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Seki, Michael ~ Oral History Interview

Edward Glazier

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

Interview with Michael Seki by Edward Glazier

Summary sheet and transcript

Interviewee

Seki, Michael

Interviewer

Glazier, Edward

Date

August 4, 2016

Place

Honolulu, Hawaii

ID number

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Biographical Note

Born and raised in Hawaii, Dr. Seki received his B.S. in Biology from the University of Oregon-Eugene, his M.S. in Oceanography from the University of Hawaii-Manoa, and his Ph.D. in Marine Environment and Resources from Hokkaido University Graduate School of Fisheries Science in Hakodate. He began working with at the Pacific Island Fisheries Science Center in 1980. He is currently the Science Center Director.

Scope and content note

Interview contains discussions of: Seabirds, high seas drift nets, satellite technology, seamounts, long line fisheries, swordfish, tuna, JIMAR

Dr. Seki provides a rich description of his career, his work, and his research. He also notes the changing face of research in the Pacific as well as use of different technologies.

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Transcript - MS_001

Edward Glazier (EG): This interview is being conducted as part of “Voice from the Science Centers” project funded by the Northeast Fisheries Science Center. It is also a part of the “Voices from the Fisheries” project supported by the National Marine Fisheries Service Office of Science and Technology. My name is Edward Glazier and today August 4th, 2016. I'm speaking with Dr. Michael Seki at the Pacific Island Fisheries Science Center in Honolulu. Dr Seki has had a long career with NOAA Fisheries having begun with the agency in 1980 and he is now the Director of the Science Center. Mike, I thought we might talk a bit about your early career and tackle other issues as we move forward. Mike...

Michael Seki (MS): I grew up here, obviously born and raised, went to high school here, private high school. Umm, then went off to college. I went to University Oregon in Eugene and actually, when I was in, um, when I was, just before I left, I got a job working at the University of Hawaii in their [Physiology Department] taking care of marine animals, meaning I had a turtle over at Pacific PBRC, Pacific Biomedical Research Center at Kewalo Basin. And my job, you know - I was very young, I would come in and feed [my professor's] animals and I would take care of that. I also would be his logistics person, so he was um; a professor was at the University of Hawaii School of Medicine Department of Physiology. So he's a physiologist but he studied marine animals. And he was specialized in thermal regulation. So, he was doing a bunch of studies. He looked at basking sea turtles. He was also looking at the incubation physiology of marine birds, sea birds. And he had some studies going on at Rabbit Island. So in addition to feeding his animal, and I would get the herring, I would feed them herring. I would get it from Sea Life Park. I would also go out to Makai Pier which is out there and I'd be his boat driver and his help, because he was a little older guy. And help him get to and from Rabbit Island, where he would go take and anchor the boat, help him get up, we were doing humidity and burrow temperature measurements so we would put hydrometer rigs in there, and you had known weights that you'd measure.

EG: Rabbit Island is what a mile off the beach there?

MS: Not even.

EG: Not even, ok, but you had some boating...

MS: No.

EG: Picked it up, huh?

MS: Well, it was just one of the small little skiffs

EG: Skiffs. Got you.

MS: It had an outboard motor. It's easy to drive. So I did that, and then when I went off to college, we were friends, friends till today. But when I would come home, he would give me a job doing the same thing. And the studies advanced, there were other folks that would come and visit and you know, we got into micro gas analysis of the air cell and things like that. So it was good. I got publications, co-authorship back then. We were doing a bunch of sea bird work. And I went off, and because I was doing that I actually went into physiology. When I graduated from Oregon, I had a degree in biology with a specialization in physiology.

And then when I was done, I was going to go to graduate school, so he was the professor, was going to write me a letter of recommendation. I went down to SCRIPPS and talked to Fred White. He had just gotten a few grants been denied, so he was in a foul mood and told me what a waste of time it was to get into the sciences. And so it turned out, I came home, and I didn't go to graduate school, and I came back and I went to work for the professor that summer. And came the fall, I needed a job, so I didn't go to grad school right away, so he held my letters and I was doing sea bird work.

They were launching at the time; this is in the late 1970s. And they were starting the Northwestern Hawaiian Island Resource Assessment Surveys. So the National Marine Fisheries Service at the time were doing their piece, they had NOAA ship *Townsend Cromwell*. They were doing the surveys for bottom fish, lobster, and kona crab, whatever the resources were on the leeward islands. There was no real protected species program, per se, yet. The U.S. Fish and Wildlife Service and NMFS [National Marine Fisheries Service] were launching into a sea bird feeding study for all of the 18 birds that breed in the northwestern Hawaiian Islands.

And so it was going to be a partnership and they wanted, one of the shortcomings of seabird feeding studies historically are that experts don't do the analysis. So you had bird people trying to analyze the food, which really they knew nothing about, so they partnered with NMFS who would actually do that. But it turns out, I didn't know, so the job came up and we knew Craig Harrison who was running the study and he told, you know, I have the seabird study and I went to see about the job. So I did that. And it came out to that the first thing I did was jump on a ship we went out through all the islands. So I slept on all the islands; the first thing we did get out there, and we got to sleep on all the leeward islands. Pretty phenomenal.

EG: Yeah

MS: Um, and then we'd get up. We'd collect spews, of barfed birds, the project's called Bird Barf. We would go and barf all the birds, collect them all, and my job from there, when we got

back to the lab, was to analyze all of the food samples. Of course, I was a physiologist. I didn't know anything about fishes or squid that these birds ate. So I launched into a career and learned very quickly all about fish and squid. And I did that for a year. And then NMFS offered me a job as did Fish and Wildlife to be a full-time technician there. And I chose to, because I was stationed at Dole Street, I was at Dole at the time, and I knew everybody there. I didn't know the folks at Fish and Wildlife, even if that's whom I really worked for. I opted to stay with NMFS. And we finished the study. The study went on for two more years, but at that point, I was working for NMFS.

EG: What year was that Mike?

MS: Ah, let me see, 1980, 1981, wrapped up the study in 1982.

EG: Got you.

MS: So after Magnuson. By then now, I'd gone to the fish and squid world, because I didn't really have much experience at all going into that.

EG: Interesting way to come into it, right?

MS: Yeah, but, um doing that then, now I had sea-going experiences. Very quickly then I started going out on these cruises, so when I started I worked for Richard Uchida, he was my boss back then. We were the full time staff on these cruises, but we all had projects at home. So we'd go out, do all the sampling, we came home and we had projects that became ours. So as junior technicians, and junior biologists, we had projects to help us break into writing and all of that. So I got into stomach work, which I already knew. I worked on butaguchi, it's a jack. I worked on papio, and um, some of the other, some of the tunas and things that were there. So that's what I kind of did. If you look at my early publications, aside from the seabird feeding, the energetics of those things, I started looking at fish. So that was my segue into the world of fishery science. Kind of worked with all the sampling and all that. Um, this was in 1980, 1983 that it became a permanent job and became a biologist at NMFS and been in ever since. I pretty much been here my entire career.

EG: Wow.

MS: It wasn't until... I did this, and I did studies down in, after that, I went...where did I go to? Um, I didn't; when that was over, the Northwestern Hawaiian Islands Study, ended in about '83. And then we launched into the seamounts, a study of the groundfish resources of deep seamounts. There's a fish that was being trawled by the Japanese by large in the northern end of the Hawaiian ridge, seamount, the upper end of the archipelago. And so we went into that whole study. Involved going to sea, working on those species, so we had pelagic armorhead...

EG: See, what was the impetus for that? Was it because these were being fished by...?

MS: No, they were being fished by the Japanese, and there was a moratorium, and there was an interest in the U.S. interests of the resources there. And so we did. We did, we had a partnership with the fisheries lab in Japan, so a lot of our contacts started coming into there. And I kind of

went down that road. We developed some Japanese contacts and we worked on that for a few years.

Taking a little step back, during the 80s I was doing the bird stuff. I also, there was cooperative work with Hokkaido University, here. We here were looking at the squid resources around the main Hawaiian Islands, so I was involved with that too. So I was tapped to work on that project. That was in the early 80's. So I did a lot of surveys on the training ship, *Hokusei Maru*, which was part of the Hokkaido University, the ship that comes out every year. And this is all important because these are the relationships that would build my career later on. So when people ask me how I got where I am, it really is relationship based for all that I did.

So I had seamounts and the project lead at the time was George Boehlert. George came over from Oregon State University, and took that position and he ultimately became the next Lab Director. By at the time when he did that, he was the one who encouraged us to go back to school. So it was then that I started looking seriously, through George, to go back and go to graduate school. - Where were we? We were in the latter 80's at that point. - And um, were finishing up the seamounts, I had a bunch of papers, were working on that. And I was going to leave, again the program ended so I moved into pelagics. At the time, the Center was Insular and Pelagics and so I was in the Insular Program. We did seamounts. A lot of my peers went off to do the Marianas Project. While I did some of that, I was working really in the pelagics side, until the late 1980's or so. I was tapped to do drift net program, the high seas drift net program, which was, we had bilateral observer agreements with Korea, Taiwan, and Japan. And worked with Canada as well. So their multi-national fishery monitoring of the high seas drift net fishing, which was a godsend. I mean, we didn't know it at the time, it was sampling that you change, you know, it gave us information that we would never know again.

EG: Now I know about the demise of high seas drift net fishing, but was it concern about the resources that initiated the funding that allowed for that tripartite...

MS: We were looking; we wanted to know the impact. It was an impact study. So in between the years of 1988, 89, 90, 91, there was a multinational observer program to monitor drift net catches that were going on there. And we had government vessels went out and did drift net surveys. So at the time I went out on the Japanese Fisheries Agency [ships] *Oshoro Maru*, the *Shoyo Maru*, and then I also dealt with the data from both the large mesh and the squid mesh, drift net fishes. And so it opened up lots of doors. You know, I worked a lot with Alaska Fisheries Science Center. Worked a lot with the Japanese, the Koreans. There was a program that they were targeting squid, the concern was the incidental take of salmon. So it was all about borders of fishing. Fishing for salmon verses fishing for squid and regulating that. In 1992, the United Nations, of course, declared a moratorium on high seas drift net fishing, independent of what the science said, okay, and they were the last. It was a great program from a science perspective. So these walls, they would set walls of net across the entire ocean basin, and they would catch animals that were not susceptible to hook and line gear, and other gear types. So it gave us, like you say, they were called the walls of death, they would capture anything that came into their path and on the upper 10 meters of the surface, so...

EG: So we're talking about 10 meters?

MS: Yeah, so we got information on the distribution and assemblage patterns for really large nektonic resources across the ocean to today of numbers you never see again. So it was a phenomenal program. Uh, so they closed fishing in '92. It was interesting, it is when, right after that, it was the end of the International Pacific Fish Commission. We used to manage some of the temperate North Pacific fishes- fisheries, and it was the birth of the North Pacific Anadromous Fish Commission which didn't have a science component, in addition to that the North Pacific Marine Science Organization was born. So Warren Wooster out of the University of Washington created that program, today known as PICES [North Pacific Marine Science Organization]. So that's where PICES came, this year PICES makes 25 years. You go back, 1991 to 2016. That where that came from.

Um, so what was that, that was back into the 90's. I was going to school, I finished my Masters, did my Master's in Oceanography, at the University of Hawaii. And I did it on the biogeography and spatial assemblage of pelagic cephalopods. So squids and how they were responded to large scale fronts. And it's through the transition zone of North Pacific. I sampled, during that time we had trawl surveys that I'd look at the animals as you moved through large fronts. So I covered the physics as well as biology and I looked at how the animals responded.

EG: This was irrespective of any seamount interactions? This was just large fronts...

MS: Strictly high seas, and it was really the variability you would see would be completely due to water masses, okay, and the physics that you were observing. So that was pretty cool. And of course, that's...my interest in squid started way back then. And my professor, my advisor at the University of Hawaii who was one of the renowned squid people. So when I got done I said, "I'm going to continue, going to get my Ph.D." and I did. I was going to stay there and do it and just continue on. But I had folks that I'd known for many, many years now at Hokkaido University and they were squid folks. We did all the squid surveys. And so they offered me chance to go and study there. To do it there, I didn't have to go there physically except to go there and do some research and to go back there to defend. For a lot of it, I could still do it from here.

So I stayed back and I took that option. And I stayed back, I did the dissertation and I did it from here. Um, still worked full time. I could run, at the time I started working with Jeff Polovina. He'd kind of gone in a different direction. We were kind of looking at some ecosystem and habitat work. So I was looking by and large at ecosystems and because I was looking at frontal areas and hot spots, I started looking at eddies, I started looking at the impact of the physical ocean on the biological responses.

So I still spent time at sea, but I did more oceanographic work and it was during this time that I was able to link in the satellites. We were doing satellite oceanography. It was coming in vogue. A lot of people were using sea surface temperature but we had at our availability, was ocean color and sea level height. So altimetry, the combination of altimetry and ocean color gave us a better sense of surface, sea surface anomalies that kind of told you the current patterns in the ocean. And that helped a lot to kind of look at what we were looking at when we did these large-scale surveys and to go out at sea and measure the in situ responses of what's going on. And to

verify satellite information with in situ measurements through the water column. Because you know that satellites only give you the skin parameter of the ocean. And you needed to know what was happening in the vertical, so we would run lines to look at what's happening as you ran through the transects of what happens in the ocean down to 500 or a 1,000 meters relative to what you're observing on satellites.

EG: Quite deep. Yeah.

MS: So I did that, you know, for a number of years. And it included also the advent of the GOES Satellite. So the GOES Satellite is a geostationary satellite as opposed to the ocean color (SeaWiFS) or any other ocean satellites that are polar-orbiting. And the altimeters on Topex-Poseidon, or any of those we were using were also polar-orbiting satellites. And it would take, you know, days to kind of give you a complete picture as they circled the earth. Geostationary satellites stand in one place, that's what the Weather Service used. But at the time they were developing a product that gave sea surface temperature. So when you had AHRR sea surface temperature we're getting from the Weather Service here, they would give you two passes in a day. And often because you have so much clouds, you have a lot of areas you just wouldn't have enough information. But with a GOES satellite, you could wait for the clouds to move, and you would have many images in a day, so you could get a pretty nice composite picture under water in about two, three hours. So we took that and took the ship out and using that we could find wind driven, wind generated eddies off the Big Island, which were very common to there. And go with the ship in and actually find it in the ocean and sample it in situ, which is what we did successfully. And that was the first time anybody's been able to do that. So that was...

EG: What year, that was GOES was what, '93?

MS: '93, '95, I think '95 was when I published that work. I think that's when it was, around there. So I thought that was - was it '95? I can't remember now, maybe after that, somewhere I think that's when it was flying. So I did, a lot of oceanography at that point. And then, of course, I finished my Ph.D. A lot of these studies are the chapters of my Ph.D. that I ended up doing.

EG: Do you have Japanese language skills?

MS: Well, I'm third generation, so when I'd go on the ships, I could read all the species stuff, you can talk, you converse to get by. But understand fully, no.

EG: But sufficient for matriculating at Hokkaido?

MS: Yeah. So, that took me up into the late 1990s and almost into 2000, which is, of course, brings you up to up to about 2003 when they were looking to create the Pacific Islands Region. And I was wrapping up all the Ph.D., I finished all those studies. We were doing some other oceanography, we continued to do the surveys up there, looking at the subtropical frontal area which is something we spent lots and lots of time looking at. It was a time when the albacore fishery operated. It was after, in about 1990, when the long line fishing came to be. Folks from the East Coast came in. They brought in monofilament gear with light sticks, and the birth of the swordfish fishery, which didn't exist before, and that grew into the sixth largest swordfish port in

the world. Um, this was a very different world, it was a time over this period, we saw the primary fishery of pole and line for skipjack, give way to long line fishery for ahi and swordfish became the dominant species in Hawaii's fisheries. It was a change, all of them operated, whether it was the swordfish fishery or it was the albacore fishery, they were all fishing up north in the subtropical front area, which is where you know we'd been spending....

EG: The ITCZ [Intertropical Convergence Zone] that region, right, latitude, or higher?

MS: Higher. So Subtropical Front area, so in winter that's about 30 North.

EG: 30. OK.

MS: And so it's just due north, it actually bisects, it kind cuts into the northwestern Hawaiian islands because it goes, kind of runs through northwest, intersects, depending on the winter, sometime, somewhere down...on how far down the front migrates. So it has obviously carry capacity impact for those ecosystems. But it also has, how far it came down, influenced where the fleet operated. For many of the species up there, much like the squid, which is I cared, they go, undergo vast seasonal migration from the subarctic where they feed and grow to the subtropics, where they spawn.

EG: What's the southern limit? I guess I'm a little confused...

MS: It depends, um, for the squid?

EG: For that, for the sword?

MS: You know it depends, it believe, there are several fronts they go to the subtropical front, I've always believed that there's always, the surface expression, which is the subtropical front proper, which is what often people go, and is tied with about the 18 degree surface isotherm. But there's ones in the south that runs at about 21 degrees, coincides with 21 degrees surface isotherm, but it's actually, sits subsurface, so what you have is a maximum, and pretty shallow mixed layer, if you will. And a stratified or very shallow mixed layer and is there where it's lifted enough and you have enough nutrients coming up so you have a powerful maximum, somewhere around the 15 meter or so mark.

But it's there that you also have where, the southern limit of migrating ommastrephes, the large squid, migrates up to the spot. And we believe that's the trigger that brings the swordfish in and how far south the fisheries can operate. Because they are very strong, they have a very strong predilection for cephalopods, especially large squid. Like *Ommastrephes* so there at this southern front if you will, and while they're there, they spawn, they lay their egg masses. They tend to, the egg masses tend to occupy depth of the pycnocline, where you have this density stratification so they kind of, they are neutrally buoyant at that. So that's what we believe would bring a lot of them to concentrate there in the winter. So that's why we believe it brings a lot of them to concentrate there in the winter so that's why there's a winter/spring swordfish fishery down along that area. So I spent a fair amount of time looking at that. And now that was probably the last bit of real science that I worked with.

We had partners at the university, very good friends, that we looked at the productivity of the region. He specialized in phytoplankton, so if you looked at what we did; we looked at the phytoplankton classes actually associated with the front. And where you actually have these regions of high energy were giving rise to the production of dinoflagellates or large ciliates or diatoms, which are very large phytoplankton that shorten the food web. Otherwise the region, as oligotrophic as it is, you tend to have phytoplankton-sized classes in the phytoplankton range where they're very small and they tend to just go into recycling mode. So you know, you add many more layers into your trophic change, so you have trophic transfer fish in the seas when you have these larger phytoplankton created by areas of new production. That's what you're finding at these frontal regions; you're really shorten the food chain and allow energy to flow up.

There was a time when there was a lot of studies going on in the academic world of balancing the carbon budget. This was always believed because you're looking at these highly productive regions, they were not a component in most carbon models. So then, you could account for a lot of the carbon that sinks into the ocean at these ephemeral places. Places where they have new production that's going to take on atmosphere carbon and sink it out. So it was a great partnership, we had the ship time, they had interest in looking at the carbon budget. We were interested in the dynamics of how it worked and the impact of the fishery from a productivity standpoint, carry capacity. So we would churn up during those years, this is what, the late 1990s, we had lots, if you go back in my resume, you'll see that's when a lot of papers came out because that's where we're at. But like I said, that was my last fling, because after that, they asked if I would take the first crack at being the Deputy Director.

EG: So you had branched off from La Jolla, from Southwest Fisheries Science Center at that point?

MS: At 2003

EG: OK

MS: Yeah, when they created the Science Center at 2003, the Honolulu Laboratory left Southwest and became our own Pacific Islands.

EG: So all those administrative challenges became part of the region...

MS: And they didn't give us a lot of money, so I did, I became the Deputy at the time. Jason Baker was the other one, I did the ones that Jason, I think Jason did the first, or did the second, I can't remember now who did who's first. But he took a short stint, and then I did a short stint, and then a permanent job became allowed and Jason had no interest, I did apply and I got the job. So other than the period that Jason was the Acting Deputy, I was the Deputy for the Center from its' inception until I turned it over last fall.

But it during the time, you know, we went, it was building, becoming a science center, the biggest thing for us was that we are a financial management center, you hear the word "F" "M" "C" since we became, we had our own direct budget lines from Washington. Well, La Jolla

didn't give us much, La Jolla gave us people's salaries, came on primarily on one funding line. We had a little bit of, we had the monk seal program because that was an earmark, when Inouye was still alive. We had some turtle money, but that was really it. We had some start up funds for the region, five million dollars that we shared between the Regional Office and ourselves. We were set because we were a laboratory, so we had at the time somewhere about 100 employees, some federal and non-fed. We had maybe, I'm going to guess, about 60 federal FTE [full time employee] at the time. The Regional Office had maybe 6 to 8 and they were all housed at Dole Street. They'd kind of gone off by then but it's still very small. So when they built the region, a lot of it was to build the Regional Office. The Science Center share of the \$5 million dollars that came, went to build out the FMC administrative parts of what we needed to do. So it was, if you go back and look at we end up getting, it was to build the full center to allow us to deal with the budget, the acquisitions, grants and all those pieces that make you a Science Center, or a separate FMC.

EG: When did JIMAR [Joint Institute for Marine and Atmospheric Research] enter into all of this?

MS: Oh, JIMAR came before then. JIMAR was actually was originally a concept that was more over at the University, and they and the OAR, Ocean and Atmospheric Research, were the ones who created the joint institute.

EG: Isn't there another JIMAR arrangement in the country somewhere?

MS: Oh there's lots. There are a number of cooperative institutes.

EG: I see.

MS: This one was with, a NOAA/University of Hawaii, site specifically. They have one Northwest, one...

EG: Florida too, I think.

MS: Oh yeah, they're everywhere. They have them in the Midwest. Those are Weather Service, So NOAA Academic Cooperative Institutes, but some are with the Weather Service, some are with OAR. OAR, almost all of them. We are the only CI [cooperative institute] in the country whose fisheries lab is in the lead. Everybody else is principally OAR. And so JIMAR was originally was a OAR property in situ, so people like Eric Firing, who had the Sea Level Center, people like Roger Lukas, who had some oceanographic, climate types of things, they were all part of the original JIMAR cooperative agreement. Barry Huebert with meteorology, those folks.

Then when we came in and got involved which was during George Boehlert, more so when Mike Laurs came in, it was the growth of the living marine resource piece of the joint institute. What really made it grow were the funding that came with corals. Those were millions of dollars that went in, and they were soft money so a program developed at the joint institute had to do with that. Corals, marine debris, oceanographic programs, monk seal program. So fairly large programs had gone into the cooperative institute at that point.

EG: From OAR?

MS: It was still OAR lead, okay. It wasn't until, where are we, 2016, so it must have been 2011 or so, 10, 11, when we re-competed the cooperative institute with, and the University of Hawaii, won that award. But it was at that point that the Pacific Island Science Center became the CI lead for the NOAA partnership. And so that's when now Julie has that bigger role. The OAR program has kind of, they're smaller they just fall into the umbrella of the CI. So I did, I dabbled in science and by and large I was running the center for the next 11, 12 years, whatever it is.

EG: But still, you've got your hands in the science, obviously you got to make sure that things...

MS: I still do and finally, got our subtropical volume done, so, a lot of the papers I've done we've just got to preface. So we expect it will be out, most of the papers are already out, so we'll have a progress of oceanography volume come out. I have three papers in there. And I still, more so, as Director, I'm more back into the science, as everyone has assumed more and more of the operational pieces, I spend more time on the science side. And so it's been good.

EG: Can you recall if you had to say what were some of the most important projects, or the most enjoyable projects that you've done over the years?

MS: You know, I think the technology, the satellite pieces, we did that, you know, we got into the world of, getting into the relationship of the physics and biology. When you're looking, when you're working an ecosystem/habitat program that was pretty significant. That was a pretty big turn, in my career. There's so many, I think throughout the career, I've worked with people with Richard [Uchida], Tom [Hida], who taught me all I really, great field biologist, but taught me a lot about going to sea, about working, what the animals are. I didn't have the formal training at that point, to know what it was. George Boehlert, was a, he went on after that to become the Director, at the time, Pacific Fisheries Environmental Group in Monterey. Then he went to become the Director at Hatfield, of Oregon State's Marine Science program out in Newport. He was very, very, how would you say it? He was good, good for the career, he is a visionary, you know, and he had very much believed in academic research to the point where you know, they were very, they pushed very hard for us to remain scientists. Jeff Polovina, was still the same way. So Jeff, George, they all are people I worked for, gave me the freedom to do the science and to expand on what interests me. We tied it to the practical nature of what we needed to do. They gave a lot of flexibility into where and what we wanted to do. I think it served the agency well.

EG: Because this project is addressing history, I, there is, you can talk to people and look back in time and there is clearly a tradition of transferring knowledge and scientific methods, and it really depends on the people who are available. One would assume that new folks are coming into keep the tradition going. Are you hopeful for the future that folks are going to continue to carry....

MS: You know, we always try to mentor folks. If there was someone who worked with me for years, and he picked up some projects, and he in turn brought in, you know we had. A lot of

them kind of picked those pieces up. I think that part will continue to support. Because pelagic ecology is not something that many places have the ability to study. I mean it is critically important for the fisheries that we're charged with. So yeah, I think we try where we can. I think we also, because I've been doing the operation side, you find folks, and you leave that legacy, if you will, behind, and pass it on, and mentor those that you can. We try as we see a lot of the succession kind of coming along, we encourage folks to become affiliate faculty, or get some status at a university to take students on because, I do think we're going to lose, it's not just us, nation-wide, you lose some of those expertise as the generations move on.

EG: I'll try to wrap things up, maybe with a question about the region. We're quite distant from any landmass. The most remote archipelago on Earth, or one of them, and yet, I'm sure, you put a lot of miles in recent years to interact successfully with Silver Spring. What could you say about those challenges and the unique nature of the Pacific Islands regions and how you address all that?

MS: Well, we are unique in so many ways. It's, you know, we're responsible for probably the largest geographical area anywhere. It's larger than the entire continental United States. That's all obviously a real challenge when you look to conduct surveys. It's more, so, in any aspect, we're handicapped. Stock assessment, historically we've been so dependent, on fishery dependent approaches, which is not the best. So we struggle with that a bit. You need to measure the ocean, so satellites have become a godsend for us, you can synoptically look at very, very large areas. Culturally, we have, very similar to Mariana's archipelagos, as well as ours. Each with unique cultures, very different approaches when you look at fisheries, societal needs. Island ecosystems, when you look at resilience, coastal resilience, anthropogenic inputs, shared utilizations...

EG: Data, data challenges

MS: You just don't get those same types of concerns in other parts of the United States. Then we deal with time differences, from that side. For most of the year, we're six hours away from Silver Springs, the decision makers. So often we're afterthoughts. So you battle that, the distance away from them and the time difference. It puts us at a huge disadvantage. You try to put forward the importance of what we do, just stay on the radar, not to forgive us- forget us! And you look at; we deal a lot with highly migratory species. In the Atlantic, it's managed out of the Headquarters at Silver Spring. Out here it's not, so it's handling the region, it's a very different dynamic we think they have resources, it because it's, they're in Headquarters, the need is there, they fund it. For us, we've never gotten any resources to deal with our responsibility for highly migratory science or management aspects. So there's lots and lots of challenges you can take pretty much any facet, and we have it we have our work cut out for us.

EG: So there's room for assistance and growth in a lot of areas, yeah?

MS: Always will be. And you know, I did the ecosystems science review for us and like I say, they just don't look at the, more and more I've come to appreciate the social sciences aspect, just because of dealing with the various cultures and it's up to, we just don't get the focus in, it's not on the radar of anyone back there. It's a real struggle, because our issues are unique.

EG: Well, thank you so much, Mike. I know you're a busy man, so I don't want to take, keep you.

MS: I don't know if that's what you wanted on there?

EG: Yeah, sure, you bet.

MS: You're always welcome to come back in, if you need, specific fillers.

EG: We may need to try to grow this out at some point. I think it's important.

MS: I agree, I think, I've been very fortunate to have worked with people like **Heeny**, Richard Uchida, Richard Shomura, **Tamio Otsu**, **Tom Hida**, Walter Matsumoto, Howard Yoshida; so these were second generation Japanese who really form the core of what the fisheries in Hawaii were developed out of. We use, when they started, this used to be the Pacific Ocean Fisheries Investigation. Strictly tuna and oceanography, Warren Wooster, I remember when - he's considered the father of fisheries oceanography - and we were out here for PICES one year, and we were up at the East-West Center and he told me "I want to go down to the Honolulu Lab" Said I "Why do you want to do that?" he goes, "It's the Mecca, the Mecca of home of, true home of fisheries oceanography." And so he did, he came down and he was a funny man.

But it's been a time of science, It was a time of discovery. It was a time of inspiration. And it went through the '60s that way, and the '70's and they started passed more into, getting into the insular pieces. And the nature of what the Honolulu Lab did changed, with Magnuson, with ESA [Endangered Species Act], with MMPA [Marine Mammal Protection Act], you could see it in steps, where you had the fisheries. It's always been a fisheries lab, it was always a tuna, a pelagic lab. Then in came the insular lab, there was a time when the monk seal was, came in with the Marine Mammal Protection Act, and turtles, with the ESA all that. And you could see that come in after they passed those legislation. Then, of course, when corals came, you can almost see that with that, with the passing of the bill, you just saw it all over again. The infancy of a coral reef program. The protected species were just, they were settled, they were a long time programs. Now you have a nascent program that kind of changed the way we do business. You see these markers, timelines of what we did. It's interesting.

EG: I mean one thing that's been made clear in these interviews is that from the old days, it was really a development, fisheries development, demeanor. Now we're talking about closing huge areas of the ocean...

MS: Conservation

EG: Yeah, conservation.

MS: When I tell folks what I've seen over my career, it's been 36 years now, is the time when it was all fisheries exploration, fisheries development. Very strong fisheries lobby. You had in Congress, folks who were very much commerce oriented for the fisheries. Whether it was

Magnuson, whether it was Stevens, whether it was Inouye, whether it was Lott, whether it was Hollings, whether it was these folks were instrumental in building the agency. They were friends to NOAA, it was a time of earmarks, so they grew. Their interests were to have very strong national fisheries programs. The other thing of it you saw overtime, was the growth of conservation NGOs [non-governmental organizations]. We saw the growth of money in the lobbies, of how big they become. Whether it's MCI, or World Wildlife Fund, or Pew, they've got huge, huge, hugely deep pockets that they, that they had big lobbies, they have friends that are on the Hill that fight the fight. And I don't think the fisheries lobby has the voice that they used to. So that's why you see when it comes down to discussion of whether you're going to close an area for conservation verses keep it open for fisheries, I could've seen where 30 years ago, fisheries would have had the muscle to keep it going. But more and more now, you know, the conservation efforts will prevail.

EG: Do you feel the science is still a part...

MS: The science is independent. I think, what's changed with science I think is the sensitivity, and I said this today, is that you have now, you have fisheries science and you have conservation science. They're very different. And there's a lot of scientists, it's not just here, it's everywhere throughout political literature there is a lot of agendas for many people who do science. I think there's a lot of advocacy science that goes on that, I think, our jobs have changed where we need to be very careful and looking to be sure that that is not, that our science remains independent. And you watch that that doesn't creep into the products we put forward.

EG: That is a challenge in itself.

MS: That is a challenge. What's I told them today that for me, that's where you have these papers coming and where it is that it gets hung up for a clearance, that's what I look at. The reviewers will pick up the technical accuracy on that. That's what their job is. It's for us to really kind of look at the policy side and ensure you're putting out good, independent science.

EG: I think everybody here should be glad you're at the helm.

MS: (laughs)

EG: Given your background and many years.

MS: It's a fascinating world in all aspects. Whether it's in the field, or here at the labs, it's a very different...yeah

EG: Thanks so much, Mike!

MS: Ah, anytime!

EG: We may be coming back to talk some more

MS: Anytime

EG: OK, thank you