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Waring, Gordon ~ Oral History Interview

Joshua Wrigley

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

Interview with Gordon Waring by Joshua Wrigley

Summary Sheet and Transcript

Interviewee

Waring, Gordon

Interviewer

Wrigley, Joshua

Date

June 27, 2016

Place

Northeast Fisheries Science Center
Woods Hole, MA

ID Number

VFF_WH_GW_001

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Biographical Note

Gordon Waring was born on July 19, 1946 in Brooklyn, New York. He earned his B.A. in Biology from Humboldt State College, his Master's from Bridgewater State College, and his Ph.D. in Fisheries and Wildlife Conservation from the University of Massachusetts, Amherst. Waring began working for NOAA in 1973 and is a retired former team leader of the seal project within the Protected Species Branch at the Northeast Fisheries Science Center.

Scope and Content Note

Interview contains discussion of: ICNAF quotas, Atlantic herring population, international herring tagging project, Soviet cooperation on fish tagging projects, interactions between Soviet, Polish, German and American scientists, effects of extended jurisdiction, stock assessment review process, establishing preliminary fishery management plans, development of the Protected Species Branch, harbor porpoise protection, East Coast marine mammal surveys, differences between marine mammal surveys in the Northeast and other regions, gray seals on Cape Cod and white sharks on Cape Cod.

In this interview, Gordon Waring gives a rich account of his time working as a scientist at the Northeast Fisheries Science Center. He details his experiences working on international joint projects during the Cold War and his work on seals with the Protected Species Branch at the Northeast Fisheries Science Center.

Indexed Names

Anthony, Vaughn

Brown, Bradford
Edwards, Robert
Palka, Debra
Peterson, Allen
Runstadler, Jonathan
Simpkins, Michael
Sissenwine, Michael
Snow, Crocker
Smith, Tim
Taylor, Barbara
Wade, Paul

Transcript –GW_001

Josh Wrigley (JW): Great--

Gordon Waring (GW): I've wanted to get...

JW: --sound.

GW: Yeah. I purchased a small version for my daughter--

JW: Oh really?

GW: --for music.

JW: I mean, the fidelity on it is really kind of incredible. And that it has different levels as well, you can record, you know, at, you know, the highest sound quality which, of course, is a huge, you know, one and a half gigabyte file once it's all done.

GW: Oh. Yeah.

JW: But we're recording at the, sort of, CD standard quality--

GW: Yeah.

JW: --which is also the minimum standard for, um, the Library of Congress's American Folk Life Center, which is not where the interviews will wind up eventually, but they'll be going to the NOAA Central Library instead.

GW: Okay, right.

JW: So, but it's good to keep the, uh, you know, the sound quality up there at least. So, um, so we can begin the interview with just a short introduction here.

GW: Okay.

JW: And, you know, if you, um, if you need to, you know, take a break or anything or, you know get more water, use the bathroom, anything like that, it's, you know, it's very casual to sort of barrel along through, you know,--

GW: All right.

JW: --come hell or high water, if in severe discomfort or something. No need there.

GW: Sounds good.

JW: So I put together a couple of questions here--

GW: Sure.

JW: --that sort of focuses on some of the things that you mentioned when we last spoke.

GW: Right.

JW: And then the rest of the questions, you know, really sort of consist of just me following along with what you're saying and trying to go deeper into some of those--

GW: Okay.

JW: --aspects of your career, the science, your experiences at sea and so forth.

GW: Okay. Yup.

JW: So, so I'll just read this part here and, and then we can sort of get started. And because I'm an historian, you know, I like to sort of move in a chronological fashion so we'll maybe start out with you know, when you were born, you know, where you went to school and then we'll sort of move up through time.

GW: Sure.

JW: That being said, if there are digressions and tangents that we want to get into too, that's perfectly fine as well.

GW: Okay. Yup.

JW: It's very free form. So, actually...

GW: That's all right.

JW: Let me just wait until the--

GW: Yeah.

JW: --until the sirens go by so we're, our sound isn't terribly polluted by... emergency vehicles here.

GW: Yeah. You're on, Fish Road runs right up here, runs parallel to the main road and to the hospital.

JW: Yeah. Sort of a... ill positioned I guess.

GW: Well, summertime it's, you know, you've got, you get the car accidents you get in the wintertime, you got bike accidents etcetera. Swimming accidents.

JW: I guess, here, let me just, I'll introduce you as, as being retired and the former head of the Protected Species Branch. At what--

GW: Oh, I was, yeah, I was team leader for the--

JW: Team leader, okay.

GW: --for the seal project, yeah.

JW: Okay. Within the Protected Species Branch.

GW: Right.

JW: Okay.

GW: Yeah. The only time I was head of the branch was when they had a hiatus and, the branch chief, and so we would rotate around for--

JW: Okay.

GW: --three months.

JW: Acting.

GW: Acting.

JW: Okay.

GW: That's pretty prevalent in NOAA.

JW: Okay. So I'm going to, I'll get started here. This interview is being conducted as part of the Voices From the Science Centers project funded by the Northeast Fisheries Science Center. It is also a part of the Voices from the Fisheries project that's supported by the National Marine Fisheries Service Office of Science and Technology. I'm Josh Wrigley, Voices from the Fisheries Project Manager, and today I'm speaking with Gordon Waring, who is retired and a former team leader of the seal project within the Protected Species Branch here at the Science Center. The interview is taking places at 15 Carlson Lane, which is where the Social Sciences Branch is located and the date right now is June 27, Monday. The time is about 9:00 in the morning, as we're beginning the interview. So, so to get started, let's go back to the very beginning and, when were you born?

GW: Okay, I was born July 19, 1946 in Brooklyn, New York.

JW: Okay. And where did you do your undergrad and graduate work?

GW: Okay. I, uh, I got an Associate in Applied Science degree from Suffolk County Community College in 1968 in Marine Technology. And then from there I went to Humboldt State College and received a B.A. in Biology. When I came to work at NOAA Fisheries on January 2, 1973, I was afforded the opportunity to take evening classes at Bridgewater State College and, um, in 1980 I received my B.A. in Biology and then subsequent to that back in 1990, I went off the same thing, similar, where I went to the University of Massachusetts at Amherst, received my Ph.D. in Fisheries and Wildlife Conservation in June 1995.

JW: Okay. What, what did you work on for your grad work? For your Ph.D. dissertation?

GW: For the Ph.D., I worked on marine mammal fishery interactions, ecological, was a couple components, one chapter focused on the interaction of the Atlantic mackerel fishery, which was basically a joint fishery operation with countries from Germany, Netherlands, and Poland, and looking at the bycatch of pilot whales and trying to examine the time series and see if we can relate the bycatch to any of the components of the fishery. Example, size of the catch, duration of the tow, things of that nature. Temperature. And after examination of that data and some other, a small project that we funded for observers on these vessels, it was clear that the reason the bycatch of pilot whale was so high at certain times was associated with the schooling of mackerel and the way the fishery operated. So they had large nets that they, when they were on the surface a long period of time, the pilot whales would chase the trawls and when that most of the pilot whales in that fishery were in the mouth of the trawl, in the gate, they were taken during the haul back operation. So we worked with the industry to try and mitigate that but having to do some evasive... That was my first chapter. The second one...

JW: And these were mostly foreign fleets? Foreign vessels, at the time?

GW: It was some U.S. vessels that were involved in a joint venture.

JW: Okay.

GW: And some of the, actually, some of the highest bycatch came from a couple of U.S. vessels where they towed their bag of fish from where they hauled the net over to the processing vessel, so they had multiple pilot whale take in the net.

JW: So this was quite an issue, I guess, at this time?

GW: Right. Right. It wasn't that it was the, actually the, it was an issue because we were trying to reduce the by, mitigate the bycatch. At that time the, we weren't into the whole process of figuring out what the potential biologic removal was, when this whole thing started. But we knew it was an issue, conservation issue, we weren't sure what the impact was on the pilot whales, but because they're a social species, you could wind up disrupting the group cohesion, stuff like that. And so we were trying to mitigate that, you know. There was no sense in, you know, allowing them to take large numbers of marine mammals, because, I mean the trawls that they fished were substantially larger than trawls that American vessels used. So foreign vessels are, you know, a couple of hundred feet, big pelagic trawls,; U.S. vessels, you know, a large one would be a100' long.

JW: Right, right.

GW: Much smaller vessels. So the area swept by the foreign vessels was, was very much larger. We used, the other, the good side of that, there is a good side, but anyway, we were able to, because the vessels were so large, we were able to collect whole carcasses and so we sent a lot of the carcasses that we were able to get down to the Smithsonian and so it gave them a lot of animals to look at for some of the life history studies they were doing, diet studies, health and assessment studies, so. That was the positive side of getting those animals that it, they all went to some really good science-based studies that were published and journals, you know.

JW: Just out of curiosity, how were the carcasses transported down to the Smithsonian? Was that by land or by sea?

GW: By land. Well, so the vessels, the observers, any of the trips had a, about a two and a half or three week duration, all right, so the vessels, depending on the country, the vessels would arrive in January and stay to the middle of April. And so since the largest components of the mackerel stock at that time were aggregated in the Mid-Atlantic region, they were from, uh, western Long Island down to, uh, Chesapeake region, and so the vessels--

JW: During the winter.

GW: Yeah, orspring. And so the vessels would come in to Port of New York or Port of New Jersey, so, and since they had the capacity, freezer capacity to hold these animals, we basically asked them to put them in the hold in one of their freezers that they weren't using for fish. They'd come to the dock where you'd made the arrangements with either the Smithsonian or with the Sandy Hook Laboratory and they'd have someone pick up the animals. So. Yup.

JW: Wow. It's quite an operation.

GW: It was pretty, pretty... yeah but it wasn't, you know, the, foreign nationals were very cooperative in doing it, so it wasn't an issue, stuff like that that. I mean they were, you know, they have a bunch of regulations they have to work under and stuff like that, and so, this wasn't a burden to them.

JW: So how did, how did your work in this area then sort of translate into what you began doing for the National Marine Fisheries Service when you joined?

GW: Okay. So when I started in 1973, I started in the Biostatistical Unit, which was now part of the Protected, I mean, the Population Dynamics Branch. So that name of that group evolved over time. But anyway, so when I first started, I was basically auditing survey trawl logs and going through public, published records of fishery catches and fishing vessel effort to extract data to support the Atlantic herring stock assessment, research that was being conducted by Dr. Vaughn Anthony. So I basically worked for Vaughn Anthony for probably close to ten years on herring assessments. And in addition to that, I was working on Atlantic butterfish and also when I started my graduate master's program, I was working on skates and so my master's thesis was on population dynamics of little skate off the northeast U.S. coast.

JW: How many were in your cohort in 1973 when you first arrived?

GW: Uh, in 1973... yeah, they were just building that whole group. The Center Director brought on Dr. Bradford Brown who basically was running the, the group at that time. And he was bringing in both Ph.D. scientists and students with bachelor's and master's degrees to build the program, basically just... And his philosophy that was that you bring in these young people to work for the senior biologist researchers. They develop and grow through the system.

So when I started in the group I was in, there were, I think, about five of us and then, at that time, in the early '70s they started the, uh, co-op programs were expanded more and to, some of the, uh, historical black colleges and Brad was really in the forefront of bringing more minorities into the program, and so we had students from, not just minorities, but students from a lot of the schools coming in in the summertime. So, so over time the program built; a lot of the people were the temporaries, the co-op students, and the, the more permanents, probably were increasing slowly through the mid-'70s when the U.S. went through extended jurisdiction. Then things slowed down a little bit. But, you know, subsequent to that year forward when I, when the Protected Species Branch was formed, you know, I got involved in another group that also showed a new growth curve.

JW: Okay.

GW: Yeah.

JW: Um, so what was, what was kind of the research focus of, of the branch at that time then? Because that was when ICNAF [International Commission for the Northwest Atlantic] was--

GW: Right.

JW: --regulating--

GW: Yeah.

JW: --Atlantic herring, right?

GW: Right. Right. So the, uh, the senior scientists would go to the ICNAF scientific meetings; they had two series that would meet then, so, they have the spring ones and the winter ones. And the, so we would, you know, and Vaughn would have all of these data sets that he wanted put together to run the, uh, the virtual population analysis so we had the assessments. It was a multi-national assessment, it wasn't just one stock. So you had German, Russian, Polish, and a couple years you had, I think, Romanian, Bulgarian vessels that were fishing herring and some other countries. And so basically the...when the scientists met, they sat in the room in working groups, sorted out all the data, trying to reconcile differences in the size, age, composition of catches and stuff like that. A good example of some of that was the importance of the Age and Growth Group we had. So herring, being a short-lived, relatively fast-growing fish...year classes are very important. And so, one of the year classes that showed up really strong in our data, the Canadians had as a weak year class, and so they went back to the two Age and Growth Groups in Atlantic Canada and one in Woods Hole and those people got together, went through blind samples, stuff like that, and so...

JW: What was responsible for the discrepancy?

GW: Um, the, uh, the Canadians had missed, uh, a check or an annual, a ring, when they read them, and so... And so went back, you know, they reconciled it and so, you know, then they had to go back and correct the assessment, the original assessment. But the assessments were basically because of, under ICNAF, they had these whole country quotas and stuff like that and it was strong evidence that some countries were underreporting all of... all of their data at times and so, you know, trying to get as much possible out of that. Plus we had research vessels going doing spring herring surveys. It was involved mostly with the Polish and German vessels. And sometimes, some sampling from the NOAA vessels *Albatross*[IV] and *Delaware*[II], but mostly on the foreign vessels. We were out and trying to look at the period before the spawning season; they were autumn spawners here and so you go in the spring to get an idea what's happened out there with the stocks.

JW: How much... how much control did ICNAF really have, at that time, over setting quotas for different countries and imposing control mechanisms on the fishery?

GW: Well, they, they pretty much had, I think they had a lot of control in setting the quotas, because that was the scientific organization that was all, was all structured, people were all signatory...

JW: Right, right.

GW: Okay? But in, within coastal areas, national waters, it was up to the country to enforce them. So, the U.S. Coast Guard would board vessels and look at the mesh they were using in the trawls, stuff like that, whether in fact they were catching, not catching... excuse me, prohibited species... So for the United States, United States had lobbied for restrictions on certain species that were very important to the U.S. and they were concerned about overfishing by the foreign nationals.

JW: What were some of those species?

GW: Oh, like river herring... the continental shelf species, lobsters, scallops, stuff like that.

JW: Okay.

GW: And so they were, and some of the flounder species they had more strict regulations on those. But, you know, I mean, there was no such thing as an observer program at that point, you were basically relying on the logs that were provided by the countries themselves.

JW: Yeah.

GW: And so, you know, the Coast Guard would do some of these at-sea boardings on the vessels, the Fisheries enforcement people would operate with them, to look at, they did overflights to see where the fleets were fishing and stuff like that. And we'd get, we'd get some of the data back at the Woods Hole and there were people in our group that would look at the surveillance data to try and get an idea of what the fishing patterns were and trying to reconcile differences that may occur at the scientific meetings, so.

JW: And since it was an international organization, was there, um, was it, were it's workings more characterized by consensus or conflict, as it was dealing with different species?

GW: I think it was mostly consensus. You know, I only started going to the meetings later on in my career. But like I said, mostly the senior scientists went to those. But, you know, my understanding is that there was, always, some disagreement about the age structure, the catch structure, or, you know, what the mean weight was, because you're talking about tens of thousands, a hundred thousand tons of fish being caught and you...you're fooling around with the weights of fishes, stuff like that, it makes a big difference in how strong the year classes are, what year classes are supporting the fishery. The aging, make sure the aging, you know, I know they were, probably some heated discussions although I wasn't there, but I'd get feedback from Vaughn--

JW: Right.

GW: --talking about how the assessment meetings went.

JW: So when, when had Vaughn Anthony come to the Fisheries Service?

GW: Oh...I, I'm not sure...

JW: I guess he worked for the Bureau of Commercial Fisheries--

GW: Yeah.

JW: --before--

GW: Yeah.

JW: ...the National Marine Fisheries Service

GW: He...Vaughn was one of the scientists who came down from Boothbay Harbor, so--

JW: Okay.

GW: --we had, the Science Center had a lab in Boothbay Harbor which was closed, I believe, in 1972. And so that, all the people, a lot of the people, the fishery people up there, it was all zooplankton people, came down to Woods Hole. Yup. But Vaughn had worked on, you know, Vaughn had worked on Atlantic herring, he did his Ph.D. on population dynamics of Atlantic herring...it was probably one of the most comprehensive tomes. He had incredible, incredible detail in his document on...because at that time there were, I don't know how many, probably over thirty sardine plants, as we call them, along the coast of Maine. And he had set up a sampling scheme with someone to go to, they had these boxes that the...they'd go to the plant and collect fish samples, throughout the whole, every month of the year, all different samples, he had, he had very good biological data on what the landings were from the U.S. vessels. And so for the U.S. component of the assessment, the U.S. data that went there, it was a very strong, clear indication of what was happening along the coast because he would, they would have, for the, the Downeast Maine, they'd fish on the small fish, so they knew what the early year classes were, they'd get some idea what's happening with the...

JW: That are for packing in cans?

GW: Yeah. Right, right. And he had, I mean, some of the details they had were, we used to laugh at it afterwards, like he had, he had conversions of numbers, the pack per cans, the numbers of fish and bring it all up.

JW: Wow.

GW: Very, very detail-oriented. And so when he came down here, you know, all that whole program came down here with Vaughn.

JW: Yeah.

GW: Yeah.

JW: And then, eventually, in 1977, right, the Atlantic herring population sort of took a severe downturn and collapsed?

GW: Yeah, I believe we had, I think we estimated that the combined, the Georges Bank, it was a combined assessment we were doing at that time. They used to do a Gulf of Maine assessment and a George's Bank assessment, and then in 19--, uh, a couple of years before '76, they talked about doing a combined...combine the stocks. And they started, under ICNAF, they started international herring tagging program, so we were involved with that, and the Department of Fisheries and Oceans was involved with it, tagging fish up along the Canadian coast and we were tagging on Georges Bank and the Gulf of Maine.

JW: Was that to determine the amount of transference between those areas?

GW: Right. Looking at the mixing and the movement of the stocks. So and that turned up some very interesting patterns, but...

JW: During what years did you do the tagging study?

GW: We started in August of 1976. At the end of August, on Georges Bank. And we tagged about, I think it was like 25,000 fish. We did a second one in the spring of '77 in the Gulf of Maine. But the assessment from that year, I think it was something like...the stock was about a 100...maybe 130,000 metric tons, spawning stock. But in 1977, in the spring surveys that we were doing, like I said with the Germans and the Poles, Polish vessels, the catches of herring were like totally sparse. And then the autumn 1977 fishery was a total bust and it was apparent that the stock collapsed.

JW: So the study was, um, that was a cooperative effort between the United States and...

GW: For the tagging?

JW: Yeah.

GW: Yeah, we also worked with the Russians--

JW: Okay.

GW: --the Soviets, at the time, so...but we...on Georges Bank we...a Soviet vessel that we'd worked with for years came into Woods Hole, we lugged...loaded small boats on, and then at night time on Georges Bank, the Soviet purse seiners saying they had herring catches, they'd communicated with the vessel that we were on and we'd lower the boats and go over there and tie up to the purse seiners and brail the fish and tag them.¹

JW: How long did that take to tag individual herring?

GW: Uh, the tagging's pretty fast, they were doing these, it's like these fabric guns that put these T-bar tags, so basically Floy tag used the same technology, so there was a little clip of tags--

JW: Oh, like rack clothing where you have the--

GW: Yeah, right, right...

JW: --the little price tag--

GW: --same, same type of thing. Yup.

JW: Okay.

GW: Right. And so you just do it in the back of the, on the dorsal fin, and so you can do it very, very rapidly, stick them in. The major problem is that herring lose their scales fast, okay, so if you're, if the boat is moving and the fish are hitting the net, they shake their scales. And so we were trying to do if we had anything that...

JW: What was the effect of that?

GW: Well, you wouldn't tag them. Once they, so we would only tag the fish that didn't lose more than 20% of the tags, which is, you eyeball and say, what's 20%, but they had a lot of ta-, scales off, we wouldn't tag them. So that was a bit controversial with the Soviets because they thought it was, that, the person I was talking to said, no, we can tag fish without scales, we've got various, success, not success, and so I was being stubborn I guess and I said, no, we can't tag, we have to stop tagging when the fish were really getting scaled. And plus the other issue was we had that inside the net we had blue sharks, a lot of blue sharks on Georges Bank at that time we had blue sharks, we had squid in the purse seine, too, and so the sharks were stirring up the fish.

JW: Eating tagged fish?

GW: Yeah, probably... No, because we would put the, the tagged fish outside the net. But, you know, it was, we're, it was very interesting because we're on a small, 20' boat, and we're tied up at a net and these sharks...

JW: And this took place at night?

¹Narrator Clarification: Foreign vessel identities during the Cold War were frequently those of Soviet bloc nations such as the Ukraine.

GW: At nighttime, yeah, yeah. And then, probably one of the more interesting parts of that whole operation, well two parts, one was that the sea men on the Russian boat, you know, they said, "oh, we can take care of the sharks." They had these like handmade harpoons they were throwing harpoons off, from the deck, into the net to hit into the sharks, you know, and we're going, okay. Now these guys are about 12' above us, we're tied onto the net at the side of the vessel.

JW: You're in the line of fire?

GW: Well, I don't know, trying, as well, I had the interpreters in my boat I'm saying, you've got to, I'm telling the interpreter, "you've got to tell these guys to stop!" You know, and so it was interesting. And then we, we, we did this for a couple of different nights. And then so, um, so we got, we got as many as, I think we got like twenty-something-thousand fish tagged, but the...

JW: Over the course of those two seasons?

GW: No, over that, that ten-day trip.

JW: Oh, okay.

GW: Yeah. Yeah. But one of the, one of the issues we had was, one, the first couple nights we're tagging, we had really good weather and we were doing really well and I talked to the captain and the commissar, they wanted to know how we were going. I said, "oh, we're doing really, really well", I said, we're, I said "if we keep tagging like this, we might get 30, 40,000 fish tagged." We had plenty of tags. And then all of a sudden, we weren't going out because the Russian purse seiners weren't catching any fish. I said, "hmm, okay, I don't know what this is all about." We saw boats fishing. There were trawlers there, everybody else was fishing, day and night, so we knew fishing was going on. Said, okay, um, so that went on a couple of days, and then we had some more discussions, I had some, because I was the Chief Scientist I had a discussion with the captain, the commissar about what was going on, I said, "well, you know", then they asked me again, I said, "well, I don't know and now we're getting close and we might not make it, the original number that we wanted to make." And so they woke us early one morning, said "oh hey, we got fish." We went outside and we looked and it was like, "my God, we can't go", it, it was like, six, seven foot seas, I was like, "we're not going." I said, "we can't go in these little boats." And he said, "oh, we have, we have it solved." So they have these large lifeboats that are enclosed, you know, they said "no, we're going to send you over in one of these things." So we said, "okay", we went over, we saw the purse seiner and, you know, we were, we had, we were really concerned about this, so we get over there, we tie up and we can't work out of this life raft they have, boat they have, so we have to climb onto the purse seiner, and then eventually, now we go to bring all the fish out of the net, so the boat is really pitching, right, because of the seas. And we start dipping the fish and it's like, no scales at all on any of these fish. So I said, "oh, we've got to quit." And the guy said, "what do you mean", their captain said, on the boat I was on, said, "what do you mean you have to quit", because, so he calls the captain of the, the vessel that was hosting us, the other vessel, and they're talking and they've got the interpreter in, and we're all having this discussion. I said, "well, there's no scales on the fish so I can't tag them, it doesn't make any sense." They said, so they weren't happy about that. And so, and to make a long story short we didn't reach the number we wanted to get originally, like 28,000, I forgot the number Vaughn Anthony had calculated, we were supposed to get. And we got back to

Woods Hole, they filed a complaint with the Science Director, said it wasn't cooperative, so I talked to Bob Edwards and he said, basically said, he goes, well, you know, you probably should've, this is a, more than just science. We had this, Nixon, I think, started this whole program with the Soviets at the time. He said, "you probably just should have tagged them."

JW: Disrupting foreign diplomacy.

GW: Right, yeah, yeah, well I was only a naive biologist, what can I... But anyway, I went on a lot of different Soviet vessels, you know, trawl surveys that we used to.

JW: What was the mortality of the de-scaled herring?

GW: Probably 100%.

JW: Okay.

GW: Yeah, yeah.

JW: So they really just had no chance at...

GW: No, no.

JW: Okay.

GW: Yeah, I don't, I don't have any research that would show that if you de-scale a fish it's going to survive. Yeah, I mean, that protects them from all kinds of infections, all kinds of stuff.

JW: Right, right. So how many other Soviet vessels did you ship with?

GW: Oh, so for the tagging stuff, I think we were on three different Soviet vessels over the years we did it. And then for the trawls, the trawl surveys that we used to do with them, I was mostly on the *Belogorsk* that was the most common vessel that they had here, although there were several different large Soviet trawlers that were part of that.

JW: Did you have relationships with the vessels, I mean, is that, I guess, how did it, how did it work in selecting what, uh, what vessel--

GW: Oh, this was all set up--

JW: --you would ship with?

GW: ...probably through the State Department and the, or the Fisheries office in the State Department and with the Science Centers and would, whatever level, whatever comparable level with the science labs in the Soviet Union. I think the lab that, the institute that we worked with in Kaliningrad, that's where most of the vessels began out of. And so that was all, it was all set up in advance and the protocols on what we were going to do, probably too, any of the surveys that have, we'd have the science meet with scientists on the Soviet vessels and captains and go through the protocols of what we were going to do.

JW: Did you get to know the Soviet crews after awhile?

GW: We did, we did, but it was, the first time I went on one of the trawl surveys, I got, there was a young biologist that I was, that I talked to. He was trying to learn English, he knew a little bit of English, and I was talking to him and we'd sit in between, in this little room they had, and sip coffee and I was trying to learn some Russian words. And so after a couple of days, the interpreter on the ship came up to me and said, "Mr. Gordon, Mr. Gordon, why is Vasily so interested in you?" I said, "what do you mean, why is he so interested in me?" "Why do you always talk to him, you know?" I said, I said, you know, why, stuff like that. And then after that, the other days on the survey, whenever him and I sat on the deck or, there was always this other person sitting next to us all the time. But, yeah, that's the way they, they operated. Unrelated to anytime I was there, there was, in early years, of this was before, I forgot what year it was, it might have been late '60s, early '70s, there was a Soviet seaman jumped off one of the Russian boats into Woods Hole Harbor.

JW: Oh, a defector.

GW: Yeah.

JW: I think Linda might have mentioned.

GW: Yeah, and see, and then, the Coast Guard, and they gave him back to the ship.

JW: Oh really?

GW: Yeah, I don't know how.

JW: He didn't make it.

GW: Yeah. The Coast Guard picked him up. I don't know how it, some diplomatic...

JW: Interesting.

GW: Interesting.

JW: So that, that I guess was an aberration of...

GW: Yeah, but, I mean, you'd have to talk to Linda but there was always interest in all the people that worked with the Soviet's vessels. You know, they had these, they always had the people that went off the ship, they always went in groups, it was, I hardly ever saw...

JW: You mean here in Woods Hole?

GW: Yeah, yeah, they would walk up town, get a ride up town, do shopping. But they would always go in groups of like three or four or whatever.

JW: Was that just to ensure that you didn't have any people that would--

GW: I, I have no idea, yeah.

JW: --try to jump ship?

GW: We, we could interpret it. [laughs] But, yeah, so, it always, to me it was always, they were always worried about we would try to encourage people to leave and stuff like that. You know, that wasn't, I don't, I don't know of anyone that ever went on as, any American that went over that were trying to talk a Russian into jumping ship. We already knew from what the Science Directors and stuff told us that, you know, don't even go down that path of discussions, you know, so, I don't know anyone that would try that. But that's, that's just the way they operated. Interestingly, when, in the 1980s when we started to work with the mackerel, we worked with a Polish vessel and we didn't know what was going to happen with this *Admiral Arciszewski* was the first large Polish vessel coming to work on this mackerel project because the vessel had left Poland, I think, right before the martial law was declared. And the ship arrived in Boston; Boston has a large Polish-American community. And...

JW: I guess this is during the Solidarity Movement--

GW: Right, right.

JW: --in Poland?

GW: Right. Yeah, and so the ship tied up in Boston, you know, people from the Polish community talked to the men, and, I don't know, they lost so many men off the ship, that we couldn't start the...start the survey.

JW: Really?

GW: We had to wait. But it wasn't like...

JW: Till they got a new crew?

GW: Yeah, yeah, but it wasn't like, it was interesting because, well, the guys left, okay, so, you know, I didn't get the sense that anyone on the ship was, like, paranoid about what us talking to any of the new Polish... They were fine, there were pretty open discussions, I talked to a lot of them spoke pretty good English, so, it was different. Thinking, I guess, you know, in my mind at that time, thinking, East Bloc countries, they're all East Bloc, they all operate, but, after I started working with Polish vessels and East German vessels, I realized that they're all, there's a lot of independence within the science, scientists that we dealt with.

JW: Interesting.

GW: Yeah.

JW: Well, it's fascinating hearing about the science playing out against the Cold War backdrop here. It sounds like there was a lot of free exchange of knowledge and ideas.

GW: Yeah, yeah, they, you know, like I said, on the Polish and East German boats they were, it was a lot easier to talk to people; they seemed to be more, you know, could talk about anything, no one seemed to get upset about it. You know, they may have had people on board, I mean, I know, I know on the East German vessels--

JW: Just general conversation--

GW: Yeah.

JW: --not just scientific.

GW: Right, but I know also, on the East German boat they, they'd say "oh, these people are members, these guys are members of the Communist Party" and some, whether they all were or weren't I don't know. But, you know, it was a more relaxed atmosphere on the Polish boats and on the East German boats. Yeah. I mean, it could have been on the Soviet boats. I, I think maybe that whole incident, whatever, changed their mindset, I don't know. But yeah, it was an interesting period of time.

JW: How did you spend your downtime aboard ship, when you, when you weren't working?

GW: Well, it depends. Sometimes you just sit around, go in someone's room, maybe one of the Soviet scientists would invite people into their room, we'd sit around. If they had vodka, we'd have a glass of vodka, or not. You know, on the, on the foreign, on all of the foreign vessels they, alcohol was not a restricted issue. And they had it differently, so on Soviet vessels, you know, sometimes one of the scientists would have a bottle of vodka, you know, the first couple days they drank it, that was it. And then it mostly...

JW: It didn't last long.

GW: No. No, it was mostly served after, you'd have tea or coffee in the evening, sit around and just talk about stuff. But it was, it was, no politics talk, it was more about just, it was always a lot of conversation about U.S./Soviet friendship and maybe the Olympics, stuff like that. And I was on, , one of the vessels I was on was right in, I think it, we went on the survey right after the U.S. boycott of the 1980 Olympics because that's when the Soviets went into Afghanistan.

JW: Right, right.

GW: Yeah, so that was... you know.

JW: Was there a little more tension then?

GW: Well, you get comments sometimes, you know, "why did, why did, why did the U.S. not want to go to Russia, or Soviet Union", stuff like that. And it's like, but it wasn't, it wasn't like sitting around and having a big debate about it. It was sort of one of those comments that they were, they're trying to get some ideas of how other Americans may have felt about that. But, uh, on the Polish vessels and on the, all the, both East German and West German that we worked on, they had, they, you could purchase, or they'd give you beer if you wanted. So it was, but, it was so, such a relaxed atmosphere that no one like, no one sat around and drank, it wasn't like, oh, we're sitting around drinking all day. It was, we get the work done and then in the evening if you wanted to have a beer, something, people, and the same thing, different members of the scientific party would invite you to their rooms, sometimes the captain invite everybody to their room, stuff like that, to play, you know, might play cards, things, do other stuff. Ping-Pong, I played Ping-Pong on a vessel once, that was kind of interesting.

JW: Must have been a challenge with the pitching and rocking of the, uh--

GW: Yeah, well, they were big ships.

JW: --vessel.

GW: Yeah, but still, it was a challenge, but big ships. And sometimes they'd, and then they'd have like, on all the vessels they would have like little birthday celebrations for, particularly if it was one of the, the Americans on the vessel had a birthday, they would, they'd have, they would have a little party for an American scientist. Yeah, it was pretty exciting times, you know, it was mostly, like I said, most of the vessels that we worked with were looking at herring, not mackerel, fisheries. But, but the trawl fisheries multi, it was a multi species, sort of like, supplement to our fisheries, the *Belogorsk* which was the vessel we used to work with a lot from the Soviet Union, we did a lot of gear comparison work with their vessel.

JW: What did that entail?

GW: Well, different, uh, we had two different trawl, we were looking at using the different trawl on the *Albatross*, a little bigger trawl. We used to use the research Yankee trawl, then they had the 41 trawl, which was a bigger bottom trawl. So basically you go out to an area, both the *Albatross* and the, and the *Belogorsk* fish in the same area, and do day/night towing with each trawl, you run a series of tows with one trawl and then a series of tows with the other trawl in the same area. Then, basically, the, after all the data processed, the statistician would go through and try and look at the catchability of the two different trawls and see what the differences were.

JW: What did the numbers in the trawl names designate?

GW: Uh, not sure. I think it's the model, you know.

JW: Okay.

GW: Yankee 36, we used to call it, I think it was the Yankee 36 trawl and the modified 41 trawl.

JW: Interesting.

GW: Yeah. And then, so when we went to using the 41 trawl for a number of years, basically what we did was, what the statistician did, then we had the conversion fact of, okay, we also had a day/night conversion factors for different trawls for converting species catch rates. So that all went into the analysis of, how the survey data goes into the assessments.

JW: So how did, how did the establishment of the 200 mile limit then change things in 1976?

GW: Well, obviously--

JW: Did it alter--

GW: It obviously ended--

JW: --international cooperation at all?

GW: Um, well there was, there was no, well, there was no longer any commercial fishing going on, unregulated commercial fishing going on.

JW: Right.

GW: At the, and we, and basically the people in the Population Dynamics Branch and other groups who were also working on it, had to develop all of these preliminary stock assessment plans for the Councils that were all new also. You had new governance structure and trying to look at how you allocate the resources to the U.S. fleet, and plus you had prior to the 200 mile limit, basically we had U.S. vessels that fished in what now became Canadian waters.

JW: Right.

GW: And vice versa with different things, right? And so, our Center put up a lot of effort into looking at the biological data, fish, a bunch of other things, and the court case, to determine whether the boundary line was... for the U.S.

JW: Right, right. That was finally decided in 1984.

GW: Yeah.

JW: In The Hague.

GW: At The Hague. Yeah. And unfortunately, you know, that eastern end of Georges Bank became part of the Canadian EEZ [Exclusive Economic Zone], the, the some...

JW: That was the compromise?

GW: Yeah. Yeah. So. So basically after that, one of the things that happened is, the U.S. fishery expanded, was a lot, there was, I think people expected that, and then all these foreign nationals were out of here, there was this large resource, but, the stocks, at that time, were in low status from all of the prior heavy fishing from everyone. So, the whole thing with the Management Councils, was different so, we were still doing the stock assessments, for instance the herring stock assessments, we were, we were still working with the Canadians on the herring stock assessments because they were these trans-boundaries, not only, they were trans-boundary stocks, we knew there was some movement between them, and we had that tagging data so that helped look at some aspects of that movement between them. And so there was other stocks like that too that were, like mackerel stock, it moves north in the spring, summer. The two components of the mackerel stock were in Canadian waters part of the year, and then in the U.S. waters, so it was a lot going on with the U.S. and Canada too, so they established all these bilaterals with Canada and scientific working groups to look at joint stock assessments. It still goes on with some species, they do joint stock assessment even though they're managed in U.S. and Canadian waters differently. Uh, so the, but the other vessels, the vessels that, after 1976, the vessels, foreign vessels that wanted to fish, had to fish under special licenses, and so at that time, I think the only ones that were fishing were Japanese and Spanish and, there might have been another country, but the Japanese and the Spanish vessels were interested in squid and butterfish.

JW: How were they restricted by the permits?

GW: Well, they had, they had quotas they were given, total allowable catch--

JW: Okay.

GW: --that was assigned to them. And we had, had a 100% observer coverage on those vessels.

JW: So American observers who would ship aboard--

GW: Right.

JW: --the, uh, the vessels for the duration of the voyage.

GW: Yeah, well they would, yeah, they would, well they would, the observers would go out for, I think they had, like three week trips, maybe a little, maybe four, some, on the Japanese longline vessels they may have been longer trips. So that was how that was monitored. And so we were collecting data from those vessels on their catches. And the, on the domestic vessels, we didn't, at that, when it first went to 200 miles we didn't, I don't recall, we had, we didn't, we had the domestic sea sampling program wasn't established yet. And we used to go out as, um, on the vessels, as sort of a, through contacts at the Councils or whatever, and with different fishing vessels that were concerned about some of our assessments, and so they said, send biologists out on our boats, so we used to go out on some of the boats fishing for flat fish, fishing for butterfish, fishing for other species. But that was all Center people, pretty much, that were doing that for, until the domestic, or the sea sampling program was established.

JW: So did the, I guess what effect did the establishment of the 200 mile limit and the Fishery Management Councils have on the organization at the Center here?

GW: Um...

JW: If any.

GW: Oh I'm sure it did, I don't, basically the, had to interact with the, both Councils so Councils would, would have requests come in through some protocol to ask for data on a particular stock, ask for assessment of state, we used to have, Vaughn set up the Stock Assessment Review Program we had, where basically the Council would, people would come down, they would, we'd, each of the scientists and the, that were responsible for a particular species would give an oral presentation of the stock assessment. That would be discussed, recommendations for revisions and stuff like that, and then the stock assessment would be revised and then that would be given to the Council. There was a bunch of steps in between, people had to sign off on these things. So that's how the process, that's how the process worked, evolved. It took awhile to get it to where it is, you know, now. The first, first few years of figuring out what the best way, structure of these workshops and stuff like that. And, you know, then the Center has people on working groups with the Council, they do specific tasks, look at effort, look at habitat, things of that nature. It's changed quite a bit, so, we still, the Center's still involved in international fishery work groups through ICES [International Council for the Exploration of the Sea] and through NAFO [Northwest Atlantic Fisheries Organization], stuff like that.

JW: NAFO which was formerly ICNAF--

GW: Yup, right.

JW: --prior to 1978?

GW: Yeah, I think that's right--

JW: '79, somewhere?

GW: --I think that's when they switched over, yeah.

JW: Yeah.

GW: Yeah, yeah. So...

JW: And then the fishery management plans themselves emerged in the years following the passage of the

GW: Right.

JW: --the Fishery Conservation--

GW: Yeah the first thing, the first thing--

JW: --Management Act.

GW: --we had to do was to get preliminary fishery management plans to have something in place. That's what a lot of us in the Population Dynamics Group and the Survey Group were working on right after that whole, after the limit was established and the Councils were being formulated to have something--

JW: Right.

GW: --to try and manage the different fisheries, what was going on.

JW: What were the challenges of creating the first fishery management plans?

GW: Uh, I think it was just restructuring projections also. We had, before you had data from many countries coming in, okay? Now you don't have that data source anymore, good or bad. And so your surveys are even though important, now they're even more important because that's your independent source of information on the fish stocks. And trying to obtain data from the domestic vessels, how do you get that data? There was no, like I said, there was no, in the early years there was no large-scale observer program. So at that time we were relying, we had a, what's it called, port agents in different ports on the coast. They would sample boats that came in dockside. And so we, we had those data and working to get assessments and, for a small-scale...

JW: So that was the data from surveys made by the *Albatross IV*?

GW: The *Albatross IV*, yeah, mostly *Albatross*. Some *Delaware*.

JW: Okay.

GW: The *Delaware* was doing the shellfish surveys; scallop, clam surveys and stuff like that. Some of the, we worked with commercial vessels for some of the other, quahogs surveys. Yeah. I think it was just a matter of now, we're responsible as a unit, as an individual country, to handle all the stuff...or a region, and you don't have all of this other scientific input whether good or bad, but now you've basically lost, probably some of the other expertise from around the world looking at fish stocks and trying to understand what's happening.

JW: So when did the, when did the Protected Species Group emerge? Because eventually, if I recall from our conversation earlier, you made a transition--

GW: Right.

JW: --then from Population Dynamics--

GW: Right.

JW: --to, uh...

GW: So the, there was a large program that was started by the Minerals Management Service funded a program at the University of Rhode Island in the late '70s. It was called the Cetacean and Turtle Assessment Program. Because at that time there was some expectation that they might do some oil and gas exploration activity off the U.S. Atlantic coast. And so this program that was run by the University of Rhode Island, used aerial platform, ship platforms, to collect data on marine mammals, sea turtles...so that was a pretty major program. At the...the Center was also...I think in the 1980s, was getting funding from Congress to support marine mammal research on the East Coast. I forgot when the National Marine Laboratory was formed...most of the...I don't believe the...my understanding is that most of the work that the National Marine Laboratory was doing was on the West Coast and not on the East Coast.

So there were...the people who were studying marine mammals on the East Coast were able to work with the Marine Mammal Commission, they had two workshops in Boston, New England Aquarium, and laid out what was needed for different taxonomic groups, either seals or right whales or humpback whales. And the Center was using the money, I think it was like \$250,000 to fund some of those projects. The person who was handling those projects here at the Center retired and then Mike Sissenwine at that time was the Chief of the Population Dynamics Branch. And so he was looking for someone wanted to learn about contracts to handle these research contracts, so I said, I thought it sounded interesting, a little different, so I volunteered to take on that project. And so over the years, that was all we're still doing. We were just funding different research, we weren't really doing anything ourselves, we had no direct, other than collecting the carcasses from the foreign vessels, stuff like that, we weren't really doing anything...then the...on the West Coast, the Japanese intercept fishery was taking marine mammals, I think it was Dall's porpoises[that were] the big issue, and the American salmon netters and NGOs [Non-Governmental Organizations] basically formed a coalition, sued the Department of Commerce. Department of Commerce lost the lawsuit, so

that basically ended the general permit or...they allowed the issue to foreigners, and [the] U.S.² I forgot what the two different names were...so once that decision was made, Congress had to do something if they weren't [to] allow U.S. boats or anybody else to have marine mammals, because now that was the rule that the agency was using at the time to estimate how many animals could safely...be biologically safe to take, was ruled to be incomplete.

JW: What had the Japanese been targeting?

GW: They were, they had salmon.

JW: Okay.

GW: They were, had a driftnet, driftnet fishery for salmon, intercept salmon. Yeah.

JW: Right.

GW: That was one of them, one of the fisheries. But.

JW: Yup.

GW: But they were taking dolphins, porpoises, other marine mammals in those high seas fisheries they had. So when Congress revised the Marine Mammal Protection Act and they had to, they put in this five year moratorium in place, I think it was in 1987, at that time, the requirements within that framework for what had to be done to develop marine mammal stock assessments, to come up with some scientific basis for allocation of bycatch and various other things, so Congress put a lot of money into the Marine Mammal Program.³ So at that time, Tim Smith, who had come to the laboratory on a sabbatical to write a book on the history of fishing, also subsequently became the head of the Population Dynamics Branch. So the Center Director at that time, Allen Peterson, you know, asked him now to form a marine mammal group, because Tim had expertise-

JW: Yup.

GW: --in that. And so Tim formed a mammal group and then he said, "well, what do you want to do? Do you want to stay in fish or do you want to come over to mammals?" And since I was already doing this contract stuff and got to know a lot of marine mammal people on the East Coast and saw a lot more opportunities to do marine mammal work, so I moved over into that group. There were a couple people at the Center at the time were in different components of the fish groups and they moved over. And so that's when we started the group.

JW: And what was your role when you first became a part of the group?

GW: Well, I was still doing, handling all of the contracts that we did. And the second component was to sort of be the Center representative to this NOAA-wide, Science Center-

²Narrator Clarification: The lawsuit to which Gordon Waring refers is the 1987 case of Kokechik Fishermen's Association, et al. V. Secretary of Commerce in which plaintiffs argued that the issuance of an incidental take permit to the Federation of Japan Salmon Fisheries Cooperative Association would be in violation of the Marine Mammal Protection Act.

³The Marine Mammal Program, originally known as the "Marine Mammal Investigation," was started in 1990 and later became the Protected Species Branch.

wide group that were developing the framework for the stock assessment reports. A lot of our workshops were held on the West Coast and the, people on the West Coast like Paul Wade and Barbara Taylor in La Jolla, they were developing different types of modeling approaches to figure out what's the best way to do this whole algorithm, which is the PBR [potential biological removal] algorithm. And so the people in the Science Centers gave their input what the issues were, what the fisheries bycatch, what the species were. So once that, all that went through, the other aspects of the thing was the funding from Headquarters for marine mammal research. And so I participated in those working on the, helping develop our funding proposals for different stocks that we wanted to study, or species groups. And going to the workshops that Headquarters hosted, they were basically peer-reviewed among the Centers, scored and ranked, to see who would get what funding for what projects. And then from that point on, we started actually doing our own marine mammal surveys, both ship board and aerial surveys.

JW: Were there fisheries of particular concern?

GW: Uh, for bycatch, the biggest one was the ground fish gill net and harbor porpoise, okay, under this contract stuff that we were, I was handling before, we had funded some small-scale projects, co-funded with the Commission, the New England Aquarium, looking at bycatch of harbor porpoise. Also the University of Maine was doing, putting people on some fishing boats to look at the bycatch of species in the Gulf of Maine; seals and harbor porpoise. But the major concern was harbor porpoise. Given the estimated numbers that were being bycaught and compared to work that was already going on in Atlantic Canada and on the West Coast and in other areas where harbor porpoise were, were being hit pretty hard by these set-net fisheries.

JW: During what years was the harbor porpoise issue of, sort of, primary concern?

GW: Uh, I have to say, probably in the late '80s... But it's always been a concern because...

JW: Okay.

GW: Once, Debbie Palka who was responsible for doing the stock assessment of the harbor porpoise, and she directed, designed the aerial and ship board surveys of that species, looking at what they, the PBR, but also she was doing a lot of the bycatch analysis at that time for harbor porpoise, looking at the, looking at stuff across the fleets. We had observers on vessels at that time and so we were getting a lot of data. And, but it was, it was pretty clear from those data that the bycatch rate was exceeding PBR and so that's when they started the first, harbor porpoise was the first take reduction team in the Northeast region, yeah, Debbie had, Debbie and some of the people from the group, our group, were involved in that, developing protocols working with industry and everybody trying to come up with some ideas, you know, the whole thing with the pingers...

JW: When did the pinger come into use?

GW: Oh, I would say, I think in the early '90s, maybe even before that. I don't know exactly, but the, there was clear evidence that the pingers were working, that they would work if the fishermen had them on there, and they had the right numbers on them, so, you know, there was an evolution and process there of making sure that they had the right frequency and things of that nature, that they weren't attracting animals. You know, there were people

doing, on the West Coast, and they were doing studies trying to look at animal response to pingers.

JW: Did the device originate from government research or from the private sector?

GW: I think that, well, it was probably a combination of government and NGOs funded stuff. There was a lot of work done in, in Europe, I think it was Denmark, they were doing a lot of work on, in certain areas, with looking at harbor porpoise bycatch trying to do things. Canada was doing some work. So a lot of, it was going on in a lot of places, of trying to...

JW: So it was more of a cooperative effort to come up with something that would work in this capacity?

GW: Well, it was cooperative in the sense that they had, um, through international, of small station working groups, people would go through those to, Debbie was an active member of that and all the NMFS people with different Centers also involved in that. So, harbor porpoise work was a major concerns for small cetaceans, that was the largest one. You know, for the larger whales, it was obviously right whales and humpback whales were the big issues. But the...

JW: So how frequently did the aerial and ship board surveys run?

GW: So we, the original schedule was to, a three year schedule we tried, was the, we started with a harbor porpoise survey, then we were doing, um, we were doing a cetacean survey. A cetacean survey, so the harbor porpoise survey was very focused; it was in the mid, the eastern section of the Gulf of Maine, up along the Canadian coast, it wasn't out very far. As the survey developed and Debbie started looking for data and the some of the stuff that New England Aquarium had already done, they had really, pretty good information on the temperature, depth profiles, that the harbor porpoise would use so they could help design the surveys, and so that was, the region was very well confined. When we saw that the offshore surveys in 1991, we were basically working from about the hundred fathom line out as far as we could do so, saw tooth survey, then it got expanded with the, we had two parts, with the aerial component. The aerial component would do the shelf and the ship would do the offshore part. The, you just couldn't get an aerial platform that could fly all the way out and back and do, and be effective in doing it, so it was a combination survey. And then the third part was the harbor seal survey, which was an aerial survey during the pupping season which was late May, June, along the entire coast of Maine. So in the early years, we got one complete cycle like that. But over time, the harbor porpoise issue was still pretty high profile and so we were actually doing more...

JW: In terms of public attention?

GW: In terms of, yeah, well, the public NGOs and stuff, people were paying attention to the issues, the bycatch, the stakeholders. And so we were doing more frequent harbor porpoise surveys. We, after 2001, we didn't do another harbor seal survey until 2012. A long hiatus there. Offshore surveys were actually being expanded, the ship and aerial surveys, because of a couple things. The bycatch of the drift-net fishery that was in operation for a number of years, and it was a pelagic drift-net fishery that was taking large numbers of marine mammals, particularly beaked whales, which we knew nothing about, very elusive species, no idea what the stock structure was, what the populations were. We had very low sighting

reads on surveys for beaked whales. So there was a lot of concern about the beaked whales and so part of one of the surveys that we actually did was, this vessel that we used to use a lot for our marine mammal surveys, the *Abel-J*, which we chartered, was a totally silent vessel. But we used that to go out and sample...we made arrangements with some of the drift-net fishermen to actually get the beaked whales as they were bringing them up...bycatch. And so they got these, the beaked whales, on the research platform, they did complete necropsies on them, got all kinds of samples, so...trying to understand what the species were. Because we haven't, you know, we didn't, identification was still a major issue--

JW: Interesting.

GW: --for those. And then the other species that were being taken, there was a pelagic pair trawl fishery that was going on; it was an experimental fishery. They were taking smaller cetaceans. The drift-net fishery was taking lots of common dolphins and some other species. And so out of that formed this offshore take reduction team that was, these take reduction teams there was a large whale one, I mean, they sort of spun off on what was perceived as the major issues with the bycatch. The, so the offshore team met, had drafted plans, and everything else like that, but the components of that fishery, the players in that fishery, were, they were, sort of battling with each other for a quota, so it was the pelagic long line fishery, the driftnet fishery and the, and then pelagic pair trawl, the experimental pair trawl fishery. So the, I forgot what the exact sequence was, but the, because of the bycatch and the, um, the pair trawl, pelagic pair trawl fishery, and not only for the marine mammals but also for other species, fish species that were part of that, they didn't allow that experimental fishery to become a fishery. So that ended that fishery. And then the drift net fishery, that was a, sort of a global thing about drift net fishery, you know so.

JW: What were they targeting, primarily?

GW: Um, they were tuna and swordfish. Yeah. So, so they fish really along that, and then longline fishery also had some bycatch too, particularly, their interactions were particularly with pilot whales. So each fishery had some different cetacean groups that were involved with it.

JW: So then would the take reduction team generate recommendations as to how to reduce bycatch there,--

GW: Right.

JW: --courses of action that the industry could take?

GW: Yup. Yup. Looked at it from different, looking at what the bycatch was, the seasonality, and there was a variety of schemes that came up. One was to maybe shift some of the fishing effort different seasons, different components or it. But as I said, the, the three fisheries, they were not basically, I mean they were at the table because they had to be, right? They wanted to be. But they weren't necessarily... You know, they were also in competition for quota too from NMFS, or, I forgot what the, the one that handles the large pelagic fish work, stuff like that. So. But the NGOs were like, really relative, some of the bycatch stuff going on in the drift net fishery and the experimental pelagic trawl fishery.

JW: Which NGOs played the greatest roles in the, the conversation?

GW: Uh, I'd say, probably Humane Society. This was the Humane Society, U.S., but there were other groups, there was a variety of stakeholders at the table. I would have to look at who was on the different groups, on the different teams at the time. I mean, we had people from the Science Center and Regional Office. I think we also had people from the Southeast Science Center and Regional Office on the team. And then there were, there may have been some state people on them and then commercial fishing and then NGOs that were on the team.

JW: Okay.

GW: But, yeah, Humane Society...

JW: What was the relationship like between the Center and, and those industry participants during.--

GW: I had, well, you know--

JW: --during this time?

GW: --I think the Center scientists tried to, for the most part, be neutral, I mean, never trying to side up with anyone in particular. We had, we presented the data--

JW: Right, right.

GW: --we presented what the surveys had shown, we presented what we knew from the observer programs, we looked at different strategies. If you shifted something around, basically we could with the data we had, stuff like that.

JW: I know it can be contentious though.

GW: Yeah.

JW: Between the regulatory scientific community and the fishing industry--

GW: Right.

JW: --sometimes. I was just curious about, you know, what, what that atmosphere was like.

GW: Well, you know, well, okay, so if you have a take reduction team, you have people on this, so you have some NGOs, and I mean, the Science Center is trying to develop ways to mitigate the bycatch and it has to be a consensus thing, so I mean, under the way it was revised, you know, one of the things is that you could, cannot be a, a, I might be describing it wrong, but it was not supposed to be detrimental, in other words, shutting down fisheries, that wasn't the idea of this whole process. To allow fisheries to operate with minimal impact on marine mammal, wild marine mammal stocks to meet their optimum sustainable population levels. But it wasn't, the biggest thing to try and get across to people, particularly some people in the fishing industry, this wasn't a quota, PBR isn't a quota. That's not, that's not like if PBR was a 100 pilot whales it doesn't mean that's fine, you know, because there's whole steps to bring down reduce, the whole process to reduce the bycatch.

JW: And what did PBR stand for again?

GW: Oh, the Potential Biological Removal. Yeah. And so there was a whole process to bring the bycatch down and then monitoring it with the observer program to see in fact is it stable. And the survey data, surveys given the frequency we're doing surveys, some of the CVs for some species, because they're rarely seen are real high, and so you don't have a lot of confidence in their numbers. The beaked whales, again, a good example. We don't, it's really, really super hard to identify beaked whales at sea visually; they're really low profile, they don't surface very long. Aerial surveys, offshore, again, we don't go way offshore with the aerial surveys, so you've got like the deep water species like the beaked whales and the sperm whales, they're in deep water. Really have to rely on the ship survey data, as far as the aerial, no, not, less so on the aerial survey data. So there's very little, very small geographic window where those overlap enough that the, you might pick up beaked whales with aerial surveys. So the, basically NGOs are saying, "well, the numbers of some of these fisheries are just totally unacceptable", it's not, it was not unusual to hear NGOs say, "well, okay, well, NMFS isn't, we've sent letters and if NMFS doesn't go forward, we're going to sue NMFS." I mean, I don't know how many lawsuits NMFS gets...

JW: I was just going to ask, how many, how many times did they--

GW: I have, I have no idea--

JW: --litigate.

GW: --I have no idea, I mean, I, I've seen this, a lot of times at those things, some is saying that they're going to sue NMFS about this or about that, sort of an expected, it hasn't, we don't respond to that because that's not our job. Regional Office people can respond to that if they want, but we've had people from Headquarters on these teams, but yeah, that's what they're saying. And the industry has their point of view.

JW: Right.

GW: But, um, I say, I've only been on, I've only participated in that one take reduction team, but I know the, there's really strong feelings on both sides of the table.

JW: I imagine.

GW: About, about the bycatch. And so once the, all the drift net fisheries were shut down, pelagic drift net fisheries shut down, basically they, they said, "well, now we won't plan anymore because two of the three fisheries are out of here." And the bycatch in the pelagic long line fishery was more of an issue with turtles. It wasn't marine mammals. Because I mean, marine mammals, there's still the issue with pilot whales particularly, but otherwise, and that program is already under the observer monitor through the Southeast Fisheries Science Center which handles the pelagic long line fishery monitoring and stuff, so.

JW: So did the other Science Centers around the nation also employ the same survey strategies?

GW: I think it was different, okay? They had, I think the, in the Southwest Fisheries Science Center, they had, they had a harbor porpoise specific surveys, then they have shelf cetacean

surveys, then they had offshore, deep-water, plus they also were doing the ETP surveys, Eastern Tropical Pacific surveys that were run out of the La Jolla Lab. Yeah, so totally different. And in the Northwest they had different things. They did like, probably La Jolla, but also in the Northwest, they also put more funding and more surveys on pinnipeds. Pinnipeds, in the West Coast, had a higher survey, or higher research priority than we've had here on the East Coast. You know, as I said, we have one survey in ten year, ten year window. And the way the stock assessment PBR process works, once the data are eight years old they, you don't even report them anymore. They fall off the chart, so you have no estimate, so you can't develop a PBR because you have no population estimate. But the issue on the East Coast with seals was the perception that the seals population were increasing, the gray seals in particular re-colonized this area from being a rare species in New England, after being extirpated by bounty programs, to a population that now is, that's the only seal the fishermen see in their eyes. Their nemesis as well. You know, if you go on the outer Cape, say in Monomoy, there you can, you see 10 or 20,000 seals lined up on a beach, you know, it's a, it's a...

JW: It's quite a visual.

GW: It's quite a visual, yeah, yeah, and all, when you look at those seals, the seals look twice the size of the harbor seals. They all look pretty healthy and we talk about, we do, we've been doing surveys for a number of years trying to monitor the pup, the pupping colonies, and they hear about how many pups are being born a year, there's the stakeholders, there are a lot of stakeholders that are opposed to the fact that you can't move or do anything or control, but they use different words, but...

JW: Yeah, yeah.

GW: In Nantucket, in Nantucket they formed a seal abatement coalition that was started primarily by recreational fishermen because the gray seals are basically sitting on the areas where the fishermen like to fish in the autumn--

JW: Stealing their catch?

GW: --for striped bass, stuff like that, taking the catch, so the commercial fishermen are talking about gray seals, they are basically devastating fishing grounds, that they basically have to move and they can fish and then all of a sudden, the seal will show up and they just give up and they move somewhere else, have to change every year.

JW: So they're not talking about it as a success of the Marine Mammal Protection Act necessarily...[laughs]

GW: No, no they keep asking, how many is enough. They sent out, the seal abatement coalition, although they changed the name subsequently. When we were doing seal capture work I met some of the, well we met with them in a formal meeting, but then, I was doing, over there, I was doing capture work I met with a couple of the principal of that, and I was jokingly, over breakfast with them I said, "well, you know, the word abatement is kind of a, you wonder why people might not be very..."

JW: A little politically charged?

GW: Charged, yeah. So they changed it, I forgot what they changed it to. But, you know, still this same idea, they think there's too many gray seals and we're not doing anything and we're supposed to be doing, you know, ecosystem work, how come we're not concerned about that part of the ecosystem.

JW: What do you foresee in terms of how the, this ongoing dialogue about the expanding seal population, you know, develops?

GW: Uh, well, from, from the legislative part of it, if there was going to be any kind of change, Congress has to do that. But I don't, I don't see that, you know. I do volunteer work now with the Park Service, I go to the haul outs that form, these bars form in the summer, spring and summer...

JW: Out on the National Seashore?

GW: Yeah. Hundreds of seals there. And I engage myself with the public. A couple of people down there, we just try to keep the people from chasing the seals off the bars and not go swimming in the water with them. And...

JW: So it's a lot of outreach work.

GW: Yeah, but it's very interesting, because people from all over the world go to the National Seashore, you know, and some people are just amazed that they can be this close to this many animals, you know? And other people come up to you and go, "is that enough? Or, how many fish are they eating a day? You know, or, you know, they're destroying all the resources. Or they're polluting all the beaches, all the water."

JW: What do you normally say to people that have that combative mentality? Is there a way to diffuse the--

GW: Well, I try and--

JW: --situation?

GW: --I try it by, so they say, "they're eating all the fish." I go "well, they eat a lot of fish. You can see how nice and fat and happy these seals are." But there's, you know, are you talking about codfish? They go, "yeah." I go, "well, there's no data says, shows that these are specifically targeting one species. None of the data we have from anything." And this, I says, this same, I said, I say, "well listen, the Department of Fisheries and Oceans, they've been, they've had major projects on gray seals, you know, looking at gray seal impact on recovery of the cod populations and gray seal impact on a lot of other things up in Canada, you know, they, they collect live animals that they shoot and all kinds of data that they collect, and all of this, all the work they do, there's no clear evidence that."

JW: So they're doing a lot of stomach sampling work up there?

GW: They're doing a lot of, yeah, yeah, because they, they don't have, their regulations for marine mammals are different, so they can hire hunters to go shoot mammals and then they bring them back in and they process the animals or they can do other things, you know, other, they're allowed to do. So we rely on bycaught animals for our stomach data, the big problem

is the bycaught animals that we get are mostly yearlings, from the other studies that we worked on, most surveys, and from the stuff we do with other, other NGOs, cooperative work we do, because the seal program was basically a collaborative program. Any of the work we've done with seals would never have been accomplished without all the partners we worked with. But they...

JW: What are some of those partners?

GW: There's, okay, the Center for Coastal Studies, International Fund for Animal Welfare, um, the Riverhead Foundation, so a lot of the people that help us do the biological sampling on the animals are people that work in rehab facilities--

JW: Yeah.

GW: --a lot of people involved in training facilities. We work with the Department of Fisheries and Oceans, depending on the capture work we do. They'll send people down and help us do the capture work and the sampling.

JW: Do you work with the National Marine Life Center over in Buzzard's Bay?

GW: Yup. Yup. They have, uh, they have samples, will come out on some of the projects with us. The, in the last couple of years, researchers at MIT, at Jonathan Runstadler's lab, on Influenza A virus in gray seals populations, so they have a large National Science Foundation and other grants, and so basically we partner with them, we had the permit to do all the captures and sampling. We have the expertise, we have people, we have the boats, we have the special use or permits with the refuge, Monomoy National Wildlife Refuge, and also with the Park Service. So with those, we're able to obtain access to the lighthouse, the house on Monomoy to the work, the people stay out there in the wintertime we do gray seal. But the MIT program they provided, they bring all the food for the whole sampling field work. They just bring all the food. They pay for all supplies, they, Headquarters provides us with all of the, some of the biological sampling kits we need, from alcohol or betadine, or syringes. And then the people from these other facilities that, they're not being paid, we don't, all we do is, what small budget we're able to recover salaries for some people. And so with this collaborative nature, everybody get samples, everybody supports a large, broad research program on seals, and so it works very well, you know. And it's been going on for several years now, you know. The other place, the other place we work is on Muskeget Island, which is the largest gray seal pupping colony.

JW: Oh, really?

GW: Yeah. But that's a privately owned island. Most of the island is owned by the Snow, Crocker Snow, his family, and so for that one we have to, you know, work with Crocker to get on the island, but Crocker is also one of the seal abatement...

JW: Oh.

GW: He has really strong--

JW: So that complicates things.

GW: --he has really strong feelings about gray seals. He just self-published a book on Muskeget Island and it's interesting reading, throughout the book he has very strong points to make about, about what the gray seals are doing to the island. And, and the gray seals that basically removed all the fish and he's very opinionated about what's happening out there. But, you know, I mean, if you look at the history of this whole area, we've extirpated bird species, seals used to be an important component given the fact that the seal parts found in Indian middens, historically were here...

JW: Right, right.

GW: You know, we removed them from the area, and, and...

JW: Like to so many species.

GW: Yeah, and so people saying well, you know, this, they're invasive. I said, "well they can't be invasive, they were here before us." Invasive is species that have never been here before, they came, some--

JW: That's not the best argument.

GW: --somewhere else. But, you know, so, you know, from, Nantucket has a really important tourist industry and part of that, one of the components of that is recreational fishermen that come for fishing striped bass and blue fish and--

JW: Right, off Great Point and uh, yeah

GW: So they want to be there, okay, Great Point's part of the National Wildlife Refuge now, a small piece of that.

JW: Oh, it is?

GW: Yeah, it's very complicated because the Trustees of Reservation, what it's called in Nantucket, that--

JW: Yeah...

GW: --have conservation--

JW: --the trustees.

GW: Yeah. And so, now there's all this, and so this little point that the refuge operates, they have restrictions on it for birds, nesting birds, so fishermen can't go out there. Then NMFS is responsible for the, not so much for what the seals are doing there but responsible that people don't harass or deliberately harass the seals there.

JW: Right.

GW: So but the fact that the seals are impacting the recreational fishermen to whatever extent, I mean, we know it happens, but how much, we don't know. When Mike Simpkins and I and people from the Regional Office met with the abatement committee several years

back. We had some discussions about this, they said "well, why can't we just, why can't you just move some of those animals?" I said, "where are you going to move them to?" I said, "the biggest gray seal population in the world is in Atlantic Canada, right? And that's where these animals that we have, that have colonized, came from, from Sable Island population and the Gulf of St. Lawrence population, based on genetic studies of sampling pups born on Muskeget and Monomoy." And so, so we know some of these animals, we've seen branded animals that were branded in Canada come down here. We know some of the animals, that we see have tags, other electronic tags from Canada. We know some of our animals based on tagging go to Canada. I said, "these animals, you can't, were are you going to translocate them? The furthest, you can't bring animals into Canada, you can't go across the boundary and say, oh, I'm dropping off a few seals here." That's illegal, "so what if we brought them to Eastport, if we brought all the seals, the gray seals, brought a bunch of gray seals to Eastport, as far east as we can go", but then, I said, "they'll be back here in a few days. These animals have site, have site fidelity, they like an area", I said, "seals use habitat because two reasons, either for pupping season or for feeding. And if, at Great Point is, obviously it's a, the way the topography is, fish run through there because it's a run."

JW: Right, a huge tide rip.

GW: Yeah. Yeah. I said...

JW: Ideal habitat.

GW: Yeah. I said, "so the seals will come back again." I mean, seals, we already know there's fidelity in some of these sites, and so, there's no real mechanism to move, translocate. They tried to do that with the sea lions on the west coast. I think they gave that up after, even moving them pretty far, they just come back again. But the seals have a really dispersed; they're now from Maine all the way down to North Carolina gray seals, seasonally. And we have, the pupping colonies are expanding.

JW: So is there a lot of research going on right now trying to determine the impact of the seal population on recreational fisheries, or is that...?

GW: Uh, no.

JW: Not, not a high priority?

GW: Well, there's just no funding for this, zero research program, sustained funding, you know. Maybe the Center has, doing some seal work, but not a large-scale funded project. So some of the, different people from the universities and NGOs are have a lot of interest in trying to understand the ecology of seals, so the white shark thing, that's regionally, gray seals are blamed, and they're still blamed for a lot of things, but they're blamed for bringing the white sharks to the Cape, right? So, you know, the seal population's increased, that's why all these sharks are showing up and people are like getting really upset about it.

JW: Although I guess some people now are--

GW: Well that's what happens, see--

JW: --celebrating the--

GW: Well...

JW: --the arrival of the sharks, right?

GW: Yeah, because it's now become, it's economics. White sharks, you go, you know, like in Chatham, there were, people worry about the beaches, people, oh, no one's going to come here because of the white sharks. Now people are like, oh, now...

JW: Love sharks.

GW: Sharks. We get asked, the docents, when we go down the beach, the Park Service people, they always ask us, we were, I was down there on Friday, right? And so I had to, we interacted with 28 different people. Some of them were family groups, stuff like that. I don't know how many asked me that. They said, "are we going to see a shark attack today?" Because like a few days before that in Race Point, a white shark, you know, there's a YouTube video, you know, a white shark took a seal. In Monomoy

JW: Oh, was that this year?

GW: Yeah, yeah, last couple weeks--

JW: I missed that.

GW: --there've been three seals taken.

JW: Really?

GW: If that weren't in a reserve, I mean sure, and so that's one of the first questions we get. In Chatham, they have, now the shark conservancy formed there...the white shark people have all kinds of fundraising...[inaudible]...

JW: Yeah.

GW: They're the, they're like the most charismatic species here on the East Coast. There is, and they have, they've set up this whole system of having passive acoustic buoys. The towns are paying for them, putting them in, so they have some kind of...

JW: It'll detect the tags on the shark?

GW: Detect the tags, I mean, that's all it is detecting, just detecting the tagged animals around. They also have the Park Service you know...has policies in place so they have large flags that they fly. There's lighted signs now on the main roads going down the Cape that say the beaches are open or closed, or...

JW: Oh, really?

GW: Yeah, yeah. The towns and the Park Service and refuge people, I mean they're concerned about sharks, they don't want...basically [they're] trying to make people aware of the sharks and that yeah, sharks feed on seals but there's no...you can't predict when a shark's

going to show up and take a seal, and you can't predict where it was. I mean that one on Race Point, that shark there, they said that shark was ten feet from the beach. That's pretty darn close.

When you look at the haul out that I was out at Head of the Meadow, the bar is like one of the largest bars I've ever been on, off the...it's separated from the beach, except for a really thin walkway on one end of it. But all the seals are piled up at the point of this, this large sandbar. And we estimated like 300 or 400 of them there in the morning. And a lot of, then there's another fraction of them were swimming in the little pool that runs along the beach and the bar, that's between the beach and the bar. Really shallow, about waist deep and then, so whether or, where are the sharks? Sharks may go inside that pool and chase a seal, or take them off the off the beach there, but, yeah that's the big thing I think there's more interest in, they want to see a shark attack on a seal.

So that part of a issue is not so bad, but they still seals are blamed for the sharks, seals are blamed for beach closures even though scientific study that was conducted by people at WHOI, the Woods Hole Oceanographic Institute researchers, and some of the seal people...they collected...who went through the Cape Cod Commission...I think it was the Cape Cod Commission, someone in the Cape, they collected all this database on contaminates on beach, one beach, they decided to close the beaches based on coliform.

JW: Oh.

GW: So they had a retrospective looking at the big seal haul out sites and the enclosures and they couldn't find any correlation between them. It's basically, most of the closures around here are usually after large rainfalls, so they get a lot of stuff out of storm drains washed in--

JW: Right, right.

GW: --and they close the beaches because of the fecal coliform numbers go way up, there's no, you know, so it's not the seals. The seals are eating all the fish and the, and then, and if you look at, read Crocker Snow's book the seals are basically destroying the island of Muskeget.

JW: Seems like a difficult public relations war to win.

GW: Yeah, people have really strong opinions about seals. We've worked with, actually we've been trying to work, when I was working there and they're still doing it, talking to some of my former colleagues, working with the fishing industry in Chatham, trying to get, have them partner more on some of the stuff that's going on. And so they've been helping out with some graduate students, some of the projects, to look at some of these issues that are of concern. For instance, they, last year, a graduate student did her thesis on looking at bites on fish. A gillnetter, okay, she was on one or two gillnetters, sampled, and basically looking at the bites, so the bites from a dogfish or from a shark, or from seals, I mean. Okay, looking at-

JW: Yeah.

GW: --comparison because seals get blamed for all the dead fish. And so they had some, they did some measurements of and the type of bites that seals do and dogfish do, you know, it was really interesting, that addressed some of the concerns, not all of them...

JW: What were some of her findings?

GW: You know, that's, some of, some of the areas and some of the trips, most of the bites were from dogfish and not from seals.

JW: I guess do they both gravitate towards the same area of the fish? The stomach?

GW: The softest part, yeah.

JW: Yeah.

GW: But the teeth, the way they bite down and the size of their mouth, it's, it's pretty clear if you look at it--

JW: Right, right.

GW: -- and spend some time doing it. And that was, I think, that research was eventually partially funded through one of the researchers, one of the professors at the University of New England. One of their students relating more to dogfish predation than it was for seals, but it also addressed that issue of the seals. Because, like I said, down in the, at least in Chatham, particularly in Chatham, the gray seals seem to be the biggest issue.

On the Maine coast, I was reading some stuff that, fishermen don't see the gray seal as a big issue. But it totally impacts the fisheries, different target species in the Cape fisheries than along the coast of Maine, so. Yeah, it's a, it's going to be a long story, to better understand the ecology of gray seals, what their, what size the fish they're eating. The assessment people are also interested in how much cod they gray seals are eating. Right now the Canadians, and the Canadian stock assessments on Georges Bank, said this is, there's a joint assessment group that looks at some stocks in the U.S. and Canada and cod is one of them. And so they, Canadian assessment scientists, have increased the natural mortality levels on different ages of cod from .2 to .5, which they infer accounts for predation by gray seals. And so the assessment scientists here had talked to us about, "well, what do you think, can we do anything?" "Well, we have no data to support that." So now you have two countries trying to look at the same stock--

JW: Right.

GW: --and you have two different components of natural mortality. As I said, the Canadians had spent a lot of time looking at, they did a lot of modeling work to try and figure out the impact of gray seals on the cod population.

JW: I know I guess it's a funding issue, but do you think that there'll be more of a, I guess, an interest in trying to create that data set in the United States as we move forward?

GW: Uh, for the diet?

JW: Yeah.

GW: Yeah, there is interest, like I said, the only component that we have now, and only a piece of it, is from the stomach of bycaught animals. And as far as we have gone with it, is the frequency of occurrence which basically, looking at the hard parts that are in the stomachs, a sign that the species hard parts, and then looking at, then numerically the frequency of occurrence of those versus the other ones. Okay, so that's, that's--

JW: So that's not complete enough though to make--

GW: Well, you're missing, the biggest part--

JW: --decisions about--

GW: --is, is the, doesn't give you the biomass. And so, if you had, say three cod otoliths in a stomach, and you add a 100 sand eel otoliths in a stomach, the frequency of occurrence obviously, is sand eels, okay, are going to outweigh the cod. But if you, if you knew that those cod were say six or seven year old cod, they're eating, okay, you could, you could then say, well, now on biomass of this, that's what they feed on these guys, the biomass is more important to diet. That would flip that around, right? Potentially. So that's what, that's the component that we don't have. To have people go through those hard parts and actually do the measurements to convert that to biomass. And, and also the, as I said, the diet data are also biased from the bycatch in the sense that we're only seeing, pretty much ninety something percent of them are yearlings, we're not seeing adults. But we're seeing adults on the beach with gear on them, some people are saying about 10% of the gray seals in the Cape Cod region have gear on them from interacting with gillnets.

JW: Oh, entanglements?

GW: Yup.

JW: Yeah.

GW: Yup, and so, part of the collaborative group that we're working with was to work with the Chatham fishermen to see if they would, could bring in, if they had large gray seals, because either they're breaking out of the gear or the fishermen are cutting them out of the gear. And we're guessing that they're cutting them out of the gear because they're not, 300 pound seal or 250 pound seal, they're not trying to bring them on the deck. So if they could bring any of those animals in under - we've checked around on the legal protocols for doing all this stuff and everything else, and it seems that if they caught this animal and they wanted to bring it in, there's a mechanism in place that a permitted organization that has say, a stranding permit, say the Woods Hole Oceanographic Institution for example, could pick that animal up in Chatham, the chain of custody is, would be, all the way to Woods Hole. The animal would be necropsied at Woods Hole, and we'd have data on larger animals. Other ways of getting data from larger animals, I mean, from live captures when we do them, but you're not going to do that many live captures. We did one in June 2013.

JW: How would a live capture work?

GW: You have to do a biopsy core sample. So you would get, you wouldn't do the stomach, but you can do a biopsy core sample and give you some history of what they, what the diet was. So there are other mechanisms to get some of that diet data, but one is to, if you can take better advantage of bycaught animals. There's not, some people might say, "well, you're going to encourage fishermen to bycatch seals." And I say, "I don't think so. Fishermen don't want to do anything with seals. They don't want to get them in the nets, it costs them time and money to deal with seals." All we're saying is if they invariably capture a large seal and they wanted to do this, that, you know, we'd work some kind of a, you know, it's not like--

JW: Work out a protocol.

GW: It has to be boat by boat, captain to do this, to get the animal in, to get more of the biological data. We're not trying to remove seals for the science, so to speak. So, you know, that's, that's another mechanism to do it. But it's kind of, it's, and they have, we have like, the Center has probably the world's best fisheries dataset from the research platforms for the, I don't know what the survey, maybe 35, 40 years now of data on fish stocks.

JW: Oh, really.

GW: And plus the State does. Massachusetts does a state survey, and so there's a lot of data on the, on the prey. It's sort of this matching up thing. But you would need, you need some evidence. We've talked to people who are interested in, applied for grants through NOAA, they try and do research on, around gillnet vessels for instance, following up some things that people already do with turtles, but ROV near the gear and try and video what seals are doing around the gillnets. Are the seals taking the fish out of the nets? Are they, how are they interacting with them? How are they getting caught in the gear? There was a person at the Center for Coastal Studies who was a graduate student at the time that worked with the trap fishermen in Chatham and he put up a, basically a side scan sonar type thing, and video camera in that net, in the pound nets, traps down in Chatham. And you could see the gray seals going in, you could see them chasing the squid and the other fish out of the net.

JW: Was it a success?

GW: That project was, yeah, because it's a fixed net, it's not going, the net is set under.

JW: Fairly shallow water?

GW: Fairly, yeah, the boats, the family, it was a one-family operation that owned it for years, and they tended the nets daily, so you'd go out and see, try to understand those interactions...

JW: Check up on the equipment and...

GW: Yeah. Right, and protect the areas. But on the offshore areas and the idea was to try and understand the dynamics of the seals around the gear, a lot of it, and see if you could see any, could place and what the level of it is. Like I said, the fishermen have told us that they basically, areas that they used to fish, they won't fish anymore because as soon as they set the gear the seals are there. They said they, they told me that when they used to fish over on some of the areas that cod used for spawning, they don't even go to those areas anymore. They're moving all their activities around to try and get away from the seals. And so, yeah, they say offshore, they say, we don't do aerial surveys for seals offshore, all of our survey

works have been all by sight. So we have very little information. So part of the work we did with the Duke University, when we did that, was adult capture in Chatham June 2013, that was for a graduate student's project but part of that was to understand how seals are using the habitat and where they're going and the idea was that if you had really, really good tags you get time, depth recorders and everything else, you get all kinds of information and you could actually look at those later, and then overlay with all the survey data and say well, we know that species X, Y, and Z are here, seals are here, and so they are predating on probably those guys. Because you look at the diet that we have for seals from scat and from the bycatch, it's a pretty broad, which is consistent with other areas of the world.

JW: Are they very opportunistic feeders?

GW: Yeah, yeah. You might get, you know, you can, in different parts of Cape Cod, you get scats that are 100% sand eels, but that makes sense because you look at Stellwagen Bank, I mean, that's pretty much what humpback whales are doing out there. You know, they're chowing down on sand eels, there's other small cetaceans out there, fin whales and other animals that are, birds. So it's a big, sand eels are a big resource so it's obvious the seals would...

JW: Gravitate towards that as well.

GW: Gravitate to this, yeah. Yeah. I've been on a whale watch out to Stellwagen Bank area, and you see seals out there, you see small dolphins and stuff like that. So, you know, it makes sense that food is going to attract these animals to the same site.

JW: Right. If you find the forage, you'll find the predators.

GW: If you go, some of the scats we've had from other areas of the Cape, it's more diverse. You get flounders, you get some gadoids, which are cod and haddock and stuff like that. Silver hake, red hake are pretty important in the scat, and some of it in the stomachs. But it's clear that if you look at the bycaught animals, which is our biggest source of data on predation, and you look at it regionally, the patterns make sense. So you'd see red fish in the stomachs of bycaught animals up in the Gulf of Maine, okay. And you'd see some of the herring species down around the Cape that you won't see up in the Gulf of Maine, from temperature profiles, the fish don't go there. So you can get some patterns out of it, but it's a lot more work has to be done to--

JW: But I guess tough to still quantify--

GW: Yeah.

JW: --what the, what the biomass is that they're...

GW: Yeah. I mean, it doesn't stop people from doing it, but there's, several people have cranked out numbers for what total removals are by seals.

JW: Yeah.

GW: I said, "well, yeah, okay, what does that mean." I mean, you have, you have say 40,000 tons of predation mortality, where do you petition that to? And the problem is that people

have a tendency to say, "well, it has to be for this species, because this species is not here anymore, or this species has been reduced and we don't know why it's collapsed." But it's a little different in the data. It gets murky to do it that way. I think better to invest the money to try and establish a long-term program.

JW: More comprehensive dataset?

GW: More comprehensive program, yeah. Because there's no indication that the gray seal population's declining. We know that the number of pupping colonies is expanding in two ways; more pups and more colonies. There's a limit to the colonies because when you get west of Cape Cod, there's really no suitable habitat for gray seals to have large numbers of pups. Then you get down to other...

JW: Do they really need those sort of broad, sandy--

GW: They, uh...

JW: --beaches with--

GW: No

JW: --bar structures?

GW: No, well, in Cape Cod they, they use Muskeget which is a sand island, right, and if you looked at, took a picture of Muskeget Island and compared it to Sable Island, they look pretty identical as far as habitat. Monomoy is also more like Sable Island, it's a very long sand stretch beach, and when you get up onto the, beyond the dunes, there's lots of grass up there, so the, the pups, mothers and pups are up in there a lot, and Monomoy is so large that there's no, it's not like, it's no sense of any carrying capacity being reached there. Maybe on Muskeget because Muskeget, when we first looked into the gray seal population, it was mostly concentrated on one part of the island for the pupping but now it's basically a ring around the island. All parts of the island are being used for pupping. And the Monomoy was, has now expanded the last couple years. Monomoy used to be on our surveys, sometimes you see five pups there, sometimes you see 50 pups there. But now we're into hundreds of pups being born on Monomoy, so it's more established. But the island, in Maine it's on rocky islands, isolated islands. They use, the gray seals like to use the outer islands and so they are using those.

JW: Is that up around mid-coast Maine, I guess?

GW: Mid-coast, yeah. Most of them are in mid-coast

JW: Downeast.

GW: Yeah, Seal and Green Island off Penobscot Bay. Some Downeast. But, you know, a lot of those outer islands are, there's no one out there. They have, there's field stations for bird work. There might be a lighthouse on some of them.

JW: Are there projections as to when the, um, areas around the Cape here may see, you know, a peak in, in the seal population when, you know, will it reach its carrying capacity, or... or is that sort of up for grabs?

GW: That's up for grabs. You know, we're not, I think, a couple things, one is, like I said, all the seals that we see in our aerial surveys and anything we do on the beach, those seals all look pretty well-fed. I would think one of the signs you might see would be some thin seals showing up.

JW: Yeah.

GW: No one's reporting thin seals. Even these seals with the most gruesome neck injuries on them look in pretty good shape.

JW: Is that from gear entanglements?

GW: Yeah, yeah. I mean, one of the animals that we captured in June 2013 that we caught, actually we caught two, this was pretty funny because we caught two, out of the numbers we caught which came to be 10%, we saw people project it. I said, that's, not that I'd say, that's full documentation, but I thought it was interesting. And the gear on those animals, it was a monofilament, it was, in one case it was pretty close down to the bones in the neck, you know. And the vets spent an hour or so on each of those two animals trying to tweeze the gear out, cut it, snip it out, try and suture the wounds the most they could.

JW: So it must've, the animal must've been entangled I guess, earlier in its' life--

GW: Right.

JW: --and then and the wound close over it?

GW: Right. And another one I heard about, I wasn't on that, I was, like I said, we were doing the captures now on two more places, but the gray seal pups on Muskeget and Monomoy, so I was on Monomoy last, yeah, last, the 2014-15 pupping season. And we got, I got a call from the researchers on Muskeget, and they said, "what do we do about this seal? Well, we have a mother here who's nursing a pup which we can't believe, and she's, we're not sure what's holding the head onto the body", sort of thing, that's how bad the neck wound was.

JW: Wow.

GW: So it's amazing what these animals can survive with. It's kind of gruesome, but, anyway, the point is that even injured, severely injured animals are able to find food and survive, and we're not seeing thin animals. The other part of that is the harbor seal. In Sable Island, it's clear evidence that the gray seal population basically extirpated the harbor seals from Sable Island.

JW: They outcompeted them?

GW: What?

JW: They outcompeted them?

GW: Outcompeted them. Pushed them to a poorer side of the island and then the harbor seals on the poorer side of the island were also subject for predation by Greenland sharks. We, from the 2001 survey that we did for harbor seals, and the 2012 survey that we did,

the abundance estimates declined by 70, no, by 25%. We changed so many parameters in that survey, we're not sure if it was a survey design issue. We also had a higher proportion of pups in the 2012 survey than we did in the 2001 survey and the, we had like 30% which is biologically not likely, so for some reason the adults were off the ledges and the pups were on there. That may have been related to the platform that we used. We used small aircraft in the 2001, and we used the NOAA Twin Otter in the 2012, which is a larger, noisier... So the seals may have heard it and left the ledge. They'll leave ledges with the pups on them, it's pretty common. Or, in fact, the harbor seal population has declined, for some reason, maybe from the increase in gray seal population.

The most evidence we see for that ecological direction is in the Cape region down to eastern Long Island, where it's historically, in our research time, I say, the '80s, harbor seals were the predominant seasonal species in the Cape Cod region down to eastern Long Island. They'd show up in the autumn, stay through early spring. As the gray seal population increased, we're seeing some of these sites that harbor seals were using, are predominantly gray seals now. A lot of the haul outs are mixed sites with harbor seals and gray seals. Harbor seals have a tendency to stay away from the gray seals, whereas gray seals will mix inside of a harbor seal haul out group. So it's these little observational things we see from the survey that maybe suggests there's enough pressure on them. And the other thing is the bycatch rates, both the observed and the estimated bycatch rates of seals are shifting towards gray seals. So you could say, well that's because this place maybe is more dynamic, using more offshore waters, than the harbor seals do, or it could also be that the gray seals maybe not only are outcompeting harbor seals by actually dispersing them from around fishing gear. And so maybe that's why harbor seal bycatch rates going down. You can't prove any of this stuff. But it's interesting that, that also it'd be happening.

JW: Yeah it's fascinating to speculate on what's giving them the competitive advantage there.

GW: Yeah, I'd say size, probably. And I've watched gray seals come up to a haul out site with smaller harbor seals and harbor seals just go away. And if you look at some pictures of gray seals next to a bunch of harbor seals, it's like, wow, that's a really big body size difference, between the large animals.

JW: Right.

GW: Anyway. We don't know, but. So we talked about the carrying capacity may be happening in that direction. In other words, moving competitive species allows you to take more of their prey resources and increase your size.

JW: Yeah.

GW: Yeah. It's a dynamic that probably should be studied more, try to understand what's happening out there. Now will gray seals reach carrying capacity? Probably eventually, but they still be expanding, they're still seasonally expanding to the west, so they're expanding their foraging range, and I said they, at least in the New England region, there seems to be no restrictions on habitat for breeding. It's a long story that's still evolving.

JW: Yeah.

GW: Because the Canadian dynamics also complicate the whole thing. The Canadians have tried different culling programs to reduce the gray seal population; they've had commercial hunts on gray seals.

JW: So is there, is there the same kind of transference of, of scientific information here, of data here between the United States and Canada like during the 1970s when these cooperative research programs were going on between Eastern Bloc countries and the United States, that sort of thing?

GW: No, marine mammals, we never, to my knowledge, we did, the Northeast Fisheries Science Center did nothing regarding marine mammal studies directly until the '80s. Under the ICNAF days, the Canadians would have assessments on harp seals and gray seals but there was no, I don't think there was a lot of interest here, I mean, when I first started at the lab in '73, you know, in, in some winters someone would yell, "hey, there's a harbor seal!" And everybody would run out and look at it. So, you know, that's where we come from. Now, now we get on hard winters, we'll get ice floes in Woods Hole Harbor, and it could be harp seals on them, young harp seals on them, and no one pays attention. You know, it's...

JW: It's too commonplace now?

GW: It's, yeah, it's interesting, but it's too commonplace. There were no reports. I asked people on some of the foreign vessels I was on, because some of the people who were on the vessels when we were doing research were also involved in the commercial fishing, before the 200 mile limit. And I would ask them about seals but no one said, oh, we caught seals, but if you look at...

JW: Largely undocumented?

GW: Completely. If you look at the fisheries that used to occur in the '60s through '70s by the foreign nationals, for instance, Soviets used to have a driftnet fishery for herring, spring fishery on Georges Bank. And you look at all these areas, you look at the patterns of bycatch that we've seen in the U.S. vessels, these vessels and the size of the gear that they use, those vessels had to have a tremendous impact on the marine mammal community, off the Northeast, off the U.S. coast in those years. And so I'd always say, well, people talk about, well what's the historical numbers? I say, I don't know. I say, I think when the CTAP data that we collected, when that comprehensive program, that's probably the best best line of what the populations were after the removal of all the foreign fishing effort. That program, CTAP started in the late '70s, ran through I think '81. The bulk of that heavy fishing was gone by '76 so that three year window is not really a lot of time for a marine mammal population to do anything.

JW: Right, to rebound.

GW: So it's probably what the, that's probably the best baseline for what the population was at, after they were exploited.

JW: And has that been quantified to any degree?

GW: Uh, in, what sense?

JW: You know, I guess just, are there, are there numbers that--

GW: No.

JW: --are attached to what that baseline would be?

GW: No, no. The only other data that exists, the people who were involved with the right whale research, they went through the logbook of coastal whaling in New England, like that, try and get an estimate of how many right whales were removed, the large whales...

JW: Oh, during the nineteenth century?

GW: Yeah.

JW: Yeah.

GW: Right. But there, it was one, for harbor seals there was one study that was funded by the Maine, inland fisheries it was called back then, and scientists went out on parts of the Maine coast in 1976, and counted about 5,000 harbor seals, so that's sort of the baseline, I mean, for all the seal population, the relevant data. People that keep asking well what was that historical population level, because we want to see, what is it doing relative to that. Well, no one knows. People have gone through the old books, journals that were written by people. Historians trying to capture what was happening in the colonial period and all of that.

JW: Yeah, yeah.

GW: People in that were reporting on trade and fur and all other stuff like that. There's not a lot of data out. There's one that said that, a couple of researchers, one of the University of Maine campuses, went back and re-gathered data from the bounty program that was available and they came up with some estimates of what had to be a population of seals in order to account for the bounty removals.

JW: Right, for the numbers harvested.

GW: Yeah, yeah. But other than that there were no, no real data. And so the surveys that we're doing, been doing, since the '90s, basically are building the data set to understand how the populations are recovering. So the, and with the Canadians, the Canadians, we've been, we've had really good collaboration with the Canadians on the seal, seal research when we started doing it. And plus, excuse me...

JW: In the 1980s?

GW: We started in, no in, in 1990s, late 1990s. When we started doing seal stuff and so, part of these scientific exchange of meetings we used to have with them, had those, and the, so there's the North Atlantic Seal Research Consortium that was basically for years we used to have these seal meetings and trying to figure out what are, we have to do to get money from people to want to fund seal research? We were involved, the government agency involved and a lot of NGOs. And we used the Pacific, um, I think it's called the Pacific Seal Consortium, something like that, a bunch of universities and NGOs on the West Coast, I said, that's what we need, something like that. And so people at WHOI and some people decided

to try and set that structure up and they did, so this, this consortium. It's housed, housed at WHOI, it's not part of WHOI, it's independent. But it's seal researchers and we had a workshops last autumn and the Canadians, scientists, came down for that. They usually participate in it and talk, the whole thing with the gray seal was the, one of the main focuses of it, is how do, how do we reconcile numbers in Canada where they have very intense survey operations for seals. They have a, the gray seal populations in the Gulf and in Sable Island, are, I think, had really good coverage and they have really good information on what the population growth rate is and the pup production. And then our program down here, how do we stitch those together? And so, we, we did some surveys this winter in the pupping colonies, aerial surveys, and so the goal is that those NMFS data will be included in the Canadian, next Canadian assessment, and try to get a sort of Atlantic-wide estimate of...

JW: Comprehensive.

GW: Yeah. And then there's people at Duke University that are trying to do it a different way, so they work with us with the tagging data we did, so they've gone through looking at Google Earth images, then they have three points in time, from 2014 through 2016, I think, or '13 through '15. I forgot. And they have counts of, Google Earth counts, of haul out sites. And using that tag data they had as closest representation to the Google data, they're trying to use that to come up with a correction factor. So they, they have a paper that's in press going, and is trying to, coming up with numbers from that as a Cape Cod abundance estimate, so that's all that would pertain to. The interesting part about the seals that were tagged, they stayed in the Cape Cod region. One went out towards Sable Island, but they pretty much stayed southern New England, Nantucket Sound area. There was no exchange between Maine and Cape Cod region, which is very important because they had said there was pupping colonies up there so these different pupping colonies are all discreet among themselves. So, so anyway, so hopefully there will be a generation of some new numbers with some, at least give an estimate, I'm not sure...

JW: Was that what they had expected? That the, that there would be that sort of, um, I guess, site fidelity amongst the seals?

GW: Um, we've never, we didn't know what. The only people doing photo ID work on gray seals are the people at the Center for Coastal Studies, but they're focused on mostly on marked animals that were in gear entanglements.

JW: Yeah.

GW: Injured animals, that was, a very small-scale. So we didn't know what the animals would do. We know that, we, there was, we have a good bit of information on the seasonal movements in the Cape region, how the animals go around during the pupping season, and come back to the Cape. So in the general sense.

JW:Yup.

GW: How they would, where they would go to forage and what they were do, is going to be really surprising. They'd look at the data, so we tagged in June, a lot of those animals stayed right around that. It's like, are these animals going anywhere? You know, a couple went up to the northern part of the Cape, and a couple went a little further south, but it wasn't until you were getting closer to pupping season, they started shifting out of the Cape and going out to

the Nantucket Sound and some of them stayed on Muskeget, so those are the females having pups because they were basically the number of days that they weren't, they were there about the duration of the pupping nursing period.

JW: So females would move, say, from Monomoy to Muskeget during the breeding season.

GW: Oh the males too.

JW: Okay.

GW: Yeah, I'm just saying, we all know the males, we didn't tag any real super big males that were, basically the breeders, right, but the females, we, we thought we had two of the, I think it was at least two of the females that we had, out of the nine animals, were pregnant, given their morphology looking at them.

JW: So were they moving because the, the forage supply was better on Muskeget, or because it's just better breeding habitat?

GW: They'd move over there because they're breeding.

JW: Okay.

GW: Okay. But there seems to be a shift anyway with the other animals coming around, so animals all seem to go in the Nantucket Sound and foraging around the, off Nantucket, some going out.

JW: That's fascinating.

GW: Yeah. But there wasn't any, like I said, no long-distance movements back and forth to Maine, which, the interesting about that, is that when we were registered and working with gray seal population studies back in early 2000s, so she put a satellite tag on an animal on Seal Island, which was one of the two Maine, big Maine pupping colonies. Okay, that animal went, left Seal Island, went over to the northern edge of Georges Bank, was basically in the Canadian zone, they stayed there for weeks, made an excursion to Chatham, stayed there for a short period of time, then went back up to Maine again. So, this is a weaned pup, so I mean, small animals can do those type of...

JW: That's incredible.

GW: Yeah, so we know the large animals, so we know, like I said, we know animals that have been tagged in Canada show up, same with harbor seals but it's the gray seal dynamics are more of an interest because the, trying to understand how many, what fraction of the animals that are in U.S. waters are actually part of this breeding population or are they, is there some group that goes back and forth all the time? That's, so that would require, actually, some more tagging work. More, yeah, more money.

JW: That's what it always comes down to.

GW: Yeah, yeah. So it's difficult to answer all the questions that the stakeholders have. It's, and I say that's why for the seals in particular, it's a collaborative project. It has to be

collaborative because everybody that participates brings something along with the benefits with these, some kind of cost of sharing, stuff like that. And then the projects and get done and then everyone can share the data. It seems to work.

JW: Well, that seems to be almost sort of a motif here, throughout the, the interview, going back to your earliest career in 1973 of working collaboratively and working with research partners to achieve common ends.

GW: Right.

JW: Is there, is there, do you have any, sort of, parting thoughts that you'd like to add in? Since we've now been discussing things that span a good number of decades from '73 up to the present day.

GW: Yeah. I, well, I say I'm very lucky and to work at the National Marine Fisheries Service. I really support what the organization's been doing. I've had lots of professional and personal opportunities for my research, and meet people from around the world, very interesting people, get involved in these surveys, so I think that when I left the agency, I left because I said, "okay, it's time to, time to hang up my boots, so to speak." Not because I was dissatisfied with my work at all and I always have good things to say about working with the Science Center. I focused mostly on the Science Center here, but the Marine Mammal program particularly, we, we worked closely with the Southeast Science Center on everything, all the stock assessments, we shared documents, everything was shared on that. We, our offshore surveys, are shared with the Southeast so it's a really comprehensive survey that runs from Florida all the way up to the U.S./Canada zone. And so I've found working with other NOAA colleagues very productive. So, I would just say, thumbs up to NOAA and NMFS.

JW: Well, thanks very much for interviewing today.

GW: Sure. Okay. Thank you.

JW: I appreciate it.

GW: Yup.