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Wetherall, Jerry ~ Oral History Interview

Edward Glazier

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

Interview with Jerry Wetherall by Edward Glazier

Summary Sheet and Transcript

Interviewee

Wetherall, Jerry

Interviewer

Glazier, Edward

Date

August 2, 2016

Place

Honolulu, Hawaii

ID Number

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Biographical Note

Jerry Wetherall was born in San Francisco. He graduated from Humboldt State University with his undergraduate degree and received his Ph.D. at the University of Washington. His dissertation focused on salmon, downstream migration of salmon, on the Duwamish River. He served in the Peace Corps in Uganda and Kenya, and then began his career with National Marine Fisheries Service in 1974 at the Honolulu lab. Jerry has had a long and distinguished career in NOAA Fisheries and has worked all over the Pacific on a variety of topics.

Scope and Content Note

Interview contains discussions of: Peace Corps, tuna fishery, aku fleet and bait, skipjack, development of international management, high seas drift net fishery, international observer program, swordfish fishery, turtle interactions and lawsuits, lobster stock assessment, Scientific Information System, data visualization, GIFAs, data and databases

Dr. Wetherall discusses his long career at the Honolulu lab. He provides a rich description of the history of fisheries work in the Pacific as well as the history of the Honolulu lab. He describes the changes which took place and his current work on data management.

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Transcript

Edward Glazier (EG): This interview is being conducted as part of the Voices from the Science Center's project funded by the Northeast Fisheries Science Center. It's also a part of the Voices from the Fisheries project supported by the National Marine Fisheries Service Office of Science and Technology. I'm Edward Glazier. Today, August 2nd, 2016, I'm speaking with Jerry Wetherall at the Pacific Islands Fisheries Science Center in Honolulu. Jerry has had a long and distinguished career in NOAA Fisheries and has worked all over the Pacific on a variety of topics. Jerry, I thought we could talk a little bit about your early days and proceed through a variety of things from there.

Jerry Wetherall (JW): Sure. I was born in San Francisco and spent my early years there until I was about 12. We were not far from the ocean, but that isn't something that really attracted me. The ocean surf there in San Francisco can be kind of mean and foreboding and cold. [laughs]

EG: Cold and foggy.

JW: And nasty. [laughs] In the summers, we'd take vacations up in the Sierras and I became a real...I had a fondness for the outdoors and the streams, trout streams in the Sierras. Then, when I was 12, I was lucky enough to, the family moved up into the Sierras. I spent my high school years up there. I learned how to trout fish. I was taught by a music teacher. I was taking cello and my cello teacher was a guy in his 60s who'd built a cabin up in the woods and retired, and he loved trout fishing probably more than playing the cello and he took me along. After every weekly lesson, early in the morning, we were trout fishing till dusk. [laughs] That went on throughout the summers and then as I really got into it over the years, it was a real passion for me.

EG: Were you fly-fishing?

JW: Fly-fishing. And tramping around the lakes and streams of the Sierras. Just did everything in the outdoors. When it came time when I was a senior to decide what I wanted to do in college, there was the music side, which I'd cultivated, and then there was this yearning to be in the outdoors. I found out that there was a curriculum at Humboldt State in fisheries and in wildlife science and forestry and so on, so that sort of sealed the deal. So, I went off to Humboldt and I was immersed with a lot of people of like mind and passion. So, I knew right from the get-go that I was going to be in fisheries. Then during the summers at Humboldt, I always had a job in the field in forestry or . . . I spent three summers in Alaska working on salmon research.

EG: Whereabouts?

JW: In different parts. On the Yukon River one year, and then the Wood River Lakes, Chignik Lake and that whole system; different parts of Alaska. This was in the early '60s. It's still God's country, but then it was really God's country. Just buried out in the wilderness. That was just great fun but I was really doing fisheries stuff early as an undergraduate. Then I had a summer working as port sampler in the State of Washington and then went on to grad school at the University of Washington.

EG: Washington.

JW: I spent six years there, working on, doing my Ph.D., working on salmon, downstream migration of salmon, on the Duwamish River, which feeds into the Port of Seattle, Elliott Bay.

EG: Snohomish?

JW: Duwamish. Yeah, so I spent my years there doing research on the waters of the Bay and all around Puget Sound, and finished up there at the end of 1970. Then, I had to decide what next. I

just decided I wanted to have a little adventure first. I wanted to travel in Africa with some friends, so we had planned this out. We'd go to Africa, travel around. Then it occurred to me that it might be cool to find a job there and you could live there and, you know, take advantage of that and explore the country while you're there. So, I made some inquiries and then lined up a position at the East African Freshwater Fisheries Research Organization on Lake Victoria in Uganda. They didn't have funds for a position but we worked through the Peace Corps to set up a special placement deal. So, I joined the Peace Corps. [laughs] I wasn't getting paid anything, but it was a terrific experience. I was associated with a UNDP [United Nations Development Program] research program there and the local research laboratory. I was there for two and a half years.

EG: Did you say Tanzania?

JW: Ah, it was Uganda to begin with. I was there for about a year and a half and then we were evacuated because of the turmoil there. Idi Amin was in rule then. Had some security issues. We were evacuated and then I joined the Kenya Peace Corps after a little interlude in Ethiopia. I finished up my Peace Corps work in Kenya, but working on, stationed on Lake Victoria, I was able to finish up a lot of the work I'd started in Uganda, so we kind of kept that project together. Then I left the Peace Corps and did another few months of travelling in West Africa and then came back home. After six months of chilling, decided what was next. [laughs] I had two offers. One was an Oregon State assistant professorship and the other was a Honolulu lab job.

EG: What year was that, Jerry?

JW: That was, well, '73 when I was making those decisions. Then I started here in January of '74. So, right now, I'm the oldest, longest employee. [laughs]

EG: Yeah! I'm honored.

JW: Yes, that was the beginning. I've been here ever since.

EG: So you've had a long-term perspective on changes here.

JW: Yes, certainly when I got here, I mean it was a different world. I was hired after there had been a RIF, a reduction in force, in the early '70s. They'd laid off a number of folks at the Honolulu lab.

EG: The lab at the time was on campus?

JW: It was at Dole Street, there. Yes. That building was the initial, it was built in '49 and '50, occupied in June of 1950, I believe. That's when folks moved in. The work had started before that, but people were in other temporary offices. Yes, it looked pretty much the same as it does now on Dole Street there to start with. At any rate, when I started they'd had this reduction in force and they'd mothballed all the research vessels, so there were no ships at sea at that time. The staff, we must have been less than 100. I mean, everybody pretty much was collected at Dole Street and there was plenty of room. Everybody had a big office. Working on, I guess there

were sort of two major thrusts at that time. One was tuna physiology work that was going on at Kewalo Basin and some really ground-breaking stuff on tuna behavior and physiology using live tunas that were brought in by the *aku* boats, then maintained in the tanks at Kewalo. There were a couple of main scientists there at the time and then later on other people came through there and became part of that research and culture. Chris Boggs is one of those guys. He probably mentioned that through his discussions.

EG: So, Kewalo was around for quite a while, too. How did that come together in the agency?

JW: I'm not sure. It had been going before I came here, but I think when John Magnuson, who'd been a key researcher here at the lab, he was the guy who started it up, I believe. Yeah, so for years they were doing key research down there on live tunas. It's about the only place in the world where people were working on live tunas, at the time. The rest of the folks at the lab were working on the main problem of the day, which was really to try to expand the opportunities for skipjack fishing for the Hawaiian fleet. Of course, at that time the *aku* fleet was the main fishery in Hawaii and it dominated the annual catch. The longline fleet was there, but it was the old-style vessels using old-style Japanese gear and --

EG: Closer to the islands, I would think?

JW: Closer to the islands. But the *aku* fishery was the main contributor to the fish catch.

EG: Those vessels were based primarily at Kewalo?

JW: Yes, mostly at Kewalo. There were some people scattered around the islands, but Kewalo was the center.

EG: Big Island, perhaps?

JW: Yeah, and Kauai.

EG: Kauai too?

JW: Kauai, too, I think. But mostly at Kewalo. During the big runs in the summer, they'd supply a lot of the fish going into the cannery, which was also at Kewalo. I don't know if you remember when that was going, Hawaiian Tuna Packers? Then there were, of course, fresh fish sold, too.

EG: Was the auction operational at that time?

JW: Yes, the auction was there, too, adjacent, right at Kewalo Basin. They handled all of the longline fish.

EG: And *aku*? Or *aku* was primarily cannery?

JW: *Aku* came into the cannery and then it was also sold off on the side. May have been some of that coming into the auction, too, but for years, the problem with the *aku* fishery is they spent half their time making bait, getting fresh live bait, primarily *nehu*. They had baiting grounds sometimes in Pearl Harbor when they could get permission and there were bait there, but mostly at Kane'ohe Bay. So, it was a real effort.

EG: Was it a trawl set-up?

JW: The bait was caught in little seine nets, so they had a little skiff with their *aku* boat and they'd go get, seine the *nehu*.

EG: Bait balls, I would think.

JW: They would encircle them with the seine and try to contain them and then brail them out with buckets; bring them together, bunch them up and brail them out into the bait wells. Then often, as often as not, the fish are running off Waianae or something, so then they'd have to trek around the island and go fishing, so they spent almost 50% of their time just in the baiting thing. So, for years NMFS [National Marine Fisheries Service] and others had tried to come up with some alternative baits. They did studies with tilapia and mollies and threadfin shad in the Wahiawa Reservoir trying to find an alternative, but none of those species had the right characteristics. When I arrived, the project was to bring live anchovies from the Eastern Pacific, California to Hawaii, because they were used as live bait in the pole and line fisheries off California. That was the first project I engaged in.

EG: How did that turn out? That's interesting.

JW: I guess there was some hope at the beginning they could bring them over in... They took like a tanker truck that you'd haul fuel or other liquids in and retrofitted that and went in and kind of cut out a lot of the baffles and then some of our folks here, Reg Gooding was the guy who built the life support system, so they'd get oxygen in there and proper circulation. The idea was you'd put the anchovies in and then you'd drive that truck onto one of these. . roll on/roll off container ship operations [freighter]. [laughs] Four days later, you'd drive it off in Hawaii and take it down to Kewalo Basin and pass out the anchovies. But, the first couple of trips were a real bust. I mean they had high mortality.

EG: Lots of dead fish.

JW: Anchovy paste or something. Yes, the most successful attempt was actually bringing a big bait boat from the Eastern Pacific and loading it up and bringing it down to Hawaii. They had pretty high survival. So, they came into Kewalo with quite a bit of bait.

EG: Was this government sponsored or a research effort or did it become commercial?

JW: It was government implemented but it was funded out of, there was a particular fund for this development project for the sort of industry/government funded, but really promoted by the industry. There was a high survival on that trip. Then, fishermen went out and they took both

baits. They were willing to take the California anchovy, but they had to take the *nehu* with them. That was their holecard. [laughs]

EG: Security blanket?

JW: Security blanket, exactly. So, depending on the situation they were in, they'd rely on the *nehu* to really hold the fish to the boat and get some fishing success. It's hard to get any really clean information out of that. That was kind of like the first trial, so the experimental design wasn't all that great. Then the project moved to Tiburon, California, the whole project was taken away from here. It went over there. Then they tried a different design for the tank and they were about halfway through that engineering when the plug was pulled on the funding. That was the end of that project. [laughs] That was in like '74.

EG: Still the development, fisheries development days.

JW: Yes. I mean, the whole thrust from the beginning of the lab was really to explore the resources of the Central and Western Pacific and South Pacific because it was pretty much unexplored and unexploited. The Japanese had expanded their longline fisheries out after the war and they had covered a lot of the region, but there was a large skipjack resource that they weren't exploiting in the longline fishery. So, the thrust was to try to map that out. Our lab was engaged in this. Skipjack tuna bait research was part of that and we had cooperative bait fish research with other folks around the region who have pole and line fisheries. There was a fishery in Palau and other fisheries in Papua New Guinea, and the Solomons. We did collaborations with the South Pacific Commission, which had just created a skipjack survey and assessment program. They had a Japanese bait boat chartered to go out and survey skipjack and bait resources all over that region. So, the whole push at that time was really to develop bait boat fishing. That was before purse seining came in, in the Western Pacific.

But our lab, all along during this period, our lab was doing collaborative work with our colleagues in Japan. This is something that started back in the early days mainly through the efforts of Tamio Otsu, who I'm sure you've heard of his name, was one of the young biologists who came right at the beginning as a fisheries tech [Tamio was a WWII veteran, member of the renowned 442nd Regimental Combat Team, who earned a degree at the University of Hawaii under the GI Bill]. In 1951, he was given an assignment on a Japanese mother ship out in the Trust Territories where they were doing a big longline survey and he was out there for several months with that group, sort of embedded with the Japanese and made his first trip to Japan at that time and made friends with a lot of scientists in Japan, young folks, who were involved in doing research on the mothership operations and the longline fishery. [working at the Nankai Laboratory in Kochi]. Then he parlayed that into continued interactions with the Japanese and other collaborative research and sort of seeded what was a long-term relationship with Japan scientists, especially with the Far Seas Fisheries Research Laboratory in Shimizu [which had evolved from the Nankai Lab]. We had lots of interaction with them. So, that was continuing into the '70s, and in 1975, our lab, we were part of the Southwest Center and the Center developed this agreement with the Far Seas Lab to do stock assessment on North Pacific albacore. Both the U.S. and Japan had major fisheries on albacore in different sides of the ocean, but nobody had ever brought it all together to look at that. So, that was my assignment, to do the

first full stock assessment using data from Japan and the U.S. Most of the U.S. data had been compiled over the years by Cal [California] Fish and Game.

EG: This was still based on a development, fisheries development model, or it was just about the time that the Magnuson Act was --

JW: This was before the Magnuson Act, so these were fisheries that had been fully developed, but on either side of the Pacific. Not much was known about what happened in between, although Tamio had done a lot of important research on albacore. The Honolulu Lab had done surveys out there in the central Pacific.

EG: These were some real science questions that were being pursued.

JW: Yes, Tamio and others had done a lot of great work on models of albacore migration and growth and maturation and all that system work. But nobody had really brought all the fisheries data together, so that was my first task. A challenge given the technologies of the day when data were collected and handled with more difficulty. You know, it [the current data technology] was all dated; we had to keypunch it up.

EG: You had a computer on campus [University of Hawaii] I would think?

JW: Yeah, it was a mainframe, up on the third floor of the geophysics building.

EG: Geophysics?

JW: Yeah, it was before the [now-adjacent] marine science building was there, and of course, the POST building. We had a major keypunch operation going on at the Honolulu Lab. This equipment was pretty newly acquired, so they were keypunching all of the old data, from the earlier equatorial longline surveys and the other stuff that was going on, and data that came in from the State on the *aku* fishery. So now we've got all this albacore data from Japan, so they were busy trying to meet my demands to keypunch all of this stuff. [laughs] So, we ended up with boxes and boxes of punch cards. We[Marian Yong and I] had to write all the Fortran code to do the analysis of this stuff. Nowadays we would just pop it into R or something and you'd have your thing done in five minutes. But this was a lot of programming and debugging, and taking all these cards on a hand truck and taking them up to the HIG and up to the third floor. It'd be a day-long project just to get really simple things done. So, I spent a lot of time up there.

Anyway, the work was successful and then the next year when we had it all done, we hosted the first North Pacific Albacore workshop. We had folks from Japan, Canada, West Coast states, and later Taiwan. That started a process that was maintained over the years. Maybe every couple of years, we'd have a workshop here, Japan, then La Jolla, back and forth. That eventually, of course, became the ISC [International Scientific Committee] which is the fisheries science body now for the North Pacific tuna and tuna-like species. So, that was a lot of fun.

Yes, so the principal Japanese folks engaged at that time were people of Tamio's generation that he knew, and then they brought on all the young guys my age, and then over the years we all

worked together. That was really one of the highlights of all of the work here. I'm sure a lot of people [being interviewed] had these same experiences, just this interaction with the international community on these projects. Yeah, so that was in '75 and then in '76 and then we got into the FCMA [Fishery Conservation and Management Act], Magnuson Act, which sort of changed everything. So, now we [with the new Western Pacific Regional Fishery Management Council] were required to do all of these management plans. I was involved in that with other folks at the lab doing what were then called preliminary management plans. These were simple little documents, not like the big tomes they [the Council] have now. We did one for billfish, and one for lobster, and one for seamount resources – the armorhead and other resources on the Hancock Seamounts. Although we knew very little about those resources and very little about the lobster. Billfish stuff, a little more, but still pretty meager data to put together a management plan. Yeah, so during this whole period, there were folks who got engaged in all the Council-related work and then fleshing out these plans in full blown FMPs [fisheries management plans] and so on.

But the international work continued. So there was this whole phase of international meetings on tuna and billfish that I was involved in. We had workshops, meetings all around the Pacific Basin on doing assessments of tuna in the Indian Ocean and the Western Pacific. These were not sort of published things, these were like grey matter reports, but they're all done collaboratively with folks from Japan and the other countries. That went on for several years.

EG: Were you travelling quite a bit?

JW: Travelling a lot, yes. All the Asian countries, Indonesia, Thailand--

EG: With the blessing of the La Jolla folks?

JW: --Sri Lanka too. Yes. We were involved. The La Jolla folks were involved, too. We had FAO[Food and Agriculture Organization of the United Nations] people participating because they were running the Indian Ocean tuna program at that time. All this is sort of a prelude to what later on became the international management, regional management organizations. Initially, it was just everybody kind of getting a grip on what was known about these resources. At that time, a lot of sharing of data.

EG: Of discussions with international scientists by phone or mail correspondence?

JW: Yes. And sitting around in meetings and conferences and putting papers together. Richard Shomura was our Director at the time, he was in the thick of all of this and instrumental in arranging a lot of this stuff. But, you know, information flowed pretty freely at that time. Few restrictions on fishing at the time, no management going on. One of the things that we did at that time, Marian and I did this project, she may recall it later when she talks to you.

EG: This is Marian Yong.

JW: Marian Yong, yes.

EG: Mathematician, I believe?

JW: She was a mathematician. She worked, after I got into some of this work, she became my co-worker, so we did all the programming together. So, we published this, I think it was a tech memo, that estimated all of the Japan longline catches inside the 200-mile zone of the U.S., the Hawaiian Islands and the other islands and territories. It was really coarse, you know, because we had data by five degree cells, but once we got into these 200-mile zones we were doing a lot of assumptions about how much of this is actually inside the zone or outside the zone. [laughter]. Anyway, we published this and then the Japanese weren't too happy about that and suggested that yes, they were fishing inside our zones, and so the data sort of dried up after that. It wasn't just us; others were doing a similar thing. As things got closer and closer to what everybody could see would be some control and management, the data kind of became not as openly shared.

EG: Were the Russians coming down too or primarily Japanese?

JW: Yes, the Russians nowhere to be found.

EG: They were further north?

JW: Yes.

EG: OK.

JW: Our long-time relationships were with Japan, but Taiwan was also easy to work with so we were getting data from them. Then later on the Koreans, too. All of them were publishing their stuff. The Japanese had regular publications. They may still publish this stuff. We got the publications in our library. One of Tamio's jobs and, of course, he was fluent in reading, writing Japanese, he translated the stuff that came into the library. He'd go through and mark up all of these reports.

EG: Was he second generation Japanese-Hawaiian?

JW: I think so.

EG: Or third? Yes. Anyway, he had the language skills--

JW: He had the language skills --

EG: --as an American, yeah.

JW: For folks like me, I was working with these Japanese data books and I couldn't make, I could recognize some characters after a while, but it's only his little notes in the margins where he'd translate his stuff that allowed me to understand what the heck was going on. During all of this, he didn't really participate in these kinds of meetings where we'd go do assessments and so on. Shomura was the more outgoing person who helped create all these relationships. Tamio was doing all this incredible work translating everything that came out of Japan related to tuna.

There's a whole series of stuff, his translations, which were recently digitized here, so you can search them through our database. Then he did translations of a lot of the trade journals and newsletters in Japanese. These were extremely valuable to researchers here and people in the industry.

EG: Are we still primarily talking about albacore and skipjack?

JW: Now we're talking about everything related to tuna and billfish.

EG: Everything, okay.

JW: Everything, yeah. He covered all that stuff. This was like required reading. So, at the lab, the days before the Internet and all the rest of the stuff, we had sort of two sets of readings that were passed around the researchers. One was so-called chron file, which were copies of the correspondence that went out of the lab. Those came around to everybody so we could see what the heck was going on. The others were a set of these translations that Tamio had made of a Japanese trade journal called *Katsuo-Maguro Tsushin* that covered all the skipjack and tuna fisheries news and what was happening in the industry and science. That was just regular reading. Everybody devoured that stuff. And Tamio sent them outside the lab, too, to other research centers. He continued doing that after he retired. He had a service, a subscription service, so we paid him to do that, others paid him. He did it, yeah, for a long time.

Yeah, so anyway, a lot of that international collaboration stuff continued and further developed, and then, now we're talking sort of in the late '70s and into the early '80s. I'm just talking about from my own experience now. We got into more, a phase of albacore fishery development in the South Pacific. The U.S. always had a troll fishery in the North Pacific, but there's an albacore resource in the South Pacific that we knew was pretty substantial because longliners were down there, Japan and Taiwanese longliners, and we got log books off of those vessels that came into Samoa. There was a troll fishery out there by some New Zealand vessels. They couldn't make it very far offshore but they were catching albacore and vessels out of Chile were catching albacore. So, our fleet (U.S. vessels) was interested in exploring down there, so we did a couple of cruises down there in the mid-'80s, to do oceanography in the transition zone of the South Pacific and troll for albacore and tag albacore.

EG: What did you conduct that from?

JW: From the *Cromwell*. We did that in collaboration with colleagues in New Zealand and French Polynesia and as a joint thing with the Honolulu Lab and La Jolla Lab albacore folks. So that was kind of a little sidetrack. It was just for a couple of years. While we were down there, there were a half dozen U.S. albacore trollers down there fishing around us in the same vicinity, so everybody learning what was going on there. Then after we pulled back and they sustained the fishery down there. It's still operating. It never actually boomed very much, but we know more about that resource down there. My work then quickly got into what the new problem of the day and that was the high seas drift net problem. You must recall that?

EG: Sure.

JW: Of course, it was a global phenomenon. We had Taiwanese and Japan vessels fishing in the North and South Pacific.

EG: Cetacean interaction problems.

JW: Koreans also fishing in the North Pacific, Taiwanese fishing in the Indian Ocean and the Atlantic Ocean, so all the oceans were involved. Here in the North Pacific, the main concerns of the fishery that came up initially had to do with salmon and seabirds. They were taken in the squid drift net fisheries of Japan and Korea primarily, and to a certain extent Taiwan. Later, the folks who were leading this effort out of Headquarters learned, yes, that there was a large mesh fishery that Japan had had for, ever since the beginning of the 1900s, a large mesh fishery that targeted billfish and tuna mostly in waters closer to Japan. So, then that became a concern, too, and the Taiwanese were just getting into that fishery too, so we had Taiwanese and Japanese in large mesh fisheries and then Japan, Korea, and Taiwan squid fishing. That was in the North Pacific and in the South Pacific you had Taiwan and Japan both fishing tuna down in that area with large-mesh driftnets. So, we were immersed in all of this.

There was money provided by NMFS to address the problem and I headed up a high seas driftnet program for the Lab. We worked together with folks out of the marine mammal lab in Seattle and the Alaska Fisheries Science Center. They were the marine mammal specialists and salmon specialists. Also colleagues from the La Jolla Lab. We had a seabird guy from the Fish and Wildlife Service in Alaska. So we had a whole team of NMFS folks that sort of did the core planning for this program and we worked with colleagues in Japan, Korea, Taiwan and Canada to put together this international observer program so there are U.S. observers on all the different fleets and Canadian observers on the Japanese squid fleets and the Asian observers on their own fleets. Yeah, it was quite an undertaking. We put this together, did all of the standards, trained all of the observers, figured how we were logistically going to do all this and collect the data and manage those. We pulled it off and ran it for a couple of years. We ended up with like one full year of data from all these different fisheries and then part of a second year when we were about to complete the whole thing with the large mesh Japan fishery and then the moratorium kicked in.

EG: What year was that?

JW: In '93, I think it was. So, yeah, we were sort of in mid-course. We had all the observers trained to go on this last large mesh season in Japan and then the agreement was reached and --

EG: No more.

JW: Pulled the plug and that was it. It was about a year more of funding to kind of wind down and try to tidy some things up and kind of clean up the database a bit. Some of the papers were written up. We published some things during the middle of all of this, but I don't think we really ever had a satisfactory finish to everything. I know Mike Seki just recently published some things with one of his colleagues for a PISCES volume that they did. He was young biologist on the project, but I think most of the scientists were disappointed that an [early] end came to the

fishery because it was just a gold mine for data to learn about that region about which almost nothing was known. There was just a ton of data coming off these observer trips. The South Pacific, we didn't have any observer programs there but we were collecting data from the countries involved. I was involved down there, too, and I spent a lot of time in these meetings related to science and negotiations between all the parties, Pacific Island countries and the fishing countries there. Same thing in the North Pacific. We had a lot of travel going around to meetings. Some of them discussed the science and what was coming off of the observer data. Other meetings to sit and argue over impacts. Those were the less fun meetings.

EG: Environmental impacts primarily?

JW: Just impacts on stocks or things like with albacore, the albacore were taken incidentally in the squid drift nets but they were a little too big. They'd get caught, they'd get entangled and they'd drop out. There was some dropout mortality. There had to be. So, our troll fishermen were catching albacore that had net marks on them and there were, sometimes, a high proportion of marks. They were pretty steamed and they were putting a lot of pressure on the State Department to do something about this. So, we'd go into these meetings to discuss the albacore data and we'd know that the Japanese scientists who are our friends and, in other circumstances, we'd be friendly and discussing data in an open way, they were coming in with some hardball positions from the fisheries agency [Japan Fisheries Agency] and then we were getting directives from our side on the...Okay, this is going to be the U.S. position on albacore and the impacts on albacore.

EG: Tough spot.

JW: Yeah, and we were trying to, how do you be objective. Those were uncomfortable times, but that whole project I'd have to say is one of my most fun ones or satisfying ones because it had all these elements that were fun. It was brand new. You're starting up something so you could see, I mean you're growing something so successful. New territory. New data. Things that nobody had seen before. That was a thrill. And just working collaboratively with all these different folks, these different circumstances, and it was a hot issue, so that made it fun. [laughs] So, yes, that was a lot of hard work. That was a kind of grueling period.

EG: Again, wrapping that up, early '90s?

JW: Yeah, right. So, it really got going about '87, I guess, and then getting into a lot of the early meetings and preliminary sort of discussions. Then learning more about what exactly these fisheries did, really how they operated and setting the parameters for how we do an international program.

EG: How did the moratorium come down?

JW: There was so much pressure around the globe from all the NGOs [non-governmental organizations] and the governments, yes.

EG: Popular issue, yes.

JW: Popular support. I mean, there was the wall of death image and all this, everything in the path annihilated. We knew it was just a fishery out there and dispersed mortality over a wide area and big populations. It was a short period that we were studying but we weren't seeing like it was big declines in anything, you know?

EG: It's a big ocean out there.

JW: Big ocean, yeah, so there was a period I think when people were looking to, were actually doing research on ways to reduce mortality, like on seabirds, lowering the nets. Seabirds were caught near the surface attracted to fish in the net, so if you could lower the nets. So, we were doing experiments in the northern region to see if we could reduce bird mortality. The salmon mortality, that was the early concern about interaction. That was pretty much regulated by the, by regulating the northern boundary of the squid fishery during the season, so it was below the 15-degree surface isotherm. It was the southern boundary of the salmon waters.

EG: How about the dolphins? I remember that being a --

JW: Yeah, the mammal interactions, yes, again, I mean people are trying to think of ways to reduce . . . it was mostly like Dall's porpoise and Pacific wide-sided dolphins, species we don't get in our fishery here but people were thinking of ways to reduce those interactions. So, I think people thought that well, by fishery regulations you could reduce the impacts to the point where by reduction of effort, and there may be some area restrictions and so on, that you could sustain the fisheries. But it didn't prevail. [laughs] And of course the Japanese still used large mesh drift nets but inside their 200-mile --

EG: Insular, right. What does that fishery look like today? Is it sustainable?

JW: I haven't followed it. It gets reported out every year in the ISC working groups. They compile totals of billfish and tunas from all the different fisheries so that's always part of the mix. Yes. In the old days, they came all the way out here north of Hawaii, just kind of north, about 30 north they would, you know. The one year we had observers on they were mainly targeting skipjack. They happened to be really abundant that year out here. Yeah, so after that drift net phase, I was heading up the stock assessment group at the lab and our longline fishery was just ramping up. This infusion of boats from the Gulf bringing in new technologies.

EG: That was early- to mid-'90s as I remember?

JW: Yeah. It started the late '80s and then kicked in the early '90s kind of steamed up. We [the Honolulu Lab] got log books in place in the latter part of 1990. This is really kind of '91 when we started getting log books from all our vessels.

EG: All vessels?

JW: Yes. Then in '94 when we [the Pacific Islands Regional Office] stood up an observer program.

EG: That was partial coverage?

JW: Yes, real partial at that. I mean 5% or less at that time. So, I was heading up the stock assessment group there and I had Bob Skillman [and Gerard DiNardo and Pierre Kleiber] in the group and we had various people working on swordfish, which is the main early interest or target of that fishery.

EG: Primarily north, right? Is that correct? Sword was primarily north of the islands?

JW: Yeah, that's right. So, there was a focus on swordfish and we were working with colleagues in Asia and the Eastern Pacific on swordfish biology. We had a couple of swordfish symposia [organized by DiNardo and others] to bring together information on biology with various people involved. I was just sort of managing the stock assessment program, was still involved in some albacore research. Then I was doing a little bit of work with sea turtles because back in the late '80s, I'd been helping out George Balazs. He was doing some nesting surveys out at East Island, so I helped him with some of the quantitative parts of that with analyzing the saturation survey data that he was collecting out there. Then in the high seas drift net stuff, I did some modeling to look at some impacts of the drift net fleet on turtle populations. I wrote that up in one of my reports that came out of that drift net period, but it was really crude stuff and we really didn't know much about any of the species. I was sort of working on that --

EG: Was it for greens primarily or green turtles primarily? Or all turtles?

JW: Yes, with George, of course, it was the green turtles. The high seas fishery caught mostly loggerheads and some leatherbacks, a few greens, and a few olive ridleys. I was sort of working on that and then as our longline fishery developed and, of course, we had a big interaction problem, the way we were fishing early. We were catching a lot of loggerheads.

EG: Shallow.

JW: Yes. So, our regional office wrote a biological opinion [in 1998] on the impact of this fishery. I decided I'd write a, I'd do a little piece to support them using the model I'd built to look at longline impacts on turtles. I put that together and wrote it up. I think it was an Administrative Report. It wasn't peer-reviewed or anything, it just kind of came out and ended up being used, and then we [NMFS] got sued in about '99. The first lawsuit we had on the fishery. Earthjustice [Earthjustice Legal Defense Fund] was the firm that brought it on behalf of some others. So, I got involved in that lawsuit and my paper was Exhibit A. [laughs] Okay, here's what...the paper said, it covered a lot of what we knew about impacts on turtles at the time and the status of turtle stocks, which wasn't much at that time. We really didn't know much. But the guy, and I couldn't see it, we were in the courtroom and it was Paul Achitoff, the [Earthjustice] attorney at the time; young kid. He had the easel facing the Judge Ezra, so I didn't know what he was showing him, but he was talking about Wetherall's analysis and all this and I didn't know what he was showing him. [laughs]

EG: Turn that around, please.

JW: Yes, but then by the gist of his speech there, I could tell he was talking about the Malaysian leatherbacks and they were in decline steeply. It had nothing to do with longline fishing, but that didn't matter. So, anyway, that was sort of a beginning of a period of keen interest in the longline fishery, impacts on the turtles, and concerns about that.

EG: As I remember, a series of experiments were taken on by the lab, intended to find ways to reduce frequency of interaction?

JW: Yes, well, seabirds were a big problem.

EG: First?

JW: Yes, that was so. I think Chris [Boggs] was involved pretty much in that. They were looking at dyed bait and other means of reducing bird interactions. A lot of the work on sea turtle interactions came later when they looked at circle hooks.

EG: Circle hooks, right. And deeper sets.

JW: Some of our people did a lot of work on that. I mean, Chris was involved. Yonat Swimmer [and others] did a lot of work in that area. Still are doing that work. It turned out to be very successful, all these methods eventually reduced the interactions big time. Anyway, I was engaged then in some of that stuff regarding impacts, which is pretty high intensity stuff. At the same time, I was assigned the lobster stock assessment in 1994, I think it was. I think it was 1994 we had lobster fishing[in the Northwestern Hawaiian Islands]and it was under a quota and --

EG: A limited entry quota?

JW: It was. I think it might have been limited entry, but there was actually a catch quota, a seasonal [annual] catch quota. So there was a [pre-season] forecast made of what the stock size would be [when the season opened], and hence the quota, then the quota was re-computed mid-season based on early catch rates when the fishery got underway. When the quota was reached, the fishery would be shut down. But the forecast was a little squirrely, so before they knew it, they'd overfished the quota, so there was an abrupt early closure, an emergency action to close the fishery and there was a lot of uproar and the Council was upset. I wasn't involved in that assessment. [laughs] As a result of all that ruckus, though, that whole assessment thing was put in my lap. Gerard DiNardo was working under me at the time, he and Bob Skillman were part of my staff and Pierre Kleiber, stock assessment. So, I assigned Gerard to the lobster --

EG: DiNardo?

JW: Yes. We were under the gun to come up with a new model and a new forecast method and a new quota system within about six months. They brought in a panel, expert panel, to do a peer-review of the problem, what had happened, what had gone wrong, what we needed to do, so we were really under the gun to do this. That was a period of high stress. [laughs]

EG: So, a kind of a memory there, right?

JW: Yes, I mean it was, so we had to do a bunch of models. Gerard has a real set of skills as a person interacting with people and doing all that kind of stuff. He didn't have the skillset for the modeling [and coding]. I had the modeling skills, so I built the model and tested it and got it all ready and then he ran the model and got the results and presented with the Council. But we came up with a new approach. That was used over the next few years without any big closures, but the fishery, the recruitment was just not there, so the fishery just declined and it was eventually shut down.

EG: Even with limited entry? I remember there being --

JW: 2000, I think, it was shut down.

EG: --at one point there were 12 vessels allowed up there, I believe?

JW: Yes.

EG: Even with that, there were problems?

JW: Yes. Yes, it's just the recruitment that they had early and experienced early just wasn't there, and there was high uncertainty in the fishing mortality and other parameters, so the fishery was closed. I think it was called a moratorium or something in 2000, but that was the end of it. Then [President] Clinton came in that same year with this thing prior to the sanctuary, a marine reserve for the Northwestern Hawaiian Islands. That pretty much sealed the deal on that. A few years later the monument, George Bush's proclamation. Yeah, so that was the end of the lobster fishery and that research. [laughs]

So then, at that point I sort of changed course. I had gone through this period of a lot of stressful stuff with the litigation on the turtle issues and not being able to come up with the magic number that everybody wanted for, you know, what was the number of turtles could be safely taken. I wasn't prepared to come up with that number. Then we had a lot of this ruckus with the lobster fishery. I went into a period of deciding well, you know, I wasn't happy doing this stuff.

EG: Time to retreat from the front lines.

JW: Retreat, yes, from the front lines. That was sort of a turning point for me. Stepped down from the stock assessment work. Yes, it was something I did to sort of maintain my sort of self-preservation because I just had a medical, serious medical repercussions. So I took a real step back from that and it was a great stress relief to be away from that stuff. Then I got engaged in some of the international things that were happening then and that was sort of the preliminary talks with the Western and Central Pacific Fisheries Commission, the preparatory conferences. Mike Laurs and I got involved a bit in some of those. So, I tried that hat on for a couple of years and then sort of decided well, being sort of the science guy at these types of meetings and then deciding that no, it was not that much fun. Because they're totally political. They could be fun, you know, and you meet a lot of nice people and have fun times, but to me, there was no satisfaction, you know? [laughs] So, then I decided to create what was SIS [Scientific

Information Services group at Honolulu Lab]. I pulled together these different sorts of information science service functions that had been scattered around the lab at that time. For example, all the manuscript editing and everything was handled under Susan Kamei and she was head of admin and she was overseeing that. There were other mismatches around, so I sort of collected all that and created this SIS group.

EG: What does that acronym stand for?

JW: Scientific Information Services. That encompassed the editorial services and publications, the website, which was, we hardly had a website then, so it was primarily trying to take this infantile thing we had and make it a little better. So, getting a webmaster [Sunny Bak, and later Greg Udarbe].

EG: What year would this have been? Do you remember?

JW: That was about 2004. Then also the library, and Ani Au was the librarian. Also graphic services. Debbie Yamaguchi did that. And then some data services folks. They would have been part of the so-called data management group, but they handled access to data so it was really providing some [scientific information] services, information access. That was like Brent [Brent Miyamoto] and Chris [Christopher Tokita] and then Nate [Nathan Chan], who did our data entry stuff. And Lucille was still in that group at the time. Lucille Tsukano. She was one of Sally Kuba's employees from the old days. She worked here a long time. She was still in that group. So that was my gang. [also Judy Kendig, Francine Fiust, and Audrey Rivero in the publications editing department]. We did a lot of good stuff over the 10 years.

EG: Absolutely.

JW: Then dispersed a couple years ago.

EG: Upon arrival at Ford Island?

JW: Not immediately. It was like maybe, yes, maybe a year after.

EG: How long has the agency been over here?

JW: I am trying to remember, 2014, I think. Was it '14? Yes, March, I think, 2014.

EG: Right.

JW: So, about a year later, I got to the point where I was getting sort of tired of the grind. [laughs] And I had some medical issues. I had cancer, so I was battling that, so about a year, over a year, I was in and out of the hospital. I had developed this interest in data visualization. Really the problem of getting data out of our databases and archives, where I thought it was sort of rotting away and getting it out and making it accessible and then putting together visualizations and putting these up on the web so people could really see and explore the data and think of other questions they could ask and so on. So, I decided I'd pursue it and spend more time on that

as I shed the different responsibilities of SIS, which took awhile; I finally got rid of the last ones in January this year. All the data reports and things I was doing up through last year.

EG: It can be hard to snip those threads, I guess.

JW: Yes. I mean, there was so much, and they didn't yet have enough people to cover. There's still a lot of things that fell through the cracks. So, that's what I've been doing of late. It's been fun and I'm still hopeful that I can actually see some of these [data visualizations] come to fruition. Running into roadblocks either with insufficient databases or with not being allowed to post these things on the web because they're coming from an external server, so we're trying to work through those bottlenecks right now.

EG: How about the future – what are you looking at in terms of your career?

JW: I mean, I still have this interest in visualization stuff and I think it extends beyond the data here. These are things you can do on your own. There's tons of data out there now that are made available. Government data. I mean, just plenty of data being made available. So, you can spin up a blog and do your stuff and use all these tools like I'm using. You can post free. It's an interesting one. I've been playing around with some whaling data. There have been a lot of papers published over the last 10 years on the history of whaling, data that was from the Russian and Japanese industrial whaling over the last two centuries. Finally, it was shared and published in the Fishery Bulletin and some of the other bulletins. And there it is, these stale tables, you know? I could just go in and strip it right out and build these visualizations. I haven't gone back to it for a while, but while I was really trying to scope this thing out, I could have all these historical whaling data in the different oceans and then try to pull together time series of the whale stocks where I could find those data.

EG: Will you look at Alaska native whaling as well?

JW: Wherever there would be data, yes.

EG: There are some decent data.

JW: Yes. The idea was to put together a blog where I could kind of have one set of visualizations that sort of themed this way so I could sort of write some narratives there, point to key references, and expert sources and so on, but just show some of the data. I look around and I really can't see it.

EG: You don't see anything like that.

JW: Yes. Those are the kind of things. I still have that little flame burning there that I want to do these things. [laughs] Working here has been great, but fewer and fewer people that I interact with, so that's something that's not satisfying. [laughs]

EG: Well, you look great. You look like you could go quite a long way.

JW: Yeah, no, I'm sure I'm biologically a lot [laughs] in terms of spirit and strength and vitality. My dad worked until he was over 100; he died at 102.

EG: My gracious.

JW: He was still practicing law when he was 100 and 101. Was still driving his car at 100.

EG: In San Francisco?

JW: No, up in the Grass Valley in the Sierras.

EG: Right. You folks moved.

JW: Yes.

EG: There must be some good air up there.

JW: Fantastic air, yes. The air there and in Hawaii, you can't really beat. Yeah, I probably skipped over a few things here. Let me see if I can fill in. [brief pause]

Yeah, earlier, all that international period before the Magnuson Act, I spent some time getting involved in these State Department negotiations. They're called GIFAs [Governing International Fishery Agreements]. These are these sort of bi-laterals with different major fishing countries. They were to hammer out these, I think they're called general international fishery agreements or something. They covered all manner of fisheries relationships between the two countries. The tunas were just a little piece of that. So, I'd be part of the delegation to be able to answer questions on the tuna fisheries in our region.

EG: As a rep from Commerce?

JW: Yes, right. These are all State Department affairs. They'd have people from Commerce embedded there. That was kind of an interesting experience for me early on to get a flavor of those kinds of meetings. Just how they played out.

EG: Somewhat diplomatic functions, I would think.

JW: Diplomatic functions, yes. I'll never forget the one I had on Japan. It was in D.C. The Japanese had invited us out to this really nice restaurant, Japanese delegation. They had it all orchestrated, so all the U.S. delegation on one side of the table and all the Japanese folks on the other side. The servers came out and they put a nice, big steak in front of each of the Americans. They came up and put a nice slab of salmon in front of all the Japanese. [laughs] Nothing was said, but it hammered out one of the points that they'd been trying to make with us during the negotiations about their salmon fishery. That's always stuck with me. [laughs]

Yeah, the other thing that stuck with me about these international things was after the drift net fishery ended and, of course, Japan was busy getting rid of all their vessels and retreating and we

were just sort of cleaning up. We had some money during that last year to do some follow up studies. So, we spun up a study. The idea was to go in and measure the economic impacts of the moratorium on the Japanese drift net fishery and the related support industries and so on. I gave a contract to Dan Huppert. He hired a guy to do the fieldwork. I don't think Dan wanted to confront those guys over there. [laughs]

EG: Stick his neck out, yes. [laughs]

JW: So, this guy went over there and yes, he knocked on a lot of doors and a lot of them didn't open.

EG: Interesting.

JW: He managed to get information here and there. They're pretty resourceful in getting enough stuff to put together a report. On one occasion he went to visit the director of the Far Seas lab, a guy who I'd known and interacted with. Nice guy. But he came in and sat down in a very somber mood and said, "well, you guys murdered our fishery and now you want to come and examine the corpse." That pretty much summed up their whole attitude to that, yes.

EG: [laughs] Tricky business there.

JW: Yes, exactly.

EG: What are your perspectives on the present-day movement? There was a big meeting last night about the Papahānaumokuākea Monument and expansion thereof?

JW: I'd like to have been there and listened to that discussion. I think we're in these deals where the views that are going to prevail are not necessarily the views that are supported by science. I mean, you just see it.

EG: Do you even see science being used in some of these decisions? Sufficiently?

JW: Yeah, I mean it's sort of there. I mean, you see it like in the tuna, like the big eye tuna stuff, you know? They have measures in place to restrict harvest. I don't know. I've really not looked deeply into it, but the idea is to reduce fishing mortality and get the recovery. Most of the issues now are allocation of those harvestquotas, so our own fishery and you've heard all this and I'm sure others have talked about it. We have a quota that's barely adequate to cover what our normal annual catch is. That's the way they were established was that quota levels were based on some recent level of catch. So, ours is right up basically against the limit and we have an expanding fishery. The Japanese, on the other hand, they had a much bigger longline fishery and a higher quota but their fishery has retracted somewhat, so there's like a slack in there when you look at it. Then our fleet, we're sort of forced to kind of move to these other ways of extending our fishery and getting a lot of flak for this. I don't know that we do a very good job of communicating the big picture on these fisheries. I think we may have a shortcoming here in just our fishery monitoring and reporting. We don't get much out. Our longline fishery is a tiny part

of the whole Pacific-wide longline fishery. Then, there's the purse seine fishery out there which is –

EG: -- dwarfseverything, right?

JW: -- just the big dog out there. It's whacking as much bigeye as the longline fishery. But that's not even, we don't even report that widely yet.

EG: No.

JW: We might be doing that soon because we now have, the Center has responsibility for managing the purse seine database. We're sort of the caretaker of it. That actually belongs to the foreign countries. Yeah, we could probably do a better job of solving our situation and maybe get a little more sympathy from people out there. [laughs]

EG: Whereas certain, uh, other entities are sort of geared for putting messages out. Message production.

JW: Yes, I mean they spend a lot of money on that, folks like the Pew Foundation and all those other folks. Well-oiled machines. Yes, so it's sort of sad. Yes.

EG: Full circle from, well, half circle from fisheries development days to where we are now.

JW: Yes, right. And being squeezed more and more into other waters and we haven't even talked about marine mammals yet. I mean those screws are tightening more and more too. [chuckles] There was a period when people thought we should bring back the skipjack fishery because it's a clean fishery and there are plenty of fish. [laughs]

EG: Right. A somewhat under-utilized species.

JW: Under-utilized and if you could get the price up, it might help. There is actually some local boat who was kind of keen on doing that, but I mean this is several years ago, the idea sort of popped up. Nothing ever happened.

EG: Do you like *aku*?

JW: I like *aku* sashimi. I don't eat it that often, find it that often, but it's okay.

EG: I enjoy it. There seems to be --

JW: I used to eat *aku* belly down at one of those old dives near River Street there; in the old days, there was a nice little place.

EG: It's still fairly popular locally. I don't think it gets utilized on the continent like it might.

JW: Yes. I don't know. We can start our own *katsuobushi* operation here, too.

EG: That's right. [laughs]

JW: I don't know. You wonder whether things will come around to something like that.

EG: Well, that was a wonderful discussion of a long and fruitful career. I enjoyed it.

JW: I mean it was, I have to say I couldn't have found a more satisfying career and I had no idea what it would become. When I started out, like I was saying, I liked to be trout fishing, so obviously you go into fisheries, right? Then at some point along, some wise, seasoned, fishery biologist told us young freshmen that "look, if you want to spend your career trout fishing, become a dentist." [laughs] Don't go into the fishing business. You'll never have time or whatever.

EG: Has that been true? Are you fishing these days?

JW: When I go to the mainland for any period of time, if I can I go trout fishing, but I keep all my gear at my sister's place in Grass Valley.

EG: Do you fish here at all?

JW: Not much. It never had the rewards and it didn't have what I liked about all the trout fishing is just being out in a serene, tranquil place by myself in beautiful surroundings, out in the water, and here, I'd be on a crowded --

EG: Yeah, it's a different environment to be sure.

JW: Place. Yes, it wasn't quite as satisfying.

EG: Shoreline fishing is tough here.

JW: Yeah. Yeah, but, ah you couldn't think of a job that had more sort of adventure attached to it. I mean I've been to places all over the globe. I've done collaborative turtle research in Mexico and in the Azores and worked on tuna and billfish problems with people everywhere from New Zealand, Australia, Sri Lanka, all the South Pacific islands and western Pacific and Asia. Yes, so I have a lot of fond recollections of that stuff. [laughs]

EG: That's terrific.

JW: Yes, and I've had chances to go to other places [to work], to La Jolla or Alaska Center in Seattle, but then I'd have been more confined. Yeah, if you're working in Seattle, okay, you'd probably go down to Portland and maybe up to Juneau or some place and the fisheries are pretty confined. Once in a while, you might be able to go to some overseas thing, but out here where we're situated with the kind of critters that we're studying, we have just great opportunities for travel. [laughs] And meeting all these great people.

EG: Fantastic, Jerry. Thank you so much.

JW: I don't know, I think I've probably covered everything, every aspect of this stuff.

EG: It's been fun to have people walk through their careers and they touch on key issues every time. In describing your own work life, you hit on a wide variety of --

JW: I'm sure people have talked about the technology changes, but for somebody who's been around for as long as I have, I mean I've seen just about every . . . You know, I remember early days in Alaska lakes and doing work and dropping these mechanical BTs down and it was the same thing in the early Honolulu Lab days, in the oceanography equatorial work, where they'd drop a BT down with a little smoke slide and you'd get a trace of the temperature and depth and you had to take that slide out and stick it in another instrument that was calibrated and then you'd read off the values and then you'd write those down.

EG: On a piece of paper.

JW: Yes.

EG: Log book.

JW: If you wanted to plot those then you had to, I mean, that's sort of the way everything was.

EG: Right, more physical.

JW: Now you've got some autonomous device out there loaded with all kinds of sensors just beaming it up.

EG: It's an incredible change.

JW: Yeah, I don't know how it changes the way science is done, the information is processed. You get it so instantaneously. I don't know if you learn more by sort of plowing through it and absorbing it. I don't know if you're more careful in that situation or contemplative when you're writing. Maybe the stuff you put out has been better vetted. I think there's a little bit of that and I think there's a lot of stuff maybe and there's more pressure now to get stuff out, too, move along. So, I'm not sure the quality of the stuff is as good as it could be.

EG: It reminds me of putting together a dissertation and walking through all of the steps to get to the end product. You're really forced to see how everything works and understand the literature and how to produce a scientific product. Now it seems a lot of the work is being done automatically.

JW: Yes, everything. And just the information search. I mean there's some real stark examples of how we're in a real warp, looking at this building. I don't know if you were in the building when we first occupied it, but we had the library, the display area was up front. It's the one that's vacant now. They've gutted it out to put a store in there so they can sell t-shirts and stuff, but initially we had the beautiful native hardwood display shelf for periodicals and we had all the

chairs where you could sit there. All the action was [to be] up front. Ani's office was up front. We were open for business but nobody came.

EG: Nobody came.

JW: We designed this library to be the perfect library we'd always wanted. [laughs]

EG: Books are becoming passé.

JW: Yeah, and we should have known, because this was already the trend. But I think we all hoped "okay, we're going to have this, it's just going to be fantastic." We had all these rows [of books and journals]. We were going to have monitors in there so people could do all their digital searching on there, too. They never did get installed, but people do it from their desktop.

EG: There's no one in the library these days.

JW: I mean, Ani at the time wanted to have a half-time person with her because she wanted to expand stuff. Now we have just a half-time person.

EG: Is Ani still around?

JW: Unfortunately, she quit. She commuted here from Kauai.

EG: Oh really?

JW: She lived in Kauai, yes, so she was here two 10-hour days every week, then tele-worked. Yeah, she had some other things going on, and moved on to those pursuits.

EG: Times have changed. They really have.

JW: It's something else. [laughs] Yes. My interest is in sort of the cutting edge stuff and really seeing databases get in the proper shape so that all these new modern tools can be used. There's a whole new field of data science that's sweeping over government and industry.

EG: How would you characterize that?

JW: Well, it's just more data and then sort of --

EG: Big data?

JW: Well, big data's part of it and sort of drawn the attention to data and then the people, businesses and everybody, municipalities with all these smart communities we have now that are collecting data and using it in almost real time to manage the cities. What is it? Philly or one of these cities, they have sensors in their garbage cans. These are the larger garbage things [containers] that are scattered around the city. They have a sensor sort of inside that measures the level of the garbage. They have another sensor that's beaming the location and the data. So, from some central computer, they have the trucks going around emptying cans, but instead of just

going around systematically and looking in an empty can and then going to the next one, they sort of optimize the routes to go pick up the ones that are fullest. This is part of what they do is the way they're managing data. Sort of fascinating.

EG: Pertinent to fisheries. VMS and maybe real time monitoring the stocks.

JW: Yes, people are working on that so hopefully we'll have the electronic reporting and stuff within, that's a pretty hard deal, but they're working on that. That'll be a real breakthrough.

EG: I also think about purse seining fleets and the FADs (fish aggregating devices) with data being sent from FADs out in the Pacific.

JW: Right.

EG: They can tell you what the aggregation looks like. You can even visualize it.

JW: Right. The companies that own those FADs are probably working on that, too. Yes, just getting our own databases. We still are putting some data in d-base formats. We still have data in these antiquated obsolete structures that require computers that aren't even allowed on the network anymore, so they have to be isolated [laughs]. So, we have some work to do to bring our stuff up to standard. I think we just under-invested in data management time after time in NMFS, at least the Honolulu lab has, the Center here. I think the leadership is pretty attuned to that.

EG: Good.

JW: Yes, we just have to come up with the funds but, [laughs].

EG: A perennial challenge.

JW: But yes, getting the data in the proper databases and then using the [modern] tools to get it out. Some of the young folks are plugged into it. Justin [Justin Hospital] is working on that with the economics data. That's exciting. But we're running into these barriers about what IT folks will allow. It's sort of strange because usually you think of the people at the ground level are doing the most innovative stuff, but in our instance, it's the Department of Commerce headquarters. And you think of people at those top levels of Commerce as being a bunch of stodgy bureaucrats, but they actually have data as one of their main goals at that level. They have this data services group that they stood up there, all modern, and they set up a, hired this whole group of data scientists, and a Chief Data Scientist, and they're building out all this stuff that's sort of the *avant-garde*. [laughs] And providing access to all of the major Commerce databases, the patent and trademark data and census data and all that stuff, so people can easily get that. And then showing them [public] how to use it with the different data science tools. So, they're using some of the tools that we'd like to use, but we're not allowed to by our IT folks at NMFS. We've got --

EG: Agency level, right.

JW: Yes, something's wrong with this system.

EG: Interesting, well, it might be fixable.

JW: Evan's working on it, so we'll see. [laughs]

EG: That was a really a nice comprehensive discussion. Thanks, Jerry, very much.

JW: Thanks for the opportunity.

EG: I think that discussion of history and then talking about the future, it was really cohesive. It's hard to formulate an understanding of the future without that wonderful discussion of the past.

JW: Yes, some of the past I didn't, I have a sort of murky awareness of the early days. I talked a little bit about Tamio and how he started out with his trip on that mothership and it kind of launched his career along a certain path.

EG: Well, until I talked to you, there were 20 years of murkiness that you solved, so that was nice.

JW: Yes. There are other things that happened in that early period that are just really monumental events. All the exploratory work in the equatorial region on the oceanography and the pelagic fishery stocks in those regions.

EG: Post-war research?

JW: Yes, post-war research. The early days of POFI (Pacific Oceanic Fishery Investigations) in the '50s. They did a series of cruises down there. Most of them with the two vessels, the *Smith* and the *Manning*. The *Smith* was an oceanography vessel and *Manning* was doing the longline gear work. This is the old Japanese style basket gear in use at the time. So, they were sort of mapping out the resources in the region and mapping the structure of the ocean . . . But it was during these cruises that Townsend Cromwell and his colleagues discovered the equatorial undercurrent there.

EG: I recall it from --

JW: Which solved all sorts of things about the ocean circulation here in the Pacific.

EG: --that was part of my introduction to oceanography class. [laughs]

JW: Right. You learn all about that.

EG: Everybody did.

JW: Yes, that would have to be one of the hallmarks of this Honolulu lab. Yes. If you talk to any other old timers, hopefully they can shed a little light on those earlier days. You're talking to Richard Uchida? Is he one of the guys?

EG: Richard is involved [it was subsequently determined that Richard could not participate].

JW: Yes, so he was, I'm not sure what time he came here. It was before I was, for sure. Yes. He probably has some good understanding of those days.

EG: He's actually writing up some history as we speak.

JW: He is? Fantastic. We have a lot of resources here, just scattered resources on the history of the lab.

EG: It would be useful to bring it all together.

JW: And nobody's ever made the effort to try to pull it all together.

Okay. [laughs]

EG: All right, Jerry. Thank you.

JW: Yes, OK.

EG: Best of luck.

JW: Thanks.

EG: In the coming years.

JW: Thank you.