



07-28-2016

Methot, Richard ~ Oral History Interview

Maggie Allen

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Recommended Citation

Methot, Richard. Interview by Maggie Allen. *Voices from the Science Centers*. Voices from the Fisheries, NMFS, NOAA. 28 July 2016.

This oral history was produced in 2016 as part of the *Voices from the Science Centers Oral History Initiative* conducted by *Voices from the Fisheries* with funding by the NMFS Office of Science and Technology.

Voices from the Fisheries
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Interview with Richard Methot by Maggie Allan

Summary Sheet and Transcript

Interviewee

Methot, Richard

Interviewer

Maggie Allan

Date

July 28, 2016

Place

Northwest Fisheries Science Center
Seattle, Washington

ID Number

VFF_ST_RM_001

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Biographical Note

Dr. Richard Methot grew up in western Massachusetts. He attended the University of Washington and received a bachelor's degree from the College of Fisheries. Following graduation, Dr. Methot went to Scripps Institution of Oceanography where he earned his Ph.D. in Biological Oceanography in 1981. After a one year postdoc at Bodega Marine Laboratory, he began working for NOAA that same year at the Southwest Fisheries Science Center in LaJolla, CA. In 1988, he moved to the Alaska Fisheries Science Center in Seattle, WA. Then in 1995, he moved across town to start the west coast groundfish program at the Northwest Fisheries Science Center. In 2002, he became the National Stock Assessment Coordinator for NOAA Fisheries Office of Science and Technology. Since 2012, he has served as the first NOAA Senior Scientist for Stock Assessments. Dr. Methot is also an affiliate professor at the University of Washington School of Aquatic and Fisheries Science.

Scope and Content Note

Interview contains discussions of: National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Scripps Institution, stock assessments, stock assessment models, stock synthesis, Southwest Fisheries Science Center, coastal pelagic fisheries management plan, U.S. West Coast, Northwest and Alaska Science Center, Northwest Fisheries Science Center, groundfish industry, anchovy and sardine stocks, resource ecology and fishery management, communicating research with the public and national assessment toolbox.

Dr. Methot discusses his career at NOAA NMFS and details the work he has done on stock assessment, particularly the stock synthesis model. His work has led him to various positions at both the regional and national level.

Indexed Names

Botsford, Lou
Chapman, Douglas
Clarke, Elizabeth
Fox, Bill
Hunter, John
Huppert, Daniel
Lasker, Reuben
Mace, Pamela
MacCall, Alec
Merrick, Richard
Murawski, Steve
Picquelle, Susan
Seymour, Allen
Smith, Paul
Stauffer, Gary
Stein, John
Thorson, Jim
Varanasi, Usha

Transcript-RM_001

Maggie Allan: This 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 Allan and today I am speaking with Dr. Rick Methot at the Northwest Fisheries Science Center in Seattle, Washington. It is July 28, 2016 at 1pm.

Rick Methot is the agency's senior most authority for stock assessment science. He earned a Doctorate in Biological Oceanography from Scripps (Institution) at the University of California in San Diego in 1981. In that same year he started working for NOAA at the Southwest Fisheries Science Center in La Jolla, California. Rick was the National Stock Assessment Coordinator at the NOAA Fisheries Office of Science and Technology from 2002 to 2012. In 2012, Rick became the first NOAA Senior Scientist for Assessments and serves as the SME on the NMFS science board. He's also an affiliate professor at the University of Washington School of Aquatic and Fisheries Science. Thank you for being here today. Do you mind telling me a bit about what inspired you to pursue a career in stock assessments and the evolution of that career?

Rick Methot: Well, that could start a very long story because I have kept focused on that really throughout my career. I didn't start there going into my education. I actually started off here at the University of Washington in Seattle as an undergraduate in the early 1970s in the then College of Fisheries. I didn't know about stock assessment. I actually had a sort of an interest in aquaculture at the time and very quickly turned towards the more quantitative side after I got here and as I finished I had an opportunity to consider staying at the University of Washington, which has an excellent graduate program in population dynamics, a world renowned program, but I didn't stay here. And with the advice of my advisors at the time, I went to Scripps Oceanography in order to have a different experience for the next stage in my graduate education. While there, I quickly struck up an affiliation with the Southwest Fisheries Science Center. So that worked out very well for me. That really launched my career.

I quickly moved into, basically, fishery oceanography, looking at factors affecting the recruitment of anchovy and sardine and gradually developed more of a quantitative bent through that era while I was there at the Scripps Institute of Oceanography and working at the Southwest Fisheries Science Center. There in the 1980s is where I really got into the whole role of stock assessments as I joined the Southwest Fisheries Science Center. I started working on the coastal pelagics fishery management plan...this is the early 1980's. This is actually one of the first fishery management plans developed in the country. We were already at the stage of the first round of revisions of that plan when I came in the scene in the early 80s and I, with Alec MacCalland, Gary Stauffer and Dan Huppert...Susan Picquelle, and a few others who I've forgotten. We were part of that team working on the Coastal Pelagics plan and that's where I developed a new approach to stock assessment modeling one that we felt was tailored to the data situation that we had for anchovy at the time. Through my affiliations with some of the people who were there at the time...Reuben Lasker was the Division Chief at that time...we now have a NOAA ship named after him, a very renowned scientist on the West Coast. Paul Smith was there and he still is active in some aspects of the SWFSC...and John Hunter. Under their guidance and discussions, I pursued the development of this modeling approach. At the time I called it stock synthesis for fish stocks and synthesis for the whole being greater than the sum of the parts...is the concept that I was after. We had bits of data about anchovy, but no one source of data alone was enough to really tell a very complete story about what was going on with that population. So that's what launched me into something that has turned into a career-long central focus of my research and development efforts. So that's how I got started into this whole business of stock assessments and I'll pause there and continue at another question.

MA: Ok. How did you then end up in Seattle after that?

RM: Very good, very good. So let's see...we're now in the mid 1980s and it was clear that coastal pelagic fisheries were not growing at that time. This is long before the sardine resurgence, there wasn't that much interest in fishing for anchovy, basically there wasn't a whole lot of agency money going into coastal pelagics at the time. But there was a lot of interest in the growing groundfish fishery on the U.S. West Coast. We had some ground fish work going on out of the Southwest Fisheries Science Center's Tiburon laboratories...at Tiburon... The small program they were, they weren't able to extend very far along the coast. So there was interest in having us spin up a groundfish program operating out of the La Jolla laboratory. We had some scoping workshops that involved several of the notable groundfish scientists from Seattle. Some

of them had moved up in the recent years from San Diego but were now working in Seattle...as well as scientists from the Tiburon laboratory. We were able to get together and talk through what are the research gaps, what do we need to do...and coming out of that we ended up developing a start of some research programs operating basically just north of Point Conception which is where we were mostly working. This would be about 1986-1987. But through that, I developed a familiarity with the groundfish programs in Seattle which I didn't really know prior to that and they learned to know me.

Shortly after that, a position opened up in what was then the Northwest and Alaska Fisheries Science Center located right here in this building. I had a chance to come up and visit them. It was a very different place then because it was both centers all in one. So the nice open hallway outside my office right here now had desks lining both sides of it. We have trailers now and we complain about them. We had old trailers at that time. I remember the age and growth laboratory was out in one of those trailers. So this is back again in the 1980s before the Northwest and Alaska Science Centers were separated. At that time, they had a position where they were looking to have someone focus on West Coast groundfish because they still, at the Northwest and Alaska Fisheries Science Center, were responsible for providing the science advice for groundfish along the coast. They had a fairly dedicated program in doing so. They had a need in that position.

So that's what brought me to Seattle. I transferred up in 1988 and moved into what was then the combined centers and took a lead role for their West Coast groundfish involvement...in what was the REFM division, the Resource Ecology and Fishery Management Division (REFM) and then Gary Stauffer who was the Division Chief for the Resource Assessment and Conservation Engineering[Division]. Gary's program principally did the surveys and the REFM program principally did the stock assessments with good collaboration between the two. So Gary and I were the Northwest and Alaska Fisheries Science Center's point people on the West Coast working with the Pacific Fishery Management Council to help provide the assessment advice here on this coast.

Well, most of the rest of the leadership of the center was focused towards Alaska, the north Pacific, where there was hugely growing program going on there. We had the load split people wise. So I, there in the early 1990s, became the chairman of the groundfish management team and it was sort of an interesting opportunity because it was the first time I was really exposed to a new collaborative group like that. I was pretty young in my career at the time. This would be like 1989-1990 and I came to this group and there were people who had been there for a long time and there was a bit of acrimony going on. The current chair of the group just didn't have a handle on it. It came time to rotate chairs and I was becoming reasonably successful in interacting with the group and I was elected as chair in 1990 rather shortly after coming to Seattle. From 1990 through I think it was '95, I chaired the groundfish management team for the Pacific Fishery Management Council. It was in that role that was continuing development of the stock synthesis modeling approach now applying it to the groundfish as well as serving on the groundfish management team which was a role in which I was really delivering the advice to the fisheries managers very directly and doing it in concert with Gary Stauffer who chaired the Scientific and Statistical Committee of the Pacific Council at that time. Gary and I were both from the agency we had lead roles in those two Council committees. We kept the information

flowing pretty well. I also at that time was doing, hands on, the stock assessments for at least two of the pretty important stocks on the coast. One was sablefish and one was Pacific hake or whiting. In hind sight that's sort of a bad combination because I was developing the model, I was applying it to some key species and I was the chief communicator delivering the results into the process. It's way better, in hindsight, to have those roles spread out a little bit more.

But nevertheless we felt we were getting the job done and we were moving along and it was during that period that the Northwest and Alaska Fisheries Science Centers split into two centers. I was sitting there in the Alaska portion of it as the Northwest split off and the split was not uniform across all components. Some components went to the Alaska Center, other components were in the Northwest Center and shortly thereafter there was an agency level realignment between the Centers [and]the Regions and it became clear that the Northwest region which provided the management for West Coast groundfish needed to have their advice coming from the Northwest Center, not from the Alaska Center. And so, we weren't prepared to just do that as an agency and it took some time. So one of the first steps, and it happened with the involvement of some of the key industry leaders which I'll get to very shortly here, there in 1995 they were able to create a West Coast groundfish-oriented division here at the Northwest Fisheries Science Center in 1995.

So I had a choice. I could stop working on West Coast groundfish and stay in the Alaska Center or I could move across town and do something totally new which was not only become a Division Chief but to start a new division. Start a new very small division. I naively took that choice and jumped into creating a more focused role on West Coast groundfish. Now within the Northwest Center, working under Usha Varanasi who was Center Director at the time, and figuring out how to build a program with very little resources and very few people to do it with...it's not easy to hire new people in the agency. It's not like they said, " Okay, create a new division and here is 30 positions. Go out and fill these funded positions." There was nowhere near that big a stake in creating it. So we started small [with only 7 positions]but we had big expectations from everybody involved on what we deliver.

I made that transition and what I had said a while ago about the challenges of building the model doing the assessments, delivering the results, but that now cycled back because the industry leaders, principally the group out of Newport, Oregon. Basically the Oregon ground fish industry was pretty well organized so they had a strong interest in seeing good science for West Coast groundfish. They wanted to see it happen and they wanted to have a voice in how it happened. They actually were, I believe, instrumental in helping get some funding for it. And so when I came on the scene, they remembered the old me. There was some apprehension there and some work needed to be done in order to build a bridge with them. One of the strongest bridges we ended up building was to create a groundfish survey for [the] West Coast that was tailored to be conducted off of the local industry boats. The fishing boats know how to fish. They know how to deploy what could be a standardized version of their gear. It could be a sampling gear.¹We, in the late 1990s, built the survey capability that is deployed today from that same class of boats off the West Coast.

¹Narrator Clarification: In this sentence, narrator Richard Methot is describing the process of working with the fishing industry to develop standardized sampling gear for the groundfish survey.

So that took me through 2000 and the effort of creating a division, running a division, being the chief organizer of it was further from hands on with some of the science than I wanted be in the long run. I had an opportunity to transition out of that, to transition to what would be a Senior Scientist role here within the Northwest Center, to continue working on some of the science aspects of it, but to not be Division Chief. At that point, Elizabeth Clark came in and took on as the division chief there in 2001. Shortly thereafter, after having worked on some national projects, to orient the ground[fish] stock assessment, in particular the first version of the stock assessment improvement plan, which was led by Pamela Mace who was working out of headquarters at the time and we had representative from each of the science centers to develop this plan for how could we improve our whole stock assessment enterprise. I was the Northwest Center rep on that. So that gave me more national exposure than I'd had before.

Very shortly thereafter, I was offered an opportunity to begin working with the Science and Technology office in DC. Better still, Bill Fox who was head of Science and Technology at that time and Pamela Mace, they offered to let me do it remotely so that I could be working for headquarters but doing it from Seattle. I just couldn't refuse that offer. So I stayed in Seattle. I moved offices quite a lot, I think, but I've stayed in Seattle once again and I now... I guess shortly thereafter, maybe within a year after I joined S & T [Office of Science and Technology], Bill Fox left and went to be the Southwest Center Director and Pamela left and moved back to New Zealand. So I now was the lead voice for stock assessments in the Office of Science and Technology, nationally. And so this role of National Stock Assessment Coordinator came up and basically in that role trying to focus on developing tools that can help everybody.

We had a national assessment toolbox, there was a strong role in communicating the assessments nationally. You know, "Where's the bang for the buck?" is the question we get from the Hill, from Congress, from constituents all the time. There's a lot of money that gets devoted to doing stock assessment they want to know what they're getting for it. Why is this work that is imposing restrictions on fishing a good idea and are we doing it well. There's always a lot of questions. I became the chief spokesman for the stock assessment enterprise through the 2000s as well as continuing on from the stock assessment improvement plan, some initial work that Pamela had gotten started to get some budgeted initiatives so that sort of got that budget line from 0 up to \$5 or \$10 million. Well, during my tenure there, we got that to \$70 million and it became the major chunk of money that is nationally supporting much of our stock assessment enterprise throughout the country. That also is a constant communication issue of why is this a good idea, what are you going to do next.

I think over my career, you know, I started off on the technical side, I found that I was adept enough at translating the technical into a language that could be communicated to fishery managers at the Council process and then through the 2000s I refined that in the direction more of communicating with the general public about what is this thing that we're doing. Staying away from the gory details and too much of the geek speak and try to put it in lay terms so that we could communicate what it is that we are doing. I've done a lot of training sessions and just outreach sessions to give people a sense of what we're about. That's a role that I continued in for a number of years as well as all the time. While I was Division Chief of the Northwest Center, it was harder because I had a strong administrative role so the continued work on the stock synthesis model waned during that period even though it was getting increasingly used for more

of the ground fish assessments through the 2000s. Then in 2003...could I say a little side bar story here? So in 2003, this is like September 2003, I had just started working for S & T and I needed to go back there for an intensive two week session to get really indoctrinated into the whole budget development processes. So it was two weeks in D.C. Well, in the weekend in the middle of this two week period, there was a hurricane bearing down on D.C., I forgot the name of the hurricane, I used to have it.² I used to have it actually as the code word for the early development of the model. This hurricane was bearing down on us and I was in a hotel that we were able to maintain power in the hotel but cable TV went out. So here I was stuck in the middle of a hurricane and not much to do but I had my computer with me and I'd had some prototype models that other people had developed using a new software package called ADMB and it's very powerful for estimating parameters of models like that, really tuned for that. I said, hmm, my model that I started for anchovy in the early 80s and rebuilt for ground fish in 1990, it was time for another refresh of that. This is 2003 so that weekend, because of the hurricane largely, I basically banged out the prototype of what is now essentially the stock synthesis model of today. That happened then. It took probably a year before we had refined and tested and doing everything we wanted it to do.

While I was working for S & T in that role I was able to continue now working on that as well as continuing to evolve that model to basically meet the needs of the assessment community. It is now used worldwide for well over a hundred fish stocks. It's used as a training tool in a number of places. I think it's succeeded in capturing such wide usage largely because I was willing to continue to evolve it, continue to adapt it to the needs communicated to me by the user groups as well as the inherent flexibility, the approach I took to it. That's continued essentially to this day, so even though...now in the last stage of...what I'll talk about as my evolution, in 2012 the agency got approval, the agency I mean NOAA Fisheries got approval to create three senior position scientists called STs and they had had some ST positions in other line offices of NOAA Office of Oceanic Research and others, but none in fisheries. Three positions were created in 2012 and I was the person selected for the position on stock assessments. So that's the position I serve in today and I have since 2012. It's been another growth opportunity because now I'm managing up the chain a whole lot more than I used to need to. I serve as the subject matter expert on the new [NOAA Fisheries] science board, you know helping to develop policy for fisheries as well as trying to continue to look out for this community of stock assessment scientists that are turning out assessments for nearly 200 fish stocks a year across the country. So it's big enterprise and there's always issues. I serve as an advisor for that and try to look for gaps that need filling or ways to support that community and doing it as this subject matter expert. That's where I'm at today.

I think as I reflect back on my career and how it took this path I think I characterize myself as a jack-of-all-trades who has been able to make connections that then create successes. I have what's now used as a very advanced modeling framework but I'm nowhere near [as well trained as] the mathematical statisticians that we employ today. I'm not a highly trained computer programmer. I'm not a highly experienced ecologist. I think more like an ecologist. I know how to talk to statisticians. I have a knack for computer programming and I've been able to find a way to translate things and to relay advice. Somehow that combination of acquired skills, some

²The hurricane to which the narrator refers, was Isabel.

trained skills, but mostly acquired skills over time have led to what I'm at today what I've been able to piece together into what I think is a fairly successful career.

MA: And you think you got all those skills just through work just how you became a jack-of-all-trades just through your different experiences you think?

RM: To a large degree. I mean I think being willing to listen and learn from other people, reach out to other people has been a big part of it. I think having a diverse experience is important. Even though mine is not, disciplinary wise, very diverse, I'm pretty focused on stock assessments, I've done it in a number of settings. I've moved around the settings which I've done it in, looked at it from different perspectives and I think that has helped me.

MA: What's been your biggest challenge with communicating stock assessments to the public or to the fishery managers? And what are things you've learned on how to do that well?

RM: Yeah, yeah. I think the hardest thing, and this came up several times when I was trying to communicate with some of the fishing communities along the U.S. West Coast, they know that all these data are going into this model which trying to explain the inner workings of the model itself is like explaining a computer to me and exactly how it works. It's hard. So the hard questions were, "Well, what proportion of your answer comes from these data?" and trying to dissect apart what is inherently a collection of interacting parts is one of the hard questions that we tend to get. I think the other thing is just in general trying to communicate the degree of uncertainty we still have in our results. It's not engineering, we're not building bridges, so there's always going to be a lot of uncertainty and lack of information and how we can communicate a good enough answer to provide a basis for management actions. The result of assessments, that's a large fraction of what the quotas are. It starts with the science and everybody knows it starts from the science so the focus questions start there. The managers and the general Council they all are relying upon the assessment side to come up with answers that they can use and they can defend. Doing that in the face of all this uncertainty is certainly a challenge for the community and something that I continue to work on trying to communicate.

MA: Do you think that maybe technology is getting better so that it's easier to do accurate stock assessments and that would translate into better management?

RM: There certainly are advances in a number of ways but it's still a very large challenge. We have a number that's like 500 for the number of different species and they have such different life histories and live in so many different habitats and they're touched by so many different fisheries, particularly in the southeast of the U.S. where there's many different fishing types that are very strong. Most of the catch of some species in that region comes from recreational fisheries. That diversity is huge and so making a lot of progress is very hard. There are new technologies that are helping us go out in the field and make better measurements. There certainly are technical advances happening with the models to help simultaneously be more synthetic about what we do to try to pull in more pieces of information. We are doing better. We're getting more standardized in our approaches and that helps us update more of the assessments more frequently. That sort of comes with the bang for the buck questions. "Why aren't you doing this stock more often/ why did you bother doing that stock?" We get those kind

of questions. One of the things that I spear-head over the last few years has been development of an objective prioritization process so that as we consider, okay, of all these hundred stocks which ones, we can only allow five this year, which ones will we do and how frequently should we do them. So we've worked through a protocol there to help us out.

MA: What changes do you see in technology in the work in the future like looking ahead five to ten years?

RM: The biggest changes that we're seeing is to ... Part of this comes from building upon the success of what we've been able to learn now. Part of the learning now is, oh my gosh all of this stuff that we don't know, and part of that is how general climate changes, general ecosystem shifts, how all of that affects optimal fishing rates. That's where we're making a strong push today is to establish better linkage. Modeling is about ... Sort of things like all models are wrong, some are useful. It's always an issue of trying to make the model good enough to provide advice but don't get lost in the weeds and you've got to get it done because you've got to get a number out there. We are recognizing that we've gotten a little too trapped into keeping it too small [a focus]and that we need to be finding better ways to be linking to more of the broader influences.

From an agency perspective, you see things like the climate science strategy, you see carbon vulnerability analyses being projected, you see development of integrated ecosystem assessments that try to take a holistic look.³ What we do with the population dynamics of fish in order to provide assessment advice, the assessment advice, it's a very focused advice. Is overfishing going on? Is the stock so depleted that it's become over fished as a state? What future catch would implement a sustainable harvest policy?Very specific deliverables. That's what makes it anassessment and not just research on population dynamics. We're trying to broaden that influence so that as we conduct the assessments we're doing it with more explicit language to the outer factors affecting the fish and not just treating it as a random force on the outside that is there but it's not driving things to a particular direction. We now see more evidence that there's stuff driving things in a particular direction and we need to be taking that into account. That's the big push.

MA: So you see that happening? It's not just your wish, it actually is happening?

RM: It is happening. I mean we all wish it would be happening faster. But in most cases, it's more data demanding. We could certainly be open to the possibility but actually calibrating a response is harder. Not in all areas of the country do we have anywhere near the accumulated information in order to do it. I mean really not much beyond the Bering Sea and the Northeast shelf are places where we have a long history of food habits data and extensive surveys so that you have a strong founding for it. We certainly can, in our looking at it everywhere, the progress will be slower.

MA: What's it been like collaborating between the Northwest Fisheries Science Center and the National Office, what's that like?

³ Narrator Correction: The intended word in phrase, "...you see carbon vulnerability analyses..." is actually "climate" instead of "carbon."

RM: I think it worked. It's a little challenging, working three hours offset. When something needs to be done by close of business, they give it to Rick to do so he has three more hours to get it done, right? But it's been a good collaboration. I think it's good for us as an agency, for people in the agency, to be thinking about mobility. I think as hard as it is on young families, you know, finding opportunities for more rotation between centers, certainly between East Coast and West Coast centers, between headquarters and the field. I know people who've done a rotation at headquarters and come back with their eyes open and the other way around too. There's people who've come into headquarters and have been at headquarters and are not fully grounded in what is really going on out here. It's good for the people involved and it's good for the agency to have these kind of connections built up. I certainly encourage it.

MA: What about collaborating with other scientists here and other researchers at the center? What's that been like?

RM: Yeah. My collaborations have been so much around the model development and my other activities were science facilitating but not science doing so much. The roles I've had from groundfish management team to Division Chief to National Stock Assessment Coordinator with S and T and now my ST role, they're all touching the science but I'm certainly am not what I would call a bench scientist, for quite a while. My collaborations and projects have been fruitful. Both within the center and with colleagues at University of Washington have been very fruitful but certainly not as plentiful as some of the other scientists here who are more directly in the role of doing research. I'm trying to help them have opportunities and as I can participate.

MA: So you think your average today would be mostly in the office now and going to meetings I suppose sometimes?

RM: Yeah. Managing a dozen simultaneous conversations by e-mail.

MA: Speaking of the office, since you've been here what have you seen the most change just in the office? I guess besides the split. That was probably a big one.

RM: Yeah, that was a big one. I think the whole evolution of the division structure here in the Northwest. I think it's more of that than it was the split itself. The split happened and what happened to me was a consequence of the split but it wasn't really part of the splitting. I certainly was part of how we were going to build the Northwest Fisheries Science Center now that it's been split. So as a Division Chief in the late 90's working with John Stein, under Usha, and the others trying to figure out how to make this place work. That was a real learning experience on what it takes. Since then there's been perhaps less change, it's been more evolutionary within the organizational structure from a headquarters perspective.

MA: Just who's in charge over headquarters...

RM: Yeah, yeah.

MA: How did that effect activity here?

RM: Certainly there's been changes over the last 15 years in the organization among the Center Directors and how they're organized with headquarters. The current structure which I think got started when Steve Murawski was the Chief Science Advisor for NOAA Fisheries. They have these Science Center Directors reporting to that person. Richard Merrick now is currently the supervisor to the Center Directors as well as me as an ST. So that structure has evolved over the last several years. I guess the first stage of that evolution was when Steve Murawski was in that position and the second stage was really when Merrick became the Chief Scientist and the three ST's came on board and the STs basically joined that leadership group of the science board.

The agency is always sort of tweaking organizational structures and trying to learn and trying to get good communication. I think that's one of the things that I've learned by going back and forth from the field to headquarters. Within the Science Centers, they're pretty regional and pretty focused on regional issues as they should be but because we don't have very many people doing a rotation into headquarters and thinking about things from a holistic perspective, I think we as an agency get a little hampered on our ability to think nationally because we're mostly really regionally oriented people. That's something that I think I worked on all through my time with S and T and now in my current role of trying to find ways to move us closer together and how we think about things and how we share information, of how we report what we're doing in a consistent way across all regions. So things like that have been sort of at the forefront of some of my efforts to try to make us the National Marine Fisheries Service and not a consortium of regional science centers. We're somewhere inbetween.

MA: Does the evolution of getting easier to communicate make that? Just because of the internet...

RM: Oh gosh yes. Yeah, yeah, yeah I know. I remember reflecting... See this would be from, let's see, it would have to be from the early 1990s when I was chairman of the groundfish management team. I had 8 or 9 people spread out all along the U.S. West Coast and you needed to communicate with them. I thought it was the greatest thing when they had broadcast fax. I could just feed the paper in once and it would send it to all 8 of them at the same time. It was great! We've come a ways since then.

MA: Yeah, so what's been the project that you've worked on that you've had the most fun with, that you most enjoyed?

RM: I should say something other than the continued evolution of stock synthesis. I wouldn't have continued doing it if I didn't really enjoy making it work better for the community. I'll have to start there but I'll try to come up with number two. I think it is trying to think spatially to a greater degree than we tend to when we look at populations. That line of work is really ramping up. Our new young scientists here at the Northwest Center, Jim Thorson and some of his colleagues here are very strongly pushing the analytical tools for us to act spatially with how we analyze populations. I've always been an advocate of that and I know that some of my earliest investigations with anchovy in the early 1980s, I saw spatial patterns in the population and I knew that it affected what I was doing. From the earliest days, I wanted to understand underlying principles affecting things.

I think one of my "eureka" projects, probably because I did some of the work in Eureka, California, was my post doc. I actually did a short post doc inbetween graduate school and starting at the Southwest Center. I did it on Dungeness crab, under Lou Botsford at UC Davis [University of California Davis]. That was out at the Bodega Marine Laboratory. So working on crabs and working on the project. Dungeness crab on the coast have this huge boom and bust cycles and it looks like these big sine waves that go about every ten years or so, or at least they were at that time. Lou turned me loose on looking into that to a greater degree and I have a paper out where I believe I found that it really was a very extreme boom at the beginning and it sort of tailed off and it looked like a much smoother population signal than it really was. It really seemed more like a huge boom at the beginning that just saturated everything so you didn't see how boomy it was and then it persisted for a few years and tailed off until another one happened. So I think that that paper was one of the "dig into the details of what's going on", what are the data really telling us. That was one that I found very rewarding at the time back in the early 80s also. I should go over something more recent, I'll have to think about that.

MA: Yeah, we can come back if you think of something. I guess just a couple of my last ones is going back way before this. What originally inspired you to pursue a career in science and biological oceanography? What was your "Ah-ha" moment I guess?

RM: Yeah, yeah! Alright I'll have to [go]way back now. I'm now a sophomore in highschool, ok? I'm in a working class family in western Massachusetts and nobody went to college. It was a relatively small town. I did well in school and all. We visited the Massachusetts State Lobster Hatchery out on Martha's Vineyard Island that summer. That was the summer where I'm starting to think about well what am I going to do after highschool. I sort of got inspired at the moment by seeing, wow, look at this. They're growing lobsters here. They're doing lobster aquaculture. I had no idea about anything like that. That thing happened at just the right formative moment in my mind and I said, "Hmm, maybe I'd like to work on something like that." One thing led to another and that led me to look around for schools where I could pursue something like that which led me to find the College of Fisheries at the University of Washington. My aunt and uncle lived here in Seattle. They had moved out here many years before and we visited them on one of our cross country trips. So, it wasn't totally crazy for me to jump on an airplane and go across the country to go to college. Which is what I ended up doing. What got me into fisheries was this idea of lobster culture which I didn't even touch until I came back to that post doc at Bodega Bay with Lou Botsford. One of Lou's other projects was bioeconomic modeling of lobster aquaculture and they had a culture facility that was set up there at the good seawater system at Bodega Marine Laboratory and the person who had helped set it up for them was the same person I had met in Massachusetts some years before. It came full circle on me to a limited degree but I always sort of reflect on that.

The fact that I chose this direction and not engineering because I really thought more like an engineer at the time but then suddenly I went off in marine fisheries. I think I could have succeeded in an engineering kind of field. I'm a space nut. I would've loved to have been working for NASA. When I was at University of Washington taking my general ed classes, of course I've taken general ed in biological fields with all the pre meds and after I totally aced the genetics class because it was mostly statistics which I could do. I totally aced genetics so then

one of my friends asked me at the time, "Huh, why aren't you going to medical school?" I went, "Huh, never really thought about it." I've kept that a focus. So I've not [done] anything too radical in my life I guess is what I'm saying. Perhaps some other opportunities might have presented themselves. I stayed in this marine fisheries focus for better or for worse.

MA: Did you go right from undergrad to getting a Ph.D.?

RM: I did. I did. That itself was an opportunity. Just a collection of opportunities came together to make that happen. Douglas Chapman was Dean of the College of Fisheries at the time and he was someone who did some advising for me. He was advising me to consider going elsewhere, don't just do what everyone else seems to be doing which is go get a master's here at University of Washington. He encouraged me to look around and I was on a student faculty committee and the faculty member who I worked with on that committee, I was in his office one day and he had a paper that he'd just gotten from one of his colleagues and he says, "I can't make any sense of this but you know you do this kind of stuff maybe you can make sense of it." So he hands me the paper. This was Allen Seymour, he was a radio ecologist. The paper was by John Isaacs who was sort of a Da Vinci, you know, touches all kinds of science. He was at Scripps and he also had done radio ecology work, some of the bomb tests and looking [at] consequences of propagating through the food chain.

So the paper was about inverted food chains in the marine environment versus food chains on the terrestrial environment, John Isaacs was at Scripps and I said, "Wow, this is sort of cool." That gave me an opportunity to contact him with someone at UW [University of Washington] to give me a good letter of introduction and so I struck up an acquaintance with Isaacs. He had some funding and with Doug Chapman and Allen Seymour's letters of advice that was what got me to choose going to Scripps to continue my career.

But Scripps was a place where they accepted people in straight out of either from a master's or from their bachelor's and attended to work straight towards a Ph.D. program there, not very many master's. It was diverse and I sort of continued this jack-of-all-trades that I was able to touch upon a number of different fields while I was there. It also was during the time that Scripps itself had a stronger connection with fishery kind of issues than they had subsequently. There was a number of people who were there at the time who were very interested in pursuing that. I was there at the right time to be learning from them, be working with them. As I showed up at the Southwest Fisheries Science Center, it also was another opportunity that was a novel opportunity and I was able to grab it and pursue it. So when I showed up there, it was right after Reuben Lasker and some of his colleagues had just finished publishing a paper documenting that you could see daily growth increments in the otoliths of larval fish. You could actually age them to the day using this technique that they had validated in the laboratory. I show up at exactly the right time to do the first field applications of this. So that was my Ph.D. thesis. It was based upon growth rates and mortality rates and other aspects of what we could learn about anchovy and some other animals by analyzing their very, very, tiny otoliths to measure daily growth increments that are about a micron a piece. It was the only time I've done laboratory work really. Painstaking laboratory work. I don't think I'm that good at it. I was able to use it in order to do the field collections, I was able to get out on the Southwest Fisheries Science Center's David Starr Jordan (vessel). I was able to work in one of their laboratories to do the work. It was that

project, the daily growth increment project, that connected me to the Southwest Center and then from there grow into their population dynamics program.

MA: So you mostly did field work? You didn't do much lab work, mostly field work? And then mostly computer work?

RM: Well, frankly there was a lot of lab work on that because you know preparing those otoliths and sitting there. One of the projects was birthdate distributions of juveniles. Now, we're collecting juvenile anchovies that are three to eight months old, say, and back tracking when they were born and trying to figure out what were the conditions in the spring when this pulse of survivors was born. That was one of my thesis chapters, a paper that I got an award for, was birthdate distributions. Reading all those otoliths probably took the most time but I did spend some time at sea and I was on a couple of three week long CalCOFI cruises. I learned oceanography and the like being there at sea. I can do that kind of work. I think it also helped hone my leadership skills at that time. I've always been a bit [ready to]move into [a] lead spokesman role for a group. But there on the cruises I proved to be reasonably adept at trying to get a collection of different people because the work we needed to do we could only do it nights. We needed to fill up the day time. I was able to orchestrate getting enough people together and I think that started helping me develop those skills, getting a group to work together. So that got me on field work.

Then certainly the computer programming side was something that I needed to develop as well and that was something that I think I had a knack for it and I took just enough classes to know how to do it. I remember one of those cruises... this is 1978, we had computers, and there was some computer that was logging the data coming off the CTD. So they sent the computer – the CTD – to sea and they started doing the first CTD cast and it wasn't communicating. It wasn't working. So I said, "Let me take a look at the program maybe I could figure it out." I'd never seen this computer language before but I was able to piece together... "Ok, what is it trying to do here?" and where is there potentially a [logic] flaw, and I found it. I was able to fix this computer program which was fairly rudimentary but still it was in a language I'd never seen before until getting on that boat and I didn't have a manual. I just sort of looked at it and did some pattern matching and figured it out.

MA: That's pretty impressive, yeah. I guess my last thing that I usually want to end with is what advice would you give someone who wants to pursue your kind of career? Maybe an entry level scientist. What would be your take away?

RM: I think there is a lot of value in having a diverse background but also having a strong skill. Explore. Do some things that are a little bit different to try to find where your strengths are. Be open to changing your mind, be open to changing direction and evolving as things move forward. That's science. Science is constantly evolving and I think as people, as scientists, we need to evolve also and try not to be too locked into one thing. I probably got too locked into the stock synthesis thing, I'm not going to change now, but I think having a good diversity in your background. Don't worry about taking too many classes in some fields because in the end, you could always go back and brush up for what you actually end up needing. Learning it all ahead of time and expecting it's going to be what you're going to use in the future is unreal. Do enough

to find good opportunities for yourself and then figure out what you need to do to pursue them well. You can never prepare yourself totally for what's going to come next, so be adaptable.

MA: Thank you!