keep an account. You know what I'm saying? So, all the details – I'm not a detail person. He knew where my weakness was, which was a very good thing because it got me thinking that around me, as I built this division, or eventually – at that time, I didn't know I was going to go for center director. But if I was going to build it, I have to have strong administrative staff, staff that I can totally depend on, for accuracy for the budget, but also all kinds of other building maintenance and security and safety and all those things. I need to have people smarter than me in those fields, and I should not take

over anything they're doing because they're doing a better job. So that's something I learned from Dick Berry. Anyway, he hired Linda Jones, who is also a scientist, but I think she was managing her own program in marine mammal things. So she was managing all aspects of programs, and she has a much [more] gentle personality than mine. So, it is something that was needed in the deputy director position. She saw it as a stepping stone when Dick left to be the director because the deputy director gets a lot of exposure, especially if the director is laid back and really doesn't want to go anywhere. So then, that change happened. She comes on board. She is coming as a program manager of a marine mammal program, so everything is new to learn. We are all very independent [and] highly established in our field, and she's totally not knowing any of these things. So, somewhat – I call – a period of adjustment for all of us. But everybody wanted the center to survive. We didn't want to go back to a position where we were the lowest of the low in the priority list of budget and all. And then, when Dick decided to – he said he's retiring – not many people from outside wanted to [apply] because they all felt it was a thing that was going to disappear. By that time, Rollie had moved to Washington, DC. I got a call from Nancy, saying, "Time to step up." I said, "I am now doing both. I'm doing my science. The center is doing well." She said, "Usha, think about it. First of all, the same logic – more women managers, directors, [and] leaders are needed. I don't need to give you that lecture again. But if anybody else gets that position, will they even understand what you are doing?" Then my staff comes to me, my senior [staff] – not the ones who are going to apply for the director's position, but people in my team. They come and say, "If you don't move, none of us can ever get promoted. If you don't move and care for this program, this program will disappear." So, this particular time, I took the position – I stepped up a little bit more from the selfish point of view. In the previous one, I stepped in only because Nancy made a point that women directors had to be. This time, I actually stepped in much more vigorously because I could see, first of all, that I could lead as a manager, not just as a scientist. I already have more confidence, right? I know how to run a government unit. I know the rules. Even if I don't know the rules, I have people who know the rules. And we had expanded, so I know how to expand things and how to [inaudible]. I am much more ready to apply. I am much less favored as the director because now it's the center, and the center doesn't just have biochemistry, or even physiology, or analytical chemistry – those were all my fields. Those are all my things. This is totally different. This is a fisheries stock assessment. This is marine mammal protection. It's a huge arena, and even though the center was small, it's a huge arena to go in. And what are my credentials? I am an outlier, doing things when NOAA has a crisis, right? But I said, "What the heck? I got to apply." That's where I got help from – this is where all these people, like Estella Leopold and all these people writing letters, saying, "You got diamond in the rough. You got to go for it because [if] you just go for a traditional person, this center will not have a chance to survive. You got to go for something." So, all the things were getting set up for me. Since Rollie came from the Northwest region, he knew all these names. He knew all these people; all these people knew him. Also, if there was a head of NMFS who did not know the Northwest area, I don't think I would have had the chance. Again, it's what you call – things are starting to align. I always feel,

in most cases, things align. You have to be ready to see that they are aligning. Now, what do you [do] to bring it all together? That's where we stop. How about that?

MG: [1:05:06] Okay, good. We can probably finish on Friday with your time as the center director.

UV: [1:05:11] Sounds good.

MG: [1:05:14] I'll miss these conversations.

UV: [1:05:16] I know. Me too. Well, we'll keep in touch somehow.

MG: [1:05:20] Okay, good.

UV: [1:05:21] See you on Friday. Goodbye.

MG: [1:05:23] Bye-bye.

-----END OF INTERVIEW-----

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