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Marsh, Tiffani ~ Oral History Interview

Maggie Allen

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Voices from the Fisheries
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Interview with Tiffani Marsh with Maggie Allen

Summary sheet and transcript

Interviewee

Marsh, Tiffani

Interviewer

Allen, Maggie

Date

September 22, 2016

Place

Seattle, Washington

ID number

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Biographical Note

Tiffani Marsh was born in Warren, Ohio in 1956. She received her B.A. in Zoology from Miami University. She began her career at the Northwest Fisheries Science Center in 1990 studying salmon migration patterns. She is now a Supervisory Research Fishery Biologist in the Fish Ecology Division.

Scope and content note

Interview contains discussions of: general duties and projects with the Northwest Fisheries Science Center, juvenile salmon studies at the Lower Granite Dam in eastern Washington, projects along the Snake and Columbia rivers, collaborating with the Army Corps of Engineers and the Nez Perce indigenous tribes, use of dams for energy production and scientific research, changes in technology - specifically PIT technology and the future of the fisheries projects.

Tiffani Marsh provides a rich overview of her projects at the Northwest Fisheries Science Center. She also discusses the future of salmon research and how her childhood dream of conducting science became a career.

Indexed Names

No names are mentioned

Transcript - FSC_015

Maggie Allen (MA): This interview is being conducted as part of the Voices from the Science Center's project funded by the Northeast Fisheries Science Center. It also 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 Tiffani Marsh at the Northwest Fisheries Science Center in Seattle, Washington. It's September 22, 2016 at 2 pm. Tiffani Marsh was born in 1956 in Warren, Ohio is a Supervisory Research Fishery Biologist for the Center. She started her in 1990 when she assisted in the study of wild Chinook salmon's migration pattern. Her first project leadership role was evaluating whether the Lower Monumental and McNary Dams provided safe passage for fish. She received a B.A. in Zoology from Miami University and currently works on studies that evaluate the effects of smolt transportation from hydroelectric project on the Snake and Columbia Rivers. Tiffani, why don't you start by talking about what inspired you to pursue a career in science and where you went from there.

Tiffani Marsh (TM): I've always been interested in science as far back as I can remember. I had chemistry sets when I was in grade school that I would get for holidays and birthdays. I can't think of a time when I didn't want to be some sort of science-based professional. Of course, the '60s was the Space Program, and everyone wanted to be an astronaut, including myself. When I found out I couldn't go to space because of my eye sight, I decided to pursue something in the oceans. We had a very limited marine biology program, I guess you'd say, at Miami University, and so I pursued that. And then I was in Oceanography at Florida State for some graduate work that I didn't quite finish. But when we moved out here, I applied for the job. I was originally hired to do some totally different work, but within a month, I was transferred over to this program and never really did any of that work. So it's a, I guess I can say I have never done a moment on the work I was hired to do which is probably fairly unique. So I never envisioned not being a scientist.

MA: And what, so you applied for a job at here and just came out here because of the job?

TM: No, um, we were, I was married at the time, and we'd decided to move out here. My wife was a teacher, down between here and Tacoma, and I was doing, I worked for a temporary agency. I worked for a company that produced test kits for salmonella and coliforms for the food industry. And just kept putting in applications up at the Sandpoint, the Center, and finally I got on, I got hired on here with basically no salmon experience in my life, being from Ohio, there's not a lot there. And so, that's how I got started.

MA: And then you go out to, all the way out to the Snake and Columbia River, every once in a while. How often do you go out and do field work?

TM: I, it used to be that I would spend roughly half the year out in the field. I typically spend my springs on the Snake River. We have a tagging facility set up at Lower Granite Dam where we tag fish to evaluate the effects of transportation, whether it's beneficial or not, or when it's beneficial. We've also have work that goes on in the mountains of central Idaho that is another researcher's study. He's who I originally started working for and so we would spend five to six

weeks camping in the mountains and tagging fish from their natal streams. But, with added responsibility for my own projects I've, over the last few years, haven't been able to make that trip. So, most of my time now is limited to late March to middle June at Lower Granite Dam on the Snake River.

MA: OK, and so you just live out there for those couple months?

TM: Right, I rent a motel in Lewiston, Idaho which is about 50 miles away and then drive in each day and run the tagging operations.

MA: And then the rest of the time you're out here at your desk?

TM: Most of the time yeah. I do occasionally, I do spend one week in September going out. We have an adult trap at the dam that's manned by four NOAA personnel who are stationed there year round. And I'm their supervisor, so last week was performance reviews and helping them work fish. We would work between five and 600 adult salmon and steelhead each day. Collecting information, population information, growth, you know, how large they are, taking genetic samples, scales, so that we can tell how old they were. And then there's also other programs that use those fish to tag fish for their studies, looking at how those fish disseminate throughout the Idaho and Oregon drainages above Lower Granite Dam. And the trap is also the source of brood stock collection for fall Chinook hatcheries in Washington and with the Nez Perce tribe in Idaho. So I do get to work a little bit with the adults as well. But mostly it's juveniles.

MA: And how have you seen salmon change throughout your career over there?

TM: Um, I would have to say, we're definitely getting more fish back than we were when I first started. There was one year we couldn't even tag because there was so few fish coming out. So we have seen increases in the number of adults that have come back. We probably have a larger diversity. The Nez Perce tribe has introduced Coho back into the Snake River, and so we're having those come back. We see larger numbers of sockeye coming back. They were down to zero almost and so now they're coming back. The overall trend seems to be a good one, but it's also cyclic. So if the ocean starts turning around where we have a lot of El Ninos, then the numbers could start falling again and we just have to remember that we can get back up to the larger numbers, once the ocean turns back around.

MA: And what's been a challenge? What do you see the future in that? Do see challenges ahead for the salmon? Do you have any predictions about that region?

TM: I think one of the big challenges is, trying to maintain the levels that we have. The population obviously is growing and spreading farther and farther out into the wilderness, so one of the challenges I see is keeping the habitat we have from being destroyed and possibly building what has been injured back up so that they can sustain the populations that if we keep improving the salmon returns, they'll need more space to spawn. So I see that as one big challenge. And then there's also the managers take our data and weigh it against society, economics, people's needs. And so it could be, I see it could be possible becoming even more of a political format

that it has to abide by. So biology may start losing a little bit of focus in order to maintain what the people want and so that could impact the stocks, how quickly or if they recover.

MA: Yeah, do you see, do you get to talk to people out there at all and get a feel of what they want? What their values are?

TM: Well we see a lot of that within the various, we work with all the tribes and state agencies in the region and you can get a feel for how each one feels or how their people feel when it comes to what is important. Some areas, it is getting back as many fish as you can so you can actually fish for them either commercially or in a sport fishing environment. Some of them want to make sure we have enough so we can make sure we maintain the populations. And so it's a, there's quite a diversity that we see. I don't actually have a lot of interaction with public. We do occasionally have tours that come by with students, that's probably about my biggest connection with the public. We do occasionally have media come through, and we've seen some of their write up and presentations on TV. So, I'm not on the ground, touching base with the State, the public, who are supporting all the work we're doing.

MA: And what about the, you did evaluate whether the dams provided safe passage. Did you find that they did, and how are they doing that?

TM: Prior to 1993, which was my first study at LoMo [Lower Monumental Dam], there was no passage and they all had to go down through the turbine. Well, there was no spill at that time either so everything had to go through the turbine. The dams weren't really being run for fish. It was for electricity. So they built a new juvenile bypass system to get fish from the forebay down to the tailrace safely. And so, that involved quite a bit of flume development and structure. We had to test it to make sure all the flumes safely passed fish, there were no obstacles. And with anything new you're going to find little bits here, and little bits there that may have been overlooked, or the design was not quite working out the way they figured it would work. So we did find, for instance, that one of their ways of removing excess water, was actually taking out too much water. We also found pieces of concrete that had fallen down into a pipe that you can't look into, and so that was injuring fish.

And then at McNairy, which was the following year, they had an old facility that couldn't handle a lot of fish. They built a brand new facility and we had pretty much the same observations there. They had fewer issues with concrete in pipes. They were better at looking for that and cleaning that out. But just making sure that all the joints were smooth, making sure that all the pipe joints inside that we couldn't look at, as well as the flumes, were passing water and fish safely. That the sampling gates weren't injuring fish. So for the most part, we did find that everything was working well.

We weren't able to look at some things that actually turned out to be a problem. There's a lot of, the McNary Dam is on the Columbia and it's in a very hot area and so water temperatures can soar during the course of the day and so there's little pockets here and there where fish can get held up into and they can have problems. But those weren't part of the new structure, those were established points and so we weren't able to look at those. But they're very good at making, they're in the process now of building a new flume to move to fish at Lower Granite where I

work, down to the juvenile facility. That will be operational in 2018 and there'll be some evaluation of that to make sure that it's passing fish safely and that they're making it down to the juvenile facility in the best condition they can be.

MA: And you see them, the dam is staying around for a while? You think they're still providing electricity, cause you know, some dam, like the Elwha came down because it wasn't really doing much, but these dams are providing a lot of electricity?

TM: My understanding is they provide about 5% of the electricity in the region. So I would imagine that from electrical standpoint, if they were to remove that, they would have to come up with some other source and most likely that'd be a fossil fuel source. And so, the residents of the Northwest would have to decide whether they want to worry about carbon dioxide or whether you want to protect the fish at all costs. The cost to remove these dams, which are much larger than the Elwha and some of the other dams that have been removed, could be in the billions of dollars, depending on how they go about doing it. And so that's an investment that the people of the region and the country would have to decide was more important.

But I foresee that the dams will be around for quite a bit longer. We have done studies, we did one study in the early, mid-2000's looking at the effects of those lower four dams. And we're in the process of writing that report and getting it out so that people can see exactly what the effect of those dams are. Hopefully here in the next 6-7 months we can have that analyzed and distributed to the region.

MA: And how has technology advanced since you have been, since you started at NOAA? What role has technology played in your research?

TM: Technology is the basis of my research because I use a tag called passive integrative transponder tag or PIT tag. And this gives every fish a unique ID so that instead of having to, in the past they would have to tag groups of 10,000 fish with the same code wire tag and brand, and now basically every fish is its' own release group. And so we can tag a lot fewer fish and have all the information that's possible on every fish. We know exactly what it did at every dam that it went, that it passed after it was tagged. And now there's detectors in the ladders as they ascend as adults, so we can follow them back up the river as adults. We even have antennas in the streams so we can tell if a fish strays into a stream instead of coming back to Snake River. We can tell whether it stays there, whether it comes back out, what it does. So technology is the key to all the research I've conducted. I haven't run a study other than the facility evaluations that didn't rely on PIT tag technology.

MA: And how as your interest changed over time, since you came here and you didn't do much with salmon before you started working it. Now do you have a , would you say, your interests have changed since you now focus on salmon, since you came out here? Do you think you're more passionate about it than before?

TM: I think so. I, having moved here from Ohio, I didn't know anything about Pacific Salmon. I didn't know that they were having issues with them. Coming out here was an eye-opener in that regard. A week after I was hired, I was sent on the trip into the mountains of Idaho and there

were several times when I was sure somebody would abandon me somewhere because I asked so many questions because I didn't have the knowledge and the people that I worked with had been doing it for years and they were very knowledgeable and very willing to work, to teach me everything that was going on. As much as they could understand why things were going the way they were going. So I've obviously become a much bigger fan of salmon recovery. Whether that involves increasing their ability to survive going down river by the means that have been going on, or whether that means taking out dams, that's a more controversial issue. Right now we seem to be doing fairly well with the recovery of salmon with the dams in. So whether the dams need to come out is going to basically be more of a societal question. So I'm very interested in salmon. I don't salmon-fish, I never have. I don't fish for steelhead, but I know a lot of people and work with a lot of people that do. But they are a very interesting fish and you kind of have to admire them for the distances that they swim and all that they do to get back to the same stream that they left from.

MA: What's been the project that you've worked on that you most enjoyed, or are most proud of?

TM: I think that, I don't know if it a blessing or a curse, but I've worked on the most controversial issues on the Snake and Columbia River, transportation and, as I said, evaluating the effects of the lower four Snake River dams. We called that a latent mortality study to look at how that effects the fish once they leave Snake River. I think that actually the latent mortality study may probably be the one I'm most proud of, once we get the results out because there's been a lot of discussion and obviously the recent court decisions where the judge wants to bring breaching of the dams back into the forefront. This type of research is going to directly relate to what happens with that. The river currently is being run based on the results of the studies we have done for transportation. When we first started, nobody realized it was a difference whether it was early in the year or later in the year and our studies have shown that there is and so now we don't start transporting right away because there is not as much benefit for some of the species as there is later in the year. In fact, sometimes it's detrimental. And so now, the river, they generally don't start transporting until the end of April or the first part of May. And that's something to be proud of that we've changed the way the river's operated based on our research. But I think the latent mortality will probably be the one that I'm most proud of once we get the report out.

MA: And what's been some challenges working with the government or in your field?

TM: I think the challenges, um, first off, we are part of the government, so that comes with an inherent mistrust by a lot of people. That is a big problem particularly with regard to working with other state agencies. States have their own priorities, as one would expect, and the federal government has sometimes an opposing, not necessarily opposing, but different priority. And so we often find ourselves at odds with some of our collaborators as to what is the better way to go for different tasks or different solutions. That's kind of, that's been challenging over the years.

There's also being with the government, maybe it's the same in big business, but sometimes being able to do things quickly is difficult because there's all the steps you have to go through, even to purchase something. So that can sometimes be a little frustrating, when you need to get started because, you know, fish suddenly start earlier than normal and you want to get out there

and start working, but you have to wait until everything's all lined up. So that can sometimes be frustrating, but for the most part, we have a very good group that I work with here. And it's most, I would say most of the interactions with the other agencies and tribes have been very positive.

MA: I was going to ask about that, just wanted to just about collaborating with other scientists and stakeholders, so you said it's positive. Do you have anything to add to that about your relationship to other people in the field?

TM: Even if we have different ideas, we all want the same goal. We all want the salmon to come back, to be self-sustaining, so we can take them off the endangered species list, people can enjoy them. So you have to remember that sometimes when you seem to bump heads, is we are all trying to achieve a solution. We all have different perspectives and, like I said, we all have different priorities but the main goal is to get the fish back, so that they can sustain themselves. So if you can keep that bigger picture in mind, it kind of makes it a little easier to get along with everybody. For the most part we do even if we have disagreements over work, we'll go to supper in the evening and it's like work doesn't exist, we get along great. It's just that sometimes work environment creates a little head bumping.

MA: And have you seen the office environment change since you got here in the early 90's? Any key shifts you've seen?

TM: Um...we've grown! When I first started, I had one of these corner offices all to myself and it was big enough for multiple people. Now, at one point I had an office behind a door, that was my space and it was fairly small. So we've grown quite a bit. There has been a lot of reorganization. When I first started, several of the current departments were all one under what was called Coastal Zone. And now that was divvied up into their own individual departments based on what they actually did the work on. And so there's been quite a change that way. In 26 years, I think we've gone through several division directors. I've had 3 or 4 different supervisors during that time, people retired. A lot of the people that were here with all this institutional knowledge are gone and their knowledge is gone with them which is sometimes a little unsettling when you have a question and there is really no one to turn to now. Because, I'm one of the older people, one of the more experienced people here and so who do I go to when I have a question. That's, the office, it's pretty much remained the same, technology's advanced, we have the internet now and email, for the most part it's all good.

MA: What about, is the research station out in Idaho? Is it a NOAA station?

TM: The place where I spend my springs is Lower Granite Dam which is U.S. Army Corps of Engineers operated and owned. And it's actually, it's in eastern Washington but it's about 30 miles downriver from Lewiston, Idaho, which is one of the closer places to stay, particularly for a long period of time. There's Pullman which is a little closer but with the University there and in Moscow, it's really hard to get places to stay at times, so, Lewiston's the more stable place for finding accommodations.

The Corps been very, very good with us. We have four people stationed there, we have an office that the Corps has given us, they can use and the adult trap that the folks I supervise operate, is

owned and maintained by the Corps. And so they have a very close working relationship between the four of them and the Corps. So, we don't have any, I think Pasco is the closest NOAA facility, we have an office there. And so the people that are at the dam, which is about 2 hours away from Pasco do, used to do a lot of their administrative stuff through Pasco. With the increase in technology, they basically do it all out of Seattle now, with some oversight from Pasco for training and things like that.

MA: So you're mostly just working in the field out there. You don't really have to worry about an office or use the Army Corps head offices if you need to?

TM: Right, we have our own set up there. We even have our own internet service because obviously the Corps is part of the Army and so their computer system is fairly tight. Ours is as well, but we don't want to infringe on them, so we actually have our own internet service out there.

MA: And where do you see the future of your field going?

TM: I think most of the work is going to move off the main stem of the river and into the habitats and into the estuary. When I first started, survival down through the river was pretty low. And even well before I started it was very low. We're at least at 10 times better survival than what we had back in the early days. And it's been due to a lot of refinements that NOAA people as well as other organizations have developed over the years. And so right now, I think we are probably getting to the point where we're not going to get any more boost out of getting the fish down below the last dam at a higher rate. So I would imagine that while there'll be monitoring of the hydropower system, most of the work will probably move into the estuary to better understand what they need down there to boost survival to adulthood. And then working up in the habitats of the natal streams to try and figure out a way to increase productivity up there. Some of these streams that we work in are 6,500 feet in elevation, so there's freeze in the winter, there's not a lot of nutrients and so the more that they can recover the habitat up there, the better chance it will be that the fish will be able to have a higher survival from egg to smolt.

MA: Okay, and what about you? Do you plan to retire soon, or do keep, want to keep going out there? Or..

TM: I'm a field biologist, even though I spend nowadays, 9 months out of the year here in Seattle, I love being able to go out and work with the fish, to see them. I miss the Idaho trip because I can see where they're actually coming, you know, the natal streams, see how they change over time. But, I plan, I have at least 5 years, before I have my 30 years in. And as long as I'm enjoying the work, I'm probably going to stick around. I started late. I was in my mid-30's when I started, so it'll, it's taking me longer to get to my 30 years it seems like. But as long as I can keep going out physically and mentally keep going out into the field and spending three months working with the fish, I enjoy it so, I plan to be around.

MA: Does it have a lot of like physical challenges? I mean do, are you getting wet and dirty, or are you mostly staying on land, when you're tagging salmon? I mean how grueling is it at times?

TM: It's, we have a tagging facility set up next to the raceways at the juvenile collection facilities at Lower Granite. And so, the fish come to us and um, probably the most physical stuff is crawling around, making sure all the pipes and the plumbing and the pumps are working correctly. Moving hoses around, so we can get fish going where we want them to go. We've even worked with a system that moves fish out of the raceways up to our tagging facilities so we don't have to dip net them out anymore. We haven't done that since the mid '90s. A lot of the physical labor, as far as the juveniles go, has been removed. And so there's a lot of standing and tagging which can get uncomfortable if you're standing at the same spot for hours at a time.

For the adults, we do carry them around from our main anesthetic tank to the tanks where they can be processed either tagged or collected for brood stock, or have scales or tissue samples taken from them. And so there is some carrying around. Last week when I was carrying around fish, some of these fish were 100 cm long and probably 10-15 cm deep, so they were very large fish. And I've noticed that as I've gotten older, they're getting a little heavier to carry around. But we anesthetize them and so we try to do the best we can to make sure they stay safe, while we're moving them around. That is probably the one area we still have quite a bit of physical labor. We, in the mid '90's again, we developed a system they don't have to be dipped out of the holding area of the trap. We have a hoist that will bring up the bottom of the trap, so that the fish can voluntarily leave. So a lot the physical activity been removed, but there's still the carrying them around from station to station and to the release tank, so.

MA: Yeah, sounds like it's a satisfying experience, all around.

TM: Yes it is, very much.

MA: And so what advice would you give to future field biologists? Or anyone who wants to work with salmon or just in biology in general?

TM: Right now, I probably would never have gotten hired with just a bachelor's degree. I've had to hire replacements for a couple of retirees and most of the applicants have had at least a master's degree for just the technician job. So get as much education as you can, and particularly writing, that's um, the way you get your findings out. So being able to write clearly, so that people can understand what you found is very important. I think, like I said, I think a lot of the work is going to move off into the upper end and the lower end of the system, the habitat and the estuary. That might be areas that people could start looking more into instead of the main stem type of systems. So that's probably the areas that are most important for future biologists. And building networks I think helps, or learning how to build networks, so that when you get into the job, you can more easily associate with the people that are there and pick things up.

MA: So you say, study more estuaries and ecology and how estuaries work, is that what you're saying?

TM: Probably that would be a big area. Like I said, there's a lot work going on in estuaries now, recovery of lost areas, re-flooding areas that have been drained for development or for whatever. So that would be something to understand and probably would help a great deal if you understood how everything is connected down there.

MA: And just for those who maybe don't know what the landscape's like out there, what is it like for you? What's the weather like? What's it like being out in eastern Washington and Idaho?

TM: It varies a lot. There have been times, there was one year, the first week of June, we had snow falling on us, but generally, and we've had Aprils where it was in the 100s. So there's it depends on the year. The weather is quite extreme. We are out when we're working on the juveniles, some of us are constantly outside walking around, making sure all the pipes are working, hooked up, there's no leaks, making sure the pipes are working. While the taggers are inside the trailer, protected from the elements, to do the tagging and sorting of the fish. The water temperatures range from the 40s up into the upper 50s, low 60s in the spring time which is the water temperature that the fish like. Once you start getting into the 60s it starts getting a little warm for them. The adult trap, we actually have thermal limits that we can't go past because the fish just don't handle it well. And so when you start getting in the upper 60s, we cut back on what we can do with the fish, and if we hit 70, then generally we don't do any of the processing of fish. I know the folks on the trap, they start up in March. Luckily, there aren't a lot of fish, because they can't keep their hands in the water for very long because it's very cold. Generally they process the fish as quickly as can and then get inside and try to warm their hands up. So there is a lot of extremes in the environment of eastern Washington and that section of Idaho.

MA: Well, if you have anything else to add about you, your career, what it's like, but that's pretty much all my questions, so, if you have anything else to add in general that you just wanted to share...(laughing)

TM: Nothing is really coming to mind, although this project sounds like it's a very good one. Like I said we've lost a lot of intellectual knowledge, or knowledge of what people have done in the past, and every once in a while, when we have new people come in, it's reinventing the wheel. And if you have people that have knowledge, or there's a repository where it's at, they can look and see, "oh that's been tried!" so let's try a different angle, or that's been tried but maybe if we do it a slightly different way we can make a difference. So I think this type of repository of information should be very useful.

MA: Yeah! That's the plan!

[Both laugh]

MA: Great. Well, thank you.

TM: Thank you.