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# Ylitalo, Gina ~ Oral History Interview

Maggie Allen



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# Interview with Gina Ylitalo by Maggie Allen

*Summary Sheet and Transcript*

**Interviewee**
Ylitalo, Gina

**Interviewer**
Allen, Maggie

**Date**
August 10, 2016

**Place**
Northwest Fisheries Science Center
Seattle, Washington

**ID Number**
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**Use Restrictions**


**Biographical Note**
Gina Ylitalo is an environmental chemist at the Northwest Fisheries Science Center in Seattle, Washington. She was born in Yakima, Washington in 1957, and has been interested in a career in science since junior high.She attended Yakima Valley Community College for two years before transferring to Western Washington University and receiving a bachelor's degree in biochemistry. She earned her Master of Science in Chemistry from Western Washington University and was hired by National Marine Fisheries Service in 1989. She is currently the program manager of the environmental chemistry program.

**Scope and Content Note**
Interview contains discussions of:Northwest Fisheries Science Center, NMFS, NOAA, environmental chemistry, Exxon Valdez oil spill, Deepwater Horizon oil spill, PAHs, PCBs, DDTs, legacy contaminants, xenoestrogens, marine mammals, Gulf War,

In this interview, Gina Ylitalo discusses her work developing analytical methods for detecting environmental contaminants as an environmental chemist with NOAA. She started at the Northwest Fisheries Science Center in April 1989. Since the Exxon Valdez oil spill had happened only a month earlier, it became the major focus of her early work. She went to Alaska on the NOAA R/V Fairweather to help with analyses of fish bile for hazardous compounds associated with oil spills. After that, Ylitalo worked to develop methods for analyzing and detecting different classes of environmental contaminants. She explains that even though legacy contaminants like PCBs and DDTs have been banned, they still exist in the environment and accumulate in animals at the top of the food chain. She also describes how advancements in computing technology have revolutionized how chemists can collect, identify, and analyze data, and allow them to do it more rapidly than in the past. Her lab collaborates extensively with other NMFS science centers and organizations around the country because of the unique chemical analysis work that they do.

The Deepwater Horizon oil spill also had a major impact on her work, and she did seafood safety analyses for a year after the spill. Her lab continues to analyze the contaminate levels in marine mammals and sea turtles even years later, and she feels very proud of the work she has done with the two major oil spills. Another enjoyable time was her month-long researchexperience doing shipboard analyses of fish in the Persian Gulf after the Gulf War.

Ylitalo has seen an increase in the number of female scientists since she started working at the agency, but believes there still is a lot of progress to be made in terms of diversity. In the future, she predicts that chemical analyses will continue to become faster and more accurate, and that they will begin to look at other chemical tracers besides contaminants to learn about the nutrition of animals. She also believes the technology for obtaining non-lethal samples from difficult to capture animals like whales will become more advanced. Currently, her lab is working on the ability to do a suite of chemical tracers in samples from marine mammals for things like hormones and fatty acids.

**Indexed Names**
Gulland, Dr. Frances
Krahn, Dr. Margaret

## Transcript

**Maggie Allen:** This interview is being conducted as part of the Voices from the Science Centers project funded by the Northeast Fisheries Science Center. It is also a part of the Voices from the Fisheries project that is supported by the NMFS Office of Science and Technology. I am Maggie Allen and today I'm speaking with Gina Ylitalo at the Northwest Fisheries Science Center in Seattle, Washington. It is August 10, 2016 at 10:00 am. Gina Ylitalo was born in Yakima in 1957 and she's the program manager of the environmental chemistry program. She earned her Master's of Science in Chemistry from Western Washington University and joined the center in 1989. Gina has helped develop analytical methods for determining the types of environmental contaminants present in an environment, and her work addresses management concerns like the effects to natural resources from hazardous chemical releases. Gina, thanks for being here. Do you mind just telling me what inspired you to pursue a career in science and what happened with your career and how that evolved?

**Gina Ylitalo:** I really enjoyed science when I was in junior high. I had a teacher named Mr. Jones, he used to wear a white T-shirt or white shirt and a bow tie and he made science fun. I mean, it was a great experience. Can't say that much about high school chemistry, I loved biology, and continued to pursue those kind of subjects when I was in college. I went to community college at Yakima Valley Community College for two years, and then I transferred to Western Washington University. When I had spoken to the counselors up there, I told them that I was interested in marine biology or oceanography and I was encouraged by one of the counselors to think about a different path as the marine biology field had been—there was too many people already going into it. He asked me what else are you interested in, and I said well, I like math, and he said why don't you think about chemistry or biochemistry? So, that's what I pursued, I pursued a bachelor's degree in biochemistry at Western, and then I graduated in '81 and then I decided to go back to grad school up at Western and I worked on plants. Eventually I ended up working on plants and herbicides, the effects of herbicides on plant cell cultures.

Anyway, so I pursued that and the job at NOAA kind of fell in my lap. I was called by Dr. Margaret Krahn and asked if I might be interested in applying for a job that she had open—she had contacted a woman that I knew up at Western that ran the supply store for the chemistry department. Anyway, I did not apply for the job right away because the money was not…it was a temporary position. I wouldn't have medical benefits and the money was not the same as I was making at Western. At that point, I was trying to finish up my degree and I was working as an office assistant. So, I did have medical benefits at that point. Anyway, Peggy called me back and said that she had gotten the position, it had gone from a 5 to a 7 in the old system…they're not ZP positions, whatever they are—GS5 to GS7.

So then I decided to apply for the position, which I did, and I was interviewed originally by Peggy at first before, and then she got called to an emergency meeting, and then I came back and she said I need to interview you again. When she and I chatted, it was like we had known each other for a while, and it felt like it was going to be a good fit, so I was hoping she would offer me the job, which she did. So, I started at the Northwest Fisheries Science Center in April of 1989 and what had happened just before then was the Exxon Valdez oil spill. Originally Peggy was going to hire me to start working on lipids and fatty acids for the research associated with that for—I'm not sure exactly what we were planning on doing with that, but we were going to get methodologies set up and I think they were probably going to start looking at feeding ecology type stuff using fatty acids. Anyway, Peggy said I think we're going to end up working on the oil spill because this center has done a lot of work on oil spill. So, sure enough, I started and basically we ended up starting to do research and gearing up for doing analyses, shipboard analyses for PAHs [polycyclic aromatic hydrocarbon], which are compounds associated with oil spills up in Alaska. So, Peggy and I went up on a ship, a NOAA ship, the Fairweather, for two months. She did shipboard analyses of fish bile for these polycyclic aromatic hydrocarbon metabolites, and my job on the ship was to necropsy the fish. So, I collected the bile and any other tissue samples that we had archived as part of the oil spill studies. So, that's how I started.

**MA:** So, what was your takeaway from working up in Alaska?

**GY:** Well, I was scared to go on a ship because I had never been on a ship before and I knew I had motion sickness. So, I did fairly well with that except for the long transits, but I *really* liked doing the shipboard analyses. I've only done it one other time. So, it's a pretty unique experience. I loved going up to Alaska. I mean, I saw parts of Alaska that people pay thousands of dollars to see as tourists, as ecotourists. It was a really interesting time to be up there. A lot of boat traffic and a lot of people in the area due to the oil spill, so you'd run into lots of different people from all over—not just the United States, all over the world that were working on the oil spill in one capacity or another. So yeah, it was a unique experience.

Then we came back to the lab and for the next year to year and a half we continued to work on oil spill analyses as part of the Exxon Valdez oil spill. After that we started looking at different classes of contaminants and developing methodologies for that. Those included polychlorinated biphenyls, PCBs as they're known, and DDTs [dichlorodiphenyltrichloroethane]. So, we started developing a rapid method to look at dioxin-like PCB congeners using high-performance liquid chromatography with photo diode array detection. We did get the method up, we got it validated and then we started using it immediately for seafood safety samples as well as looking at these compounds in marine mammal blubber samples. So, that was quite a few years—the method took about a year, year and a half to get developed, and then we probably analyzed seafood samples for approximately a year after they were collected. Then we used that method, the HPLC PDA method for…oh, probably close to nine or ten years and then we decided that we could not use it any longer because there were new contaminants on the horizon that the levels were starting to increase and they were interfering with our analyses of the dioxin PCBs and those were the polybrominated biphenyl ethers—the flame-retardants. So, we decided we couldn't use that method anymore.

**MA:** And how has that changed over time? Flame-retardants and everything since then. How has that…?

**GY:** Yeah, our research has changed based on the new compounds that are being used in industry as well as in agriculture and other types of uses. So, we've had to kind of adapt what we're looking for now. However, I do feel strongly that these legacy contaminants such as PCBs, DDTs, and the PAHs, they're important to continue to monitor, particularly the PCBs and DDTs because they're—even though the levels have fallen quite a bit since they've been banned for production and use in the United States and many other parts of the world, they are not readily broken down in the environment and they bio-accumulate in marine biota. So, animals that are at the top of the food chain such as killer whales can have quite high levels of these compounds even though they've been banned for forty years. But at the same time we've started to develop methods that are looking at newer contaminants of concern, and that includes things like xenoestrogens such as the compounds that are found in birth control pills, ethinyl estradiol as well as plasticizers such as bisphenol A. So, these compounds are also toxic to fish as well as other animals and it's important to monitor for them.

**MA:** So after you monitor them, what happens with your results and how does that affect policy or regulations?

**GY:** We try to work with—we want to work with biologists as well as physiologists, toxicologists, to help—just because we know what the levels that they're exposed to is not enough. Now, we need to know what those levels, if they're exposed to those contaminants at those levels, what does that mean for the health of the animals? And then you would take those data, not someone form my group, but somebody else, and then they could start modeling on what the effects would be on individuals and how that might affect populations or stocks of fish or marine mammals. So that's how—and then that information can be given to managers. And given recommendation on, are there ways that we can prevent these compounds from being—such as the legacy contaminants—re-released in the environment, such as from dredging of sediments. A lot of these contaminants are associated with sediments, or if they're newer contaminants, are there other compounds that could be used that are not as toxic? Could they be replaced for industry uses, et cetera? So, that's the kind of stuff that could be done for management.

**MA:** And do you see improvements in that? People replacing that?

**GY:** Yeah. An example of that is the polybrominateddiphenyl ethers, the PBDE flame-retardants. They were banned—they've been banned in Washington State since….I think 2011, all three technical mixtures. They are seeing that the levels have fallen since that time. This is Washington State Department of Fish and Wildlife. They've been monitoring fish in Puget Sound and that's what they're finding, that the levels have fallen. Whereas for the PCBs and DDTs, the major decrease in those compounds occurred in the mid to late 1980s and then they're just slowly declining now at this point.

**MA:** How has technology helped you and how has that changed over time and helped you identify these?

**GY:** Well, when I first started here at the center, not very many of us—we shared computers. So, the computer age has really changed how we collect data, how we analyze data, et cetera. In the old days, we used to use just a printer that used to print out the data, the peaks and stuff. Now, everything's—we have software that you can do it on a computer, it's so much easier, so much faster. The technology actually for the instrumentation for these analyses, the analyses are much quicker actually on the instruments they can be, and it's much more sensitive. The identification of the compounds has gotten better over the years. So, things are more rapid than they used to be. It used to take a lot longer to clean up samples et cetera, and technology's changed such that we can do things much more rapidly. So, what that means for us is that we can get more analyses done in a given week in comparison to what was done 25 years ago.

**MA:** Okay. And how has it been collaborating with other scientists at NOAA? Have you done any collaboration with academics in the area? What's that like?

**GY:** We do work quite closely with the ecotoxicology group here at the center, and that's been going on for many, many years. As well as we have worked with other people in National Marine Fisheries Service. We've worked with Southwest Fisheries Science Center, the Alaska Fisheries Science Center, Southwest or Pacific Islands Fisheries Science Center, and even folks down in the Southeast after the Deepwater Horizon oil spill. And in the Northeast, as well. So, we have worked with a lot of other science centers, staff from other science centers as well as regional offices because my group is rather unique within National Marine Fisheries Service.

There aren't very many groups that do chemical analyses, so we can provide some information that other science centers, they don't have the expertise in-house. So, we work with a lot of marine mammal biologists to look at the contaminants in marine mammals. We've worked with—had a longstanding relationship with Frances Gulland from the Marine Mammals Center down in Sausalito, California. We've also worked with quite a few researchers from the University of Alaska at Fairbanks and Alaska Department of Fish and Game. We have done quite a bit looking at marine mammals in Alaska. We've also looked at, as I said, Pacific Islands Fishery Science Center—we've done some analyses of false killer whales as well as humpback whales and Hawaiian monk seals from that region. So, we've worked with researchers that are doing that kind of work.

A unique thing that I think we do that I think the agency's very good at promoting is mentoring and getting students in to learn what—they're interested in the contaminant data and they want to learn how to do the analyses so they can understand why we do the steps that we do so that when they need to explain what was done and how they did it and why they think the data are solid, they get a better handle and understanding why we do what we do and why it's important. That includes—we have a very good quality assurance program for our analyses, so getting them to understand why that's important. It's really important to do the collaborative projects because as chemists, we don't know how to interpret the data sometimes because our background's not in biology and life history of these animals. Our background is more in the chemistry. So, it's a great way to work together is to have people that have different expertise that can help answer those questions. Look at the data and say what do we think we're seeing.

**MA:** Yeah. And so when you went down to the Gulf, what were the major differences between that oil spill and the Exxon Valdez, especially in your work?

**GY:** Well, for me, I actually did not go down to the Gulf of Mexico to collect samples. They kept us here. So, that's one difference. I actually went up to help collect samples up in Alaska. For the Deepwater Horizon, we were asked to help do seafood safety analyses as part of the reopening of the fisheries down in the Gulf of Mexico. So, approximately 37% at the height of the oil spill, 37% of the Economic Exclusion Zone was closed in federal waters due to the oil spill. So, we worked with the National Seafood Inspection Laboratory out of Pascagoula, Mississippi and the two labs, we worked on analyzing the samples to help get those fisheries reopened, and that occurred almost one year to the date from the oil spill. So the oil spill occurred on the 20$^{th}$—the explosion occurred on April 20$^{th}$ of 2010, and we were done reopening the fisheries on April 19$^{th}$, 2011.

So, the technology really, we use actually the same methodology, the same analytical methodology to start on the oil spill with on the Deepwater Horizon that we used with the Exxon Valdez oil spill. Which is a good thing, so then you can see how the data compare—you're using the same methodology. At the same time, we work with chemists from the U.S. Food and Drug Administration to start developing new and more rapid methods to analyze for these toxic PAH, polycyclic aromatic hydrocarbons, that are associated with petroleum, as well as developing a method to measure levels of the dispersant component, dioctyl sodium sulfosuccinate, which was one of the components of the dispersant that was used both at the wellhead site as well as they did surface applications of it. The dispersants are used to help make the oil break down into smaller particles so that they supposedly will go away quicker.

Anyway, so we worked with FDA chemists on that, those methodologies and it was great for the DOS and then we adapted the method that FDA had developed for rapid method looking at the polycyclic aromatic hydrocarbons in the seafood, and we got that method up and going. What ended up happening as part of that oil spill is that my supervisor, the woman that used to be the program manager, had retired in the end of September in 2009. We asked her and another chemist who had worked in the group who had both retired if they would be willing to come to work, come out of retirement to work for how long we needed them to help us with the method development and get the work done, which they did. It was incredibly helpful to have them here. What I found the difference was is that we had a lot more people working on methodologies and getting questions answered. I was on conference calls almost every day—I mean, it was crazy times until the wellhead finally got, the oil got stopped and they got the wellhead fixed. And then we continued on, once we got the fisheries—all the fisheries reopened and then we had finished all the analyses as part of the seafood safety response to the Deepwater Horizon oil spill. Then we went immediately into analyzing samples of marine mammals and sea turtles as part of the natural resource damage assessment portion of the Deepwater Horizon oil spill. So, we worked on those analyses for at least…two to three years and completed those and are in the process of writing those results up. Some of them have been published and we're just now finishing up a sea turtle manuscript on contaminant levels in different tissues of the sea turtles.

**MA:** So, what do you see now today, six years after?

**GY:** We have not been doing any additional analyses, but I do know that once we had reopened the fisheries down there, they had collected samples approximately a month to two months after an area had been reopened, so they went back and collected samples and we found that the levels were falling for the PAHs. Same thing with the dispersant. So, as far as the seafood part of it, we were starting to see the levels falling. We have not done any follow up on PAH-related contaminants on seafood, nor on the sea turtles since the oil spill.

**MA:** So, what's been your biggest challenge working in the scientific field of the government? Or what are some challenges?

**GY:** Funding is always kind of an issue for us and we've been fairly fortunate because we have a lot of collaborators, so people come to us and ask us if we'd be interested in collaborating on a project that they think we would be interested in, and that's usually marine fish or marine mammals or organisms that happen to eat marine fish such as maybe sea birds, that's an example. So that's one thing.

The challenges also are getting new equipment—there's always new equipment, instrumental systems that we could be looking at, but yet it's hard to do that change. First of all, the cost of those can be quite expensive when they first come out, so you kind of wait for the prices to come down which is a good thing, and see how well the instruments work anyway. I would never buy a car the first year it comes out. Anyway, so it's to replace our old equipment with some of the new stuff that's coming out—that has been a big challenge for us.

After the Deepwater Horizon oil spill, they asked us what we needed and I said we're going to need new gas chromatography, mass spectrometry systems because ours were, most of them were ten to twelve years old. So, they did do that. Now our instrumentation are between five and six years old. So, we're still pretty good on that, but there's always new stuff coming out. The good news is, we just recently purchased a new piece of equipment that had been our old system stable isotope mass spec system had been defunct. So, now we have a new system that we're getting set up right now. It just takes a little bit longer to replace the equipment, and so that's been a challenge.

The other challenge is getting staff replaced and getting new people on board and trained and hoping that they would somehow be here to help get stuff…It's just difficult to get that going because sometimes our methodologies take a while to get used to—and that's every job. It's not insurmountable, you can do that. What else has been a challenge…those are the two things that I can think of off the top of my head.

**MA:** Okay. What about something you've done that you're most proud of or you've most enjoyed while working here?

**GY:** Well, I enjoy working on the oil spill analyses. I mean, I was proud of the work that we did after the Exxon Valdez oil spill, and I was also very proud of the work that we did after the Deepwater Horizon oil spill. We did a very good job, we met our deadlines, and we had excellent quality data that came out of those two disasters. We continue to try to make improvements so that our reporting is quicker, our analyses if we can make it quicker and yet not lose the quality of the data and the comparability, to be able to compare from oil spill to oil spill. So, those are two very—those two oil spills, they were probably some of my highlights of my career.

**MA:** And you received a bronze medal in 1992 for your work performed for the Interagency Assessment Team in support of Operation Desert Storm? Tell me about that.

**GY:** Yes. So, we were asked to do shipboard analyses of fish after the Gulf War that occurred in 1991, I believe. The agency, working with the State Department, decided to send a NOAA ship over to the Gulf—what was the ship…you can edit this, right?

**MA:** They do.

**GY:** I'll think of the name of it.[1] Anyway, the NOAA ship that was over and we met the ship over there and we did shipboard analyses. I analyzed for polycyclic aromatic hydrocarbon metabolites in fish bile. So, I was there for a month and that was an interesting experience also. The way we normally do things is that operations occur during the day from a NOAA ship, and then at night if you needed to do other things you would do it. It was so hot over there, they couldn't catch fish during the day. So, the NOAA ship, the captain made the decision that yeah, it was probably better if they did the fishing at night and then we did the analyses during the day and it worked out great. The ability to be able to adapt to do what needed to be done, it was great. I enjoyed working with scientists back there that were actually from the Gulf and from

[1] Narrator Clarification: The vessel referenced here was the R/V Mount Mitchell.

other parts of the U.S.—and from parts of Europe, too. So, it was a great experience.

**MA:** So, you went over there?

**GY:** I did. Yes, I was there for a month on a NOAA ship.

**MA:** Cool. And tell me about the office environment, just how you've seen the general office evolve since you've been here.

**GY:** Office environment?

**MA:** Yeah. Some people talk about how there's more women now, you know.

**GY:** Oh, our office environment. Absolutely. There are more women than when I first started here. Definitely, you see that. What I'm surprised about that I haven't seen is more diversity. I'm hoping that NOAA will, NMFS will start seeing more diversity in the workplace, but I haven't really seen that yet and I'm hoping that occurs. It's nice to see more women in the workplace, but we also need even more diversity that that because it makes us a stronger scientific entity. We've *got* to have more people that can help provide things, information from various aspects of where they come from.

**MA:** Right, sure. So where do you see the future of your field going?

**GY:** I think the field is going to be rapidly changing and I think it's going to become—the analyses, the extractions and the analyses are going to become quicker and quicker. I also think that the biological things that we're going to be looking at will change and we'll be looking at things like metabolomics to tell us what's going on with animals that have been exposed to certain levels of contaminants.

The other thing I think that my group can do, which we have done in the past, is we don't just focus—we analyze for other chemical tracers besides contaminants. We look at fatty acids, lipid classes, stable isotope ratios. I think we can start looking at even more things that we could start looking at to help tell us about feeding ecology of marine organisms, it could help tell about potentially health going on with the animals. You could look at fatty acids and might be able to talk about nutrition or other chemical tracers that could be analyzed. I also think that *how* we get the samples are going to really change. Even though that's not what my group does, I think the technology is going to change such that getting non-lethal type samples is going to be so easy in the future. It's going to make our heads spin. Especially for animals that it's not so easy to capture, such as large whales, if they can come out with methodologies that they can just put something on and it eventually falls off and yet they can get a blood sample or some type of sample, it'd be great. So, those are the kind of things I think we're going to start seeing in the future.

**MA:** What about the future of the region environmentally and with your field? What are your visions for that with what you do?

**GY:** I'm hoping that the methods would get—you mean, where I see our group going with this and the change and the contaminants?

**MA:** Yeah, that and just the general future of the Puget Sound in terms of what you've studied over the years.

**GY:** I think we're going in the direction of starting to look at these new contaminants of concern. We've already started doing that and we're working with our colleagues at Fish and Wildlife to start answering those questions as well as other colleagues' in Puget Sound. Really we would want to start expanding that not just for Puget Sound, you would want to start looking at that, you could at least start in the West Coast because we have our colleagues along here. The issues on the West Coast might be a little bit different than of the East Coast such that they might use different pesticides on the East Coast based on the types of crops et cetera versus what we do on the West Coast. There could be differences. So, that would be one thing—you'd start looking at what's out there, what is important looking at the toxicology or what you expect, how toxic these compounds could be.

And then I also think our group is going to start looking at—my group would start looking at other chemical tracers to help answer questions. It'd be great to start looking at hormones to talk about reproductive. We've started doing that in fish, looking at plasma of sablefish. We have a method started for that. It'd be nice if we could get a lot of information from say a biopsy or a blood sample collected—you could look at contaminant levels, you could look at hormone levels, you could look at other chemical tracers in those matrices and get lots of different answers with regard to health or feeding or other questions could be answered.

**MA:** Okay. Did you have anything to do with the—I know there was a big high-profile piece about salmon and the contaminants in salmon in the Puget Sound? Did you have anything to do with that study?

**GY:** We do. We actually work with Washington Department of Fish and Wildlife Service and we analyze the samples in collaboration with them. So, they collect the samples and then we do the analyses for the legacy contaminants as well as we're starting to xenoestrogens, so those are those compounds such as nonylphenols, bisphenol A, the birth control component ethinyl estradiol. So yeah, we are working with them to help answer those questions.

**MA:** And what can the public, general public, do to help reduce those toxins, those chemicals in the environment?

**GY:** I think getting the word out to think about alternative ways of getting rid of insects and stuff in your gardens. There are natural ways to do that rather than looking at chemicals. We can encourage people to look at those alternatives. For the legacy contaminants, they're pretty much in the system and so I don't know what we would do about that. The PAHs are associated, they can be associated with oil spills as well as burning of fossil fuels, so another thing is don't drive as much. As we get more and more mass transit systems set up, that would help with the PAH situation. That's…and looking at how stormwater can be, you can help take care of the toxins in stormwater if you have plants that help filter stuff—and I think people in Puget Sound area are aware of that stuff, but just keep getting the message out.

**MA:** The rain gardens.

**GY:** Yes, it's great. That's a good question.

**MA:** And so, what advice would you give to someone who is wanting to get into your field?

**GY:** I would say to get some chemistry background but also I would recommend getting some biology background, particularly fish biology background if possible and or marine mammals, and also *take some statistic courses.* It's a good thing to do.

**MA:** And what are your personal plans for the next five, ten years? Any projects you're excited about working on specifically?

**GY:** Yeah, we are going to start working on looking at being able to do a suite a chemical tracers in biopsy samples of marine mammals, and those include contaminants, various classes of chemical contaminants as well as hormones and fatty acids, lipids, and stable isotopes and see what else we can—how well we can do with that and if there's one type of extract that we can use and then parse it out. We don't necessarily always have to do the analyses, but if we get something that we can extract out all that stuff out and then just parse out the extracts, it would be helpful. So, that's one thing we're going to be working on and I know we'll be doing more method development on chemicals of emerging concern as well as looking at PAHs and what oil component, additional ones, should we be monitoring for in animals.

**MA:** Okay. Well, that's pretty much all the basic questions I have, so…Did you realize you wanted to do marine biology once you moved out to Bellingham, or did you know before that?

**GY:** I knew it before. I'm from Yakima which is kind of odd. I wanted to do that and it's funny because I ended up doing biochemistry and was thinking well, I'll probably end up working in plants because that's what I did my Master's on, and the job fell in my lab and it was meant to be as far as I was concerned. I do love working for National Marine Fisheries Service. It has been a great experience. I mean, I've been here a long time, so yeah, I love the work that we do.

**MA:** So, what made you—was there a moment growing up in Yakima that you…did you go to the ocean or did you just know?

**GY:** Yeah, I think it was that interest. My mom was actually from the East Coast and her family was, they were fishermen. So, I think that was where part of my interest came from. Then my dad was a fly fishermen which is a different kind of fishing, but yeah. That's part of that interest I think, is where that came from. I had not really thought about that, but that's true.

**MA:** [Laughter] And the teacher I guess helped, as well.

**GY:** Yes. Oh, he was great. Junior high, he was great. Mr. Jones. He made science very, very fun.

**MA:** That's always important, yeah. Does he know that you've become a scientist?

**GY:** I don't know if he ever knew that. He's no longer here, but yeah, he was definitely somebody that influenced where I was going to go.

**MA:** Yeah, I've heard that a lot. I mean, that's kind of a big—

**GY:** It is. I mean, once they make this fun and you can see exciting things related to science, then you're right. That's all it takes.

**MA:** That's the most important thing.

**GY:** It is.I do enjoy managing folks here. We have students that come like I said to learn what we do and how to do it and those had been great experiences.

**MA:** Yeah. Are they mainly coming from University of Washington?

**GY:** So, we don't have many…we've had a few from the University of Washington, but it's mostly from Alaska. We've had quite a few students from Alaska come. We've had one from Hawaii and yeah, it's been a great experience. We've had students come through or interns, we've had Hollings Scholars—I think it's a great program. I think NOAA needs to continue that program. It's been a great experience for us and I'm hoping it's a great experience for them. So, we try to get one every year to learn what we do and see if they want to become environmental chemists.

**MA:** So, you had one this summer as well?

**GY:** We did, we did.

**MA:** Yeah. And are the other people, the other students who come work for you, are they usually—are they all throughout their career, or are they mostly master's students or bachelor's?

**GY:** Some are grad students getting their Ph.D. and some are undergrads that might come though.

**MA:** Okay, so it's all over.

**GY:** Yeah. And high school even.

**MA:** And high school? Okay, that's cool. And so do you see just as many people interested in it as ever?

**GY:** Yeah, although when we have gotten chemists in here I get the sense that they don't want to go into environmental chemistry. A lot of them want to do chemical engineering. I don't know if that's because they think they're going to make more money through that career versus going into environmental chemistry. I've told them you can make comparable money working for the government, so I try to encourage that because we really do need to encourage young folks to think about coming to NOAA to work.

**MA:** Well, thank you. If you have anything else to say, but other than that…

**GY:** Why can't I remember the name of the ship…

**MA:** You can email me and I'll—

**GY:** What was the name of the ship? I'll think of it.

**MA:** [Laughter] Gulf—Operation Desert Storm NOAA ship. I'm sure I'll…

**GY:** So Fairweather and what was the other one…the Mount Mitchell! It was the Mount Mitchell.

**MA:** The Mount Mitchell, okay.

**GY:** I'm pretty sure it's the Mount Mitchell.

**MA:** So, you went there after the war was over obviously?

**GY:** Yeah. Yep. That was the first time I went on foreign travel. That's the first time I'd ever been out of the United States.

**MA:** That's quite a place to go.

**GY:** I enjoyed it quite a bit. I did, I liked that trip. I learned a lot. I learned about—you can't fish during the day over there. It's way too hot.

**MA:** So, the fish just don't…?

**GY:** You can't find them. Yeah, they couldn't find them, so they must go pretty deep.

**MA:** To be cooler.

**GY:** They encouraged us to fish at night, which they did, and then you could see. They had the lights on on the ship and you could see the sea snakes.

**MA:** Oh wow. Cool.

**GY:** Yep it was cool.

**MA:** That's cool. And so you mostly stayed on the ship?

**GY:** I did, yeah. I didn't fish on that at all because I had to get the instrument up and going and keep things going.

**MA:** Okay, cool. Well, thank you.

**GY:** Sure!