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Packer, David ~ Oral History Interview

Bonnie McKay

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Voices from the Fisheries
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Woods Hole, MA 02543

Interview with David Packer by Bonnie McKay
Summary Sheet and Transcript

Interviewee
Packer, David

Interviewer
McKay, Bonnie

Date
June 14, 2016

Place
J.J. Howard Marine Sciences Laboratory
Sandy Hook, NJ

ID Number
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Use Restrictions

Biographical Note
David Packer received his undergraduate degree in zoology from Ohio State University. He started to become interested in marine biology and received his Master's degree from the University of Maine in 1988. He is the editor of EFH and studies deep sea corals.

Scope and Content Note
Interview contains discussions of: Grain size analysis, dump site project, deep sea corals, benthic communities, EFH, species source documents, stock assessment, and ecosystem based management, Gulf of Maine deep sea coral, research cooperation between NOAA line offices

Dave Packer discusses his career in marine research and his work with deep sea corals.

Indexed Names
Auster, Peter
Green, Karen
Guida, Vincent
Hauser, Peter
Karp, William

Manderson, John
Nizinski, Martha
Phoel, Bill
Steneck, Bob
Watling, Les
Waller, Rhian

Transcript

Bonnie McCay (BM): Ok this is Bonnie McCay, and I'm here at the Sandy Hook Lab, or otherwise known as the J.J. Howard Lab, the Northeast Fisheries Science Center, and I'm interviewing Dave Packer in the Sandy Hook Lab. So, Dave, let's just start with the beginning. And the question we had here was where did you start beginning, when did you begin working for the National Marine Fisheries Service. But let me go back one step, just to say, where did you get your training, your education, and how did you end up at National Marine Fisheries Service?

David Packer (DP): I have an undergraduate degree in zoology from Ohio State University, and I sort of thought of marine biology like everyone does, Jacques Cousteau, that sort of stuff, but coming from Ohio it's like who would think of marine biology. Um, but it was interesting when I graduated from Ohio State, and I always wanted to be a zoologist. My career advisor said, if you don't have anything to do this summer, you should go to the National Institutes of Health, and become what they call a normal volunteer. And a normal volunteer is the person that they use in the control, in tests. It's not like they're going to test LSD on you or anything like that, but they use you as the normal person in the control of the experiment, and the program is actually going on all the time. I've got my National Institutes of Health certificate over there. And I said, "why would I do that?", he said, "Because it's a hospital, it's free room, board, and food, but they pay $14 a day and you get to work with the Nobel prize winning scientists at the National Institute of Health", and I thought, "That's great, but I'm not going into medicine, is there anything else I can do?" And it turns out, someone told me to go volunteer with a marine biologist at the Smithsonian, Bob Steneck from the University of Maine.

So while I did that, while I was there, I volunteered at Smithsonian's Marine Systems Laboratory, specifically in the Gulf of Maine, we did field work. So I did that for like two months and from then on, I spent four years at Smithsonian essentially, and then went to graduate school at the University of Maine, he got me into the University of Maine, marine biology, in oceanography actually. And I should add, before I had graduated, as an undergraduate, I had spent several different summers working for the federal government in different capacities. I was with the National Parks Service, the Bureau of Land Management, and the Smithsonian too was quasi-federal, the U.S. Forest Service, I was a firefighter there. So every summer, I was involved in the federal government in some way, and right after graduate school, I got an internship with the EPA [Environmental Protection Agency] Chesapeake Bay Program in Annapolis. So, the marine biology and the federal service combined got me into National Marine Fsheries, 25 years ago to be exact, so that was sort of a long road, but without having the weird NIH experience and all that federal experience, I don't think I would be in, I don't think I'd be where I am at.

BM: Because you had the civil service requirement?

DP: Yeah, I think part of getting into the federal government is knowing how to apply, and I knew how to apply, back then the 171, the sf171, I still have them, it was an art form. [laughs] Who cares how much skill I had in marine biology. So I have a masters from the University of Maine, I don't have a Ph.D. or anything like that.

BM: What year did you get your master's at Maine?

DP: I got it in '88, and then stayed up in Maine for a while, and then spent a year and a half at the Chesapeake Bay Program as an intern, which again helped me to get this position.

BM: Were you with Bob Steneck all the time in Maine?

DP: No, my advisor was Les Watling who I still work with today, actually, on deep sea coral. What a long, strange trip it's been.

BM: So we have the process of securing your position, and you were ready to apply for it, and who was your supervisor at that time?

DP: When I first came it was Bill Phoel. He hired me, and then promptly left a month later. And many of us here have rotated through many different bosses.

BM: So when you came here, you were hired to do what? What was the general research?

DP: Well at that time, I was basically considered a technician. I was either a GS7 or a GS9 essentially. And I was hired, it's even almost hard to remember! Because I knew he worked on something called total plankton respiration, I believe it was. I never quite understood and when he left or maybe even when he was just about to leave, there was talk here that they needed to run, do some sedimentology. Grain size analysis, total organic carbon and that sort of stuff. And people seemed to be flummoxed about how to do that. And it turns out that even though I wasn't a sedimentologist, my interests, my focus and my thesis in grad school was on benthic community structures which involved knowing what the sediment grain size was and stuff. And so I knew how to do grain size analysis, or knew that it wasn't that hard, I mean there's a manual written on it. So I said, "I'll do grain size analysis." And so that's how I sort of got started, and that sort of launched me doing grain size analysis, within about a year I had my first paper out and that sort of thing. So that's how I started.

BM: So that was about '90.

DP: Early '90s.

BM: And the lab was known for general environmental work, ecological stuff?

DP: Just as I had come on board, there was this big project on the 106 dumpsite, the dumpsite work essentially. And that's what I was doing with the grain size analysis, and I fell right into. It was a lab wide project. Everybody, the chemists, the fishery folk, everyone was doing it essentially. And so I was sort of like a Johnny-come-lately, and felt I sort of had to catch up, and so being the only one doing sedimentology that sort of helped, I think.

BM: It was a rather critical project.

DP: I thought it was important actually, I managed to get a chapter in the publication so I was happy about that.

BM: I see by the way that you've been an editor of the EFH [essential fish habitat].

DP: Yeah.

BM: Are you still doing that?

DP: Yes, more or less, EFH just celebrated its 20th year, they just had a big EFH summit in Annapolis, yeah, that project started about '95, and that involved creating what we called species source documents which was everything that was known about a federally managed species, particularly concerning its' habitat, gathering the information, making sense out of it, doing some analyses, looking at environmental parameters on where the fish live. And those things became very popular with the public and scientists, and region because they were source documents for the information for the EFH designations essentially. And to have basically everything that is known about a species in one thing that you hold in your hand was actually a very cool thing.

BM: It was helpful for the fishery management plans.

DP: Oh yeah, and I don't think any other region has done that.

BM: Yeah, I remember seeing those.

DP: Yeah, and we're talking about them now because it's like, the Mid-Atlantic council wants to try and figure out how to do it. I mean we don't have the people that can do that kind of intense labor. I mean we got everyone from across the Center doing that, especially in the second round, from Woods Hole and all that sort of good stuff. And they weren't easy too, I mean some of them, some species you don't know that much, but things like cod, the cod person up in Woods Hole, the poor guy had to like, "Tell us everything you know about cod!" Ok. And it's like you write something and then a week later another publication would come out, it's like...

BM: So there were two rounds of that?

DP: There were two rounds of that. '95 and in the aughts, you know, 2000 - 2005, and I basically played both the editor and the writer on a number of those things, and sort of the shepherd, and the liaison between the lab and the council work groups that worked on these things, or that needed these things, and the region that needed these things as well essentially. So I was sort of straddling, the sort of the science/management divide and providing advice. And back then, the Center was sort of schizophrenic about it, because the Center on the one hand would say, "Oh, we need to do our science, we can't let the councils interfere with that" But then they would turn around and say, "But wait a minute, really, the councils are sort of helping us, we got to help the councils." And finally, the Center, I think, is sort of understood that we're here to help the councils and help the fishery management process, and we can't just do science in a vacuum essentially.

But there was some tough going, because you know, a number of scientists in fact did not want to have to do this sort of, they sort of thought of it as busy work, because it's not, it was summarizing data and collating information rather than producing new information, and I tried to convince them that this is new information, when you put it all together in one spot you see the holes in people's research, you realize that there's some common threads, that sort of thing. So it was not easy trying to convince people sometimes to do this sort of work.

BM: And I remember probably in the 1990s talking to somebody here at the lab while I was doing one of my projects, and I was told that the lab did not, by and large, interface at all with fisheries management.

DP: That's exactly what it was, and in fact, that made me sort of an odd man out, because I was the only person here that was liaisoning, and often, you know, management didn't want me to, management here at the Center didn't want me to, and I would write e-mail after e-mail saying, "this is my logic for wanting to do this, I think this is a good thing." And now of course, I'm a major part of, I'm with Bill Karp, he's finally the one who said we really need to work with these folks, but back then there was this sort of strange, I call it separation of church and state. If someone, these days, I talk back and forth freely with council people and council staff, I'm on a number of their work groups. But back then if one of them would call me, it could create havoc essentially. It could create, "A you're overstepping boundaries." But there's not supposed to be a boundary and there shouldn't be a boundary, essentially. We're supposed to be providing them with information. So then there was some political stuff going on there definitely.

BM: And this Sandy Hook group was sort of seen as outside the fray because the stock assessment stuff was handled in Woods Hole, is that why it was like that?

DP: Well, I think that's part of it, and I think, and I don't know if you've talked to Tom and Chris about this, but we are definitely, and I think Milford lab also has this problem, anybody who's not stock assessment in the Northeast, you know, the money and the politics goes with stock assessment, because that's what people want to know how many fish are out there. And habitat has always been sort of the lost child out there, even though NMFS has a Habitat Office, an Office of Habitat Conservation. I have Karen Green here from the Habitat Office in the region. And I did a couple stints in Washington with the Habitat Office, so I could see their perspective, and so NMFS focuses on habitat but the Center until, I think very recently, we've always been the second, the hand-me down, and that's again part of the problem, that EFH was not taken very seriously by the Center, because it was like, you guys go off and do that and don't bother us stock assessment types.

BM: And has the advent of the ecosystem based management changed that? Or what has changed it?

DP: I think that has, I think it's the common sense that obviously habitat is important to the fish. Duh. I think part of it is the push from Headquarters, from the Headquarters Habitat Office as well. And I think it's people here at the lab doing habitat work in spite of opposition or apathy from the Center, essentially. You know, some of us, because of funding issues at the Center, apparently they were using money in a fast and loose way to pay us out of different accounts.

And so, what they did was, they basically said "ok, we got to have to have a bunch of people being paid out of the Observer Program" which part of my salary comes from that. But it's funny, it turns out that the people that they decided to do that, all came from anything with the word basically either habitat or ecosystem, or the Milford lab, aquaculture. I mean, none of the stock assessment types as far as I know were touched. So that tells you that there's still not as much of that appreciation for habitat issues.

BM: So ecosystem based management is still kind of stuck on having multiple species management?

DP: Well, I think what the ecosystem based management is doing, which is good, is trying to get us away from single species management.

BM: But then one way to do that is to say, "let's just do predator/prey interaction" or something like that, but the ecosystem is far more than that. Haven't been able to go that far.

DP: Yeah, I think that even in ecosystem based management, it may sound strange and I'm not sure I can explain it, but there's still, habitat is not necessarily part of that. I mean, I think you know John Manderson, he's an amazing person and an amazing smart guy. He talks about seascapes, we're not talking landscapes here, we're talking seascapes. We're talking three dimensional view that the fish has, temperature and density and all that other stuff, and currents and salinity that land animals don't have to deal with. And that is the kind of stuff that has to be taken into account in stock assessments. I don't know how you do that, I don't know if anyone else does, but...

BM: One thing I'm hearing as I go through these interviews is, we talk about data, any changes in data or issues in data. One thing you see, question of having data available and useful in management. Now, where do you sit in that regard?

DP: I'm not sure what you mean?

BM: One question is, it seems to me that the habitat work is absolute directly relevant to the requirement to identify essential fish habitat as well as, come up with habitat areas of concern. Yeah, so, the data that you and others work with, generate, being used directly in management.

DP: Um, yes but I don't think that we're doing enough of that, because the Holy Grail for EFH is what they call level four information, which is the ability to tie productivity of the fish directly to the habitat, and it's the Holy Grail because no one's been able to do it. I think you can do it with some invertebrates, because invertebrates being invertebrates, you can measure these sorts of things. You can say maybe, "Well, this habitat may give us X amount of scallops." I think the only time I've seen it in last few years, it had to do with blue crabs, I forget the paper. So we're nowhere near level four information. Most EFH stuff, at least in the Northeast is based on either presence/absence or distributional data. If there's more fish here, that must mean it's a good habitat. You know, so that's based on the trawl surveys essentially. And some of the information that we have gotten from the literature and experiments, you know. Next door they've done a lot of good stuff with winter flounder, for example, Goose fish, that sort of thing. And, you know,

metabolic rates and that sort of stuff. But we're nowhere near the level four information that's needed for EFH. So we need more habitat work, obviously, I mean, I wouldn't say we need less.

BM: But does that come up on the councils as an issue? More habitat work?

DP: Oh, yeah. Absolutely. I mean we're supposed to be the habitat lab for the Northeast essentially. And I know Milford does some habitat work as well, but we are getting down to skeleton levels at this point. And they will not hire staff. They will hire managers but they will not hire scientists. And so, I don't know how we can keep this up and still call ourselves a lab at this pace.

BM: Tell me about the deep water corals...

DP: Deep sea corals, oh fun stuff.

BM: I've seen some of the press release stuff.

DP: Yes, it's funny because again it's when opportunity knocks, essentially. There was a point where the Center Director wanted a white paper on deep sea corals. And I had heard of them. This was about 2005. I'd heard of them; I didn't know much about them. But I knew just from the little bit that I had read that they were going to be hot stuff, because the enviros were interested in them, you know. They had a certain cache, "Oh we got coral reefs and deep water corals!" And so I figured that, this could be my opportunity to work on something other than EFH. So that's basically how it started and then the Deep Sea Coral Program at Headquarters wanted each region to write, in 2007, the state of the deep sea corals report for each region, which is what I did with a few others here, essentially. And that's how it got started. And then, the main thing they were providing funding for each region, and had been providing funding for each region to do deep sea coral field work as part of the Magnuson Act. And it turns out, we were coming up next in 2013. And so, it turns out, there were very few of us doing deep sea coral work in the Northeast, because Martha Nizinski who was at the National Systematics Lab, which used to be until recently, part of the Northeast Fisheries Science Center, and is now part of S and T [NOAA Science and Technology]. She had been doing deep sea coral work in the Southeast.

BM: Who is it? Martha Nazinsky?

DP: Nizinski N-I-Z-I-N-S-K-I. Basically it turns out that most of the other regions, their deep sea corals, compared to the Northeast, are fairly close to shore. And they're a lot shallower than ours. The highest bio diversity of deep sea corals in the Northeast are found at the edge of the shelf, way out in the submarine canyons and on the seamounts, except for the Gulf of Maine, which I will get to in a moment. And so all these other regions, for the most part, had the infrastructure to study deep sea corals. Like in the Northwest, they have all these submersibles and things like that, and why do they have that? They have that because a lot of their fisheries are inaccessible areas to trawls, so they need submersibles. And when they have those submersibles, guess what, they can also look at the deep sea corals that are there as well.

We didn't have anything like that, so we, in the Northeast, had to basically start deep sea coral research from scratch. Um, the last major work had been done in the 1980s, there had been some

work done Les Watling and Peter Auster Gulf of Maine, early 2000s, but that had been it, essentially. So, we basically started everything from scratch, and basically, since the field work started in 2012, our knowledge of deep sea corals in the Northeast has grown exponentially. Because we have explored almost every single canyon in the Northeast. The foursea mounts. We have in collaboration with other line offices mapped a good part of the edge of the shelf and the canyons. We have made these amazing discoveries in the Gulf of Maine, which is what a lot of my major work with deep sea corals has been in the last three years. And in the Gulf of Maine, these corals, are at 200 meters. At least in the U.S., they're the only deep sea corals that are that close to shore and that shallow. They're in Jordan Basin, basically, northern Gulf of Maine. We've done collaborative work with the Canadians.

So suddenly, within three to four years, we've gone from 0, from just having historical data and some minor surveys, to this major survey of deep sea corals in the Northeast. And it's been very cool, and there are a Bambi kind of species. They're cool looking, they're beautiful, everybody loves them, but again, the Center, I don't think appreciates them, because they're not stock assessment. I keep this handy to remind myself. {shows something to Bonnie} This is the Center's, what do the publication where, it's the Center's plan, their strategic plan -

BM: And they feature deep sea corals.

DP: They feature the corals. Basically since Martha has left the Center, I'm the only person here.

BM: She left? Oh, she's in the Systematic Lab.

DP: Well, she's in the Systematics Lab which is not part of the Center but technically speaking, I'm the only one in the Center that's really doing heavy duty deep sea coral work. Which I just find hard to believe. And then Martha, you know, so basically her and I are the only ones carrying the flame for this stuff. And we're working with academics, we're working with people from other line offices and that sort of thing. Um, so again, although they picture it in the strategic plan, they need to sort of pay attention to these things. And I'm sure you've heard that the Mid Atlantic Council has protected like 90, some 1,000 kilometers. We're doing the same thing now with the New England Council, we're working with them to set up deep sea coral protection zones. And again, it helps the fact that I've been involved with the New England Council for a decade and a half at this point. So I think that has helped a lot.

BM: Were you directly involved with the Mid Atlantic Council?

DP: Yes I was part of the FMAT [Fishery Management Action Team] team and that sort of thing.

BM: Yeah, that was really something.

DP: That was an amazing thing, and to get that compromise between the fishermen and the scientists and the public and the enviros. We may be doing the exact same thing for the New England Council. So, we'll see.

BM: That was an extraordinary event.

DP: And it almost flew under the Center's radar. I wanted them to issue a press release on it. And I'd written one. And they were, I don't know how much I should sit here and complain about things. They were distinctly not interested and it was like, "Oh well, you know the council already released a press release." And I said "But NOS [National Ocean Service], who is also working with the science on this, has big press release, and the enviros. Why doesn't the Center at least put out something that 'Hey, look at what we did here to help the council processes."

BM: Do you have more fieldwork planned for that?

DP: The money technically ran out last year, and we're right now heavily working up the data, and helping the councils, and trying to get publications out, but we want to go back. I particularly want to go back to the Gulf of Maine, because, of course, it's close, it's shallow, it's not as ridiculously expensive as trying to get out to the edge of the shelf. We can definitely use more mapping. The *Bigelow* has mapping capabilities. We may be able some more mapping. Martha's actually going to be doing stuff in the Southeast. And they're sort of doing, I think what they're doing, the coral program might be doing a second round. So what they're doing is now they're going back to the Southeast and are redoing some stuff. And I think they're going to come around again to us, who knows when. So, ships are very expensive especially when you go way the heck out there, they're very expensive.

BM: And way down deep.

DP: And ROVs are very expensive, which is why I hope to do more work in the Gulf of Maine, because we worked Peter Auser the University of Connecticut and Rhian Waller from University of Maine, and we were able to use the *Kraken 2* ROV, and camera sled on *the R/V Connecticut*. And comparatively speaking, those were good platforms.

BM: Do you have similar communities in the Gulf of Maine to what you find in the deep canyons?

DP: Well, you do have similar species, the species count is low. There's maybe 5 species, two major species, and genetically one of them is, I believe, to the ones that we'd find in the Canyon. The difference is, you can often have, when you find hotspots, they are hot. I mean they're packed with corals, and main thing, because they are shallow, they are packed with fish. What you see in the canyons often is you'll see a lot of the deep water fish, few and far between here, if you're seeing like the movie that we did, fish everywhere, essentially, which makes it kind of fun.

BM: Is that the movie online?

DP: Yeah the one, *Deep Sea Coral in the Gulf of Maine* or something like that. That was fun to do actually.

BM: Well that's so interesting.

DP: I think so. I wonder why everyone else isn't.

BM: I remember recently, a couple years ago, one of the fishermen in Point Pleasant was just reflecting, not about at that point the deep sea corals, but he said, you know there used to be, right out here, you used to see all kinds of, I forget what they were, but plants growing. Those are all gone. There was structure.

DP: Yes, there was structure.

BM: Now he is a trawler, he's a dragger. He's partly responsible for it, but he just reflected on it, wonder what the consequences are of that loss.

DP: You can see, we have many examples in our dives in the Gulf of Maine in particular. These corals are there, because they're in spots where you can't fish for the most part. You can do some trawling and you can definitely do lobstering there, but you can see where areas that have been scraped clear most, probably by traps. I went to the University of Maine and then I worked in the Gulf of Maine before I went to the University of Maine, so now I'm back in the Gulf of Maine, and every time we did a dive, it's amazing to me. First of all, it's amazing to me how much we don't know about what goes on down there. While we're doing from surface ships, and yeah, I can kind of tell from surface ships, benthic ecology and stuff, but being down there with an ROV or whatever is a whole, other world. And the fact that some of these places, we had no idea even existed, you know, and as Peter Auser says, he's been doing dives there for 40 years essentially, and to come across these things and to realize you're only seeing A. a very tiny piece of the Gulf of Maine, and the frustration of realizing, oh, we're going to need money to get back down here. Why can't we do this all the time, I don't understand why we can't do this all the time. I find it amazing.

BM: Now are foundations involved in funding some of this? They must be doing some of that support.

DP: We have the enviros on our side, we did do a cruise.

BM: Center for Marine Life?

DP: You know, I haven't heard from them in a while actually. The Wide foundation if you know who they are, they are the people, that's the guy who founded Compaq computers, I think. They sponsored a trip to the seamounts and the submarine canyons in 2012 that we went on, using Woods Holes AUVs, which, unfortunately we suffered a catastrophic loss of one of the AUVs and had to abort the mission, but before we aborted the mission we got some wonderful shots of physalia seamount, and some good information on that, and published a paper on it, but that was the end of their involvement with AUVs so, it wasn't our fault, it was nobody's fault. That put a damper on things. But what has really worked with this whole deep sea coral program is that the cooperation that we've had from the other line offices like OER [Office of Exploration and Research] which runs the *Okeanos Explorer* and NOS did the habitat suitability modeling that we all worked on. This has been across NOAA effort to do this in the Northeast. And that's the way of the future. Everyone gets their little piece of the pie and gets the glory of it.

BM: Something sexy like that.

DP: Oh yeah, I mean, in the Office of Exploration and Research, the ones who run the *Okeanos,* they're all about sex, the sexy science. And we had a hard time with them something because it's like ok, we know that the stuff that's really deep is sexy, but we need to look at this shallow water, and they're like "Well, who's interested in that?" "We are! The public isn't, but we are, and they will be interested in it!" So we always went back and forth with them, it's like.... [laughs]

BM: [laughs]So, you're the last one in the Center doing this kind of work, but you've got other people.

DP: I mean certain people are helping me, but they're not doing it full time. I work with Peter Auster and the academics, and I still work with Martha, and that sort of thing.

BM: Is this part of the new direction for this lab, or the Center? I guess that's two questions. One is Sandy Hook going to build on this, or is it going to be taking place elsewhere?

DP: As long as I live and breathe, we're going to be building on it because again I don't see anybody from any other part of the Center dealing with this right now. We're an old fashioned Center. An old stock assessment center, and this is a whole new world to them essentially. So I'm trying to keep the fires burning on that sort of stuff. Yeah, I don't know what the future, I mean we're having a big international deep sea coral conference, it's taking place in September in Woods Hole, so this is our chance to shine with our new discoveries and stuff like that.

BM: So is there something else you'd like to talk about?

DP: I don't know, did I talk enough?

BM: Are there trends are there changes in terms of, are you at all touched by offshore developments, wind power that sort of thing?

DP: Oh yeah. I mean, it doesn't directly impact, except for EFH of course, it's too shallow for deep sea corals and it's not going happen in the Gulf of Maine, where we have the deep sea corals. Um but it is part, I am interested in it because it's marine benthic ecology. It's exactly the kind of things that we should be doing, assessing the environment for them. This is where habitat assessment comes in.

BM: Here at the lab, there's some work going on that.

DP: Yeah that's Vince Guida, BOEM [Bureau of Ocean Energy Management] work, yeah that's very important actually. And that's also a new direction for the lab in terms of habitat assessments and things like that. So again, this is a cross government effort and I think it speaks volumes that, I wonder, I question, I mean the people who catch and count, the stock assessors, do they do any of this kind of work that involved, I'm just thinking out loud here, that involved the other line offices and Headquarters, and I don't think they do. I think they have to worry so much about stock assessment, catch them and count them, and what is the council going to say, who is going to sue who. They can't afford the time to do this stuff.

BM: I mean, yeah, they're overwhelmed with the demands of the Magnuson Act system.

DP: And of course the major thing is climate change, and I do worry about my pretty little corals down there, because they're going to get hit, just like all corals everywhere, and we're already seeing, I mean not with corals, but with fish right now, at least, not with deep corals at least in the Northeast, but fish we're seeing the effects of climate change and so, what does that mean. And the stuff, Chris is involved in the OA stuff. What's interesting is that they're dealing with OA, you know, I talked to Chris about this a long time ago. I said " Chris, corals!" and he said "But I can't, I'm a fish guy." I'm like "Oh, you're right".

BM: So is nobody doing anything with these deep sea corals in OA, it's not possible to do it experimentally I guess?

DP: Well there is some, I know some people in the Southeast are doing stuff. But not up here, not that I know of. And even academia, there's very few people, Les Watling and Rhian Waller at the University of Maine, she's well known because she's a National Geographic explorer. She does a lot of deep diving, works in Alaska and the West Coast, and she's relatively new at the University of Maine, and I think we sort of actually got her started in her own back yard. She does reproductive ecology, so she's doing that with the specimen we collected.

BM: I guess she wasn't there, I did a review at the University of Maine a couple years ago, maybe four or five.

DP: I think she's only been there, we had her out 2013, 2014, since 2012, I believe, is when she joined.

BM: Well, this is great, thank you.

DP: Well, thanks for your interest.

BM: It's very interesting.