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Anderson, Emory ~ Oral History Interview

Joshua Wrigley

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

Interview with Emory Anderson by Joshua Wrigley
Summary Sheet and Transcript

Interviewee
Anderson, Emory

Interviewer
Wrigley, Joshua

Date
July 20, 2016

Place
Northeast Fisheries Science Center
Sciences Branch
Falmouth, Massachusetts

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Use Restrictions

Biographical Note
Dr. Emory Anderson was born on September 11, 1939 in Kenmare, North Dakota.He attended Dana College, where he majored in Mathematics and minored in Physics. After graduating, he became a high school math teacher. After two years of teaching, Anderson decided that he wanted to pursue a career that involved wildlife and the outdoors. He went to the University of Minnesota where he first took preliminary science courses to prepare him for graduate school. During this time, he had a job as a fish hatchery technician, which encouraged him to pursue fisheries science.

Anderson was accepted to graduate school at the University of Minnesota and receivedhis Ph.D. in Fisheries Biology. He started working atNational Marine Fisheries Service Northeast Fisheries Science Center in Woods Hole, where he worked for 15 years. He later worked with the International Council for the Exploration of the Seas [ICES] as a statistician in charge of fisheries assessment and General Secretary for eight years. Since 2008, he has served as an editor of the ICES *Journal of Marine Science* and ICES *Cooperative Research Report* series.

Scope and Content Note
Interview contains discussions of:fisheries biology, NOAA, NMFS, Woods Hole, International

Commission for the Northwest Atlantic [ICNAF], exclusive economic zone, mesh size, overfishing, statistics, cod, haddock, mackerel, stock assessment, ICES, working groups

In this interview, Dr. Emory Anderson discusses his education and work experience, particularly his time as General Secretary and statistician for ICES. He begins by describing his early life in the Midwest, his undergraduate education, and early career. His fond childhood memories of fishing on Des Moines River and love of the outdoors inspired him to pursue a career in fisheries science. He describes his experience returning to school for an advanced degree at the University of Minnesota.

He recalls his first fisheries job at the Woods Hole Northeast Fisheries Science Center, and describes what the work environment and research focuses were in the 1970s, including early discussions of the 200 mile exclusive economic zone in the US and the process of stock assessments at that time. He also chaired several mackerel and groundfish working groups.

Anderson goes into detail regarding his career at the ICES headquarters in Copenhagen, Denmark as a statistician and General Secretary, which lasted eight years and began in 1985. He describes the difference in assessment methods between U.S.and European fishery scientists, and the work ICES did with other environmental issues like water quality. He recalls truly enjoying his time at ICES, despite the significant budgetary limitations of the time, and details how he helped to modernize the organization through technology, methodologies, and office furniture. Budget struggles. Anderson continued to attend some of the ICES annual meetings before becoming a journal editor in 2008. Heplanned to give a seminar at the SMAST [University of Massachusetts Dartmouth School for Marine Science and Technology] seminar series in October 2016.

Indexed Names

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Lagler, Karl
Marshall, William
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Transcript

Joshua Wrigley: Okay. So, let me just adjust the sound levels here. I think that should be good—I'll set it over here. I'm just going to keep an eye on the machine as we go along, so if you see me glancing down it's just to make sure that we're not running out of battery and that the numbers are still moving forward as they are. So, we have to kind of watch the sound levels to make sure that it's actually picking things up.

Okay, so I guess I'll start us off just by saying this interview is being conducted as part of the Voices from the Science Centers project funded by the Northeast Fisheries Science Center. It's also part of the Voices from the Fisheries project that's supported by the NMFS Office of Science and Technology. I am Josh Wrigley and today I'm speaking with Emory Anderson at 15 Carlson Lane, which is where the Social Sciences Branch is located. The time right now is about 1:00 and today is the 20th of July in 2016. In this interview we'll be going over the career of Dr. Anderson and talking about a variety of different subjects, so, I think, because I'm an historian, I like to start things chronologically. So, maybe the first question that I'll ask is just when were you born, and where?

Emory Anderson: Well, I was born September 11, 1939—kind of a dubious date now—in Kenmare, North Dakota, way up in the prairies. My father was a Lutheran pastor, he had a couple of rural congregations up there.

JW: It's about as far as the seas as you can get—as far from the sea [laughter].

EA: Well, as you say, it's almost at the end of the Earth, but not quite. But you can see it from there [laughter].

JW: Although I think during the late Jurassic, it was actually a shallow tropical sea, so at one point it was…[laughter] Where did you go to school for your undergraduate education?

EA: Undergraduate…well, at the time I finished high school, I was living in Iowa. Again, my father having moved around. We'd tend to move, what, every five, six years. I followed my older brother—in fact, even my parents had gone to a small Lutheran college in Blair, Nebraska called Dana College and so I went there all four years. Majored in math, minored in physics, I guess, and didn't really know what I was going to do in life. Even before getting into college, high school students always take the aptitude tests, and everything that came out of that said engineer, engineer. I'd actually thought about going to Iowa State—at the time Iowa State College, now Iowa State University—which had a very good engineering school. I'm not really sure what made me change my mind. I don't think there was a lot of family pressure, I just decided to do that and have no regrets, so I guess I still have that engineering mentality in me [laughter].

And actually when I went to Dana, I actually enrolled in the—well, it was pre-engineering curriculum, so I took all types of courses that would allow me…My thinking, I guess, at the time was after two years, I would transfer at Iowa State. Well, one thing led to another, I got more interested in college…I was in sports, met my future wife, so a lot of things that kind of tug you to stay there. Also, during my freshman year, my parents moved from Iowa to Minnesota. So, having done that, I guess, I lost the advantage of in-state tuition if I were to go to Iowa State. Somebody said, "well, University of Minnesota has good engineering as well", but I guess by that time, I'd probably decided I would stick with what I was doing. Dana being a small liberal arts college, a lot of the students that came out of there, of course, went into teaching. So, probably around…maybe my junior year, I kind of thought, "well, I guess I'm going to stay here. I'll just major in math and probably get a teaching degree." So, you can do all the teaching or education courses literally in one semester you could do then, at least—plus practice teaching and all that. By the time I graduated I was a full-fledged high school math teacher. That really as a turnout didn't really suit me.

JW: Was your plan to go teach then in Minnesota?

EA: We really had no specific plan. My wife to be, we were married after senior year. She was also in teaching, she majored in English with an interest in elementary education. I guess we applied…we sent out a lot of letters both to Minnesota, Wisconsin—she was from Wisconsin—and one of the responses I got was from Blue Earth, Minnesota which was just almost, well, five, ten miles into Minnesota from Iowa. My parents lived probably 70 or 80 miles north and west of there. So, it sounded like a nice venue. We both were able to get teaching jobs. Policies in most schools then were husband and wife could not teach in the same school, so she had to drive 15 miles to a smaller school.

JW: That's a long haul.

EA: Yeah, especially in nasty, snowy winters [laughter]. But two years of that…I just said I wasn't really cut out to be a teacher. Having been in sports in college, football mostly, track, the hired me out as a coach as well. Of course, many of the male faculty also were either head coaches or assistant coaches. I really enjoyed that. I coached the junior high football team and that was a lot of fun—probably the best part of the two years was that [laughter]. The second year we were undefeated. I followed those kids after I left. By the time they were seniors, most of them were seniors in high school, they were the number one team in the state.

JW: Wow.

EA: So, not that I take credit for it, I just had the benefit of a really good year class of kids. Matured and became really outstanding.

JW: [Laughter] Good recruitment there. So, how did you make the transition the, from teaching math to going into fisheries science?

EA: Probably about, I would say, in the second year of teaching I was already deciding. Even though in the summer after the first year I had been encouraged, as were all teachers, to get an advanced degree in education. So, I took I think one semester in summer school—Mankato State College, which is now the University of Minnesota system—together with a couple of other teachers. We'd drive up every day and so I took a couple of courses and certainly had plans to develop, but I think it was into the second school year…My first year I think I had a very good group of kids. I think I had, what'd I teach, seventh grade, ninth grade algebra. I think I had a tenth grade geometry class. Junior high and high school were kind of blended together. I had really good kids, discipline problems were kind of minor. But the next year, a different group of kids came in, seventh graders—in my mind, more difficult to manage.

JW: That age is tough.

EA: I had just started thinking, ugh, do I really want to keep doing this?

JW: [Laughter] I don't blame you.

EA: It was probably during the winter that year, my wife and I had quite a few heart-to-heart talks and I said I really don't think I can continue to do this, and then I started thinking, what do I really like to do? Even as a kid I had always been an outdoorsy person. Living in Iowa as a growing up kid, we lived on a river in the little town we were at. My dad had, again, a couple of churches. But living on the Des Moines River, which was one of the main rivers flowing north to south in Iowa. The little town had a—it was a dam with a hydroelectric plant. To me, that was lovely. Nice reservoir above, but below, fantastic fishing.

JW: Right in the tailrace there?

EA: Channel catfish was the big thing, but as I recall, just about every—aside from salmonids—everything: walleyes, northerns, bass, crappies, of course all the rough fish you could think of, carp, suckers, buffalo, and whatnot. So, all the kids, and grownups, too, spent a lot of time on the river fishing, so I really loved to do that. And then in the winter, all the kidswent hunting—duck hunting, pheasant hunting, rabbit hunting, whatever. So, I just loved that sort of stuff. It was fun, it was almost like the Wild West, in a way, because 1950s…I think I learned to fire a gun probably when I was in sixth grade, seventh grade, fifth grade, somewhere in there. Every kid in town had a BB gun or a rifle and a shotgun. Very responsible, but we just…that's what you did. You went hunting to put meat on the table [laughter].

JW: Different culture back then.

EA: Thinking, as I was wrestling with what I should do with the rest of my life, I thought, I would really love to have a job where I could be involved in fish, wildlife, and so on. Maybe get a job as a forest ranger or something, just be outdoors. I'd love to be outdoors. The two summers—the summer before we were married, after we were married and we had moved to Blue Earth, I got a job with Green Giant. Green Giant had a—southern Minnesota was huge for, and still is, for sweet corn, peas, and so on for the big canning companies. So, Green Giant had a big plant in Blue Earth. A lot of the other towns had Green Giant plants or Del Monte had one, I know, near where my parents lived. So again, a lot of the teachers had summer jobs and I was with a couple of other teachers and we were in a field testing crew, go out and sample. And so I did that both summers, that summer and the summer after my first year of teaching, and that was a lot of fun.

JW: What were you sampling?

EA: Well, you'd go out to sample—in the early part of the summer, it was sweet corn. You'd go to designated fields, you had instructions on how to do a random sample, walk so far here, so far there, that sort of a thing—I forget how much we would take in each field, you know, six of eight ears of corn just at random. Don't look for the big ones, don't look for the…and then they would be brought back to the lab and they would be run through a thing to test for moisture content and…

JW: Quality control.

EA: Yeah. It was to see are they ready to be harvested and then if the results came out okay, then the signal was sent and all the machines that harvested the stuff went to that field. Later in the summer, it was the same thing with—excuse me, I think it's reversed. Peas was the early crop, excuse me. Corn was the second crop. It was again, the same thing. We went out to do the peas and again, just randomly went in and picked and brought stuff back for checking.

So, that experience of just being outdoors…I much preferred that to being inside and behind a desk with kids, some who didn't want to be there [laughter]. So, during that second winter, I went, what do I want to do? And so I said, yeah, that's really what I'd love to do. I started

writing letters. I wrote to…I think it was Minnesota DNR [Department of Natural Resources], whatever the name was. I think I probably wrote to Wisconsin as well, explained my situation, said I'd be interested in employment. Got letters back saying based on your education, you're not really qualified. You don't have any biology—you're going to have to go back to school if you want to get a job in this area. So then I started looking at schools and being in Minnesota, I checked out the university and found out they had a Department of Fisheries and Wildlife. At the time, it was Entomology, Fisheries, and Wildlife. The bug part was the bigger part of the department.

JW: Interesting.

EA: It was part of the ag [agriculture] school. So, I think it was late spring, school was still going, and I had gotten in touch with one of the professors up there. My wife and I drove up, I think it was probably on a Saturday, met him. He happened to be a wildlife professor, Bill Marshall was his name. Had a nice chat, and I brought my transcript and everything from college, and he says, "you've got good grades. Ever thought about going to graduate school?" I said, "well no, not really", but he basically convinced me that that's what I should do. Again, he says "you're missing all the prerequisite courses, you're going to have to—

JW: In the sciences?

EA: —come back and pick up that stuff". He gave me all the necessary information, so I applied and was accepted—I don't know how I…yeah, I was accepted as a student in a category called "adult special." Here I already had a bachelor's degree, but this category was for those who just wanted to come back to school to pick up courses, could be for any purpose. So, we made the decision and at the end of the school year, I resigned from my teaching position effective at the end of the school year. There were always turnover of teachers, anyway, so my leaving wasn't anything new and several of the other men whom I had worked with and were also fellow coaches—I think a couple of them were leaving as well.

We just…and by this time, we had one little child. Neither of us had a job, we packed up [chuckles] and went up to the Twin Cities and rented an apartment. I had borrowed money as an undergraduate. When I graduated from high school, a fellow in the community—in fact, he was a local Chevrolet dealer, my dad always bought Chevrolets—he started a scholarship program. In fact, I was the first recipient. It was basically for the top student in the graduating class. I wasn't the valedictorian, I think I was number two or three. I think it was made available to not just boys, but girls as well. Anyway, I took advantage of that. I could borrow—I think the stipulation it was $500 per school year. So, I had done that during my undergraduate years and I forget whether I started paying it back…but anyway, going back to school, I wrote to him and explained my situation and said would it be possible to borrow more money? Sure, sure, sure, no problem. So, that helped a little bit, then I thought, well, having been a math teacher, maybe I can get a job just tutoring and doing stuff like that. And so I did.

JW: Do you remember what the tuition cost was back then?

EA: I honestly don't. I mean, it wasn't a lot and probably we're talking hundreds of dollars.
JW: Seems incredible in this day and age.

EA: I'm sure, in some old boxes, I've probably got the records. I'm one of these guys that saves stuff like that, I could probably go back and find it. But, along about the end of September, the school year started—Minnesota, I think, was in September, it was a late start. They were on a quarter system at the time—and again, I think it took a little while before I actually got a tutoring job, which wasn't a whole lot, it was a few nights a week, some fairlywell to do people and they had a fourth, fifth grade student who was really having trouble with math. But that wasn't going to pay all the bills, and so it was probably around the end of September into October, my wife decided that I'm going to have to get a teaching job. So here the school year's already underway. She went down to—we were living in St. Paul—went down to the Department of Education there and asked if they had any openings, they said where would you like to go? They had tons of openings even at that late time. They basically gave her the pick of what she wanted. She ended up teaching first or second grade. She had taught fifth grade before. So, her job kind of saved our bacon, I'd say.

Two years and I went as an adult special and started basically Biology I, Biology II…It was so funny, here I was 22, 23—I started running into kids that I had had in high school who had been upperclassmen who were now at the university. They were in some of the same classes I was in [laughter]. "Mr. Anderson! What are you doing here?" But, knowing that I was eventually going to go into graduate school, I also took a full year of German—figured I'd need a language. But all the basic level fisheries wildlife classes that were offered through the department, a few over in zoology. A lot of stuff beyond Biology I and II, and then more so into the second year after the biology was out of the way. And of course, most of those classes it was pretty easy sailing, but I had not had biology since my sophomore year in high school because everything after that—

JW: That's a long hiatus.

EA: —it focused on math and physics. College, certainly, had chemistry, lots of math, lots of physics, but no biology. So, it was…it wasn't intolerable, I just had to really work at it and even just that couple of years out of school, it was hard to get disciplined again to study. I often look at people today who are going back, and I think, did they struggle like I did, or was it just me? Well then, in the summer after the first year back as an adult special, I was given the opportunity for a summer job with Fish and Wildlife Service with one of the national fish hatcheries in Yankton, South Dakota. So, that turned out to be a good solid three months out there—that was really helpful for me, because I think it probably solidified my interest in fisheries versus wildlife. But I still didn't know what I was going to do. I kind of enjoyed, even though I was just a "grunt," you might say—

JW: Were you working as a technician at the hatchery?

EA: Yeah, like a GS3, GS4. And again, most of what I did was I mowed a lot of lawns [laughter]. But helped handle fish and participated later in the summer when they started distributing at the end of the year and so on, to different lakes and ponds around the Midwest and

had a chance to go on—
JW: What species, primarily?

EA: Well, they raised channel catfish, but also largemouth bass.

JW: Popular sport fishing species.

EA: Yeah. So, they had broodstock in their ponds and then techniques for gathering the eggs and so on from those. I think they certainly with the bass—I think the time of the year when they spawned was earlier than when I was there. The catfish were spawning, and that was done in a very interesting way. They used—again, they had the broodstock in little ponds outside, on the grounds—but they used, if you're familiar with at all a farm community - milk cans.

JW: The old metal ones?

EA: Yeah, about this high. As it turned out, those were just the ideal size. They would have the top off, lay them on their side and they were big enough—I mean, these were good size channel catfish—they would love to go in because it was a place to hide. But then they had cut a piece of linoleum and then put Vaseline on it to make it slippery because the eggs were sticky when they were released. So, they would check these almost on a daily basis to find out how soon the female had laid the eggs and they'd been fertilized. As soon as they were, they they'd go in and literally pull that big skein of eggs out, take them into the hatchery where they put them into special containers, aerated and flowing water and so on, where they would then hatch.

JW: Interesting.

EA: Yeah, it was a fascinating—

JW: Had they cut the other end off of the milk cans so then the catfish could then go straight out, or did they have to actually turn around and exit the way it came?

EA: Yeah, they could turn around, yeah. But then after that summer, back in school. I think some of the coursework I then started taking was turning out to be a little tougher and I was starting to get a little bit worried—can I make it? Can I get through all this? Am I going to have anything to show for it if I…and I actually petitioned then and was reclassified as a senior. I said I'd like to get at the very least get a bachelor's degree in fisheries, something to show for [laughter].

JW: A second bachelor's?

EA: Yeah, and by this time, we had a second child on the way. During that second year, what made it hard was again, my wife was teaching some of the time, but I don't think she had a full-time job because she was pregnant. She had a job at the university. We were living in married student housing. Most state ag schools have a dairy industries area. Some of them specialize in ice cream, cheese, whatever. Minnesota did all of that stuff. She had a job up there a couple days

a week, so she made a little bit there. But I said "I've got to get a night job of some kind". I ended up working the whole school year at night, at like 6:30 in the evening until midnight or later at a soda, where they bottled RC Cola and stuff like that. Of course, that really was hard on studying because I had to make money to keep paying the bills.

So, a few of my classes started to really hurt in terms of grade-wise, and that was one of the things that triggered me to apply at least to get a bachelor's degree in case I just had to pack it in and say" look, this isn't going to work". Well, then on towards the end of that second year, then my major advisor who on the fisheries side started thinking, suggesting, he says," maybe you want to go ahead and apply to graduate school now". He says, I've got the possibility of—he had applied for a research grant to do some work on Lake Superior and he said you might be interested in that. So, I said okay, okay. Part of the curriculum at Minnesota for anybody getting either a graduate degree or undergraduate degree was spending one summer at the biological station at Lake Itasca. It was required for all fisheries kids and even a lot of kids in the other biology curricula.

JW: Where was Lake Itasca? Was that up in the BoundaryWaters?

EA: No, just south of Bemidji. I don't know if you're familiar with the layout.

JW: That's real walleye country up there.

EA: Yeah, but it's beautiful country. Big Norway pine, lot of lakes of course, but it's the headwaters of the Mississippi River, too. It comes out of Lake Itasca. So, we rented a little cabin right close to the grounds, had our youngest son and newly-arrived little girl. Again, it was a fun time, taking a couple of—I forget all of what I took. Of course an ichthyology, another one in identification of freshwater algae…lots of really fun stuff, living up there in the woods. It was while I was there that I got word that I was accepted into graduate school. So, that was fine. Still had to finish those courses up there.

JW: That must have been a relief.

EA: It was, it was. And of course with being accepted into graduate school, I think at about the same time, my advisor informed me that he had gotten the fellowship, or the grant, and that he could offer me a fellowship. It was like fours, five thousand dollars a year, which was as much as I made when I was teaching school. Great, this is going to really help. The only downside to that summer was my wife ended up rupturing a couple of disks in her back and hauling little kids around, lifting, so the end of the summer was kind of tough, and even on into the subsequent fall. She ended up having to have surgery back in the Twin Cities to repair, to remove the ruptured disks. She ended up all right, but it was just a hard time. And then our newly-born little girl, we discovered that she had allergies, because she got deathly sick a number of times with pneumonia and croup and just about died, was in intensive care. We still remember she was in intensive care for 17 days.

JW: Wow.

EA: So, that first year or two in graduate school, I think, it was both the first year and the second year because I think the daughter was maybe a year, year and a half old when she had the really bad stuff. I mentioned some of that in my narrative, in the article that my advisor had once referred to me. When I asked for time off, he said, "you and Job, suffering from all these calamities" [laughter].

JW: [Laughter] So, now you were pursuing your graduate degree at the University of Minnesota?

EA: Right, right.

JW: Under the same advisor, right?

EA: Well, he was, yeah. Technically, he wasn't my advisor as an undergrad, he was just…the department was fairly small. There were two wildlife guys at the time and two fisheries guys. And again, a lot of the non-fisheries or non-wildlife classes you took, biology sort, you would pick up at the zoology department which is on the main campus in Minneapolis. Lots of back and forth, and a lot of students had the same situation. They might be enrolled in the ag school, but they still had to take a lot of classes on the Minneapolis campus. So, they had this system of intercampus buses and it was a fact of life—you just knew when the buses were running, you hopped on the bus, back and forth, back and forth. Probably a 10, 15 minute bus ride.

JW: Well, that's not too bad, I guess.

EA: No, no. So, yeah. We're talking about the advisor. He gave a lot of counsel and advice.

JW: What was his name again?

EA: Lloyd Smith, Lloyd Smith. He was fairly prominent in fisheries, well-respected nationwide. His one big course in—I forget what it was called now…Fishery Biology or Fishery Management or something—it was a tough class. It was a two semester—not semester, everything was on quarter—a three quarter course, labs and everything but a lot of writing. It started out slow, but then a lot of projects. Again, to get students used to writing papers because that's basically what you ended up doing. None of which were ever published, obviously.

For example, I remember one class where we first learned how to age, read ages from scales. We'd read the scale on a big batch of fish, all in formaldehyde and we had to take measurements, remove scales, do the whole nine yards and then basically write up an age and growth paper. And then a lot of other areas were very similar, just different topics all in fisheries. And the very last paper, I remember, which was literally in my mind equivalent to a master's paper, was essentially a full-blown age and growth study and population analysis of a species. Very few students actually finished the work in time, so you'd get an incomplete. In my case, I think I finished it all the following summer, going up every night to my office and working on these things. That class of his was known around the country. It was really a tough one and once you

completed that, you really had a firm basis, firm understanding of fisheries.
JW: What was his own personal research interest?

EA: He was interested in just about everything. His student did different things. A lot of them—obviously Minnesota had the paper industry and there were concerns way up north around International Falls and so all, all the effluent from the paper mills was polluting the rivers, and so he had research money and several student had got their degrees looking at different aspects of that. So yeah, if there was any area that he picked up as a specialty, it was that. The other fisheries professor, Tom Waters—Waters is still living, Smith died about back in the '70s, probably.

JW: Do you know where Smith had studied, and under whom?

EA: University of Michigan. Probably some of the old classics…I'm trying to remember. He was the same age as—if you're familiar with some of the old fisheries people that came out of Michigan.

JW: I was speaking to someone the other day, actually, who came from Michigan. Might have been Marv Grosslein, actually.

EA: Marv came out of Minnesota.

JW: Oh, from Minnesota, okay.

EA: Marv got his undergraduate at Minnesota under Smith, too.

JW: That's why his name sounds familiar, yeah.

EA: Marv got his Ph.D. at Cornell, I believe.

JW: Okay, that sounds right, yeah.

EA: Smith died in, I think, the late '70s, early '80s. Something like that, maybe 10 years after I left roughly. Yeah, Tom Waters—I just don't want to get too far off subject—he was more of a stream guy, and he did a lot of work with insect drift in steams, the insects, of course, being trout food and so on.

JW: Stoneflies and mayflies and things.

EA: Oh yeah, all of that stuff. In fact—

JW: Was he a fly fisherman?

EA: I think he probably did, I don't remember seeing him do much of that.

JW: Seems like a natural avocation for someone who has those interests [laughter].
EA: Yeah. He's since written a lot of books about natural history and stuff in Minnesota, but again, Waters came out of Michigan—I think he got his Ph.D. at Michigan State. I wish I could remember who Smith's advisor at Michigan would have been. I mean, he's of the same vintage of people like Karl Lagler and I mean, I could go back, get on the computer, and I could figure out who he would have had as a—the one bit of advice I know, and he often told his students about it, he says, "I made the big mistake when I did all my research for my Ph.D., I wanted to get on and work right away, so I left Michigan before I had actually finished the thesis." And he took a job with, I think it was in Wisconsin State DNR or something. He says "it was the biggest mistake I ever made, because then you get involved in that work." He says, "I'd come home every night, pull out all the stuff that I had been working on the night before, try to remember where I was, maybe get a little bit done, then it was time to go to bed." I don't know how long it took him to do it, but he says, "I want all of my students, you get that thesis written before you leave" [laughter]. And I did, so.

JW: Sage advice. So, what year did you finally get your Ph.D. then?

EA: That would have come in '69. It was four years after I'd actually gotten into grad school. So, contrary to many of the students who first would get a master's degree, which could be one year, more often two years, I just went straight through four years for the Ph.D.

JW: And had you had any thought of working in Woods Hole during that time? Was that sort of an end goal?

EA: Nope. No thought whatsoever. I really had no thought whatsoever. I've thought about where would I want to work, and I'm sure we must have talked about it as fellow students and chitchats with Smith and the other faculty. I mean, obviously some of the students who left took jobs with universities. One fellow who's—he's probably five, six years older than me, had studied under Smith. In fact, he'd been a Vietnam army vet, too. He got a job at the, it was in Fish and Wildlife Service lab in Ann Arbor. That was all doing work on the Great Lakes. Probably of all the places, that was one where I thought, yeah, that would be where I'd like to work because it meshed in perfectly with the work I'd done on Lake Superior—I'd studied lake herring. Again, there was one of the big labs, there were some satellite labs. The work that I did on Superior was in conjunction with a field lab in Ashland, Wisconsin. There's just a little bit of Wisconsin that borders on Lake Superior, Minnesota has some, Michigan has more. But the lab in Ashland, they did work on lake trout, lake whitefish, and herring and so on.

I guess I thought working at the lab in Ann Arbor would be great. In fact, I happened to be over there once, I don't know what the occasion was. My friend Peter Colby was the fellow I was mentioning, had invited us over and so I met probably the director and some of the other senior people and asked about job possibilities. Of course, I was still a year or so away and they couldn't make any promises. But as it got closer to my time of finishing up, I do remember writing a lot of letters, some to other—I'm sure I wrote one to the Great Lakes Lab, Ann Arbor. I probably started just picking different universities. I remember years later when I was at Woods Hole, Pete Cole, who was actually at the time, I think, he was head of the department up at

UMass Amherst. Later went to Ohio State, he's long retired now. But he took a sabbatical and he came down to work at the lab here, and he worked with me for probably three or four months, and at some point—it was either then or whether he was cleaning out old files and he ran across a letter from me [laughter]. Probably it ended up on his desk if he was department chair at the time, inquiring about job possibilities. He says, "that would have been ironic if we had hired you". So, I wrote a lot of letters around, but then also good advice from Smith as I had mentioned in the article, I got my name on the civil service register and that's what brought me to Woods Hole. Later, when I had left Minnesota and I was at Michigan State for the post-doc, just out of the blue, I got a telephone call from Woods Hole—we're recruiting, we're filling a position and we asked for names and yours popped up.

JW: Fortuitous.

EA: I was a—turned out to be a smart thing to do. So, Woods Hole wasn't really on my radar screen at the time. In fact, my wife and I often joked, after we took the job at Michigan State, we said "that's really about as far east as we'd like to go". We are basically Midwestern people. So, the thought of going all the way to Woods Hole, way out here, was a little bit frightening. By that point, I think, I was willing to take a chance because I had already started making inquiries at Michigan State about staying on permanently, and there was some on the faculty that was kind of pushing that, but nobody was willing to make a commitment. As it turned out, it was probably the best thing for me anyway.

JW: So, when you arrived in Woods Hole in 1970, right, what branch were you working in and what were your responsibilities at that time?

EA: You know, I can't even remember. The structure of the lab was totally different then. I would have to go back and look at some of the old paperwork to actually find out what the name of the group was.

JW: And this was right after it had transitioned from being the U.S. Bureau of Commercial Fisheries?

EA: It was literally..in fact, I went out for an interview because I got the phone call—I think it was in either August or September. Brad Brown who…he was newly hired, too. He had just been brought in either earlier that year or maybe late '69. He had been, I think, assistant coop leader at Oklahoma, something like that. But anyway, he was originally from New England. I don't think he'd ever worked at the lab as an undergrad or anything, but he was the one who called and he was then my boss for the next ten years almost. He eventually was the Center Director in Miami.

JW: Right, he's down in the Southeast now.

EA: Yeah, he's still down there, I think. I haven't seen him for quite a while. So, as far as the name—it was Population Biology, or I really can't remember. He was the head of it, Dick Hennemuth, I don't know if the name has popped up in your…Marv, I'm sure, would have mentioned it. Dick was—I don't really…he was the overall Head of the Fisheries Research, I

think, and later became Deputy Director and so on, was Acting Center Director for a while. But they were just starting to build a Pop Dy program and I think what they were looking for in me was somebody with the biometrics background, the math background.

JW: Where was your office located at that time? In Woods Hole?

EA: It was—well, everybody was in the old building.

JW: All in the main lab?

EA: The main lab. The staff was much smaller.

JW: Can you describe the layout of the building as you would have seen it walking in?

EA: It's been so many…everything was this—I don't know if you can still see it anywhere—this green tile. That was basically the walls everywhere, even the main offices, second, third floor and so on. Of course, everything wide open because security was not an issue like it is today. Far fewer people, so very large offices. They had just started to partition some off. I was on the third floor, facing the water. I couldn't get enough of looking out over.

JW: Must have been a distraction [laughter].

EA: Watch the boats go by…Shortly before I was hired, they hired a woman, she was a statistician, Judy Brennan. I don't know if that name has come up.

JW: No.

EA: Judy died about, oh it might be thirty years ago or so. She had died at a very young age of cancer. But she was a very good statistician and so she was brought into the group—she was there before I was. Mike Parrack also, I think, Brad had brought him in from Oklahoma.

JW: What was his last name again?

EA: Parrack. P-a-r-r-a-c-k.

JW: Okay.

EA: He later went to Galveston and to Miami. I'm sure he's retired now. I think he finally got a Ph.D. at University of Washington under Wilbert Chapman.

JW: Oh, Wilbert McLeod Chapman?

EA: Yeah. Who else was there…that might have been about it. There were a few other—I mean the group we had, we had a few people. Because Herb Stern who later became, he was moved down to administration. He was a statistics guy as well, but we had several technician types who

were, what they solely did was handle landing statistics and stuff that came in. But it was over probably starting the year, two years, two or three years. We really did a lot of recruiting, did a lot of people—many of them just with their bachelor's degrees, many of them from UMass, others from…in fact, Frank Almeida who later was Deputy Center Director, he worked for me for years. He came in, he was first a co-op student from, I think, Northeastern [laughter]. Might have spent part of a year or so at Sandy Hook but then came to Woods Hole. I had a hand in recruiting so many people—Fred Serchuck, Ralph Mayo, Gordon Waring. They have all retired now, well yeah, Gordon has. I'd have to go back and start looking at the list to remember them all, but that was the group. As far as…It was sometime later that as the group got bigger then Brad started creating investigations within the group, and I still can't remember what the overall group was called.

JW: What was the overall research focus of the center at that time, in the early 1970s? What were the dominant concerns?

EA: The huge concern was the offshore fishery, the distant water fleet fishery. I learned that very quickly because there were always, at least two or three times a year, meetings of ICNAF, it was the International Commission for the Northwest Atlantic Fisheries. So, when I arrived in December of 1970, the meetings for that year would have been finished. The real concern, because there was very little control over what was going on at that time. I forget when the—I mean, it was a three mile limit initially and then later went to twelve, and, of course, not until '77, it went to 200 miles. Even though ICNAF had been around since the early '50s, most of the regulations in place were simply ineffective. All they could really agree on was mesh sizes for the trawls, stuff like that. No quotas, nothing like that.

JW: Did ICNAF have any ability to enforce the regulations that it set?

EA: No, there never was any enforcement authority. It was basically—

JW: So, it was all advisory?

EA: Well, I mean once they set a quota, but it wasn't that ICNAF had a police force to send out there to enforce whatever regulations. I mean, the coastal states, U.S. and Canada of course had Coast Guard inspection and so on and so forth, so they were out there I'm sure even during the years of mesh sized probably boarding vessels, checking mesh sizes and so on. But even though there was—if you go back, I think one of the papers I cited in here, a paper I was asked to write on NAFO [Northwest Atlantic Fisheries Organization] symposium—NAFO was the successor organization to ICNAF, I think it was 1997—kind of comparing ICNAF and NAFO, the good the bad and the ugly and so on.

So, I remember going into the history of the whole scheme of regulations and how it lead from one thing to another, finally up to quotas. That was the weak link, no real binding authority. I mean, if the countries did agree on something, then it was supposedly up to them to enforce, regulate their own fishermen. Later, towards the end, as everybody could see the handwriting on the wall that 200 mile limits were coming everywhere, then you started to see a little more

cooperation and willingness to accept quotas and so on, figuring that if we're good, maybe U.S. and Canada will let us stay around and fish a little longer. You could imagine the thinking there, perhaps.

JW: When did conversations about establishing a 200 mile limit first begin to percolate? Was there any talk of this nature in the immediate post-war era?

EA: I'm trying to think…was it Peru, Chile, they were some of the early ones that went to 200 miles, and I'm thinking that would have been, I'm only venturing, sometime in the '60s, perhaps, but I could be wrong. Iceland was a more recent—that was kind of the one that pushed things along, at least in the North Atlantic, when they had their big—

JW: Oh, their spat with Britain over fishing grounds?

EA: Early '70s, famous cod war in '72, I think and so on. When the first utterance of a 200 mile limit was made, I'd have to Google and do some digging. Obviously in the U.S. with what was happening elsewhere in the world, there was most certainly talk, but right here and now I couldn't say exactly when it all—

JW: Okay, I was just curious there.

EA: I don't recall us really talking about it that much at Woods Hole, maybe not until it started getting closer to that time and there started to be talk about okay, what's going to happen when that does come about? I think we were worried about it [laughter].

JW: When ICNAF started to regulate cod and mesh sizes, was that in response to any ongoing crisis within the fishery, or was that more just forward thinking on their part of how to conserve the abundance that they were presently seeing?

EA: Well, mesh size regulation was something that had been around for quite a while. I think on both sides of the Atlantic, the thinking was similar because a lot of the same people involved. European scientists from countries that were fishing here, they were involved both in the ICNAF work, but also involved in ICES work. ICES, at that point, was the, as it still is today, the provider of advice on fisheries to all the European countries.

When, again I can't put a date on when the first mesh size regulation was put into effect for any species anywhere, but I think a lot of, a lot of fisheries research was obviously going on worldwide and I think as with any area, the research you do and the ways you look at to regulate fisheries, you kind of follow your nose and look at what's the easiest thing to do? What's the most logical? What's something that you can do that will have an effect? So, I'm sure that when it became evident that maybe we'll say in a given fish population the average size of the fish started to go down in size, then people would begin to worry about okay, this is going to have an impact on reproduction. We're killing off all the big females and so on. Maybe we should allow these fish to get to a size where they are going to spawn. Well, okay back up—I think the initial concern was fishermen will use whatever nets they can to catch whatever they can. I think it was

when we observed that there's too many small fish being caught too, then you say okay, we need to allow those to escape so they can reproduce. That would then lead to the idea, okay, what's the right mesh size that will allow fish to escape and make sure that they're going to spawn at least once before—

JW: Grow to sexual maturity.

EA: Yeah, yeah. So, that kind of progresses and then if you don't get the results you want, well then, maybe you increase the mesh size even a little bit more, so I think you get the idea of how that would go. But certainly within ICNAF when it became clear that that wasn't sufficient to control overall fishing pressure. I mean, what really caught everybody's attention was the fact that catches just going like this and of course—

JW: Going up continuously?

EA: Well…they couldn't always go up continuously because a fish stock can't sustain that. If you look at kind of a history of all the—take Georges Bank, for example, or just the U.S. East Coast and you'll see stuff like this. Haddock was a classical example. The Soviets clobbered the daylights out of that in the late '60s, there was a huge 1967 year class. So, catches, mammoth catches, and then they dropped off. Herring the same way. Well, they fished herring real hard, they went up and down. Almost every species responded in the same way. When you see this happening all the time, you know what the regulations on mesh alone aren't going to do it. It was around '70…'69, '70 I think. Probably right around the time that I came that already in ICNAF there was serious talk that we're going to have to go to catch quotas. That's kind of documented in this paper I wrote, which ones first—haddock was an important one for the U.S. and Canada, so that was one of the first quotas.

JW: And then mackerel as well?

EA: Mackerel came along. I forget exactly which…

JW: So then in the early '70s, at the lab, what was the stock assessment process like? Because I know it's evolved a great deal in the last couple of decades here.

EA: It's evolved a huge deal.

JW: What are your thoughts on that?

EA: Well, first of all, the long time—the one species that probably of greatest interest at the lab was haddock. There had been earlier work done on cod, but for whatever reasons it just, there wasn't the time series of age composition data. Haddock, that was probably a function of some of the earlier people who worked on it that started doing that. So, there's a long database of age composition on haddock, so that was one that—I forget who actually was doing the assessment work on that, could have been Grosslein. Did he mention that?

JW: I haven't interviewed him yet.
EA: Oh, okay.

JW: Next Monday, actually.

EA: When I was assigned, I was assigned silver hake and red hake before I was assigned mackerel. I basically had to—we were all one man shows. You just dug up the data, you first found the catch data, then started looking around to see what you could find for age composition data. Of course, we had access to data reported not only with the U.S. itself, but also through ICNAF, all the member countries were required to report not only their landings, but also age composition data—whatever they had.

JW: How far back did the landings data go, at that time?

EA: It would depend on the species.

JW: For something like haddock, I guess, for instance.

EA: Oh, I'm sure it went back into the '30s, '20s. Just landings now, not necessarily age composition data. For ICNAF, ICNAF started '50 or '51, '52.

JW: '49, '50.

EA: '49. So, their database would go back that far.

JW: Or maybe a better questions would have been, were people recording this data prior to the Second World War in the United States and the European countries that began to form ICNAF right after?

EA: Yeah, yeah, yeah. I mean, U.S. landings have been reported almost going back to the time the country was established, I mean back—the old Bureau of Fisheries.

JW: Spencer Fullerton Baird's original—

EA: Yeah, I mean when I got going on mackerel, I went back and I got mackerel landings data back in 1800s and Canada as well had good records. Certainly, well, mackerel are a good example. A major paper that I had produced on, a number on mackerel, show the complete time series of landings data and whether they were accurate or not, but it was what was there. And then through ICNAF, we knew when the first foreign vessels started showing up and when they started first reporting. And again, you have to assume that what they were—whether it's true or not, it's what was reported. There's always, even to this day, still theories roaming around that all the Soviet data is just rubbish, but that's another interview in and of itself [laughter]. But so, as far as assembling the necessary information you need to do an assessment, it was just kind of by hook or by crook you dug up what was available, both within the U.S. records here and what might be published in the U.S. fisheries statistics, and then what was available through ICNAF.

And of course, the mainstay was, of course, was our trawl survey data—that was something that I learned about very quickly. When you talk to Marv Grosslein, you'll find out he's the father of the groundfish survey.

JW: Right, he started it.

EA: He started it, yup.

JW: In the early 1960s, from what I understand?

EA: Yup. First survey was '63, yeah. He designed the old stratified random sampling scheme, so Marv will have a good story to tell. So, for all the species—well, again, landings data, survey data. But then the whole question comes up, okay, is it one stock? Is it two stocks? How many stocks of the given species are there? So, in some cases, absolutely no work done on this. When I started working on silver hake and red hake, there was no information on, you know, are there separate stocks or is it all one big happy population out there? So, then you just have to start making some assumptions and look at geographical areas and look at survey catches and if you see that maybe you have an area here, another area here, and lots of fish in each area and nothing in the middle, well, maybe you've got two different populations. That's one way of starting. In the case of mackerel, there had been some work done years and years ago by a scientist named Oscar Sette who is considered one of the real—

JW: Was that Elton Sette, or was that…? I could be getting his name wrong here. Was he out in California?

EA: Yeah. Did I say Oscar?

JW: I think I heard him referred to as Elton Sette before, I think that might have been his middle name. I have to go back to…

EA: Anyway, he had pretty much concluded there were two separate stocks, a northern and a southern. In the case of the silver hake, it wasn't until years later—I mean, Frank Almeida, he was still working for me, decided to get a master's degree, went to Oregon State and he did as his thesis kind of differentiation of the stocks based on a variety of indicators. I kind of lost track of how it's managed today, it could all be new information, different stock delineation now perhaps, then before.

JW: What was sort of the baseline threshold for determining if two stocks were indeed separate, or if they were one? How much evidence is needed to make that determination?

EA: Well, again you kind of did it on the basis of what information you had. We didn't—just me as a single investigator—I had no access to chemical analysis, doing detailed analysis of otoliths or anything. So, it was really just looking at distribution plots and any other patterns in the way the fisheries operated, that sort of thing, to get some ideas of how fish segregated at different times of the year, if you could determine that. It wasn't…it wasn't rocket science, I'll say that. It

was pretty by the seat of your pants sort of stuff, but it was kind of the best you could do with what you had.

JW: Limited resources.

EA: Yeah. At about the same time—I think, again talk about an observed virtual population analysis.

JW: That was going to be my next question, what that entailed.

EA: That was kind of the standard tool. Getting to the point where you want to start offering advice for how much fish should be caught in a given year, and if you want to have any—at least our thinking then—if you want to have any firm basis for making that projection, you needed the age composition data, and again, the more of it the better in terms of the length of a time series. Where then working back in time, get some idea of what the size of the stock was then compared to—and match that up versus catches. Pretty soon you begin to put a picture together…I can't really go into intricate detail on a VPA [virtual population analysis], but suffice it to say that the way it starts, you're starting at the most recent time and working back. You have to have a basis for… well, you make a number of assumptions. You assume that there's a certain amount of natural mortality that goes on—fish disease, cannibalism, predation, whatever—and then the other part of mortality is fishing mortality. So, you have to have some basis for estimating what the fishing mortality is right now. You can't just take a wild guess because the way a VPA works, it takes a while going back in time before it starts to stabilize and the results are a little more reliable. Reliable to the extent thatall the age composition data you have used are okay [laughter].

So, you try to find some correlations—in other words, if you can have a measure of fishing effort, if you knew exactly how many vessels and how many hours they fished and what their catch rates were per hour. Again, that was part of the fun, too, in looking at all the different possibilities of data to come up with some meaningful relationships. I was very lucky with mackerel, I was able to come up with some pretty good relationships and in doing so was able to predict, I think, fairly reliably what the most current level of fishing mortality was to start this VPA. But every species was different. Sometimes there were good indices of effort that scientists could use to correlate with the fishing mortality rates and use that as a starting point but almost…there was never any one technique that worked on every single stock, you kind of had to play around and find what worked best in your stock. I guess that was part of the fun of the game, trying different things until something seemed to work. And then subject it to some peer review with some other scientists within both the lab and ICNAF to see what would be acceptable [laughter].

JW: So, was the age and growth data that you mentioned before—did that also go back as far as the landings data into the 19th century, or was that more recent?

EA: No, no. In the case of mackerel where I really tried to dig, I forget really how far back—there were bits and pieces of catch or age composition data available for the U.S. I'm not sure

who aged it now, I'd have to go back and reread stuff.
JW: U.S. Fish Commission?

EA: It wouldn't have been that. It would have been stuff at Woods Hole.

JW: Oh, okay. More of the academic community?

EA: No, we had an age group. We had some age readers and over the years they would have aged different things—some just out of curiosity, others, I mean, it was always the mandate you've got to age haddock, you've got to probably age this, you've got to age that. Yellowtail flounder became a very popular one as well. I know Brad Brown himself together with Mike Parrack worked on yellowtail. Of course, I insisted, once I got put on the silver hake and red hake, they start aging those, mackerel, and so on. Herring. All the ones that were pretty prominent species, there was always a shopping list with stuff with the age and growth unit. All the Canadians had some early mackerel data that I managed to find. And then once the Soviets and the Germans and the Poles started producing catches, they were again, their scientists looking at age compositions as well. So, that was beginning to be reported to ICNAF, so it was just a matter of pulling together all this stuff and, of course, the moment you do that, you start to find discrepancies. Age readers don't always agree.

JW: If there were disputes among the data, how would those often be resolved?

EA: [Laughter] They're very difficult to resolve. I'm stepping aside from this right now. One of my other jobs is I'm an editor for ICES and right now I'm editing about a 170 page cooperative research report. It's a handbook of, on basically age analysis protocols and so on for all the European stocks. It's going through all of the major fish stocks, the demersal ones, the pelagic ones, highly migratory ones—all of these, and they're giving a lot of background information. They acknowledge all the discrepancies that have occurred. What they've had, I think even age readers here have been involved in some of this, you have otolith exchanges, workshops, all of these, any things like that that you can—

JW: What is an otolith exchange?

EA: Well, the otolith—you know what an otolith is?

JW: Yup.

EA: Okay. Well, you exchange…obviously it has to be an organized affair, but you have readers who will do their estimation or they'll age a given set of otoliths then they'll be sent onto somebody else.

JW: Oh, interesting.

EA: Then you compare.

JW: Then you meet afterwards and talk.
EA: Yeah, yeah, it's really—they have a variety of age readers all looking at the same thing and find out how much agreement or disagreement there is.

JW: Sounds like that would be helpful.

EA: Yeah, it is, but still some species are much easier, as this document is indicating, are much easier to read than others and for various reasons. It's just the way that the otolith develops, you know. It's a whole science in and of itself. I wouldn't have the patience to be an age reader. I tried it [laughter]. When I was in grad school, we all had to and then we were just looking at fish scales. Fish scales, it's been learned, are not very reliable. Otoliths are much more reliable which is why most aging worldwide now is they go to the ear bones instead of the scales.

JW: I enjoyed in the article here the dummy document of the calculation of natural mortality there, and I was going to ask, how did they come up with 0.2 as a reference point? Is there a story behind that?

EA: [Laughter] You know, I honestly don't know when the very first estimate of 0.2 came up. There's got to be a story to that, but it has for some reason it's become just the commonest estimate. Now, a lot of new thinking has gone into it. It used to be that you used the same estimate of natural mortality for every age group—didn't matter if they were a fish 20 years old or 1 year old. Well, that thinking is pretty much out the window now, it's been pretty much determined that natural mortality probably varies a lot. Probably much higher at very early ages because young fish are more susceptible to predation and so on than large older fish. I'm sure that estimates came about initially just by looking at what's the typical the lifespan of a—take cod, haddock, herring, any of the popular species that were probably worked on back in those days, both this side of the Atlantic and that side. Same species, different stocks, of course. I'm sure 0.2 came out of that, but it was so clever the way John Pope…

JW: Pretty hilarious [laughter].

EA: It's amazing how that document is known the world over. When I told the editor that I had this, I made mention of it, he said, do you have a picture of that? I said yes. He said, put it in [laughter]. And I got one comment back on Twitter from somebody almost the day or two after it first was available on the internet and they said, some things haven't changed, have they? [laughter].

JW: Going back for a minute to ICNAF here, I meant to ask before—as ICNAF was moving toward quota allocation systems, to what extent were all the member countries on board with that? Was any sort of internal debate about the merit of moving in that direction, or was it pretty much a unanimous decision?

EA: Well, most of those discussions—well, I think among scientists I'm guessing there was agreement. Now, to take that into consideration, the composition of the scientific community within ICNAF, you have U.S., Canada, then you had the big players, the UK, probably the

Germans, the Norwegians. Those I call the good guys. Then you had the Soviets, Poles, East Germans—the Eastern Bloc. It was always very hard to get the Eastern Bloc to kind of get away from following the party line. Always had this feeling that their objectives were always to ensure that their countries would have maximum access to as much fish as possible [laughter]. So, I think we always kind of looked with jaundiced eye on [chuckles] what they had to say or wrote, in terms of their papers. But, they usually got voted down when it came to any hard discussions within the scientific group within ICNAF. The decision-making within ICNAF, of course, was the commissioners.

JW: How large was that body?

EA: Well, it would have been each of the member countries.

JW: Okay.

EA: Forget how many counties there were at a maximum, but again, the big players, of course, carried a bigger stick and probably had more eloquent spokesmen and so on, but I honestly did not sit in on many of those. It was the senior people at the lab, you know, Hennemuth, Edwards, and so on who generally were held on—because the way the ICNAF meetings were set up, say the typical annual meeting was usually in June, there would be an assessment meeting the week or two before, and then a lot of us would get sent home afterwards, so we wouldn't have the privilege of sitting in and listening to all the…So, I can't say for sure, some of that would be reflected in the reports, but as I said earlier, I think when the first scent of 200 mile limits came about, distant-water fleet countries could see what might happen, then I think they started to be a little more compliant with and agreeable with...

JW: That was the nudge they needed.

EA: They couldn't sound totally unreasonable either, even in discussion within the commission. I mean, they could all recognize that mesh sizes weren't working and so I think they generally went along with it, but then their objective would be, okay, we'll keep those quotas as high as possible. So, then it would come back to the scientific advice and at least for the major stocks, there was usually conflict. Again mackerel, the one I'm most familiar with, each side would come with their versions of the assessment but fortunately the way it was done then was - okay, we looked at those individual assessments but then we just went back, started looking at the data, and then basically redid the assessment based on what was ultimately agreed. The big year of '76, which I tended to highlight somewhat in here, because I think everybody realizes that was the pivotal point and something major had to be done but the Eastern Bloc really held on. It took three meetings that year to iron out finding an assessment. That kind of activity is one of the things, I guess, we all missed once ICNAF folded because—or at least once the U.S. withdrew. It was like…it was competition, you know [laughter]. You're doing your best scientifically to argue your case and trying to disprove the other side.

JW: I got a sense of some of those tensions in the article, some of the objections that people raised and the back and forth.

EA: I didn't put anything in there. There was one—it might have been around '75, '76. Again, there was real concerns that the Soviets were under-reporting. I think I mentioned earlier that the coastal states through their Coast Guards did have inspections. The U.S. certainly flew planes. In fact, we had an opportunity once to go out in one of the old…what the heck, two engine propeller-driven, they call them old "gooney birds" or something. We got grounded on account of fog and never did get to do it, but that would have been fun to—because they just very slowly over the top tried to see what was on deck and so on.

But there were also some boardings, spot inspections, trying to estimate what was in a particular tow of the trawl and so on, how much was below decks and do on. But there was a real effort one year—as I said, the feeling was, probably was some justification that they were under-reporting just based on back of the envelope calculations, you might say, maybe by some of the Coast Guard people and others that…So, I mentioned Judy Brennan. Judy did a fairly exhaustive study one year—I'm thinking it was produced as an ICNAF paper, but it was not received very well by the Soviets, because they denied it categorically. She pretty much concluded that based on everything that she could find that—I forget how much overage or how much underreporting—it was substantial, put it that way. They had just…they were furious. We tried to raise it in the assessment meeting and I remember it was mainly through the interpreter who was a political type and he almost took it personally [laughter].

JW: To, I guess, move to the council system here now—in 1976, we have the passage of the Fishery Conservation and Management Act that establishes the 200 mile limit, and you worked with the early councils with the Mid-Atlantic Fishery Management Council and the New England Council. What was your experience working with the early councils and with the members there?

EA: Well, first of all, it was a totally new experience. We didn't quite know what to expect. In the old ICNAF system, each country, the U.S. included, had not only the government-appointed commissioners and so on and the lead for the U.S. certainly was usually somebody from the State Department or somebody with some political clout. But we also had industry advisors. Every country had their industry advisors, and for the U.S., the industry advisors were the kingpins in the fishery. Well, when the council system started, many of those same individuals were appointed to the council, particularly New England.

JW: Do you remember who any of them were? Any names?

EA: Jacob Dykstra was one. He was from Point Judith. He was, I think, one of the early founders of Point Judith Co-op Fishery. Charles Stinson, he was a big herring canner in Maine. I'd have to go back and look at some of the old ICNAF reports and I could get you the full list of all of them. Of course, they were so happy about the 200 mile limit because now they were done with the foreign fleets and they're thinking now the U.S. fishery could be turned loose again and everything could go back to normal, and now the U.S. could go out there and fish to its' hearts content because there's no way that small U.S. boats could do any damage to the fish stocks when you look at all these huge factory trawlers that the Europeans were using. So, that was kind

of the attitude.
JW: So they were very optimistic.

EA: Well, they were optimistic about the fishery, and they were happy that, you might say, they were in charge. The way the council—NMFS still had the ultimate say—but I think NMFS was… probably contrary to now, it's been so long since I've been to a council meeting, but just from what I read I think the Fisheries Service keeps pretty much a tighter hand on things. But back then, I think, there was a lot of laxness in place and it became clear very quickly that there was not too much interest in really regulating. I mean, I couldn't even begin to tell you all of what went on in those first few years. It was probably mostly getting used to the system and doing what…I mean, they had to put management plans into place, but then it was a case of okay, what does the management plan say, and they really weren't interested in our assessments because they figured they weren't needed. It was kind of a disappointing time for those of us who'd been heavily involved in ICNAF. Almost right away—in fact, in some cases, it happened before ICNAF or the U.S. withdrew—we started looking to ICES as an area where we could have some scientific interest. I mean, some of the scientists, there was always somebody from Woods Hole going to the annual ICES meetings, usually a senior level person. But I remember—probably '74, '75, somewhere in there, being appointed to a couple of ICES working groups, but never going to any meetings. I did go to…my first meeting was 1978, I went to a mackerel working group meeting, and that just really opened up my eyes.

JW: That as the start.

EA: Yeah, but back to the council. Again, where we had been in the mode of doing assessments every year on all these fish stocks, pumping the information into the ICNAF system, now the council system didn't want it. I mean, there were different things that they wanted.

JW: What did they prefer to base their decisions on, in that case, since the science you'd been working on was not of significant interest to them?

EA: I honestly can't remember. I can't remember how long it took before, say, a first management plan came out and when it did, what it actually had in it in terms of any kind of regulation. I'm guessing it probably as far as--

JW: I think the early '80s, or around there.

EA: Yeah, maybe. Late '70s, early '80s. If anything, I'm sure they would have had mesh regulations kept in them. Quotas, probably. I mean, if there were quotas. We didn't stop all assessment work, I mean we still—I know I still cranked out everything I did. It was just a, I don't know…it was a sad time for all of us [laughter]. It created…well, the law when it came in also suddenly mandated that recreational fisheries had to be taken account of. I remember one of the first things I worked on was for all the species that I had responsibilities for was suddenly digging up all the recreational landings data that we could find. There had been, again, Fish and Wildlife Service and early NOAA stuff and they'd had recreational fisheries surveys done about every five years, every three years, five years, something like that. So, they had estimates in

there, so we started looking at those. But then, what do you do about the intervening years? I remember mackerel was a real strange one because in one of the years—I forget which year it was, ’70 or something like that, I think we had done ’60, ’65, ’70, ’75, something like that. One of the years, like ’70, was a *huge* catch. There was very little information.

JW: This was the recreational catch?

EA: Yeah. There was very little information in the reports that came out as to—we really couldn’t go back and look at the raw data to find out if that was based on some outlier or something. Most likely it was. So, I don’t know, we ended up cutting them in half…we did a lot of strange things, but anyway, we had to—not all stocks were as bad as then, not all species.

JW: Could that have been partially the result of a rise in interest in the recreational angling community to target mackerel, that may have caused it to hit a peak that year? Or would that not be—

EA: We really don’t know. I mean, I think we had information as well on the number of—I think the reports did indicate how many…the estimated number of anglers or estimated number of fishing trips, that sort of thing. I honestly can’t remember if there was anything of suspicion there that would suggest that it was this or that, but the point was we now had to include that information in all of our assessments. For some stocks it was easy to do, and, of course, in years later, then the recreational surveys came a little more frequently.

JW: I guess it must have been easier for species that are of more recreational value then others that are not targeted specifically by people who are fishing for sport.

EA: Right, right.

JW: So, for, I guess,as sort of a recap here, you were in Woods Hole for 15 years and a significant portion of your career was with ICES as a statistician and then as General Secretary. Is that correct?

EA: I was there a total of eight years.

JW: At ICES?

EA: Yeah. I mean, I’ve been connected with them for a longer period of time, actually employed by them almost 8 years.

JW: And you’re still connected with them as editor now?

EA: Yeah, yeah. So, getting involved in that organization really, I think, was a major change in my life for the best. As I said before, the first ICES meeting I went to, a working group meeting in 1978, that was a wonderful opportunity. I met some new people I’d never seen before, some I’d never even heard of before. But, very quickly became acquainted with them, in the case of

lifelong friends now with many of them. And then ’78 and then it took a few more years before I actually went back again for other working group meetings, but ended up involved in a mackerel working group, there were three different ones. I chaired the last two in ’84, ‘85, but I had also gotten involved—one of the bigger working groups over there at the time was what was called the Roundfish working group, North Sea Roundfish. Roundfish meaning cod, haddock, the gadoids, basically. And that was a whole different set of individuals as well, again, many of whom became real, were real stalwarts within ICES, you know, the old biologists and some who were my age, but a totally different set of people and what was so nice, I think—and I’m sure I would speak for any of the assessment people from Woods Hole that went over there to participate in those—it was a chance to get new ideas. If we were fortunate to pass onto them some of our own suggestions, you know, you might want to try this. We had our big bottom trawl survey here which we thought the world of, they had something different. They all do surveys over there, they have research vessels, but they had, at least in the North Sea, they had, and is still going today, it’s called the International Young Fish Survey. But it’s done differently than here.

JW: How does their techniques differ?

EA: Well, ours is randomly selected station locations. Over there, they’re in boxes and they just—they may not hit the same spot every year, but they go to those boxes. And then it’s different counties too, and different vessels, and different nets. So, we’ve tried to argue that they need to standardize things a little bit, but you know. They have their own thinking and they’re—I think it’s been tweaked over the years, so it’s probably working better than it maybe did in our eyes.

JW: Has there been any crossover of sort of methodologies in terms of the different trawl surveys, how we operate ours and vice versa?

EA: I can’t say for sure whether any of the Europeans have adopted anything specific from here. Again, they all do surveys of different kinds and I think in many cases. Well, I’m sure a lot of their station locations are random. I look at the Norwegians as kind of the people who tend to be out in front. They’ve done a lot more with acoustics than anybody else. I mean, I remember way back even in the ICNAF days, Bob Edwards, who at the time was Center Director here, wanted very much to develop an acoustic program. So, he contracted a fellow from Draper Lab, Jack Suomala, and Jack’s ideas on acoustics and so on were totally different than the Europeans. I remember there was a couple of day ICNAF symposium once on acoustics, and that Suomala presented a lot of his stuff there and it was kind of Greek to me because I wasn’t really much into acoustics, but what I do remember is a lot of the Europeans just really blasting him and not—

JW: They didn’t agree with his theory?

EA: They didn’t agree with his theories, no. But the Norwegians have really polished up their use of acoustics. They use it for cod, haddock, herring, mackerel, everything and it works well for them. I know acoustics has been used here more now than it was before, I mean with the new vessel and so on. I think they had the same capabilities in terms of equipment.

JW: So, when you went over to ICES in 1985, right—was that the year? How did you make the transition from Woods Hole to Copenhagen, right?

EA: Yeah. Well, it was kind of a leap of faith. Went over there not knowing how long we would be there, but basically sold our house here, packed up our kids, and went. I mean, I was floating sky high. I don't think anybody in Woods Hole thought I would get the job, and that made it sweeter [laughter]. I still remember the day I got the phone call. I had done my, I had asked a few key people in ICES to write letters of recommendation for me, people that I knew mainly from my ICNAF days, and so they were happy to do that. But I had just…I guess I was lucky, in the right place at the right time, and as it turned out later, even when I was four, five years later when I got the job, three years later got the job as General Secretary, it was kind of the same thing. I was almost ready to come back here because I was kind of getting burned out. The job of statistician was a hard one, it was a lot of work even though I enjoyed it.

JW: What did that entail?

EA: Well, I was secretary to—the big job was being secretary to the advisory committee on fishery management. They met twice a year, so okay, being secretary for them twice a year wasn't all that bad. The more time consuming part of the job was being the in-house expert on fish stock assessments, and almost every week of the year it seemed—summer was a little sparser—we'd have fish stock assessment working groups coming in doing their meeting there, so I had to be available to help them where they needed help. Basically once their meetings were finished and they had their report, even though they were responsible for getting it assembled, they turned it into me and then I had to get it all polished up and work with the secretary of staff. So, it was a lot of editing and that sort of thing. It was just being available all the time for those issues. Technically I was also responsible—even though I had a staff person doing it—handling all the catch statistics reported in from all the member countries. And then it was going with the chairman of ACFM [Advisory Committee on Fishery Management] to three different commission meetings to present the advice. So, it was travel, that was interesting. It wasn't an onerous thing.

JW: Was that primarily European states?

EA: It was all in Europe, yeah. Even before I got there—well, let's see—well, the client organization or clients, the EU was one. We technically didn't go there, that wasn't a requirement. But there was still the old Northeast Atlantic Fishery Commission, NEAFC it was called. They met every November in London. A lot of the same countries that were in the EU, with the exception of Norway, Iceland, and the Eastern Bloc. And then you had the EU, they were still paying for the same advice that they would get otherwise, but it was a different body and they had a little bit of jurisdiction, some of the stocks that were outside of 200 miles of any country's jurisdiction. And then there was the Baltic Fish Commission. That was always an interesting one. That was mostly the Eastern Bloc plus EU, Sweden, Finland, counties like that. And then there was NASCO, North Atlantic Salmon Conservation Organization, they always met every June. So, going to those meetings were generally interesting and fun, but just a lot of

work and it was but I enjoyed it very much. I came in, I always tell people I came into ICES at a nice time.

JW: Why was that?

EA: Well, for me personally, I think I've even said in this thing, for me it was like turning the clock back to the good, old, ICNAF days. We had given up doing that sort of stuff back in the U.S. We were now on the council system which none of us really cared for, to be quite honest, from a scientific point of view. No stimulation, nobody—we were only talking to ourselves.

JW: There wasn't a sharing of ideas?

EA: Some state biologists were involved, but very few even had any expertise in stock assessments. They were just classical biologists. But going over there to ICES, they were doing the stuff we used to do in ICNAF—they had the working groups every year pumping out advice for fishery management, and I just…I loved that stuff. So, that was interesting. Plus, by the time I got there and even in the first few years, I began to meet all the old-timers. It was like the generation before me who were just nearing retirement age, but there were enough of them that they were still involved in many of the working groups. Of course, you saw them every year at the annual meetings. It was like you were mingling with history right there [laughter]. I was a historian, you know. I just savored it. I savor it more as the years go by just looking back and thinking I knew these guys.

JW: Who were some of these individuals?

EA: Well…John Gulland, who was at the time just getting close to retiring from FAO [Food and Agriculture Organization of the United Nations] in Rome, but he'd been a premier guy at Lowestoft, the UK lab. Gotthilf Hempel, he had been a previous President of ICES, he's Mr. Fishery Science in Germany. A lot of the old guys in the UK, too, at Lowestoft that retired—David Garrod, who had been the Chairman of the Assessments Group within ICNAF during much of the time that I was involved, later became Director at Lowestoft. Mike Holden, he was at EU at the time. Most of these guys are all dead now. Tony Bird at Lowestoft—he was heavily involved in herring. The list just goes on and on and on. In my mind, they were all just classical individuals and they all have interesting stories. I just appreciated that I was able to know them all and see them in action. Some of them, you know, in the twilights of their careers.

What was interesting, too—and I don't necessarily know if it was my getting involved in ICES—but it seemed like when I left, U.S. involvement in ICES suddenly picked up. More and more people started coming to working group meetings, started coming to the big annual meetings. Probably reached a peak when I was General Secretary that…where then I was dealing more with the administration side. More U.S. scientists were heavily involved in a lot of the major committees. There were twelve major area subject committees in ICES. I think at one time there were four of those twelve were chaired by U.S. scientists, mostly from Woods Hole. Not all from Woods Hole, but I remember Mike Fogarty was chair of one, Vaughn Anthony was chair of another one, Fred Serchukwas chairman of ACFM, and I think we had somebody else…Tom

Osborne,who was at Johns Hopkins, was chair of the Hydrography committee. It was just a very active time, and I think now it's kind of subsiding a little bit. Or I don't see it as much. I know there's a lot of U.S. participation yet in ICES.

What I think one of the big changes that you see more people from academic institutions involved—when I first got involved in ICES, and it's the same with the European side, it was mostly scientists from the national laboratories. We kept arguing we need to get more academics involved too and even get more people involved who are from the environment side. ICES had always been a fish organization. In the minds of some, it's probably still that way. I mean, it's fisheries that initially drove the thing, got it started. And the funding of it and the management and control of it had always been in the hands of fisheries people.

Directors of the fisheries labs were the delegates, but yet ICES also had taken on—more so in the late '70s—environmental work because there were two clients that were on the environment side. You had the Oslo Paris Commission, which was to do with water quality. You had the Helsinki Commission, same responsibility for the Baltic. And a lot of those people really knew very little about ICES, but yet their representatives, their national members were from the ICES member countries. I used to go to their meetings and they would ask questions and I would agree with them. I said, you need to be more involved in ICES.

One of the things that I highlighted in here, one of the things that I was happy about—it was on toward the end of my time there—really pushed hard to make it a more, some would say a more "green" organization. Getting more involvement by the environmental side's scientific communities within the member countries. I even went so far as to suggest they ought to share funding and they ought to share delegates. Some countries did not appreciate that, but others did and they followed suit and changed their delegates accordingly.

JW: Did they recognize the value in taking a more interdisciplinary…?

EA: I think they did, but old habits die hard. Traditions are traditions and, for example in the UK, the two delegates—there's always one from England who is usually the director of the Lowestoft Lab, and the other one from Scotland was the director of the lab at Aberdeen. They were like two different countries [laughter]. The Scots would like it to be that way even today. But yeah, within each of their respective institutions, they had environmental people. So, to their credit, those who were involved—but yet, there were still other agencies within their respective counties that were outside of those institutions and who were actively involved in the work of say, the Oslo Paris Commission, Helsinki Commission, and so on.

JW: So was water quality a big issue for them, or did it sort of stretch to other areas of ecology and other disciplines?

EA: Water quality was the big issue and a lot of it was water quality of the sea as influenced by say, pollution in the rivers, you know, the Rhine, the Volga—all the big rivers that were dumping stuff and there was a lot of finger-pointing usually. The Brits always said we're not responsible for any of this problem, the Germans and others would say that's a bunch of rubbish, the Brits

are guilty as sin like the rest of us [laughter].
JW: Hard to escape culpability there.

EA: Yeah, yeah. But happily even after I left ICES and went back now and again for annual meetings, I would run into some of the members, particularly a fellow from Belgium who was a key player in the Oslo Paris Commission was now one of the ICES delegates from Belgium. He now was actively involved where previously he was on the outside looking in.

JW: So they've continued on this trend of incorporating more perspectives?

EA: Yeah, but today I know very few—I look on the website, I look at the delegates names and a few names I still remember. It's interesting, even after 20, 25 years there's still a couple of names that were delegates when I left [laughter]. My time with ICES I would say was the best eight years of my life. It was just a lot of fun and we could have stayed, but for a lot of reasons we decided to come home and we had grown kids back here, we wanted to be a part of their lives, see grandkids. I think it was the right decision.

I was seeing things getting a lot different over there within ICES—money was becoming a real issue. The first couple of years, two or three years, when I was General Secretary, I had a very supportive bureau. The bureau was like the board of directors—it's a subset of the delegates. There's a president, first vice president, and then five regular vice presidents. So, they helped set policy and craft the decisions that are brought before the full council. But there was a lot of making up time in the sense of we say ICES had to be brought out of the Middle Ages. They were still a pretty old-fashioned organization.

The fellow who had been there—well, the fellow I succeeded was in the job for six years. He had been the, Basil Parrish was his name, he had been the long-time Director of the lab at Aberdeen. I had first known him when he was part of the UK delegation to ICNAF. Back in those days, civil servants—I don't know what grade level in the UK—faced mandatory retirement at age 60. They were just out the door, make room for younger people, I don't what the…I never could get a clear answer from anybody as to why the UK had that policy. I don't think they have it now. So, he was still in his prime and about a year or two after, they brought him in as General Secretary. He had been a previous President of ICES, he had held about every job there was in the organization. He'd been involved in it since the late '40s. The fellow that had been General Secretary before him was an old, stodgy Norwegian, Hans Tambs-Lyche was his name. I think he had been on the job for I don't know, 15 or 20 years, and he was definitely the old school. They ran on a pretty tight budget, use every pencil down to this big and stuff like that [laughter]. He was a very formal individual, everybody was on a Mr. Anderson, Mrs. Jones…none of this first name stuff. It was very formal.

When Basil came in, Basil was a social animal. I knew that—I'd been at several parties at his house even in my pre-ICES days. He just liked to have a lot of fun. He immediately changed all that. Now, he was called "Basil". He wasn't Dr. Parrish and he could call all the women by their first names, very relaxed atmosphere. But, things were still…I mean, the office furniture had been there since, I think, 1902 [laughter] and they had an old, old, old computer system that just

badly needed replacing. Just lots of things. When I took over, within six months we had a new computer system. We bought new office furniture so we had to spend some money. We upgraded, we brought in people and we evaluated all the staff positions, most of the higher level people got upgraded.

JW: No more pencil stubs?

EA: Yeah, just bringing it into the late 20th century and the bureau supported me right to the hilt and we had—I remember one year we had close to a 10% increase in national contributions, which some countries had a hard time swallowing. I mean, you had the U.S. delegate voted no.

JW: Really?

EA: He was admonished later and told he could have abstained [laughter]. But anyway, that went fine for a few years, but then—I don't know what it was worldwide, whether it was oil prices or something—national budgets started to feel a punch, so they all looked to see where they could save money and we suddenly started getting real concerns about national contributions.

JW: Was this in the early '90s?

EA: Yeah. What other alternatives do we have? And they started looking at the clients. The clients need to pay more for the advice. Maybe we need to do some analysis here and figure out how much we're doing for them versus how much we're getting money from them. So, I forget what year it was, '91 maybe '92, probably the '92 meeting, I was sent home with instructions to get all this figured out and so very quick, crude calculation, put it that way, and we figured out in some of the cases, some of the commissions that were being given advice that they were really getting a good deal. NASCO [North Atlantic Salmon Conservation Organization], on the other hand, was paying more than they should have, so that sort of created a slightly different problem, that they immediately wanted to because we were obligated to report to them and they immediately wanted to renegotiate a lower [laughter]

Anyway, it just became harder because then they were forcing, the delegates, were forcing a totally new system in the secretariat. We suddenly now had to have time cards. Most people worked on a variety of projects, different working groups, reports, this and that, and we had to be able to assign their time to either ICES itself or to one of the clients. It was just starting to become a real headache [laughter]. Not that that was one of the things that triggered my decision to come back, I think it was a variety of things. But suffice it to say, I think, after I did leave, things just got more and more complicated over there and the organization, in some ways, even though the skeleton of it is the same, a lot has changed.

We still have 100 or some working groups that meet every year. The whole committee structure has changed—there used to be as I said twelve subject area committees that looked after research and so on. We had two advisory committees, one of fisheries one on the environment and we had what was called a consultative committee, which was kind of the—it was a committee that

handled the research program of ICES. It was comprised of the chairs of all the twelve subject area committees. They've now gone to a single science committee with one member for each of the 20 member countries now. They'd gone to a single advisory committee that advises on everything and the chairman of that committee now is a full-time employee [laughter]. It's become such a big job that they basically have to hire the person and they're going to do the same on the science side, science committee.

JW: Has this just been an effort to streamline things?

EA: Well, the job has just gotten bigger, they've taken on more tasks. Again, I had not been a part of any of the discussions, so I really don't know all the thinking. So, when I left the secretariat staff was about 35, now it's about 55, so they have added a lot of people. There'd been one, two, three…they're on the fourth General Secretary now since I was there.

JW: And that time you've stayed on as editor?

EA: I came on as an editor in 2008. I had actually gone—when, I left in the end of '93, I continued attending thanks to the science center all the annual meetings, and then in '97, '96, '97, one of those years, I was asked to be the convener of a symposium to commemorate the 100th anniversary of ICES. That was held in the year 2000, so that allowed me to continue to go. By this time, I'd already transferred down to Silver Spring. Sea Grant Office paid all my bills then, they were happy to keep me involved in ICES.

JW: Did Helen Rozwadowski write a book about the history of ICES as part of that commemorative?

EA: Yeah. Right. Have you seen the book?

JW: No, no. But she's an environmental historian who specializes in marine and maritime history.

EA: Yeah, she's over at—

JW: Avery Point.

EA: UConn [University of Connecticut], yeah.

JW: I've met her a couple times.

EA: I actually haven't seen her now since 2000. I may have seen her, she may have tagged along for a year or two. I forget whether…did her book come out in 2002? Because I know the proceedings from the symposium were published in time for the 2002 commemorative meeting. Her book may have come out about the same time, too. I interacted with her quite a bit. She interviewed me a lot for material in the book. She interviewed a lot of people. I think she did a good job.

But then I didn't go—I think 2002 meeting, Copenhagen, then I stopped going because I couldn't see any reason. Then we were invited, 2005 the meeting was held in Aberdeen, Scotland and we had good friends living there who invited us to come and stay with them, so we went. I didn't go the year after that because I had retired. I was already retired 2005. But then out of the blue in 2006, 2007 I guess, Steve Murawski—was he Chief Scientist? He was U.S. delegate, he was also, I think he must have been Chief Scientist at Fisheries at that time—asked me if I would like to be on the publications committee, be the U.S. member. I said "sure", and he said, "we'll pay your way and you can probably continue to do that for as long as you want". I said "great".

So that meeting, I went to the meeting in 2007, which was in Helsinki. Had no idea what I was getting in for, I got there and found out that they were looking for two editors [laughter]. One they were looking for another editor for the journal, and they were looking for an editor of the cooperative research report series. I put my hand up and they pretty much approved me, cooperative research report editorship right then and there. The other one it had to be a vote among the editor-in-chief and there were like four or five other editors at the time. That was how it was done then. Maybe by the end of the meeting, I got word on that. So, that's how it started.

JW: How often do they come out, each publication?

EA: Well, the journal—that's hard to say how that comes out. It's published by Oxford University Press. I think we're up to probably 10 issues a year. It's more in terms of pages. There's probably—it's been a dramatic increase. I mean, I think back to the time I was at ICES, Ray Beverton was the editor, Beverton and Holt, you know. He had one assistant. I think it was three issues a year, maybe 300 pages, something like that. Now we've got over 50 editors, plus an editor-in-chief. I think there's at least 10 issues a year, a couple of them are usually symposium.

JW: That's a huge undertaking.

EA: I would say 22-2500 pages. So, journal publishing has changed so much. Back then it was all hard copies. When you got an issue together, you printed it and mailed it. They still have a few hard copies, but it's going so much to electronic. So now, as soon as the paper has been approved by the handling editor and goes through the final copy editing and whatnot that the publisher needs to do and it's available online, and it becomes accessible. So, people who have online subscriptions, I know the Center at Woods Hole does, so anybody can access journals like that. I still get a complementary hard copy sent out—I don't know how many are sent like that, but every once in a while, I get a copy.

JW: It's nice to read a hard copy of something rather than always looking at a screen.

EA: Yeah. And then the cooperative research report is a very irregular thing. Typically, I would say on average there have been anywhere from 4-6 published per year. They tend to be bigger reports. I mean, a typical journal paper is 10 pages, maybe at most, sometimes the creep is on, they're getting bigger. We're continually admonished to trim, and I happen to do that to authors.

The recommended size is maybe 65, 7,000 words, something like that.
JW: Most people go beyond that?

EA: Yeah. I've had some come in—worst one 19,000.

JW: Ooh [laughter].

EA: I said, you've got to trim. You've got to trim. But on these others—those are all going electronic now, too, a decision made a year or so ago. The biggest one I've had was over 400 pages, but usually major topics…a lot of them start out as working group reports that are deemed such an interest or they maybe pick a particular topic that that working group has dealt with that is kind of time to get the state-of-the-art out for public assimilation. As I said, I'm working on one right now that's about 170 pages, essentially a handbook on aging fish stock, fish otolith aging.

JW: When is that expected to come out?

EA: It'll probably be later this fall. So far this year, there have been two published, there's another one probably going to come out within another month. So, it's an unpredictable system, but I enjoy it very much because I'm familiar with it, it keeps my hand in it. I enjoy—they're both somewhat the same, but yet they're somewhat different because the journal issues I can get paper manuscripts from all over the world and I've had them from every continent [laughter]. Lot of Australians and Japanese, Korean. I've had one or two Russian, not that many. Of course, the bulk of them are European countries, some from the U.S. The hard part is always finding reviewers, and we had this big computerized system, everything is on that so nothing has to be done by phone calls.

JW: That's a lot of languages to have to accommodate.

EA: Well, it's all English, so they have to deal with English. Those who…a goodly number English is a second language, so you have to take account of that. But if it's really bad, we usually suggest that they need to get some help from an English-speaking writer who can help them clean it up. Most of them are pretty good about that.

JW: Well, I was thinking of sort of ending on another question about Ray Beverton, whom you had brought up earlier. I noticed you had a quote in your article about how, I guess, he's referring to the ascendance of mathematics over science when it comes to fisheries research. I was wondering if you had any closing remarks or thoughts on that.

EA: Well, you know Ray was a…a sweetheart, I guess is one way to put it. He was quite an individual—very astute mathematically, biologically and so on. His own training, he had a fair amount of math and so on. I wouldn't call him a super number cruncher in that sense, but he was just an all-around very good fishery scientist. He had a grasp of everything. Through his career, which started literally right after the war, went to Cambridge and started working at Lowestoft in about '47, I guess. He's seen it all in terms of fishery science and has witnessed—the paper he

and Sidney Holt wrote, we often refer to it as "the Bible" in fishery population dynamics because it probably for the first time quantified mathematically a lot of what earlier people had been talking about, but nobody had really put it in those terms. So, that at his time, that came out '57, a few years actually after they had gotten it all worked out and written, it just took that long for it to be processed.

Life has really changed tremendously in stock assessment work. Mathematics and statistics and fine-tuning—all the stuff, whatever you want to call it—has really taken hold because scientists knowing the limitations of the data that they're working with and being always anxious to try to wrangle the next last bit of information possible out of a set of data have resorted to statistics to do it. Good or bad, some people appreciate that and some don't. I even noted in my remarks on my life in ICES that even 20, 25 years ago, I ran into people there at some of the working group meetings who were really befuddled over how to interpret some of the output for one of the tuning methods that had been essentially mandated for their use by ACFM, and complaining then that maybe there's more emphasis on the math and the statistics than on biology.

In fact, I think one of the papers I mentioned, separable VPA by John Pope and John Shepherd, two guys at Lowestoft. I know both very well. Shepherd later became—he was Deputy at Lowestoft, later went down, he was Director of the UK Oceanographic Lab at Southhampton. He was the UK representative on ACFM for a year or two. I remember it was when I was still statistician, so I was secretary, and it was one of the meetings where a particular stock was being discussed for the assessment of the stock and again, there was one of these where a working group had used this method and it included a lot of the predominant stuff. Shepherd was—I think had been asked to describe all this or explain it or something like that. He was about the only one in the room that knew what he was talking about [laughter]. Because again, a lot of the people on ACFM from the different countries were old time people, too. They probably knew how to do assessments, but the old fashioned way. I remember somebody just really laying into Shepherd and something to the effect, you're the only guy in this room that know what this means, how in the world do you expect us to…? So, I think I had seen that quote by Beverton in the paper, but it was actually a paper written after he had died. When he was here in '94—

JW: I'm just going to try and shut this window here because I don't want the…take this highly opportune moment to mow the lawn.

EA: Ray had toured the U.S. in '94 shortly after we came back from ICES, and had given a series of lectures at NMFS facilities. We had videorecorded his lectures in Woods Hole, and then after he'd gone home, he decided he might like to publish that stuff. So, he'd asked me if I could get it transcribed. So, I started working on it. Then he got sick, he had a stroke, I think, in '95 and eventually died. But, he had also had notes because he was going to give—he was going to come back that year and he was going to give a talk up in British Columbia at UBC [University of British Columbia]. So, he never got that done, but Tony Pitcher I think wrote the paper for him. He was credited…I think it's, yeah it's '98: "Fish, Fact and Fantasy: a Long View," reviews of fish biology and fisheries. But Pitcher had gotten all the notes and stuff from Ray's wife, as did I. I got a lot of extra notes and stuff.

JW: His unfinished work?
EA: Did the book. The extra notes that Ray had left here then are on video. We finally got that published in…what year was it…yeah, 2002. It was a NOAA technical report. I thought that was just—I quoted Beverton because it tended to match up with something I had observed myself, and I thought it was a…I do feel that way because I think statistics doesn't always solve your problems. Massaging the data to the point where you get the highest correlation, lowest probability of error and so on doesn't necessarily mean that it's correct biologically [laughter]. Anyway. I've often thought of if I could go back 25, 30 years and say, take the mackerel assessment. Take all the data that's available right now, all the age composition data, what I could glean, and run the same assessment or do it in the same way that I did it back in the old days, what sort of results I'd get [laughter].

JW: Well, I guess if there's—is there any topic that we didn't cover or that you'd like to throw in in the end? Any parting words?

EA: Well, I've enjoyed being able to talk on this. It's kind of coincidentally—

JW: I apologize for the lawnmower out there. I didn't realize that they were going to be mowing right now.

EA: A month or so ago, I was contacted by SteveCadrin over at UMass SMAST asking if I would be interested in coming over—they have a seminar series for students and staff to talk about what I'm doing and so on. I got back to him and said "yeah I would", and I said—because he's asked me to talk about research—and I said, "well I'm not doing any research anymore, but I thought maybe it'd be interesting, I could talk a little bit about my career". He says, "oh I was hoping you would say that" [laughter]. So, that's what I'm going to talk about. Go through some of the same stuff that we've talked about today, so.

JW: Well Emory, thank you very much for coming in and giving such a thorough account of fishery science.

EA: Well, I wish I could have been more precise on some of the questions you asked.

JW: Well, it's tough to remember thing in the moment. It's a lot to sort of dredge from the depths of history here.

EA: Yeah, and a lot of it's just fond memories, but as you get older some of the details fade, but some of it still remains pretty good. I guess keeping my hand in the editing and chats like this help keep the grey matter still functioning [laughter].

JW: Well, thanks very much.

EA: Ah, you're welcome. I've appreciated it.