



07-29-2016

## Humphreys, Robert ~ Oral History Interview

Edward Glazier

Follow this and additional works at:

<https://www.st.nmfs.noaa.gov/humandimensions/voices-from-the-fisheries/index>

---

### Recommended Citation

Humphreys, Robert. Interview by Edward Glazier. *Voices from the Science Centers*. Voices from the Fisheries, NMFS, NOAA. 29 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  
166 Water Street  
Woods Hole, MA 02543

# **Interview with Bob Humphreys by Edward Glazier**

## *Summary Sheet and Transcript*

### **Interviewee**

Humphreys, Robert

### **Interviewer**

Glazier, Edward

### **Date**

July 29, 2016

### **Place**

Honolulu, Hawaii

### **ID Number**

VFF\_HU\_RH\_001

### **Use Restrictions**

The interview transcript is provided for individual research purposes only: for all other uses including publication, reproduction and quotation beyond fair use, permission must be obtained in writing from *Voices from the Fisheries*, NMFS, 15 Carlson Lane, Falmouth, MA 02540.

### **Biographical Note**

Robert Humphreys was born in Newport Beach California, April 30, 1953. He grew up fishing in his big backyard, the Pacific Ocean and Newport Beach, California. Bob became a marine biology major at the University of California, Berkeley where he studied leopard sharks and bat rays in Bodega Bay. After graduating with his bachelor's degree, Bob then worked for the California Fish and Game office before heading to Hawaii in 1977. He began working at the NMFS Honolulu Laboratory during that year. Bob continued his marine studies at the University of Washington, and spent most of his career in the Northwest Hawaiian Islands studying seamounts and bottomfish. He is the Life History Program manager and Supervisory Research Fishery Biologist at the Pacific Islands Fisheries Science Center. Bob plans to retire at the end of 2016.

### **Scope and Content Note**

Interview contains discussion of: the changing roles of NOAA, Northwest Hawaiian Islands Research cruises, data-sampling of data-poor fisheries in Hawaii, billfish, amberjack, Northern Hawaiian seamounts, Northwest Hawaiian lobsters, shallow reef fish, open ocean pelagic fish, life history studies and armorhead.

Robert Humphreys discusses how his love of the ocean and the fisheries led studying marine biology. He describes how his first post-undergraduate job with California Fish and Game office confirmed for him he wanted to study the fisheries and do hands on research. He provides a rich description of his work over the years.

His goals for retirement are to study DNA and continue his work on billfish. In addition, he wants to continue to volunteer in classrooms to share his scientific knowledge and to continue to mentor students as he sees tremendous value in engaging the public and cultivating the next generation of scientists.

### **Indexed Names**

Boehlert, George  
DeMartini, Ed  
Hida, Thomas  
Kazama, Thomas  
Laurs, Mike  
Maxwell, Don  
Naftel, Skip  
Pooley, Sam  
Shomura, Richard  
Stearns, Dr. Stephen  
Uchida, Richard  
West, Dr. John  
Yuen, Heeney

### **Transcript – BH-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 am Edward Glazier and this afternoon I am speaking with Bob Humphreys, longtime supervisory fishery research biologist at the Pacific Island Science Center. It is July 29, 2016. Bob is going to talk a little bit about his background and then we'll progress through a variety of other topics.

**Robert Humphreys (RH):** This is Bob Humphreys. I was born in Newport Beach California, April 30<sup>th</sup> 1953. I grew up pretty much at the beach. The beach was my backyard, my first maybe five –six years of age. I think at a very early age I was influenced by my paternal grandfather who was a big recreational fisherman. I remember him always having fishing poles around and there were a number of pictures when I was just barely walking, of me looking at his catch; he'd be holding his catch in front of my face. I don't have any memories of that, but the pictures were there, so I know that was transpiring.

I learned to swim in the ocean at a very early age, so I was always sort of drawn to that whole beach, ocean, fishing kind of thing from a very early time. I wasn't very good fisherperson [laughs]. My grandfather was a little perplexed because it seemed to him like I was more interested in the fish than the fishing, and that was uh. . . I think he came to realize that it's just the way I was wired, although I did enjoy fishing as long as I was able to keep bird nests out of my reel, but otherwise, I do remember I was more fascinated by the catch than the actual fishing itself.

When I was about 6, we moved inland to Costa Mesa, California, and there I would have to take my bike, it was about a 5-mile bike ride down to the ocean, so I would sneak off every once in a while to go to the beach. Otherwise, my family had a small beach house in Newport Beach and we would always, all of us 6 kids, would spend the summers down at the beach, so those were always fond memories. Funny enough though, when I got to high school, I became really interested in astronomy, and maybe it's not so funny, because at that time that was the Gemini and Apollo programs and I was in high school when the Apollo 11 landed on the moon, and it had a huge impression on me.

So, when I went to school, I went to UC Cal Berkeley, I was actually an astronomy major, until I had to start taking a lot of physics, and I realized that physics and I were not very compatible. As one of my astronomy advisors told me "Look Bob, why ruin a perfectly good hobby? [laughter]. I mean you have an interest in astronomy, but I don't think astronomy is a good profession that might be a good fit for you."

And actually, my interest in marine science, particularly in marine biology and fish, was always there. So, it wasn't like I had to wrack my brain and think about how I was going to change my major. It was pretty obvious. So I changed my major, they had a specialization in marine biology and so I switched. Luckily, I got all my math, basic physics courses and chemistry done, so I just had to take more biology. At that time, I had an advisor, his name was John West, he was a phycologist, and I wasn't much interested in algae, but as an advisor, he was very personable, somebody you could easily talk with, and I really enjoyed him because, it wasn't so much that he was telling me what I had to take, it was more like "what interests you?" . . . "What kind of classes would you want to take to build toward the career that you want? We'll work on doing that." So I was always interested in fish, but funny enough, I didn't really have an opportunity to take ichthyology there at UC Cal.

We did have a summer marine course and field work in marine biology, and it was at the Bodega Bay laboratory. Interesting enough, it was led by this then young Ph.D., his name was Steve Stearns, and at the time I didn't really think much about life history research, which is what his interest was, and what I'd been doing here for probably the last 40 years or so, but it was a very opportune time for me to learn not only, life history work, but also do fieldwork at the Bodega Marine station. While everybody else was looking at things on rocks like chitons and starfish, I found a kindred spirit in another student, and I cannot remember his name, I can see his face, but I can't remember his name, but we both said "we're not studying anything that sticks to the rocks." [laughter].

So, we decided that we were going to do study on leopard sharks and bat rays in Bodega Bay. What we were going to do was set out to capture them, tag them, and then from that we were going to be able to try and make an estimate of abundance. And so, that meant that every day we were out on the water in a small boat and we had a gill net and a lot of times, probably the worst winter I ever had was in August in Bodega Bay, it was always foggy, cold – but that didn't deter our enthusiasm. There weren't a lot of leopard sharks that we caught, but there were quite a few

of these bat rays, and there wasn't really much known about them. We set out every day to set out the gill nets. And these things were huge at that time. They're easily 50 pounds or so.

So part of this was the science, but the other part was sort of the thrill of the hunt, and doing something that was very different from what everybody else was doing. We even had our instructor, Steve Stearns come out with, and it was pretty funny because he was trying to show us up and I remember one of the largest bat rays we captured, and we usually put them on a board and lift them up carefully, but he decided that he was going to use this big scoop net. [laughter] He went to scoop it, he got it in the net and he went to lift it up and he broke the whole thing off and the ray got off the line and took off. And I thought it was kind of funny because he was going to kind of show us up. But he was a great instructor.

I think he probably did me the greatest service. We wrote up our reports, and we presented them in front of the class, and others at the marine lab there, and he was a very good reviewer of our written projects, and I remember I was one of the first that got feedback and I remember sitting down in his office and him pulling out our paper, and it looked like somebody had bled all over it. [laughter]. There was just red ink everywhere, and my heart kind of sunk, I just thought "Oh my gosh. This is just a complete total rewrite." And he was trying to tell me that it's not as bad as it looked [laughter]. But it was bad. And the interesting thing was that I think I got a tremendous amount out of this course. Especially about what's practicable in a research project and how you go about planning and framing a research project and analyzing data -- which is something we really didn't receive in our normal coursework there at Cal. This was in a fairly small setting, with 12 students, one professor and one graduate student.

But it was interesting; he wasn't quite sure whether I was ready for going on to graduate school, so his advice to me was to take a year off and go somewhere like Tahiti or go travel, and that was kind of interesting advice. I thought about it, and I thought, I came to the conclusion that he was probably telling me "You probably don't want to go into science." And funny enough, that had a very motivating influence on me. I took that as a challenge. Sort of an "I'll show you!" kind of a thing. And that's probably the best thing that anybody did to me while I was an undergraduate. He really challenged me, probably in a way that he didn't intend to, but that was it. I was set. I was going to be a marine biologist, and I didn't care whether he thought I didn't have what it took, I was going to do it and I was going to follow my dream. So, it's kind of a weird way of being motivated, but you know all of us have our different ways.

**EG:** Clearly, it worked, right?

**RH:** [laughter]. Yes, yes. It worked. After I graduated from UC Berkeley, I wanted to get some field experience. Actually, I wanted to get a job, I was tired of being a poor student, so I just walked into the office in Long Beach -- off Golden Shores Drive there was the Cal [California] Fish and Game office. That was the main office for Southern California, and I put in an application. They had a job for, it was basically an observer job where you would go out on the recreational boats, they would give you a state car, and you would go to a port that they randomly selected, anywhere between Santa Barbara and Oceanside, and you would go out for the day, you would monitor the catch, you'd identify the catch, measure all the fish, and then take samples back for otolith extraction for the scientists back at Cal Fish and Game.

And that was a great job! Partly because I wasn't working a desk, I was . . . . I had a car, somebody actually trusted me with a car [laughter] . . . and it drew upon skills that I was really interested in like working with fish, identifying fish, and this whole thing with otoliths really piqued my interest because otoliths had been around for a while, but people were using them in earnest to age fish by sectioning them and looking at them, presumed annual marks.

Anyway, I did this for about a year and a half, and it was great. At first, you know, people, especially some of the older fishermen would think that you're like a warden or something, but we didn't wear any insignia that represented Cal Fish and Game. So, after a while, you begin to see the regular guys that were there, and so it was a really neat opportunity to be out on a ship during the day, explain to people what you're doing, why you're doing it, why fish need to be managed, why there are limits. And then it also provided them an opportunity to vent about Cal Fish and Game and why their bag limits are going down and such, and also an opportunity to talk with the deck hands and the captains who are always very entertaining.

There were some crazy things that happened – I remember one time somebody caught a thresher shark, and it was alive. So, this deckhand had the idea that they were going to try and take it back alive. So we had in the back of the vessel, a big well where we kept the live bait, the anchovies, so he grabbed this thresher shark, got it off the line and put it headfirst into the bait well [laughter]. The only problem was this thing was bigger than the bait well, so as this thing began to thrash around, it has a huge tail - the tail is about the size of the body length - and so people are scrambling because this thing is slapping all over the place and I could hear the captain screaming at the deck hand about “how could you be such a this and that idiot?,” [laughter] and trying to help this poor guy grab the tail and get that thresher shark out.

Another time somebody caught a mako shark, and the short-fin mako sharks they act somewhat like billfish so they will, once you get them on the line, they start jumping. And this one came right up in front of us and right by the side of the boat and then came down. And again, for whatever reason, they decided to land this shark. So we landed the shark, it got loose, and between the passageways, people have their poles, they have racks where they put the poles, so this shark just started sliding on his belly, snapping at everything, hitting his tail, knocking reels, people are running for their lives [laughter] and I forget what we did, I think one of the deckhands finally did it with a knife coming up behind it and cutting it behind the head, but just nuts kind of stuff.

I remember that job so well because it was, I think, right out of college, to have a job like that where you're out on the ocean every day, people have given you and trusted you, responsibilities, and it was just a marvelous job to have. I imagine they still have these jobs. But probably a lot more rules now, and more paperwork. This was also the opportunity for me to go on my first research cruise, so my boss at the time there, Don Maxwell, who has since retired, he asked if I wanted to go on their research vessel the Schofield, and they were going to look for white sea bass off the California coast and into Mexico. So I went on this cruise, and I remember my parents dropping me off and I looked at this ship and it's not like the research vessels we have here at NOAA. It was old, it was an old fishing vessel and it was reconverted

into a research vessel so it looked a little shaky, but I was very enthusiastic, and it was one of the greatest experiences I had as sort of a perk of this job.

What was fascinating to me was, in Mexico, how we would see these fishermen, maybe 30-50 miles off shore, in the fog, with just an outboard and maybe a compass, and they're out there fishing and it's like "oh my God!" We're used to the Coast Guard and all of this equipment that helps us, and they were just flying by the seat of their pants, fishing. It was a real eye-opener. So, from this job, I knew (1) that I very much wanted to continue in working in fisheries, particularly with fish; and (2) research cruises – this is something I wanted to continue and do. But I knew that if I stayed at Cal Fish and Game it would be an immensely long time before I could move up the ranks there. I always wanted to be someplace tropical so I came to a decision, whether it was Florida or Hawaii, and that was an easy decision, so I ended up in Hawaii in early 1977.

I walked into the National Marine Fisheries Office there on the UH [University of Hawaii] campus on Dole Street, and I got an interview with, actually my first boss, Richard Uchida. They were looking for sea going techs. This was 1977, and so they were just starting this new investigation of the Northwest Hawaiian Islands. They wanted to see what kind of fishery resources were there. And so it was National Marine Fisheries Service, it was the University of Hawaii, and it was the State of Hawaii, I believe it was DAR [Division of Aquatic Resources] still. They were going to combine forces and use our NOAA research vessel, the *Townsend Cromwell* to go up and survey and see just what kind of marine resources were there. Luckily, I had all this seagoing experience, so I basically walked into a job.

But unfortunately, my first two at-sea adventures were not on the research vessel. These were on a commercial lobster boat. And so starting in the earlier portion of the 1970s, people had gone up there with California lobster pots and had discovered there were huge amounts of lobster up there. And so I went up on one of the highline lobster boats. The skipper was Skip Naftel, he was kind of a bit of a cowboy, but a very bigger than life kind of person. And I went up with Tom Kazama, who was a fish biologist, a senior fish biologist at the time, and what we were trying to do was get as much biological information from the catch. In those days, they kept the lobsters alive, so they put them in these large bait-wells, and there was a live lobster market back in Oahu.

So, we were going to try and take measurements and biological observations on all the lobsters and then for certain ones, we were going to tag them and release them. In fact, all of the berried lobsters that were carrying eggs, the females, we tagged and released them. And it was brutal. This was the first time I ever got seasick. So, we flew up to Midway and I had never been on an aluminum boat before, and an aluminum boat is a bit like a tuning fork in rough seas – so you slam into a wave and the whole thing just shutters from bow to stern. Tom Kazama was an old seadog, too, but we woke up, and the motion was kind of tough, and the smell of the diesel from the engines, that put me over the. . .

**EG:** How long? Do you remember how long this vessel was?

**RH:** This vessel was about 60 feet. Yeah, it was actually a well-designed vessel. It was just getting used to the ride, and the whole thing.

**EG:** Sampan style?

**RH:** No. It was sort of front loaded, so the bridge and everything was sort of pushed forward toward the bow and there was a large working space.

**EG:** A true lobster boat.

**RH:** Yeah, a true lobster boat. And it was set-up to carry about 1000, I forget how many, I think the second boat was about 1200 traps, this boat was about half that. But I had never been on a full-on commercial fishing boat. And these guys basically started at the crack of dawn, and we would bring up all the traps that were set the previous day that would take us to about mid-afternoon, and then the real dirty work occurred after dinner where we would be baiting with this rotten bait. You'd have to crawl into the baiter to bait these things. And then actually set the traps for the next day. So, these were really long days, and I was very young then, so I adapted really quickly. I think I was more amazed with Tom Kazama because he was probably in his 40s and it was pretty darn grueling. He was about the oldest one out there at that point. From there, I probably did five more lobster observer trips. But during that first year in October, I did my first *Townsend Cromwell* [cruise] so this was the NOAA research vessel. Going from the lobster boat to the research vessel was like night and day. It was like luxury.

**EG:** A luxury liner. [laughter]

**RH:** Yeah! Even though the *Townsend Cromwell* had its own motion problems -- it was very shallow bottom, and moved around a lot. It was a real joy because everything was set up for basically the scientists to work. The crew was very knowledgeable, they were all a local crew from Hawaii, so they had an immense amount of knowledge and I learned so much - everything from tying knots to looking at currents, to setting gear and also, all the dangers that they would point out -- it's so easy to get in trouble on a ship, and I had my fair share of those.

But what was interesting, and kind of strange about the whole thing was that NOAA at that time, starting in 1972 had a NOAA Corps, and so they were sort of para-military, what the old lobster boat captains called "Pollywog Navy," they referred to it as. [chuckles]. But it was kind of funny to see this very civilian crew and then these sort of military officers, and I remember that at meals, particularly dinner, there was a table set aside with white linen and the whole bit, and the officers would sit there and the chief scientist from the scientific party would have to sit there. So, it was kind of strange and they would do, the stewards would do the room of the chief scientist and officers. It's not like that anymore, that long since went out, but it was an interesting transition from what I had been out on commercial vessels to this research vessel.

**EG:** You were well primed.

**RH:** Yea, I was well primed. It was a good thing I went that way instead of the other way. It would have been very difficult. There were basically three mentors that I had when I first came



into National Marine Fisheries, and they all retired in the '80s, so they were well along in their career by the time I met them and had the good fortune of working with them. As I mentioned Richard Uchida as the one that had hired myself and several others. There was a cohort that we all came in about the same time, and we were all sort of the technicians that did the Northwest Hawaiian Islands trips and these trips were anywhere from about a month to two months. We learned a tremendous amount. Richard Uchida was . . . it's really interesting. In those days, the biologists started at a very low level and then worked their way up, and these guys all had master's degrees but there were really no Ph.D.s. We had maybe one or two Ph.D.s in the whole lab. These were guys who had seen from the bottom up, and late in their careers had assumed roles, management roles or supervisory roles.

He was great, Richard gave me my first opportunity to do research, life history work, in the laboratory, and also opportunities to publish and present at conferences my research findings. He's always been sort of a role model for me. Oftentimes, when I think about certain situations, I think "How would he handle that?"

Then there was Heeney Yuen. Heeney was an interesting person, he was very understated, he would talk very slow, but had a very active mind, and Heeney was somebody I sought out because I was always interested in apex predators, and Heeney was the billfish guy. And so I sought Heeney out early because I knew he was looking for somebody to help him at the billfish tournaments in Kona, the International Hawaiian Billfish Tournaments. So, I was able to weasel my way on to his group and that was a great opportunity. It solidified the fact that billfish was something that was going to be a long-term interest for me—and I got to actually do the sort of dirty hands [tasks] - being able to dissect these fish and look at stomach contents, take samples of the reproductive organs, measure, identify the billfish.

It was a very unusual event though, because here we are government scientists and we're rubbing shoulders with people who are multi-millionaires, bankers, gun-runners, oil industry, all kinds of it, just always talking business big stuff, and so I felt a lot of times like I was the fly on the wall in that group. It was a very interesting experience and I'll always remember those, I think probably I did about three of the tournaments before it started winding down and we weren't going as regularly every year. Then Tom Hida was a fishery biologist who had done a lot of diet studies and a lot of different biological studies. At the time I was looking at *kahala* and we were trying to figure out two things, we were working with the university. . .

**EG:** That's amberjack right?

**RH:** Amberjack, right. *Kahala* is the Hawaiian name for Amberjack, *Seriola dumerili*, and this particular species here in Hawaii had been implicated in a lot of ciguatera incidents. They were selling it through the United Fishing Agency auction in Honolulu. So, instead of just barring it wholesale from the auction, there was a scientist at the University of Hawaii that decided that he had a chemical test that he could figure out whether they were hot cigua-toxic or not. So, we were sampling all of the *kahala* at the auction and it was an opportunity to get both the gonads and the stomach samples and so I had a project looking at stomach contents of *kahala*. Anyway, Tom Hida was basically my next door lab, but he turned out to be very much a mentor, and was able to show me all the techniques that people who do diet studies use based on maybe a little bit

of a vertebrae what family of fish that was, and building a reference library, staining them, and getting an eye for the different bones and what species and families they belonged to. It's very forensic. I think that's probably why I liked life history studies, aging studies, food habits, reproductive. Unfortunately for those kinds of studies, you need dead animals. I never really had much use for live stuff, but I loved the forensic aspect of it – trying to figure out what these animals were doing *post mortem*. And we're still doing it today.

**EG:** Did you ever do any paleo kind of work?

**RH:** No, I didn't. But I do know that, for the otoliths I hadn't realized it, but geologists do a lot of work on otoliths and they can actually, from the otoliths figure out what families and whether these are extinct families. So they use otoliths a lot as indicators.

So, for a long time we moved slowly up the system in those days. So we had these GS levels, and so we went 4, 5, 6, 7. . .so it was a slow process, but I think the thing that kept me going was that I was getting paid for something that I really loved doing. The great thing about Hawaii too is that there's so much that's unknown when it comes to fishes, or for that matter, just about any marine species group. And unlike places like California or Washington, where you have many people working on a particular species, it was so wide open here. You could study just about anything from shallow reef fish to deep sea fish to open ocean pelagic fishes.

Over time, I eventually rose through the ranks to become a biologist, I think it was around 1985. And in the '80s, I was starting to write a lot of publications and that was sort of pounded into us that advancement, the metric that they used was publications. So, we all just had bachelor's degrees, so we were being provided a great opportunity.

In the mid '80s, I was mentioning that we were doing a lot of fieldwork up in the Northwest Hawaiian Islands, and about that time, a Ph.D. George Boehlert from Scrips, I guess caught the eye of our director Richard Shomura and he was hired and he started up a seamount program. These seamounts were above Kure Atoll, so they were the Southern Emperor, Northern Hawaiian ridge seamounts – it started around the dateline and then went up to about 35 north and 170 east. There had been a big bottom trawl fishery [here] back in the '60s. The former Soviet Union had found big piles of a particular species called armorhead and also alphonse and the U.S. never got into it because we didn't have a trawl fleet here, but both the Soviet Union and Japan were heavily fishing and we had a small cluster of seamounts named the Hancock seamounts that were within our 200-mile limit. So, we began doing research cruises up there and little did I know that from then 'til even now, this would be one of those areas that really piqued my interest.

But with George Boehlert coming in, he sort of upped the ante. So he expected more from us and I think it helped a lot of us to develop, and particularly doing publications – we were doing chief scientists on research cruises and we felt, I think in the '80s, I felt fully engaged in what we were doing. And it was a very satisfying time. At about 1990, we hadn't really had a life history program there. Everybody was just doing separate types of work. In about the 1990s, Ed DeMartini came on board. He was educated at the University of Washington and a program that specifically focused on life history, so age and growth, reproductive maturity, longevity

estimates, recruitment. So we started doing that type of work and we were working on pelagics, so this was just perfect for me. And with the help of George Boehlert and Ed DeMartini, I was able to get advanced training through NOAA and that allowed me to go back to graduate school at the University of Washington. So I was able to get all my coursework done in a year, 1990-1991. And then, luckily, I had all these samples that we had taken of armorhead over the years in the '80s, and I was able to parlay that into a recruitment project on armorhead looking at pelagic duration and trying to link things I saw in the otoliths with recruitment variation to the Hancock seamounts.

**EG:** What's the genus-species for armorhead?

**RH:** So it's pentacerotidae is the family, it's jumped around a bit, it's back to pentaceros and '*Pentaceros weheeleri*'. Not very well known, in fact, in Japanese, this particular fish was known as tsubodai – ghost fish – because nobody knew much about it. The main population is at the seamounts but there were small numbers that were caught in the islands south of Japan that fishermen would catch. But nobody really knew much about it and so it was a ghost, it was a mystery fish. During the '80s, we did a lot of seamount work, along with the Northwest Hawaiian Island work. In the '90s, we began doing a lot more pelagic studies. It's sort of interesting; every director has their sort of stamp on things, so for Richard Shomura, during his long tenure, it was tunas and then the Northwest Hawaiian Island tripartite investigations. With George Boehlert when he became director it was the seamount work. And then, when our next director came aboard, Mike Laurs, it was very much back to pelagics because he did a lot of work in the Southwest Fishery Science Center in LaJolla on albacore – and so we began outfitting the *Townsend Cromwell* to do longlining work, and we were working up in the transition zone above Hawaii targeting swordfish. Swordfish had developed in the late '80s, early '90s when they got a lot of the sword-fishermen. . .the swordfish fishery was closed down off of Florida, so a lot of these guys took their boats over here. And when word got out that there was a lot of swordfish here, we had a booming swordfish fishery going on here at that time.

And also, at about the same time we had this longline observer program starting up within the region and so we were getting samples both from the *Townsend Cromwell* cruises and from these longline observers. And that also started that relationship between our life history program and the longline observers for pelagic specimens. And that continued pretty much through that decade and in the 2000s, we became more involved with deep slope bottomfish. We had been involved with it in the Northwest Hawaiian Islands, but not so much in the main Hawaiian Islands. Our director didn't at the time, Sam Pooley, was hesitant about getting into bottom fish because it was really the state's jurisdiction. He really felt that they should be doing the work, but it became obvious over time that they were not capable of doing the life history and assessment work, and the fishery Council was growing more and more...

**EG:** Well, if it was becoming an issue. . .

**RH:** It was becoming an issue.

**EG:** And the state lacked capacity, right?

**RH:** Exactly. And so he ended up making the decision and we stepped into the breach and began doing bottom fish work, and it's something that's actually continued to this date. And of late, starting in about the late 2000s so about 2008-2009, we started working on reef fish. Another purview of the state, but again, we had to step into the breach because they just don't have the capacity and the funds to do what was needed and so to this date, we're actually very focused currently on deep slope bottomfish and reef fish; particularly the life history work, but also the assessment work, especially in Hawaii. We've expanded more into the Pacific Territories. For a long time, not a lot of work was done, we would go down there every so often with a research vessel, but the focus was always Hawaii or the Northwest Hawaiian Islands.

**EG:** Clearly the territories didn't have much capacity either.

**RH:** Yeah, and they didn't have a real strong voice in the Council, or at least it seemed that way. And all that's changed so now the territories have a very strong voice, and we also in about 2009 National Marine Fisheries developed this bio-sampling program which was to address fishery needs for data-poor fisheries. And so the natural data-poor fisheries were the bottom and reef fish fisheries in the territories. So, we set up bio-sampling programs in the territories where they basically sampled markets and recorded links and weights, and were trained to do accurate species IDs, and then for or life history group, we had them collect otoliths and gonads and muscle tissues; and we're immersed in samples at this point for all of these different species.

What was interesting, in the 2000s, there was a big change for me because at that time I'd always been sort of a bench scientist, seagoing. But our supervisor who came in in 1990, Ed DeMartini was getting more and more frustrated with the amount of administrative work, and this was because we became a science center in the early 2000s. It wasn't an amicable parting from La Jolla. We had always been one of the satellite labs, and they weren't happy about us going our own way, so in a certain amount of way, we were sort of left in the lurch in terms of not knowing how to run a science center and how you get a seat at the table amongst all the science centers when it comes to funding and such. At this time too, there were a lot of new regulations coming out and so there were a lot of growing pains. And I was at a point where I thought, you know, it would be kind of nice to change from just being a research scientist to being able to call the shots in a program, and develop research plans, and maybe take us in a slightly different direction.

So both Ed and I decided that we were going to switch jobs, and Ed actually became, I became Ed's supervisor technically, along with the program. It was a very happy change, particularly for Ed, and for me also. What was interesting is we were able to keep our relationship very professional and Ed to this day, is our...we consider him our Yoda. He's the wise senior biologist, always with sage advice. I think it was very beneficial for me coming in as a newly minted supervisor to have someone like that on my staff that I could go to and it wouldn't be an issue to talk with him about these types of things. I could always trust that Ed was going to give me what he thought, which was great.

And so, at this point in my life, I'm ready for a different change, and so I'm actually due to retire at the end of this year. Looking back, I think I'm very fortunate in becoming a sort of middle manager-supervisor late in my career, because I just feel like the amount of regulations and the bureaucracy has just changed so much over time. I just think back on what it took to stage and

organize a cruise, and now what's involved for chief scientists, and all of the paperwork and different things that are involved here now. I'm glad that I wasn't a supervisor from the very beginning of my career, or even midway through my career. I think the timing was just perfect for me.

**EG:** Much like your sequence in cruises, having done the lobster boat first.

**RH:** Yes. [laughter] Yeah, so I've been lucky in that I've been able to continue to go out to sea. I always have a research project, but I realize that really it's important as a program leader to be the person, I tend to want to be a coach/mentor type of supervisor, and to get my staff what they need; the tools that they need, the support that they need, the accolades when they deserve it, and also what somebody in the past had told me about, try and hire people that are smarter than you, and that is just absolutely some of the best advice. What's really nice now is there's just so many people, qualified people. From an employer's perspective, you have so many qualified people to pick from. Unfortunately, there are just not enough positions for all of the qualified people out there. But career-wise it has been a great ride. I've been very, very fortunate; particularly for someone who never got a Ph.D. If I were to start over now, there's no way I would end up in the position I am without a Ph.D. So, a lot of life is timing and also luck in terms of being prepared when the opportunity presents itself.

**EG:** And the willingness to take on the work.

**RH:** Yea.

**EG:** I mean, it's a bit adventurous for a kid from Long Beach to come over here . . .

**RH:** It's funny how life, you wonder what would have happened, if I went to Florida or what would have happened if I'd made some other changes. But I have to say, for all the things that have changed in government in terms of bureaucracy and everything, it's still a great agency to work for. I'm heartened by the fact that there are so many smart and bright young people joining our staff. I know that it's in good hands in terms of competent scientists.

**EG:** Good, that's a question I wanted to ask you: What's coming for the future? Do you feel like you're ready to continue a mission through others coming behind you?

**RH:** Yeah. I think probably the most uncertain thing . . . For me looking back, I look at all the bureaucracy and everything, but I have to remember that for each cohort that comes in and then leaves, the bar is set when they come in basically. So, they don't know any different about what it used to be in the good old days or the bad old days. So, this is their new normal. For me, it's abnormal already and I don't want to really deal anymore with the administrative stuff but for them, yeah, it's kind of a clean slate.

**EG:** Right, right . . .

**RH:** It's something they adapt to pretty quickly. It does seem that we all of us, sort of in this same cohort of the baby boomers were kind of wondering when the pendulum is going to swing

the other way in terms of more streamlined administrative things in terms of whatever it is, travel, hiring, planning for cruises and whatnot.

**EG:** That was such a well-integrated and sequential discussion, I think you've covered all the issues in a really flowing manner. That was great!

**RH:** Oh, thanks.

**EG:** Is there anything else you want to add?

**RH:** Yeah, probably looking forward to the future, I'm not sure where, really, marine fisheries is headed. In a lot of ways, I feel like fishermen are sort of the last frontier, sort of the last cowboy. You know a lot of people thought that maybe aquaculture would take the place of fishermen and, in some areas it has, in terms of freshwater, certainly in Southeast Asia, but I'm not sure what the future is for marine commercial fishermen and whether they'll go the route of agriculture, where you'll have no small owner vessels anymore and it'll be just like big corporations that run boats and whether we'll have someday just robot boats that go out and fish and you'll just have basically a skeleton crew of people to run the vessel. And also, right now, there's a lot of push/pull going on between conservation and fishing in terms of providing protein for people. We see it right now playing out in the Northwest Hawaiian Islands with the proposed expansion out to the 200-mile limit. I'm not really sure. . .

**EG:** There are discussions there, at this moment.

**RH:** Yeah. It's kind of a tense time, and lines in the sand are sort of being drawn by both the Council and the conservationists. It kind of reminds me a little bit of the hatchery situation. When I was up at University of Washington - sort of a little context - because of damage to streams and rivers, salmon, the people who were studying salmon and managing salmon had produced all these hatcheries. The thought was that you could offset what was being mitigated, what was being done to them, and the mitigation would be to raise all of these fries and set them loose and it would help replace the populations that were either trying to get back upstream or that died on the way down. But the funny thing is that one of my professors basically started to question whether anybody's ever really looked to see whether the hatcheries were making a difference. And so it became a huge debate as to what are the hatcheries really doing? And what are we doing to the wild stock of salmon by having so many hatchery-raised fish? And so I see parallels between that and some of the conservation measures being brought forward. In other words, just like hatcheries, are these going to be effective, or are these feel-good measures at the time? . . .

**EG:** Sure, in these protected areas.

**RH:** Exactly. And at this point we're not sure what particularly like expanding the boundaries from 50 nautical miles to 200 around the Northwest Hawaiian Islands, whether that'll have a large effect on the nearshore ecosystem or even the pelagics. And there really, at this point, isn't any evidence either way. So I'm kind of wondering, kind of how all of that is going to play out because I see a certain amount of momentum going on with, not only this as a particular

example, but also I've been involved in seamounts, and in about 2004-2008, I was working with a group, an international group, the North Pacific Fisheries Commission. And because of UN [United Nations] measures, and a lot of things going on with deep sea fisheries, especially the trawl fisheries, people were beginning to realize how much damage bottom trawling was doing to some of these unique ecosystems on seamounts. These seamounts are virtually unexplored, and so we're at a point basically where it looked like a lot of seamounts were going to get shut down because they had either vulnerable marine ecosystems – in other words, ecosystems that contain sponges and deep water corals, that were not resilient to damage from bottom trawlers. And so there's been a big push afoot to take many of these seamounts, particularly ones that we know nothing about, and put them under some sort of cloak of international management to manage them and allow an opportunity to kind of figure out what do we have there, instead of sort of a post-mortem after fishing, or what's left?

**EG:** It's a departure from the model, trying to understand and then make decisions based on evidence. That seems to be a trend for the Pacific.

**RH:** That is a trend for the Pacific. And how that all is going to play out, I'm not sure. Definitely it's going to have an effect on fishing, particularly Hawaii fishermen. How much it'll have an effect on international, I'm not sure. That's one of the things that to me is a big question mark.

The other thing though is, there's always been old questions that we've only been able to answer to the best of our ability because of the techniques and the limitations of the techniques that we've had. For instance, species—being able to identify species, or identify various life stages. We have new technologies coming online, actually been around for a while, but things like DNA barcoding, and now were starting to find with DNA barcoding that even some of these commercial species, like *opah*, we thought was one species worldwide, and it looks like there's five species.

**EG:** Subspecies or species?

**RH:** Species—genetically distinct species.

**EG:** Wow.

**RH:** Enough divergence that they're considered species, and now we can also use these same barcoding techniques to figure out what the egg of a particular species look like, or what the larvae is. We can use that for stomach content analysis. A lot of times we end up with unidentified fish or unidentified squid. With barcode technologies now we can actually get these down to species, if not genus. And so a lot of old questions still exist.

Another one is connectivity—trying to figure out where a particular species, its nursery areas are. Where did it originate? And so all of these await more refined techniques. One of the things that interesting about our agency is we're very much into gadgets, we love satellites, we love hardware, things we can put in the ocean—robust things, whether they're cameras or physical oceanographic instrumentation. But we've been sort of a little less embracive of all the

DNA technology that's out there. If you look at the medical fields, they've completely embraced DNA. If you pick up any of the major science journals, *Science*, *Nature*, most of it you can't read because it's all molecular biology and DNA related stuff. And there are some of the science centers that have embraced it, ours is sort of at the precipice of embracing this technology, but I see this as something that's going to bring a lot of interesting, new findings and ways to approach things in the future.

And then of course, all of the other types of things, the traditional kind of hardware, like the ROVs [remote operated vehicle]. In fact, right now one of my staff is down in a media room and he's communicating with the *Okeanus Explorer*, which is basically the exploration ship for the NOAA fleet, and they're currently in the Marianas, and their ROV is down around 2,000 meters and they're looking at a seamount for the first time that nobody has ever seen. And they're connected by telepresence to researchers on the U.S. mainland and foreign countries. And they're all reacting at the same time to these images that they're seeing and animals and trying to figure out what they just saw and whether they can take a sample. These types of technologies, and telepresence, are going to make science very different. I can foresee maybe in the future where say as a chief scientist, you're on a vessel and you've got a camera so to speak over your shoulder and somebody's going to be telling you "Pick that thing up." And the other person's going to be telling you "No, that's endangered or that's a rare specimen, you should return it, it's still alive." I can imagine all the things that telepresence is going to bring and also distract from. It's like having big brother there 24/7. But yeah, I see the technology coming out of the laboratories, particularly out of the laboratories and into the ships and I'm looking forward to see *what?*

**EG:** Well, are you going to keep your hand in it somehow, do you think?

**RH:** Yes. So I'm really interested in volunteering, and there are several things I want to work on. I still want to work on seamounts. I still want to work on billfish, and I want to learn DNA. So, one of the UH professors said that he'll put me to work doing DNA extractions and sequencing and what I want to do is use that to . . . I have huge collections of eggs and larvae that I collected off the Kona coast and I can't identify these things, and so I'm hoping that by at least learning the techniques I can go and get these, purify the DNA, send it out, get it sequenced and figure out what we've got, and then go from there.

So, I'm very much interested in coming back and volunteering and one of the things that I really got interested in about 15 years ago, because of my kids basically, was doing educational outreach, so schools. I've had my staff get involved in that, too, and so educational outreach is, I feel, really important. People need to know what we do, and why we do it and how interesting it is. And once you give people that connection, they're a little less inclined to say "Oh yeah, National Marine Fisheries, they're wasting my money." They can see exactly what you're doing and why you're doing it. I think that sometimes, particularly as scientists, we don't communicate well to the public, number one, and we don't communicate in terms of why this is of any importance to them. So, hopefully I can do a little outreach, and mentor some students still. This is almost like back to the future in a way for me to get back to the lab bench and be able to tool around at my leisure, on my time.



**EG:** Fun!

**RH:** Yeah. I'm looking forward to that.

**EG:** Terrific interview, Bob.

**RH:** Oh, thank you.

**EG:** Thank you much. I enjoyed it.

**RH:** Thank you.