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Ford, Michael~ Oral History Interview

Maggie Allen

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Voices from the Fisheries
166 Water Street
Woods Hole, MA 02543

Interview with Michael Ford by Maggie Allen

Summary Sheet and Transcript

Interviewee

Ford, Michael

Interviewer

Allen, Maggie

Date

August 2, 2016

Place

Northwest Fisheries Science Center
Seattle, Washington

ID Number

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Use Restrictions

Biographical Note

Michael (Mike) Ford was born in Colorado in 1967. He received his Bachelor of Science in Biological Sciences from Stanford University and his Ph.D. in Population Genetics from Cornell University in 1991. In 1995, Mike began working at the Northwest Fisheries Science Center as a national research associate where he studied the local adaptations of Chinook salmon using molecular genetic data. Since 2003, Mike has been the Director of the Conservation Biology Division at the Center.

Scope and Content Note

Interview contains discussions of: Pacific salmon, climate change, molecular genetics, population genetics.

Indexed Names

Bush, President George

Hauser, Dr. Lorenz
Jones, Dr. Linda
Naish, Dr. Kerry
Obama, President Barack
Park, Dr. Linda
Powers, Dr. Denny
Seeb, Dr. Lisa
Seeb, Dr. James
Waples, Dr. Robin

Transcript--- MF__001

Maggie Allen: The interview is being conducted as part of the Voices from the Science Center's Project funded by the Northeast Fisheries Science Center. It is 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 am speaking with Dr. Mike Ford at the Northwest Fisheries Science Center in Seattle, Washington. It is August 2nd, 2016 at 1:00pm. Research geneticist Mike Ford was born in Colorado in 1967. He received his Bachelor of Science in Biological Sciences from Stanford University and his Ph.D. in Population Genetics from Cornell University in 1991. In 1995, Mike started working at the Northeast Fisheries Science Center as a National Research Council associate where he studied the local adaptation of Chinook salmon using molecular genetic data. And since 2003, Mike has been the Director of the Conservation Biology Programhere at the center.[1]Alright Mike, so why don't you just tell me what inspired you to pursue a career in science and then what's happened since then and what your path forward.

Mike Ford: I've been into science I guess, more or less since, middle school or earlier. I always enjoyed biology classes and I've always enjoyed being in the outdoors and kind of doing outdoor activities like hiking and mountain climbing and skiing, that kind of thing so. I've always been interested in pursuing a career that allowed me to spend some time outside. That being said actually, when I…I was sort of not really clear that I was going to go into science like when I went to college or something and in fact I was originally a history major. But starting around sophomore year of college, I sort of began to really revisit my interest in biology and in particular in trying to do something that would allow me to explore both molecular biology, kind of working in the lab, which I really enjoy and field bio…field work, field biology, ecology, spending time outside in the natural environment and studying natural systems. So I was particularly attracted to basically molecular populations genetics, which was a relatively new field at the time and basically in a nutshell allowed you to kind of go outside and collect a lot of samples and bring them back to the lab and analyze them. And that had a lot of appeal to me.

MA: And then what made you want to get your Ph.D. then from there? Did you go straight into it or?

MF: I did, yeah. So I... I... spent some time working as an undergraduate in a couple different laboratories in Stanford... and spent a particular influential semester down at the Hopkins Marine

[1]Narrator Correction: Michael Ford is the Director of the Conservation Biology Division at the Northwest Fisheries Science Center.

Station in Pacific Grove, California. And so that was a period of, I think, the actual formal period was just maybe three or four months kind of spent working in a laboratory as undergraduate. I met a lot of people who really influenced me after that including some people who are here at the Center now. And I had such a good time. I stayed on with my now wife actually for the summer after that, that semester as well, so I ended up spending almost six months at, um, at the Hopkins Marine Station and I guess it's probably at that time that I kind of decided that that's what I wanted to do. That was my junior year of college and I wanted to pursue a career in college and started looking into Ph.D. programs and so forth after that.

MA: And so how did you then end up at the Northwest Fisheries Science Center and secure your position here?

MF: Yeah, so that was quite a bit later, really, sometime later. So I initially went to graduate school at Cornell University and that was kind of narrowed in not only based on my own interest but also of my wife's interest. She's a veterinarian now but then a vet student and there are basically two places in the entire country where, that had strong programs in both molecular populations genetics and veterinary medicine and that was University of California Davis and Cornell and we both visited both of those places and in the end decided that Cornell was the better fit for us and so went to Cornell for four years while I got my Ph.D., my wife got her DVM. And then I had kept in touch with some people actually from Hopkins and one of the, kind of one of the most important there, was a woman named Linda Park who is still here at the Science Center and when I was an undergraduate at Hopkins Marine Station, she was doing a post doc there with Dr. Denny Powers and so I kind of kept in touch with her. I knew that she was working at the Science Center.In fact, she had gotten a job at the Science Center while I was an undergraduate at Hopkins and I remember thinking at the time "wow that sounds like a really, really interesting job" and it always kind of stuck in the back of my mind. After I got my Ph.D. and when I started kind of exploring post-doctoral opportunities, I contacted Linda and asked if there were any opportunities out here and it turns out there were. So those are early connections as an undergrad actually [laughing] were kind of important later on.

MA: Yeah, and so did you move up here from where you were? Did you move to Seattle for this job then or?

MF: Yeah, we did. We moved from Ithaca, New York up to Seattle.

MA: Okay. And so who was…what was it like when you showed up here in, I guess, the mid-90s? Who was your supervisor and what was kind of the dominant focus of the branch?

MF: Yeah, so I originally came here as a post-doc and my sort of advisor, supervisor was Robin Waples and I had met him briefly at a scientific meeting, I think, one of the evolution meetings where I heard him give a talk on the work that he was doing on salmon. Evolutionary significant units which I thought sounded really interesting and exactly the sort of thing I'd wanted to do because it was basically an applied application of molecular population genetics and I was kind of becoming increasingly interested in pursuing applied science and so this seemed like an ideal fit. So I came and Robin was my advisor and basically as a graduate student, I had looked at using DNA sequence data to study adaptation in fruit flies and I basically brought those same methods and techniques to try to apply them to salmon and address one of the questions that's

still an important question in salmon which is, sort of, to what degree are local small populations of salmon adapted to their kind of very specific environment. So I was using molecular methods to study that. It was very different, when I first got here. Linda Park had been here by that time probably... five or six or seven years and had set up a molecular genetics laboratory. But if you looked at it, it was pretty shabby, honestly. Kind of old Formica counter tops, kind of cruddy wooden shelves and it's very, very different from what you see if you go down to the lab now where it's all kind of gleaming white composite benches and everything but it was a lot of fun working in there and it was a very enjoyable time.

MA: And what's been the major change in technology in the way you guys use data in your branch?

MF: So, that's changed remarkably as you probably know. So when I was a graduate student--actually when I as an undergrad at Stanfordwas right at the time that the polymerase chain reaction, which is a very key molecular biology technique, was invented. So people were just starting to use that and really kind of take advantage of the power of that technique to look at fairly-- use fairly simple methods of looking at individual genes and organisms but then-- you know at that time, it was a sort of major study of DNA sequence variation even in a species like drosophila which was sort of a model genetic organism, you know, might have less than twenty--a sample size of less than twenty individuals and focusing on maybe just one or two genes. So that was twenty years ago, maybe twenty-five years ago. Now, it's...it's for basically about the same cost, you're literally collecting probably a hundred million times as much data because you can collect entire genomes from individuals, from many individuals so the sort of data collection and simply the sheer amount of data that are being collected has changed enormously. So the limiting factor now is no longer, sort of, going out and collecting the data but it's really analyzing it and having the kind of time and expertise to understand how to analyze that much data.

MA: And what about the state of the populations you've studied and how has that changed over time and what are the challenges that you've had, that you see?

MF: Oh, that's kind of interesting. So, you know, I originally came here as a postdoc and was out working on a very applied research problem but then after I became a permanent employee here, I sort of, made a little bit of a transition and spent less, a lot less time working on populations genetics and a lot more time working on conservation issues more generally for Pacific salmon. And so the.. around that same time frame, around the late '90s and early 2000s, was when most of the listing of West Coast Pacific salmon occurred under the Endangered Species Act. So it's a big sort of ramp up activity here at the science center. And I was not so much involved in the original listings but got very involved in the recovery planning efforts starting around the year 2000 or so. And...I'd say...things have kind of gone up and down since then. So salmon, most salmon species that we work on have a three to five year generation time so we've had anywhere from five to three to five generations of salmon since that time. I'd say most are in somewhat better shape than they were in the mid '90s. I think a lot of the…efforts in conservation taken under the Endangered Species Act have kind of resulted in some kind of incremental improvements but in some ways it's really hard to tell because against that there's these enormous changes and just environmental variation that's causing the populations to go up and down but I think for the most part things are, overall, on a somewhat improving trend.

MA: Hm, yeah. And you also had a leadership position in marine mammals? Is that correct?

MF: Yeah so I originally came here to work on salmon and that's really much all I really did from '95 to about 2002. Starting around 2002, 2003 somewhere in there, the center became involved in the Endangered Species Act listing of the local population of killer whales, called the southern resident of killer whales and we did a status review in 2002. There was various court cases and so on and a…I was not really involved so much in that 2002 one but then became really involved in the next one which was in 2004. Around that same time, the science center received some funding to start a small program to work specifically on science to support recovery of that population. That was originally lead by Dr. Linda Jones who was the Deputy Science Director at the time. Then when she retired, that program needed a home and the Conservation Biology Division, which by that time I was leading, seemed like the logical place for it. And I've been pretty involved in this sort of science aspect of the killer whale work ever since. In fact, I'm doing a bit of a sabbatical this year and spending a large fraction of my time working on killer whale genetics looking at using parentage analysis to study patterns of mate choice in the population and then also looking at using DNA sequence data of fecal samples to study their diet.

MA: And so is that what you were doing when you took time-- you took your sabbatical and that's-- that is your main research?

MF: I'd say that was about half of it and the other half was continuing to work on a couple of projects I have on salmon. Mostly looking at…I've spent a lot my career here on the salmon side looking at interactions between hatchery produced salmon and wild salmon and in particular trying to address the question of how effective the hatchery fish are, the fish that are raised and released from hatcheries, how effective they are at breeding in the wild and that's of interest both because you have hatchery fish kind of straying kind of, unintentional straying of hatchery fish into wild populations, you want to know if they're contributing some way to those populations and then you have quite a few hatchery programs that are sort of deliberately designed to try to prop up the wild population abundance and you want to know if they're successfully reproducing. So I spent a pretty large chunk of my career, actually, just addressing that one question [laughing].

MA: So what have you found then-- what-- in the answers?

MF: Yeah I do, so... I mean, of course, as in many cases in science the answer is it depends but for the most part in most of the populations I've studied, the hatchery produced fish are quite a bit less effective at producing offspring when they breed in the wild than the wild fish are. And for the most part, it sort of varies from case to case. In some cases, it seems to be something very intrinsic to the hatchery fish, maybe a genetic phenomenon that they've become kind of domesticated over time and have basically adapted to a hatchery environment and at the cost of their adaptations to the wild environment. In some other cases, though, it seems to be mostly an environmental effect of how they're reared and released. And it seems to go away relatively rapidly in some cases so it's actually kind of a mixed bag why we see these reductions in fitness. And speaking of hatcheries, I mean the hatcheries is one thing I think we've made a fair bit of progress on over the last twenty years. That was what I…I was originally hired to work on hatchery risk assessment issues, that was my original job description after that initial

postdoctoral time. And...you know, my sense is that the region has become a lot more mature about how it's thinking about hatcheries to some degree. We had a long period from let's say 1900 or maybe even 1885 up to about 1990 where sort of the dominant paradigm was that many wild populations were not going to be viable due to habitat changes and they would be replaced basically with large scale hatchery production, which was arguably pretty successful, particularly compared to, say, the situation on the East Coast where Atlantic salmon mostly disappeared in the face of widespread habitat destruction. I think we have to give a fair amount of credit to the fisheries biologists in the early 19th or early 20th century…late 19th century for kind of foreseeing that the same thing was likely to happen on the Pacific Coast. They made the judgment at the time that it was unlikely that you would change the trajectory of development that would affect the habitat and they promoted these large scale hatchery programs and... in retrospect there's a lot of problems with them but, particularly in the context of the time, I think you could argue that one of the reasons that we still have salmon on the landscape and some very abundant salmon populations is because of those decisions. But starting around 1990 or so, or maybe a little earlier, there was this sort of realization that there were still wild populations, that they were still important and that it wasn't too late to try to reverse course in some of those habitat alterations and conserve the wild populations. And so you had a bit of a paradigm shift and that led to a certain amount of decisions that need to be made on what to do with these large scale hatchery programs which have some detrimental effects on the wild populations. And so I think by this point we actually kind of figured out a lot of the things you definitely don't want to do and for the most part have stopped doing those although there are still some problems that are slowly being addressed and now we're kind of at the point of trying to figure out well how do we-- seems unlikely that we're going to achieve sufficient habitat restoration to achieve all of society's desires for salmon abundance with wild fish alone so now challenge is we have to figure out how do we promote conservation recovery of wild salmon while also maintaining sufficient hatchery production to meet some of the abundance goals that we have for salmon.

MA: And so where do you see that…what do you predict will happen in the future with that then? Do you have any estimations?

MF:I honestly don't know. I think that there is sufficient interest in wild salmon that those existing areas that harbor reasonably strong populations of wild salmon, I think there's going to be... I don't think the people would give up on those areas. I think there's going to be a lot of focus on conservation of those existing wild populations and that will remain. I think the trickier part is those populations where it's not quite clear if they're going to be recoverable or not and kind of how much resources will go into that or whether some of those will be...deemphasized with more priorities put on healthier wild populations. The other issue of course that's overlaying all that is climate change. I think salmon as a…all of the species of Pacific salmon as species are not in too much danger of climate change because they have such a large range and they've got plenty of northward areas…that are probably not going to be too impacted. But down here in kind of the Pacific Northwest andCalifornia, certainly there're populations that can be quite impacted by climate change and... sort of how hatcheries are going to fit into that mix is, I think, still a little bit of an open question. You know the other issue, of course, is I do sense that over time, even though there's a lot of interest in wild salmon conservation, it's possible that that interest could decline a little bit as the population in California and the Pacific Northwest becomes more urban. I think there's lots of trends of less recreational fishing and so forth. I think concurrent with that there continues to be a strong interest in environmental conservations

in general but I do wonder if the decline in wanting to catch salmon is going to lead to maybe just a little bit of a lack of public interest in salmon over time. I'm not really sure.

MA: So do you deal with public engagement as your job? Like do you--

MF: Not much. I mostly, working as a scientist, dealing with a lot of other scientists outside of the agency and give some talks to the public and so forth…more on the whale side. There's a huge interest in the whales by the public and a very, very interested kind of stakeholders in the whales and they tend to hold a lot of public meetings and a lot of science talks for the public type meetings associated with the whales and so I do a fair bit of that but there's a little bit of a less of that for salmon I think.

MA: Yeah, is that-- I mean because [unintelligible] of the whale people and the Puget Sound people are really concerned with them and--

MF: Yeah there's just a-- big whale watching. The whales are of interest to a lot of people. Maybe even people who never even see them. I think they're such a charismatic species that you just have a wide interest of people in the whales. Anyone who's interested in the environment and so forth is typically very pro-whale.

MA: So do you think that leads to more of conservation methods for them.Does that because the public is so interested? Does that translate into protecting them more than other species.

MF: Um, I think…well, for whale species as a whole that is definitely true going back decades so the…all whales are protected under the Marine Mammal Protection Act from early '70s. And that was in response to widespread concern about whaling and decline of whales and so forth so I think in general whales. I mean it's just factually... it's a factual statement that whales and marine mammals in general receive extra protection because of the public interest. I think that protects them, well, it does protect them from direct harms. You don't really have much in the way of whale fisheries, whale harvest, there's a little bit but very little compared to what there was and certainly compared to fish harvest. They're still subject to a lot of…well, at least some populations are subject to a lot of indirect harm. And whether they are really more protected than any other ESA[Endangered Species Act] species from those indirect harms, I'm not-- I don't think that's really the case.

MA: Yeah okay.

MF: Maybe a little bit.

MA: Yeah, sure. And so what project are you most proud of or most enjoyed during your time here?

MF: Hm…it goes up and down but at various times, I've been fairly proud of the hatchery work because I think that we've actually made a difference in how hatcheries are run and... and so I'm proud of the work that we've done, kind of moving the scientific field forward on understanding the…how hatchery and wild fish interact and what are the consequences of that interaction. I think we've also have done a good job or I'm proud of some of the, and this isn't really scientific, but part of the job is to inform policy makers about what that science means and I've now, I

mean there's plenty of people who have been here a lot longer than I have but I've been here about twenty years which was three, I guess, presidential administrations, and at various times, depending on the kind of political climate, that kind of intersects a little bit with the hatchery question because there have been desires by some politicians to go back, if you will, to the early 20th century consensus of really emphasizing hatchery production and not worrying too much about the conservation of wild populations and particularly in the early 2000s, early to mid-2000s, there was a lot of pressure to do that and I think we here at the science center, and I played a pretty substantial role in that, did a really good job of articulating why that would be a problem for wild fish if your goal is to conserve wild fish and I think we did a pretty good job of convincing some people who probably didn't really want to be convinced that, you know, kind of going back to a hatchery system would be a big mistake.

MA: So would you also say that that's been a big challenge working for, in the government for the scientific field it's…you know, convincing policy makers and...

MF: Less than you might expect. I think that working for fisheries is kind of nice in that I think that... at least, especially on the West Coast, there's a lot of really good policy makers associated with fisheries and the running of the ESA and really on both sides of the political, various sides of the political spectrum and there's a lot of, there has been anyway a lot of respect for science, and I think the science center here has done a good job of really trying to be a neutral body and kind of just present the facts as much as possible and give multiple options which I think is diffused any strong problems with... politics and the application of the science, it's not to say that there aren't any but I think for the most part the fisheries have a pretty solid culture of emphasizing science and a really strong division between science and policy which I think kind of protects the science from too much policy influence. I think the scientists are comfortable doing the science. I think the policy makers are pretty comfortable making their decisions kind of independently of the science center and which kind of because people stay in their own spheres, which I think works pretty well.

MA: Yeah, it's easy there's good communication though between--

MF: I think there is yeah, I think it's been really good and effective communication between the policy makers and the scientists.

MA: Okay. So what other challenges are there, you think, working in your field?

MF: Well, working for the government is always a challenge unfortunately. I mean, there are some good things about it which I just mentioned which are nice. The…and working for the… there is a large and...often slow and frustrating bureaucracy that one has to deal with. That may be true in any large organization, I am not sure it is just government but that is challenging. I think a lot of the controls that are set up for very good reasons to make sure that government functions in a non-political way, in a way that doesn't allow for nepotism or in a way that doesn't allow for hidden political influence or anything like that or hidden favoritism. Those are all very important for setting up a well running bureaucracy that works well but at the same time, each one of those things results in all these controls that if taken to an extreme can make it hard to get things done when you know that the right thing to do is right in front of you but you might have to jump through ten hoops to actually get it done and that can be pretty frustrating.

MA: And does that depend on the political climate? Or is it just...yeah.

MF: A little bit. I think it does, I think that and again kind of in an ironic way in that the more that the people on top are concerned about accountability and transparency and making sure that government is working as it should, which are all extremely important goals, but every one of those, by the time you get down to the person actually doing the work means that there are more rules and regulations constraining their activities and so yeah, I think it does depend a little bit. I think the Obama administration, for example, had a very strong emphasis on accountability and transparency and think in general things have been more bureaucratic if you will under that, you know, compared to the Bush administration I think was, maybe a little less concerned about that and in some ways maybe a little bit easier to get things done because there was maybe a little less, fewer eyes on what you were doing.

MA: Hm, interesting, and then so what are your plans for the future personally and in the… and in your career, you know where do you see yourself five, ten years.

MF: That's another good question, um... so I'm -- this last eight months I've been on a sabbatical where I've been splitting my time between the University of Washington and here and I did that in part because I was getting really burned out on what I was doing and so I've greatly enjoyed this sabbatical. But it has kind of…I, um, and that's going to end at the in a few months at the end of October um, and I guess I am looking forward to going back to what I was doing... working on some of the more management and get the science policy interface aspects of the job again. So I guess I am feeling a little bit refreshed at the moment. So I think for at least the next few years I'll probably continue in the job that I'm doing now. I think looking ahead, some of the challenges are...are trying to figure out what the kind of in-game is, if you will, on the pacific salmon issue. So the ESA listings for Pacific salmon are now roughly twenty years old from the original ones, a little older for the original ones right, the bulk of the mid-90s. And the recovery plans are mostly, some of them…the older ones are almost a decade old... more than a decade old, some of them are almost 15 years old. And so, at some point we need to figure out how to keep momentum going on salmon conservation when it's become clear that you're not going to actually recover them to the point of delisting in one person's career. And so that's kind of a challenge, just trying to keep the salmon focus going in a way where you feel like you're making progress over time. For me personally, one of my goals for this last sabbatical was to get caught up in my own field of population genetics, molecular populations genetics and try to actually analyze those terabytes of data that you can generate now and learn some of those programs and that's been a little more challenging than I thought it was going to be. But, I've made some progress in that so I'd like to continue to spend…spend more time on that kind of genetic data analysis. But other than that I am not quite sure what I'll be doing five or ten years from now.

MA: Yeah. So was-- what department were you at through UW [University of Washington] or was it...

MF: I'm at the-- it's at the School of Fisheries working with, mostly with the fishery geneticist over there. Jim and Lisa Seeb, Kerry Naish, Lorenz Hauser. Really just hanging out with their lab groups and learning from them and try to develop some collaborations. I put in a joint proposal with Kerry Naish, a professor over there, for actually collecting full genomes for most of our… about a hundred killer whale samples which I'm very excited about so that'll be a lot of

fun and I hope that gets funded. So basically starting some things that will live beyond the length of the sabbatical and kind of keep those connections going.

MA: Do you plan to connect it with the NOAA?Is that what you were planning to do or do you think that...

MF: Yeah.

MA: Yeah, so they'll, they'll be a project collaboration--

MF: Yeah, yeah yeahyeah.

MA: Okay, okay, yeah I guess that's pretty much it. I guess my last question is, what would you say your favorite part of the marine environment is? Favorite marine species or habitat?

MF: I don't know that's sort of a...

MA: If you have one.

MF: If I have one. I don't have one as a scientist, let me put it that way. I mean, I'm still mostly a, well, at this point I don't even get in the lab I mostly sit in front of the computer and work on data, so that's what I do as a scientist [laughing] for the most part now. But just you know... I recreationally I'm a sailor and I love getting out on Puget Sound. I've got a sailboat and I spend quite a bit of time just out on the water that way which I enjoy a lot so.

MA: Okay, yeah I was also going to ask... yeah what your day to day is like now versus when you started in…

MF: Yeah, I mean I again, most of the scientific work that I do now, like many people do wander around here, is sitting in front of the computer analyzing data, writing up results, reading…that kind of thing.

MA: Yeah, but you started working in the field outside a lot.

MF: Yeah, so as a graduate student, I collected a lot of field data. In fact I did a-- I drove... literally from New York to like Barrow, Alaska... was it Barrow? I can't remember. Anyway up in the northern part of Alaska, collecting fruit flies and then did some experiments, not just molecular genetics experiments but sort of more, laboratory experiments on the flies themselves and then as a researcher here early on, I did quite a bit of field work, mostly in the form of kind of collecting field samples. Some of the hatchery work early on, I also would go everyday to sample fish and hatchery and collect data on the fish, collect tissues samples and so on so.

MA: Okay.

MF: But I haven't done that in a while now.

MA: Yeah it's mostly population management.

MF: Yep.

MA: And so what would be your take away advice for someone looking to get into your career? Maybe as a career entry level scientist.

MF: Um well, certainly for a career in a…as a fishery scientist um... I think that there is a lot of opportunities for people with a really strong quantitative, mathematical and statistical background. So, you know we have some employees, a ton of stock assessments biologists and that kind of thing and so if you come out of a good program with a strong stock assessment background, I think it's not too hard to get a job in fisheries. I think right now, getting a job say at a university as a geneticist is extremely difficult and I guess-- my advice, which of course am not doing that-- but my advice there is to be super flexible and kind of be willing to take non-traditional opportunities. I think certainly for government work, I think it's really important to get your foot in the door in any way and then leverage that over time into maybe a more interesting job if the first job is not exactly what you wanted. A lot of people in government spend a lot of years as a government employee and there's plenty of opportunity to change what you're doing I think over time if you're willing to do that and so. I guess my advice is just to be flexible, not pigeon hole yourself too much into one thing is probably important.

MA: And know people I guess as you said helped get your start. Knowing Linda.

MF: Yeah, yeah absolutely, making those connections is absolutely important.

MA: Yeah, great. Well, do you have any-- if you have anything else because that's pretty much all.

MF: No, that's great, I think I have nothing more to say.

MA: Alright, great.