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Edward DeMartini ~ Oral History Interview

Edward Glazier

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Voices from the Fisheries
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Interview with Edward DeMartini by Edward Glazier

Summary Sheet and Transcript

Interviewee

DeMartini, Edward

Interviewer

Glazier, Edward

Date

July 28, 2016

Place

Honolulu, Hawaii

ID Number

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Biographical Note

Edward DeMartini was born in San Francisco, California in 1946. His father died when he was four years old, and he was introduced to fishing when he was six by his cousin who acted as a surrogate father at the time. Ed says he was a natural historian at a young age and credits his mother with giving him the latitude to be an avid explorer and sparking his early interest in fish. Ed graduated with a degree in biology from the University of San Francisco in 1968, and a Master's in Biological Oceanography in 1970. He got his Ph.D. in zoology in 1975 at the University of Washington studying under Bob Paine. He was a research professor at University of California Santa Barbara for 10 years before relocating to Hawaii to work in the Western Pacific for the National Marine Fisheries Service.

Scope and Content Note

Interview contains discussions of: bottom fish, pelagic, insular related research, age and growth, reproduction, coral reef, reef fish, otoliths, technology changes in age and growth studies, bomb radiocarbon, impact of climate change

Edward DeMartini discusses his philosophies and approach to looking at the growth and reproduction of reef fish, bottom fish, and swordfish; as well as coral reef ecology in the Western Pacific. He also discusses technical advances and research techniques, advancements in sampling methods, politics and resources as barriers to research, changes in the NMFS working environment, effects of global warming and acidification, and predictions for the future of his field.

Indexed Names

Andrews, Allen
Boehlert, Dr. George
Boggs, Christofer
Brainard, Rusty
Laurs, Mike
Mundy, Bruce
Paine, Robert
Parrish, Frank
Polovina, Jeffrey
Pooley, Sam
Ralston, Steve
Uchiyama, Jimmy

Transcript – ED-001

Edward Glazier (EG): This interview is being conducted as part of the Voices from the Science Center Project funded by the Northeast Fisheries Science Center. It is also part of the Voices from the Fisheries project that is supported by the National Marine Fisheries Service Office of Science and Technology. I'm Edward Glazier and today July 28, 2016. I am speaking with Dr. Ed DeMartini, longtime research fisheries research biologist at the Pacific Island Fisheries Science Center. This morning Ed is going to talk about what inspired him to get into fisheries research and we'll address some other topics as we move forward. Alright, Ed?

Ed DeMartini (ED): Well, I was born and raised in San Francisco in 1946, so I'm coming up on the big 7-0 milestone, which is one of the reasons, well, the main reason why I'm retiring now. My background... ah, probably you know my comments could best be interpreted keeping in mind that I think I was born a natural historian. My father died when I was four. My mother gave me a lot of latitude to explore and do what I want, and what I wanted was to crawl around underneath bushes in Golden Gate Park, like I said I was born and raised in San Francisco, and you know, collect things, look at things. I started with fairly inanimate things like rocks and minerals and what not, stamps and coins, then went to insects and as I look back I think a very influential point is my mother having the presence of mind, well, she didn't have another partner after her husband died and she coerced a cousin of mine, maybe not coerced is the word but, convinced a cousin of mine to sort of act like a surrogate dad, so what do dads do they take kids out to do stuff like fishing.

So, you know, I was introduced to fishing at about an age of six and it sort of took off from there. I've always been interested in fish and I was all the way through grammar and high school and college. Used to be an avid fisherman. Took up diving because I wanted to see the fish which also helped understanding their behavior so you could fish for them more effectively, and in much later years, I took underwater photography so we could photograph them both for fun and for my research. Got a biology degree University of San Francisco 1964, Master's in, oh I'm sorry, it's 1968, the Master's in 1970 in Biological Oceanography. That was an interesting

tangent if you will. And then I got accepted at the University of Washington in zoology where I studied under Bob Paine who incidentally recently passed away, I don't know if you are aware of that, and he, sort of, promoted, in his very hands-offish but very professional way, my interest is just asking a lot of questions and tinkering. And since I brought with me a natural history knowledge of fish, I naturally explored that, got in as a pre-doc to do it. Got my Ph.D. in 1975 in zoology there. Did some consulting before I got to a research professorship at U.C. Santa Barbara [University of California]. I did that for about 10 years as Paine used to like to say that he was kind of amazed that I could maintain myself on soft money for 10 years but eventually as times got rougher, that petered out. And I applied for a position out here for a number of reasons, one being it's a very good place to study fish especially if you're interested in tropical fish, reef fish, but also because my wife and I were very much into travelling, diving, underwater photography and Hawai'i was an excellent sort of launching place to go to the Western Pacific.

So I started out here in 1990 with George Boehlert and probably didn't hurt getting the job that Boehlert and I were compadres from about the same time in graduate school - he at Scripps, and me at the University Washington, and we were doing sort of similar things on fish, of course. Actually, I was hired as a backfill I think on Steve Ralston's position in 1990 and at that time Jeff Polovina was running, I forget what it was called at the time, but there was an insular ecology program and so I got hired as the head of that.

EG: Directly for NMFS?

ED: Ah, I'm trying to remember if I was the leader of the program right the first year or not, I forget. But it was just developing and the emphasis at that time was on bottom fish and lobsters.

EG: In the northwest?

ED: Yes, in the northwestern islands. The main Hawaiian Islands wasn't even on the map for bottom fish at that time and we had very strict budget constraints you know, I sort of took it as a challenge to see how I could get any meaningful information out of cruises when you have a non-salary budget that's like under a grand which limited what you could do with bottom fish because there is a limited number of cruises. I think the most I ever had in one year was two, and so you can't really do an age and growth study unless you can collect samples throughout the year, but you can do reproductive studies if you focus on just the reproductive season, so reproduction was more of a meaningful research tack for bottom fish at that time, so that's what I focused on -- the bottom fish. Obviously there was still a continuing need for age and growth studies on bottom fish but we just didn't have the resources to either go out and collect ourselves or certainly not buy from fishery-dependent samples to get the specimens we needed to age fish, and lobster was sort of a, well, little different subject because, well, it was an equally important fishery at the time but there really wasn't any means of aging lobsters and there still isn't any really good means of aging lobsters.

EG: I didn't realize that.

ED: Yeah. There's some -- I don't want to get in the specifics, it's really going off in a tangent but it's not like the recognized ability to age fish based on hard parts like otoliths, but their

reproductive studies were doable, especially since the dedicated, ongoing cruises were during the breeding season, spawning season, breeding season for lobsters and it was something that basically was being paid for otherwise. You know, the cruises were being funded, so I could get all the specimens I needed, just having somebody save specimens of lobsters, and so really the only cost in doing that research was the time and effort and cost of examining the specimens back in the lab. So it was a viable research alternative and so there's two things that were island-related or insular-related bottom fish and lobsters were the subject of what I worked on through I think the coming of Mike **Laurs** which was I think in the mid to late '90s.

EG: Yes, that's right.

ED: And he was, you know, of course, focused on pelagics especially swordfish

EG: Right.

ED: And so I like to refer to it as my 40, what seemed like 40 years in the wilderness studying the growth and reproduction of swordfish. Pelagics are a fascinating group of fishes physiologically from a physiological standpoint. From an ecological one, or life history perspective, they're horrible.

EG: Yeah.

ED: The otoliths in a 400 pound swordfish are smaller than the otoliths in a four centimeter reef fish.

EG: Is that right?

ED: Oh yeah. Yeah. So, there is just all sorts of difficulties there.

EG: I thought you were going to say because movement, you know, difficulties...

ED: Well, that too. I mean the other aspects of its' ecology because of all the trans-boundary things, and large scale movement. Yeah. Which I guess I should make a note to myself to bring up in terms of what recent technological advances have furthered things. Certainly all the tagging developments have been instrumental in improving the research in terms of movement studies of pelagics, but that's not research that I've been involved directly with myself. What has been, let's see, maybe I should take up the same time thread, so then did that under Mike **Laurs** and then when Sam Pooley took over, which I think was still – no, it couldn't have been – it had to be in the early 2000s.

EG: It was, yes that's right as I remember.

ED: Because I remember there was suddenly funding available to study coral reefs with the coral reef initiative which happened in 2000 and I remember Mike **Laurs** was still here when that all began. But surely after in the early 2000s, Sam took over and he, I guess you'd have to say he's a more hands-off director, and he certainly wasn't promoting an agenda that was strictly

pelagic. So basically I went back into more insular-related research and Chris Boggs who was my... There was a certain amount of restructuring in the lab, new divisions, partitioning of personnel, and emphases. And Chris Boggs took over the -- I forget what it was called initially, but right now it's Fisheries Management Research Division, and right now it has both pelagic and insular to it. But Chris would, in fact the fellow that just came in the door, was Chris. You can't tell from the audio recording and you can tell he's a personable guy and I'm also very appreciative of him giving me the latitude to pursue things that I think are important, and I think it's worked out well not only for me but for the lab, because it gave me the latitude to moonlight in the Coral Reef Ecosystem Division which was initially, it was a division - CRED - even though I still officially maintain my status in the fisheries monitoring program and I did a tremendous amount of diving when I started with Frank Parrish -- God it was early to mid '90s even, though it was sort of an episodic -- not an episodic -- a regular recurring but like once a year basis going up to the usually either French Frigate Shoals or Midway to assess fish forage base for monk seals.

EG: OK.

ED: So it was like a little side project which I carried on even from the mid '90s but starting in 2000, I became a regular component of the field research teams and evaluators of data for the Coral Reef Ecosystem Division -- Rusty Brainard's division -- and that officially began in 2000 and I think my last cruise as an official party member of a CRED cruise was somewhere in the mid 2000s. I continued doing reef fish fieldwork but I got smart. I got my own money from the coral reef program in NOAA Habitat Division. It's so basic. It was small craft work where you just fly up to Midway and work out of small craft and that's been very productive because I was able to pursue some needed but sort of like detail tangential research on juvenile recruitment, stuff that you really don't have the time to do when you're trying to conduct broad scale monitoring of fish abundance, you're focusing on the adults and you don't have to do special studies on juveniles.

EG: There's still infrastructure at Midway?

ED: There was at that time. That was, I think, the last field work I conducted at Midway was in 2009.

EG: Right, OK.

ED: In short, within about a year after that, I don't think there was sufficient infrastructure. I want to hearken back to what I did with Frank Parrish because I think one of the things that he might have mentioned, maybe he didn't. Two hours he probably did. Was I think we were the first, Frank, myself providing complimentary expertise but primarily Frank of using NOAA ships as platforms for multiple small craft operations which was really integral to certain types of sampling where you need to have not too many people in the water at one place but a lot of different places covered for spatial coverage. So in that respect the ship could provide a platform as a floating hotel and I think it was.... I would imagine it's something that's been done elsewhere, certainly down the Southeast Center with all their coral reef work but that type of research really requires that type of sampling and ability.

EG: This was still the *Cromwell*?

ED: Yeah, it was started with the *Cromwell*. I think my last cruise was the first cruise of the *Hi'ialaki*, but it was mainly the *Cromwell*. Anyway that's one of the things -- if Frank didn't mention, he probably should have because I think that was a major sort of development. It wasn't any technological breakthrough but it was a great shift in perspective of how to do certain types of sampling.

EG: Logistics?

ED: Yeah. The other thing... Okay so fast forward again. So for various reasons, one being getting old and creaky, I sort of phased out the SCUBA research. I think in 2011 or 2012 was my last field season and again this was small craft and shore-based work based on using money secured from the coral reef program. And, since that time I've re-focused on finishing certain life history studies that we began but because of technological inadequacies weren't able to finish to a definitive conclusion and that is age and growth work on bottom fish and some reef fish because typically the state of the art ever since the mid '70s has been to take the otoliths and process the otoliths so that you could get counts of annuli or daily micro increments, but visual techniques under the microscope. What you do in that situation is count what you perceive to be marks that form once yearly or once daily and if you're right about your assumption, you have an accurate descriptor of growth, but you need something to validate those counts and we worked for several years and finally got an expert, now an internationally-renowned expert Allen Andrews, who provided the expertise of validating these marks that we're calling annuli and, well mainly annuli, features that are formed once a year.

And there's a number of techniques, chemical techniques, and physical chemical techniques, the most fruitful of which has been bomb radiocarbon and it requires a computerized micro-milling machine which costs, I'm sure, 10 figures at least. And it's a... how should I say... you need a lot of skill and experience in being able, number one to obtain the chemical specimen that you need using this micro-milling machine but then you also need the funding to be able to send off those samples to an institution that is able to read the samples for their bomb carbon signature and then plus you also need references against which to relate the signals you get from your calcium carbonate specimen from the fish otolith and that typically is for these insular resources like shallow reef fish and deep slope reef fish. A signal of bomb carbon in a coral record, a coral slab, where you take a section from some coral heads and you verify or otherwise verify these annular features based on other chemical techniques such as the percentage of oxygen isotopes which is another artful, expensive, and difficult technological approach, but you can get this validation. So you're using one validated reference to validate another one which you then apply to the zones in your fish otoliths.

EG: With assumption of affinity between the specimens?

ED: Yeah, the assumption is that the fish is growing up in the same environment as the coral specimen, and that's accurate to greater or lesser extent. Certainly it's very accurate for things like most shallow reef fish that once they come in from the plankton and settle, their home

ranges are in the order of at most several hectares. And so the reference chronology that you get from the corals collected from that island are going to be very representative of what the fish experiences as it grows and.... Anyway, technologically, from a technological perspective that has been the one thing that has been, I think, most important and even crucial in doing the age and growth work on not only some shallow reef fish, but we're just now finishing five species of parrotfish in Hawai'i and also looked at a commercially and ecologically important surgeonfish (*Naso unicornis*) but also to deep slope bottom fish like opakapaka and ahu and onaga --

EG: The other economically significant...

ED: --yeah, right..and this also has spanned since a lot of these species are important not just in Hawai'i but in the Pacific island territories, having to develop the coral reference series for places like Guam. Getting corals from Guam, and getting a reference, so that you can then look at opakapaka or onaga otoliths from the fisheries in Guam and so that's an ongoing thing that will probably span, oh half dozen years at least further.

EG: With none or expected variability between regions?

ED: I think we already have good data that there is variability in growth rates in opakapaka between Guam and Hawai'i. There's genetic evidence that the opakapaka in Hawai'i are distinct from elsewhere, which doesn't necessarily mean that they're going to be growing at different rates and vice versa. But it looks like they are growing at different rates based on what's been done thus far on bomb carbon analysis of opakapaka otoliths.

EG: Which way does the growth...?

ED: There seems to be a trend towards slower growth in the less productive Guam environment.

EG: Ahh..

ED: And I say trend because we've seen the same thing in kala and I'm trying to think if there's any other example. Certainly the shallow reef fish including parrotfish are not as long-lived whether they grow more slowly or not I can't say right off the top of my head but there are certain... the bottom line though is as we understand in the present for a number of diverse shallow reef fish, and for at least one species of deep slope bottom fish, there are differences in growth rates between Guam and Hawai'i which is important if you have an archipelagic management plan where you're basically setting up your management in Guam distinct from Hawaii.

EG: Interesting, yes.

ED: Anyway, I want to just re-emphasize that as far as my work, my research, the most technologically, the most significant and crucial technological advancement has been the ability to bring aboard somebody with the expertise which has fairly recently developed in the past 20 years, past 10 years, primarily, of using these techniques like bomb radiocarbon to validate the ages that we're assigning based on visual counts of annuli and otoliths.

EG: Ah ha, interesting. How do you spell bomb? Is it b-a-u-m? Is that what you are saying?

ED: b-o-m-b.

EG: Oh, okay.

ED: I didn't realize -- so you're not familiar with that?

EG: Not highly familiar.

ED: Oh, you know, everybody thinks of, well, you know, oh this tree is whatever the heck that pine tree is in California, it's 2,000 years old. The reason why they are able to age it is that they can look at isotopic signatures of rare naturally occurring isotopes of carbon, and that's distinct from what I've just been talking about bomb radiocarbon which is due to all of the U.S. and European tests in the South Pacific in the '60s and '70s, so that's why it's bomb, b-o-m-b. It's all of the exploded devices which is probably, here's my sort of progressive liberal coming out, but the only good thing that came out of all of that is being able to release in the environment something that marked the otoliths of fish that were living at that time, and also continued to take up this signature which persists over time. I don't know if you've ever seen any plots of this radio isotope of carbon but basically in the '50s, it flat-lined, and then it took off with a very steep slope when they were exploding all these bombs in the '60s or early '70s and then that had a moratorium, thank God, and the only remaining signature in the environment, which starts out atmospheric but works its way into the ocean and eventually into the things in the ocean like corals and fish otoliths, is that after this peak there's a decline, and depending on oceanographic circulation patterns, and where you are lat/long in the world's oceans, there's a different slope to that curve but you can actually use that decline, what they call the decline side of the curve, to age more recently living fish and it's a technique that Allen has been in the lead in developing.

EG: So it's a regionally specific signature, but it's common enough to be able to be used as a measure of variability.

ED: It's wide-spread enough that it's throughout the Pacific, but there's going to be regional variations to it because of the different oceanographies.

EG: Which you would you have to account for.

ED: Yeah, by getting coral chronologies from the region of the fishery that you're interested in. So for example, we're working with fish now that are way under 20 years of age, and they're all on the decline side of the curve, but by looking at different parts of the otoliths, like the growing edge or the very most central core, which represents the growth during the first year, the year of birth, you can for fish that you're assigning an age to based on visual counts under the microscope, you can see how that relates to the bomb carbon count and if you had that reference chronology from the region from which a fish was collected.

EG: Yeah.

ED: It's sort of like making a silk purse out of a sow's ear, but it's been a major breakthrough.

EG: So, in a way it's technique more than technology, I mean, physical technology.

ED: It's both.

EG: Or has microscopy improved as well?

ED: Oh sure, sure. But not as greatly or as rapid a rate as these physical chemical techniques have, and I started by answering your question by saying it's both. It's both the artistry and the technology, because obviously it's like playing a musical instrument. You have to do it a lot and be talented to be able to perform it. You're right, that's one thing. But the technology has improved in the sense that you could use a smaller amount of material to get a signal now, and the sensitivity is increased, and the reason why that's important is because not all fish have big otoliths. So before, we were limited in what species we could look at if they happen to have small otoliths, they'll provide enough material.

EG: Yeah.

ED: So now we can look at additional species because you don't need as much material to get your signal. So it's both. It's both artistry and technological advancement.

EG: That's very interesting. From a historical standpoint.

ED: Yeah and you know I'm enjoying what I'm doing now is getting these odds and ends, being able to tie together all the, not all but much of the growth work, but that's enjoyment basically from a feeling satisfied that you're doing... you are finishing a good job. As far as the aesthetically most enjoyable stuff I've done here at the lab certainly has to be the diving at all these remote locations.

EG: Yeah.

ED: So from a purely enjoyment aesthetic point of view the diving ranks number one. I think I've covered because most of these points. Perspectives for the future.

EG: How about... well, we've certainly talked about...

ED: Okay, we could end with that.

EG: Sure.

ED: Sure we can go back to any one of these things.

EG: You've talked about the region in terms of your career and what pulled you here. Have you done similar work in any other regions of the world, which would allow you to compare, and

indicate any unique regions?

ED: Yeah, certainly a lot of the ability to do what I've done since I've been here, was grounded in similar work I did with temperate reef fish all along over the West Coast.

EG: Ahh.

ED: I started my research in the Pacific Northwest with the University of Washington. And, it was a project on reef fish and entailed a lot of behavioral ecology but also fundamental life history work, dealing with reproduction and growth, and subsequent to that, I worked in Northern and Southern California working on age growth and reproduction of what they called the rocky inshore fishes, fishes of the kelp beds, and so much of what I did at least started out with in the early '90s and ending with now in 2015-16, is applying the same basic philosophies and approach to looking at the growth and reproduction of the reef fish and bottom fish. So, I guess the answer is yeah, well, you know, I brought a lot of that experience to the table working elsewhere. Umm..

ED: Ahh.. how did your work environment change over time? Well, the fact having it in the politics of it... Ah, you mentioned UH Manoa [University of Hawai'i] and Kewalo Basin is in your inquiry. I don't have anything to say about Kewalo, because I never worked at Kewalo, but I certainly up until we moved out here in 2011, you know from 1990 to 2011, we were on the UH campus.

EG: Yeah.

ED: And my personal viewpoint is that you've made... NMFS, whoever...made a big mistake in taking us away from a campus. I mean, it just makes it so much more difficult to -- not so much to maintain relationships - if you work at it you can with the academics at the university - but it makes it harder to just maintain contact on a frequent basis, going to seminars, it's just too darn difficult going across town, both for them and for us going over to UH, so I think there was a good reason why I think NMFS started out, and as far as I know, continued elsewhere in being focused on university campuses. I mean, the collaborations of students.

EG: I worked at the lab in the mid '90s and I sat in at a desk in Jimmy Uchiyama's room.

ED: Seriously? Mid '90s?

EG: Yup. Yup.

ED: Well, I missed..

EG: Bob and Jimmy were in the same place.

ED: Yeah well, at that time both Bob and Jimmy worked for me.

EG: Ah ha, OK.

ED: And I was probably upstairs.

EG: Yes, I remember. It was always chilly because Jimmy wanted to keep the microscopes at a certain temperature.

ED: Yeah, well, OK.

EG: I really enjoyed working with those guys.

ED: Yeah, and I'm sure a lot of that was microscope work on the hard parts.

EG: I was doing social research so it was completely, it was where I needed to sit.

ED: Ahh...I remember there was sort of a desk just as you came in the door on the right for visiting scientists.

EG: Yes.

ED: Yeah, yeah, yeah, yeah, yeah. Chad, who sits right over here right now, I remember one time he was working there. He was actually doing some work on larval fish and he had just gotten a degree, or finished a program, or something on larval fish and he was doing something with Bruce Mundy, sitting at that desk . How long were you there?

EG: A couple of years.

ED: A couple of years?? [laugh]

EG: Well, in and out, I was at the point that I had a desk on campus as well, so I could go back and forth.

ED: I don't recall ever bumping into you.

EG: It may not have happened.

ED: Well, that reflects on how often I checked in on people or how often you sat at that desk.

EG: That's right.

ED: Or both.

EG: Right.

ED: OK, so that's about all I want to say about how the environments have changed over time.

EG: How about the future of your field? Where things are headed?

ED: Well, certainly what I was talking about last about the technological advances in being able to validate ages assigned to fish hard parts. I mean that's going to continue to improve, and so there will be more and more fish that haven't been examined, some of which are important. Like your pelagics that have small otoliths for which that technique will be applied, because at present there really isn't any way of, short of tag recapture, recaptures of tagged fish, to validate based on the days of liberty, the age versus size relationship for the pelagics. I'm sure pop up and other types of tags are going to continue to improve, it's not my field, I feel just like the ability to look at smaller and smaller quantities of material for the physical, chemical analysis of otoliths. The technology and the technological improvements there make small and smaller tags, you could use them on smaller and smaller fish. So you could study movement patterns of juveniles of the economically important fish.

EG: Yeah.

ED: Yeah, those from the technological perspective, that's the two most obvious things I could see. From the social science perspective, an increasing appreciation for objective quantification of the social environment dealing with fisheries and that affects a multitude of things including, you know, MPAs [Marine Protected Areas] and how you site them and what not. It's not really my field but I have a vague appreciation for how that...how that would work. But then you know, that's just from the technological perspective. From the sanctions within the organization, sanctions in the sense of what is being promoted, that's totally... I mean, that's the biggest black box depending on politics in this country. I wouldn't even hazard a guess.

EG: None the less, it's critically important what kind of resources come down the pike.

ED: Oh yeah, it's critically important to the extent that resources that dwindle or dry up will have an overwhelming affect what gets done and vice versa. Certainly things having to deal with the interactions between fisheries and climate change are going to be a big issue.

EG: Yeah.

ED: That's not so much technological, but from a human ecological perspective and out here to Hawai'i, it's going to be – oh, who knows what it's going to be. There's so many ramifications of that but there's going to be shifts and distributions certainly in reef fish and a lot of the sort of more warm temperate rather than tropical adapted endemic species are going to be pushed farther up chain into the Northwest. Now whether or not that releases any species with Indo-Pacific or tropical affinities to prosper in the main Hawaiian Islands where there is exploitation, I don't know. You know that's....

EG: What about acidification? What are your perspectives on that one?

ED: Well, you know there's not going to be as much of an immediate effect here say as in the Pacific Northwest where there's already been a big perceived impact because of the shellfish industries, but certainly as things continue to acidify, it's going to affect all calcifying organisms including some things that are of direct economic importance. You know, we don't have a big

mollusk fishery, but certainly the crustaceans.

EG: Yes.

ED: And, I think more fundamental and potentially more problematic is things that have calcification that are in the food web that aren't of direct economic importance. If you start short circuiting the food web, God knows.

EG: Yes, right.

ED: So, um

EG: So attention to these ecosystem issues is warranted.

ED: Yeah and you know that I saw there's...sort of get on my soapbox for a second. There's been a recent paper I want to mention. The author has no nothing to do with NMFS or whatever but it's in the primary literature that made the argument that basically these large scale environmental effects due to climate change trump – God, I should not use that word! – Ah, overwhelm all of these regional and local factors that we think we can improve upon to help local situation. Basically says based on the coral cover, global climate change and warming of waters and acidification is having such an overwhelming effect that you're not going to be able to improve your local situation by cleaning up sedimentation and non-point source pollution and overfishing.

EG: Mesoscale supersedes micro, ya

ED: Well it's actually more than mesoscale.

EG: Yeah, yeah global I guess.

ED: And I don't happen to agree with that because I was looking at the analysis, and sure you know you could set up a reserve for fish to protect some key species and if that species are the ones that it directly relates to are totally dependent on coral, and global warming torches all the coral, eventually it's going to have an effect on the fish. You know, when we take away essential habitat--

EG: Right.

ED: --and I don't care how well you protect it with a reserve, you're going to fail. But I think there's a lot of things that have loose enough effects with coral that doing things like safeguarding the regional environment sedimentation non-point source pollution, reducing overfishing or preventing it, that is going to benefit you at the local or regional scale regardless of what's going on at the global scale.

EG: So don't give up the ship.

ED: Yeah, don't give up the ship. Yeah. I mentioned in passing - we've only got a couple more

minutes.

EG: Sure.

EG: I mentioned in passing how climate change is going to affect us out here in say fisheries, endemics, and Indo-Pacific tropical species. Well in that regard, I don't foresee it ever happening because of the certain dichotomous relationship between the Monument and fisheries, but there is going to be increasing need for studies that bridge Northwestern Hawaiian and the main Hawaiian islands. And, at a number of levels. Unfortunately to do certain life history work like age and growth, you need to collect specimens, and you often need to collect a large number of specimens and whether or not, depending on species, it would be good stewardship to, if you could, get a permit to collect specimens up through the Northwestern Hawaiian Island chain, and make the comparison, say to either affirm or fundamentally test whether or not species X in the Northwest is the same stock as the species X in the main islands or not. Ultimately, I mean, you want to know what you're taking out from the main islands but you want to know not only replenishment going back and forth from the two sub-regions but whether or not they're dynamics are the same, or whether or not your pool of the stock is the entire archipelago or just the main islands, and I see an increasing need for that type information. I don't foresee that being something that's at least immediately forthcoming. But it should be.

EG: Yeah, it doesn't seem like too much to ask for to be allowed...

ED: Yeah, well. Well, it really depends on how permitting is approached.

EG: Yeah. I mean I hear some reports that it may be difficult to do any research of that nature, as fundamental as it is.

ED: Oh yeah well it has been and it's essentially why I haven't pursued it.

EG: For instance we're not sure about the state of the lobster stocks. Is that correct?

ED: Given only because we don't have any monitoring going on up there. I don't think we have any good timely accurate information on the status of the lobster stocks up there. Yeah, I don't think we've had a cruise up there since early 2000s? I forgot. I'm thinking more in terms... see that always was a ... at least by the time I got here in 1990, probably for 10 years prior to that or more, that was just the lobster fishery in Hawai'i was just the Northwest, because they'd long since depleted stocks down here, if that's what you assume, or there never was much of a stock down here to begin with because of habitat limitations. Who knows? But certainly right now, there are good bottom fish stocks up in the Northwest. And a key question, I think, would be what is the relationship between what's up there and what's down here. Bottom fish and lobster are fundamentally different in terms of the status of the fishery and the likely fishery interaction with the ecology of the islands.

EG: Larval movement...

ED: Well, I mean, the fundamental life histories of lobsters versus deep slope bottom fishery for example are quite different.

EG: I was using that as an example of sort of the politics to try what you can and cannot do in terms of research.

ED: Yeah, I think the politics.

EG: Politics and resources.

ED: Yeah. If you were to make an argument from a resources standpoint, I think, the bottom fish would be a much more meaningful tack to explore than lobster. Are there are any other things? I think I've pretty much...

EG: No, I think you've hit them. I really appreciate your willingness to talk this morning. It's been interesting. I've learned something.

ED: Well, you know, to a certain extent, even me doing all the talking, you learn something by thinking back and just reflecting and trying to put it all perspective and it should be very interesting when especially when you take all these different people's perspectives and meld them together and tell a story.

EG: That would be nice.

ED: Yeah.

EG: There's some discussion of that possibility, we'll see where it goes.

ED: Okay, well, thank you for the opportunity.

EG: Thank you. Thanks Ed.