

Stephanie Scull-DeArmey: We are on record. This is an interview for the Maritime and Seafood Industry Museum in the University of Southern Mississippi. The interview is with Chuck Oravetz, and it is taking place on Wednesday, March 24, 2010 in Florida, on Chuck's end, and Mississippi on my end. I am the interviewer, Stephanie Scull-DeArmey. First, I would like to thank you, Chuck, for taking time to talk with me today. I would like to get some background information about you, which is what we usually do in our oral history interviews. So, I am going to ask you for the record, could you state your name, please?

Charles Oravetz: My name is Charles Oravetz. I usually go by the nickname Chuck.

SSD: How do you spell your name?

CO: It's O-R-A-V-E-T-Z.

SSD: Thank you. When were you born?

CO: I was born in December of 1942.

SSD: Where were you born?

CO: Pittsburgh, Pennsylvania.

SSD: What is your current title, and can you give us a brief description of what you do?

CO: Well, I'm currently retired. I retired from the National Marine Fisheries Service in 2001. When I retired, my long, bureaucratic title was assistant regional administrator for protected resources.

SSD: Well, what we will do is just ease on into the questions that we want to get answered for this grant. If time permits, we will answer some other questions that the Center for Oral History at the University of Southern Mississippi is interested in. So, the first question is, what role did you play in introducing TEDs to the shrimping industry?

CO: Well, from a management perspective rather than a technical perspective, I was the point man in the agency for the introduction of TEDs by the Southeast U.S. shrimp fishery. I say from a management perspective because the technical support of the agency comes out of our laboratory in Pascagoula, Mississippi. It's commonly referred to as our gear research lab. The fine specialists out there were the ones that originally developed the TED and modifications to it. I worked closely hand-in-hand with them over the years in establishing workshops and training, et cetera. They are the ones that actually showed the hands-on installation and operation of the TEDs, and from a management perspective, I was the one that put the workshops together and ultimately wrote the regulations requiring them, et cetera, et cetera.

SSD: What is involved in putting workshops together?

CO: Well, we also had excellent support from our partners in Sea Grant University System as

well as states and so forth. It's pretty much calling together shrimp fishermen and showing perhaps a day or two of slide and oral presentations, and then the actual physical work of installing TEDs in nets, as well as oftentimes going out on shrimp vessels and showing how TEDs are deployed and retrieved and operated at sea.

SSD: Now, you wrote the initial regulations. How did you go about doing that?

CO: Well, I'd like to explain first that that was certainly not the first option that the government attempted in trying to introduce TEDs into the shrimp fishery. We had, for approximately a six-year period, considerable effort put into trying to get the industry to adopt TEDs on a voluntary basis. After making some progress in that area, unfortunately, the widespread use of TEDs did not happen. We were getting extreme pressure, rightfully so, from other federal agencies with responsibility for sea turtle conservation – states, environmentalists, and so forth. So, in around 1986, we first drafted a set of TED regulations and conducted a series of meetings and public hearings throughout the southeast region. There were court challenges to the regulations. There were appeals. The first time that the regulations actually took effect after being delayed by the courts and even some amendments to the Endangered Species Act by the Congress, it went on a partial phase-in basis beginning in 1988. Full implementation was not actually achieved until about 1990 or so.

SSD: Who brought challenges in court against the regulations?

CO: Primarily the shrimp industry. A foremost organization pursuing it was an organization coalition out of Louisiana called the Concerned Shrimpers of Louisiana. But they had support from other organizations. The Texas Shrimp Association, I think, joined in the suit. So, there was a compendium of organizations that actually challenged the regulations in court – in district court in New Orleans. The government won its case in that regard. Then the decision of the court was appealed to the circuit court in – I think it was the Fifth Circuit Court in New Orleans. The appeal by the shrimpers was denied.

SSD: Is there anything else that comes to mind when you think about the role you played in introducing TEDs to the shrimping industry?

CO: Well, it encompassed a large part of my career with the Fisheries Service out of my thirty-year career. Probably more than half of my time was spent on this TED project.

SSD: That is a long time.

CO: It was pretty much a full-time job for me and others for probably about fifteen years.

SSD: Well, let us move on to question number two. How were TEDs viewed in the early days?

CO: Well, I wrote a little note to myself here. The word I chose was skepticism. The industry was quite skeptical of this new piece of gear and basically didn't really see the need for it, didn't want to use it. It was large and bulky and cumbersome. At that time, the shrimp industry really was an unregulated fishery. They really didn't have any kind of licensing requirements or

anything like that. It was probably the first time in history that the shrimp industry was looking at the government to try to impact their operations. Rightfully so, they were concerned and upset and not very happy about it.

SSD: Compared to other fisheries, were other fisheries more regulated?

CO: There were other fisheries that were more regulated than the shrimp industry. If you're going to ask me for examples, I'm probably not going to be able to give you one right off the top of my head. But you've got to realize that the major legal emphasis for fishery regulation was the passage of the Fisheries Conservation and Management Act, commonly referred to as the Magnuson Act, that was passed in 1976. That was probably the first major thrust by the U.S. government to try to, from a regulatory standpoint, manage fisheries. But before that time, it was pretty much the government was actually trying to assist the development of the fisheries. In fact, my first job with the National Marine Fisheries Service, I was hired as a fishery marketing specialist. My job was to try to promote the consumption and use of what we termed back then, underutilized species of fish. But that all changed because of declining fishery stocks and virtually no control.

SSD: Gosh, that all happened just within your career?

CO: Pretty much. Yes, it did happen in my career.

SSD: That is pretty quick, to go from, "We have this underutilized resource, let us pitch it to people to eat a lot of fish," to "Oh, we better regulate this because we are running out of fish."

CO: That's essentially what happened in a nutshell.

SSD: That is amazing. Let us see. I lost my question that I was going to ask you. Unregulated fishery. Why do you think that shrimping had stayed unregulated for so long?

CO: Well, the shrimp industry, from a commercial standpoint, did not even begin very extensively in the Gulf of Mexico until the mid-[19]50s. There were plenty of shrimp around, and shrimp consumption was growing. But as the population of the country grew and more people developed a taste for seafood, including shrimp and other species, and from the health aspect of fishery consumption, people woke up. It was just not a limited-entry fishery. Anyone that wanted to get into the fishery could, and there was really no need to regulate it. Then as more and more people started dealing with what you could term as a public resource, stocks started to become overfished. Consumption was going up. Finally, the public, through the Congress, there was a need identified to "We've got to control and manage the fisheries to make them sustainable over the long-term."

SSD: Do you have any idea what the stocks of shrimp are like now in the wild?

CO: I think a lot of people do not realize about the shrimp fishery is that shrimp are somewhat an annual crop. Shrimp lives about two years max, usually only about a year. The shrimp stock at the Gulf of Mexico is – again, the landings have not substantially increased from year to year

from when they reached their peak in probably the late [19]70s. Roughly about a hundred million or a little bit more pounds of shrimp are produced from the Gulf of Mexico each year from the U.S. Gulf. That number really hasn't declined or increased a whole lot. What has happened is that the threats today from the shrimp industry are – well, prior to the passage of the FCMA and other laws – and I believe now that shrimp vessels are required to be licensed, certainly, by states. I believe even the federal government now requires some licensing. The shrimp industry was growing and growing and growing, basically harvesting a finite resource. Consequently, the catch per unit of effort of the industry were stable or declining. So, it got harder and harder for a shrimp fisherman to make a living out there. So, it had to reach a point where something had to be done. You had to make some kind of modifications to control harvest, if you will, or monitor it. Another major threat to the shrimp industry today is the importation of shrimp, largely from farm culture or aquacultured shrimp, which is a growing industry in foreign countries. I don't know if we have actual statistics on how much shrimp – we know how much shrimp is imported into the United States, but we don't really know how much of that is cultured shrimp versus wild-caught shrimp. But I've heard some numbers thrown about, at least when I worked, that it could be as much as fifty or sixty percent of the imports are farm-cultured shrimp. That's a major threat to the shrimp industry, because the cost of their producing or harvesting wild-caught is becoming more and more expensive in terms of what it costs to farm-raise shrimp.

SSD: Do you have any idea how the wild-caught compared to the aquacultured shrimp just in terms of, say, taste or health benefits?

CO: Do I have a speculation on the health benefits? Well, there are some concerns about the health and safety and quality of farm-raised shrimp, that they do use chemicals to treat these ponds, and herbicides. Certainly, in foreign countries, the regulatory standards of the use of some of those preventative measures are probably not as restrictive as they are in the United States. Is there a lot of documentary evidence of that? I'm not sure there is. I think what I've seen happen is there's an effort made to try to distinguish wild-caught shrimp from farm-raised shrimp. So, whether it's real or imagined, I think there are efforts being made by the industry to try to differentiate their product. But is there hard scientific evidence? There could be, and I'm not aware of it because I've been out of the loop for so long.

SSD: Are you aware of how TEDs are viewed today by the shrimping industry?

CO: Well, I can talk about how they were viewed when I retired in 2001, and they had been in effect for five or six or seven years at that time. I would say the industry as a whole has probably accepted them; not necessarily by choice, but kind of as a cost to doing business. They said, "Well, we don't like these things, but we have to use them. That's the law of the land, so we'll do it." So, I think they've accepted it as a kind of a cost to doing business. I was just going to say, I think there should be some credit given to the shrimp industry too about assisting the government. The government doesn't know everything, of course, and there have been a lot of good ideas that have come out of the shrimp industry on TEDs and how to make them better and more efficient. I would like to say that from the first prototype model of a TED that the National Marine Fisheries Service developed, even though it worked, it was a monster. It was a ninety-seven-pound, double-hooped hunk of metal that was very unwieldy. I've seen them on boats.

I've worked on shrimp boats that had these TEDs. The shrimp industry, through its innovation and ideas, have now caused considerable modifications to the actual physical structure of a TED and the mechanics of a TED. That's still evolving. I believe the regulatory provision still exists that the regulations actually allow for new ideas and development of TEDs. There's a certification process established so that if a fisherman, Joe Jones from Texas, has an idea, he can submit that idea to the Fisheries Service. There's a panel – that membership changes from time to time – of shrimpers and environmentalists that come out, and submit this idea to the Fisheries Service, primarily done out of Pascagoula Laboratory. They actually have a year or annual or a biannual experimentation to the Fisheries Service, primarily done off of Panama City where we take turtles and we'll introduce them into the net with TEDs, these new ideas. If the TED achieves a certain release rate within a certain time, it can then become certified and be another option as a legal TED for the industry.

SSD: Well, that is interesting. Releasing turtles, can you kind of paint a picture of what actually happens?

CO: Well, we have a laboratory in Galveston, Texas that, for years, has had a Kemp's ridley – they call it Head Start project. They take hatchling turtles from the major nesting beach. There's only one in the world, and it's down off of Rancho Nuevo, Mexico. They bring several thousand hatchlings up to the Galveston Laboratory each year. They raise them in tanks, saltwater tanks, and then they do release them. But the TED testing process involves taking some of these small ridley turtles, putting them in saltwater pens in Panama City – we have a laboratory there as well – and taking a government-contracted shrimp trawler or one that we have on our own, taking National Marine Fisheries Service divers down, and putting the turtles in a mesh bag, tethering them down a cable to the diver that's swimming along in front of a trawl equipped with one of these new model TEDs, if you will, and then actually releasing the animal in front of the trawl. As it approaches the TED, then they – they're filming all this, right? They put cameras down in the nets, and then they record the time it takes for the turtle to escape from the trawl. If certain time frames are met, I think it's five minutes, if I recall correctly. If the turtle can get out in five minutes, and this happens a certain number of times, then the TED actually becomes certified. Then the regulations would be modified to allow this new TED to be used by the industry. There's four or five different kinds of TEDs out there right now that were developed through this process. So, the fishermen do have choices in the kind of TED they use. There's different materials. Some are metal. Some are aluminum. I know they've tried plastic and other types of material. I'm not sure the plastic really ever worked, but there are choices. Even though a TED is simply a large oval grate – and it does have to meet certain standards in terms of the spacing of the bars. It has to be small enough so a turtle doesn't slip through, and they get wide enough to hopefully allow the shrimp to go through. That's the big challenge. How do we release an animal the size of the turtle out of the net? It's much, much larger than a shrimp, obviously. How do we keep this three or four-inch shrimp in the net? That was the big technological challenge back then.

SSD: So, maybe the fact that the industry had a voice in creating the TEDs made them accept the TEDs more?

CO: I think so. I definitely think it helped for sure.

SSD: From your point of view, what were the challenges faced in developing the TEDs?

CO: Well, I think I just touched on it a little bit, but I can elaborate. Well, shrimping has been shown worldwide to be one of the largest sources of man-induced mortality to sea turtles. That's pretty much true around the world. I'm not saying there aren't other sources, and there are. But turtles seem to prefer the same kinds of habitat that shrimp do. So, they're there. They're in the same area. So, you have these big trawl nets being dragged through their territory. Even though a turtle can swim at probably four or five knots for a brief period of time, they just can't outswim a trawl. They're probably not smart enough, really, to know that there's a net coming up behind them.

SSD: They have no experience with it.

CO: Yes. So, consequently, how do you release this two or three-hundred-pound animal that's two or three feet or four feet wide? How do you get that out of a net, but yet maintain the catch of the valuable shrimp? That was the big technological challenge that we faced. That's why it took so doggone long to come up with a solution to do it.

SSD: Well, I meant to turn my cell phone off, and I did not. I am going to turn it off right now.

CO: [laughter]

SSD: I do not know if you can hear it, it sounds like a frog.

CO: Yes, I heard that too in the background.

SSD: [laughter] I cannot believe I did not turn that off.

CO: Well, we all make mistakes. [laughter]

My wife's cell phone is sitting on the counter. If it rings, I'm going to have the same problem.

SSD: Well, we will just turn it off if it does.

CO: She's charging it up, actually. Mine's off. I'll move to another room if it rings.

SSD: All right. We have also touched on question number five, some of the challenges faced in getting the shrimping industry to use TEDs. Does anything else come to mind when you think about that?

CO: No, I think we've pretty much covered that, Stephanie. If you're happy, I'm happy.

SSD: How about number six? You talked a little bit about the first TEDs being ninety-seven-pound hunks of metal. Do you know how they compare to the later models?

CO: Yes. The TEDs now are considerably smaller. I think one of the big differences was the first TED was – when I say double hoop, it had a front metal oblong or an oval and a rear oval. There was a set of bars that went from the front oval back to the second oval. They were made out of – I think it was probably three-eighths or five-eighths inch galvanized pipe. There were metal braces along the sides. This thing weighed ninety-seven pounds. This actually was an idea that came out of Georgia back in the early days. There was a phenomenon that occurs off of the Atlantic coast, Georgia, and other states. Every so often, in spring, I believe it is, they call them jellyballs. It's a cannonball jellyfish that is quite prolific at certain times of the year. It's right in the area where they conduct shrimping. So, these shrimpers would be out doing their shrimping, and their net would simply fill up with these cannonball jellyfish. They had to pull in their nets every ten or fifteen minutes. They would still have shrimp in there, but then they had to dump all these cannonball jellyfish on the deck and then sort through them all. So, they had an idea of developing a single metal grid, putting it in the rear of the net about in the same position that you would put a TED, and using it to eliminate the jellyballs. Now, it did affect the shrimp catch somewhat, but based on that original idea, we then tested this idea and looked at our monstrosity, the dinosaur that weighted ninety-seven pounds. We said, "Well, these Georgia fishermen have an idea here. So, we're going to try to modify that and implement it." We did, and that was the fundamental, big concept change of the NMFS TED versus, as they call it, the Georgia TED. Now, there may be other fishermen in Louisiana and Texas that will lay claim to the same kind of idea. I'm not sure that they weren't doing some of the same modifications out there, so I don't want to just give all the credit to Georgia. But these were ideas from fishermen. There were several of them that worked. That was the major physical design change that was incorporated in the early days of TEDs. That same concept really is in use today. The TEDs today are pretty much – we've looked of how many different varieties and designs, and that basic concept of a single grid seems to be working. The critical part of it is you have to install it in a net extension that goes – it's really between the trawl and the cod-end. They call it the cod-end where the catch goes. It has to be installed at a pretty precise angle for it to work properly.

SSD: So, installation is almost as important as the design of the TED itself.

CO: That is very important. Pretty much, there's a degree range for a TED to be legal. It has to be – I believe, unless they've changed the regulation – somewhere between thirty and fifty or fifty-five degrees.

SSD: Do you have any idea what the current TEDs weigh?

CO: I think we're talking about a range of thirty to fifty pounds, probably. I would guess maybe forty pounds. That would depend on the material, metal versus aluminum. I know aluminum pipe is a pretty popular material for TEDs these days. The weight has been reduced by a half to two-thirds.

SSD: That is a good improvement. Is there anything else that comes to mind when you think about comparing early TEDs to later models?

CO: The changes that have occurred even after I left the agency were the configuration and size and installation of the opening of the TED. Now, when we first came out with the regulations, as

long as the slit in the net – which is at the business end of the TED – the escape hole, if you will – if it were thirty-five or thirty-six inches, it was sufficient. But what we found over time is if you, by chance, catch a leatherback turtle – and these are very large animals, sometimes weighing as much as two-thousand pounds – it was physically impossible for these very large animals – some adult loggerhead turtles and leatherback turtles – to simply get through the opening. So, there have been modifications and requirements to make the opening larger, but still offer protection in terms of covering the hole with a webbing flap so that shrimp loss is at a minimum. Those are some recent innovations that I think are required by regulation now. That's dealing with the size opening of the turtle escape hole.

SSD: So, the thirty-five to thirty-six inches was the escape hole or was it the grid?

CO: There were different requirements by area of the country. Generally speaking, larger turtles were found in the Atlantic versus the Gulf. The opening in the Gulf, when I left, was thirty-two inches, and it was thirty-six inches in the Atlantic.

SSD: That is not really much of a difference, is it?

CO: Well, you got to remember, based on the size difference of turtles, it was determined those opening sizes were adequate. So, we used the size of the turtle. You have major nesting beaches for loggerhead turtles along the Atlantic seaboard – not as many nesting areas in the Gulf of Mexico. So, some of the rationale is that at certain times of the year, we catch the large adult loggerhead turtles, and we need to be able to make sure they get out.

SSD: Number seven is about TED regulations. Did you have any protests against TED regulations? Did you experience any protests against the regulations?

CO: Yes, we did, to put it mildly. You probably know some of this. That's a leading question, right?

SSD: Yes.

CO: They were extremely controversial. It was not a happy time for us.

SSD: Were you actually going to some of the public hearings?

CO: I conducted them, yes.

SSD: Well, tell me some of your experiences that people might be interested in in a hundred years or so.

CO: Well, it's pretty trying on your patience to sit up in front of an audience of thousands – and I'm not exaggerating, thousands of people – when not a single person out there is really liking what you're saying. You are kind of the bad guy – not that I was the only one doing this, but I was certainly the front man. You have to let the people be heard. Sometimes, these meetings went for four, five, six, eight, or nine hours. Commenter after commenter would come up.



Oftentimes, the purpose of a public hearing is, of course, to inform the public and talk about a government proposal and then to hopefully receive comments from the public that would cause the government to rethink its position and take some of the comments and ideas. We tried to do that, but these hearings were oftentimes just general complaining sessions. A hundred people in a row would get up and say, "I will not use a TED." I think probably one of the most vivid recollections I have was a – actually, it was not a public hearing. It was right before the hearing started where we had a public meeting in Thibodaux, Louisiana, at the civic center. The capacity of that building was about six thousand, but it was filled to the brim. The fire marshal actually had to stop people from coming in because they were starting to sit in the aisles. There were several United States congressmen in attendance. There were five or six of us government types on the stage. The governor, at the time, of Louisiana was Edwin Edwards. What I remember is that, obviously, the congressmen and the governor were allowed to open the meeting and make their initial remarks. Governor Edwin Edwards stood up at the mic and his comment was, "Well, I'll tell you one thing, people," boys, fellows, whatever. "If it comes down to shrimpers and turtles, it's goodbye turtles." He had his fist balled up and he pumped the air, and it brought down the house.

SSD: Good grief. How did you respond to that?

CO: How did we respond? Well, we kind of just sat there and tried to smile a little bit. But anyway, the administrators and the congressmen and the governor, they made their initial remarks, and they pretty much left. Then we had a program of several people. We had an attorney there. We had a member of the Fish and Wildlife Service there, myself. We had some gear people. We all gave our presentations and tried to just explain to the people there what we were doing and why. There were a lot of boos and cursing and yelling and screaming. Then after – oh, I don't know, an hour or two of that, we opened it up for questions and comments. We all stood there as a panel and we heard comments and questions and complaining and hollering and threats and so forth. I think the meeting started at 1:00, and by about 9:00 that night, people were just kind of spent. They were getting tired, and we were too. Then I heard noises and so forth in the back. They were bringing in the beer and the whiskey and the food and the crawfish. They were going to have a party out there. Well, after it was all over, believe it or not, we were kindly invited to join in, and we did. I give a lot of credit to the people in Louisiana. I mean, they vented and they hollered and they bitched and they complained. Then after it was all over, they invited us for food and drink. They would come up to us. I remember several people coming up and saying, "You know, I did stand up there and tell you I never caught a turtle. But in reality, I have caught and killed some." They would tell you. We had some environmentalists there that were so concerned they actually left the stage and got on a plane and got out of there because I guess they were fearful of their safety.

SSD: You mentioned threats. What kinds of threats did they make?

CO: Well, I never heard any directly made towards me. We were called everything under the sun. I was referred to as the antichrist, a communist pig, that sort of thing. I've had magazines thrown at me. We did have our security forces there. They wouldn't have made a whole lot of difference with a crowd of six thousand. They were just not real happy times for us.

SSD: Well, when you mentioned bringing in alcohol, I thought, sometimes, people will experience a failure of good judgment when they drink alcohol. I was afraid it was going to escalate, but maybe it actually just relaxed people enough to tell you the truth about catching turtles.

CO: Well, they didn't bring the alcohol in until after it was over. I did have a cohort that was – when we got to the public hearings, I think we had about fourteen or fifteen in the Gulf of Mexico. I was doing the Texas ones, I recall. A friend of mine or a co-worker from Washington was doing some of the others simultaneously. I remember talking with him. He had conducted a public hearing in Chalmette, Louisiana, at a big auditorium there. His attendance was on the order of 3,500. When he got ready to start the hearing – they had a bar there. They had it open and they were serving beer. He finally went up and he said, "If you're going to serve alcohol at this hearing, I'm going to cancel it." We did have that right to do that. Basically, when things really started getting out of hand like that, I had to do that once or twice and just say, "Look, I'm just not going to put up with this kind of stuff. We just won't have the hearing. I'll just abandon the hearing." I never had to do that. Things usually calm down after that. Those were just a couple of experiences that I recall from that period of time.

SSD: Do you recall any feedback from those public hearings that was helpful in...

CO: Oh, yes, certainly. Certainly. There were constructive comments. There were people that talked about the certification procedure and the need for us to consider innovation from the industry. There was also comments that we needed to kind of go step-by-step approach, and instead of mandating these regulations all at one time, we had to concentrate on the most sensitive areas. We actually did incorporate a lot of those comments and ideas. But by the same token, there were helpful comments from the environmental community that, of course, they wanted to – they had lived with high mortality of turtles by the shrimp fishery for years and years. Their patience was growing thin as well. They said, "Well, we know you've had a voluntary program for six years and it's not working. You can't really say there's TED use." So, we had to kind of take both sides and weigh them and try to come up with the best alternative.

SSD: For the record, can you define certification procedure and talk a little bit more about that?

CO: The certification procedure – and I believe this is still in the regulations, just remembering that I have not looked at these regulations in more than ten years. There is a fairly formal process for TED certification. It has to be an idea from – it doesn't have to be, but the idea would come from the shrimp industry. We would kind of hope that they would have tried their idea first. We've had some ideas that are presented to what we call our gear specialists at the Pascagoula Laboratory. They might look at this thing, and they'll tell you right up front, "This thing isn't going to work." Now, I'll go ahead through the certification process, and then bring me back to that point, because I'll give you an example of one of those crazy idea kind of a thing or two. But they submit their idea and design to the Pascagoula Laboratory. Then they might do some preliminary testing to kind of seed out the good ideas from the bad. Then either once a year or every other year, depending on how many ideas we may have – some years, there just are no ideas. Usually, we'd like to wait to see one or two different ideas. But it's a fairly long and detailed and logistically demanding process where we've got to make sure our Galveston lab has

sufficient numbers of turtles of the right size. We have to send a crew over to our Panama City Laboratory, construct a pen. We have to arrange for the trawl vessel. We have to do it in fair weather, of course. We will send a team of four, five, six people, crew, divers. Over a week period, we will then install the candidate TED in a net. Obviously, the designer of this idea is encouraged, welcome to participate. We will take – I don't remember the numbers. Probably – I don't know, fifteen or twenty turtles. We will keep them in tanks on board the vessel. We use the Panama City area because the waters are nice and clear, and you can see with underwater cameras. So, we'll send a diver down. We'll introduce a turtle into the front of the net and film it. As it goes through, camera in the net, and you can actually see the turtle encounter the TED. Then we measure the time from when it's first introduced into the mouth of the trawl. Sometimes, they get hung up in the wings of the net in the side, and it takes them a while to get back to the TED itself, but it's based on total release time. From the time this turtle enters the trawl, how long does it take the turtle to get out of the trawl? We film all this. Then sometime later, after all the testing is done, we will have a meeting, usually at our Pascagoula Laboratory, and we have a panel of outside experts – environmentalists and shrimpers – that will review the results of our testing. This is not the government deciding. It's the panel deciding. Then they come to a scoring, by scores. Did he get out or didn't he? Yes or no? There's usually some discussion and debate. "Okay. Well, he was hung up." So, that process generally takes several days. So, if a TED meets the asset test, then it would be submitted to the regulatory people that now are in St. Petersburg. A regulation modification will be adopted, go through the system, and that will become then a viable TED, and an option for the shrimp industry to use.

SSD: Well, what do you think about the possibility that wild turtles might react differently to the TED than the lab turtles?

CO: What do I think of that idea?

SSD: Right.

CO: Not much.

SSD: You do not think there is a big difference in the way wild turtles would get in or out of it than the lab turtles who have never been in the sea before?

CO: Well, there's a couple problems with that. Even if it did make a difference, how would we get enough wild turtles to conduct these tests? I don't really think it makes a difference, because I – nothing against turtles, but they're not the smartest animals in the world. They have a brain the size of a walnut. Their main objective is to swim around and eat and sleep and whatever. I really don't see how, when you introduce an animal into a TED, whether this thing has been raised in captivity or not is going to make any difference, because it's more of a physical thing. The turtle is not going to outswim the trawl. He's going to be forced back ultimately to this barrier, and then he's going to be – through his own momentum and the flow of the water. Sometimes, his flippers help him get out. Sometimes, they hinder him to get out, because they might wrap a flipper inside the TED itself. So, it's just a matter of how does it get out. But I think, realistically, even trying to do it with wild turtles is just kind of not hardly doable.

SSD: How many turtles are we talking about per test?

CO: I don't remember. We'd probably take a hundred over there or so.

SSD: Wow, that is a lot.

CO: Yes. I mean, it's not one or two turtles getting through. I would have to refer you to our Pascagoula Laboratory to answer some of these specifics about numbers of turtles and so forth.

SSD: Just ballpark figure, I was thinking. About a hundred, you think?

CO: Yes, they'd probably take a hundred turtles over there.

SSD: Why do people submit their ideas? What motivates them to submit an idea for certification?

CO: Well, they may not like the TED choices out there, or they may be in business to produce TEDs and say, "Well, let's test my idea, and if it works, then I can sell TEDs."

SSD: You said that there were some crazy ideas you wanted to get back to that you just would look at them and decide, "Oh, that wo not work."

CO: There was one idea that came out of Louisiana. It had a little explosive charge or something attached to it, as I recall. What was supposed to happen is when the turtle got back to the opening in the TED, some small charge explosive device was supposed to be triggered, and it was going to cause the turtle to swim out of the net. We haven't really touched on foreign use of TEDs, but we can get to that in a little while. But foreign governments are also required to use TEDs, by the way. We had an idea from Thailand. We had some Thai government people and fishermen come over. They have what they call their Thai TED. Well, one of them had an idea, and he says, "Well, we're bringing a TED made out of rattan." Do you know what rattan is?

SSD: Well, for the record, let us define it.

CO: Rattan is like a bamboo that make a rattan chair. A flexible, vegetative stalk like bamboo is rattan. Well, they had brought over a TED made out of rattan. We kind of laughed at it, and they did as well. But we did put it in the net and did take it out and test it for them, and it obviously didn't work.

SSD: It did not work?

CO: I don't really think they thought it was going to work, but they had some fishermen that came up to them and said, "Let's try it."

SSD: I guess it was a readily available material.

CO: Yes, readily available and cheap.

SSD: Well, is there anything else that comes to mind when you think about your experiences with protests against TED regulations?

CO: I mean, I could go on and on about different times, but suffice to say they were interesting. They were highly controversial. They were trying on a person's soul when...

SSD: Did you ever fear for your safety of bodily harm or your life?

CO: No, I never did.

SSD: Well, that is good. Number eight, have you ever been involved in enforcing compliance regarding the use of TEDs?

CO: Yes, I have. I was not qualified as an enforcement agent, but from working with TED for so long, and from developing the regulations and knowing the specs, both domestically, but more so internationally – I remember when TEDs were first put into place. When the Texas shrimp season opened, there was a fairly massive enforcement effort during that first year. I was assigned to work with one of our law enforcement agents for a week or two in Texas to physically go with him, and from a technical standpoint, advise him on the technicalities. I don't want to imply that the enforcement agents were not competent enough, but they were new to the process. There were enforcement agents that – when the rule first went into effect, there was not time to give all of them specific training in the specifics of TEDs. So, I was involved from that standpoint of working with them and saying to my enforcement counterpart, "This is illegal. This meets the specs." It was then his call as to what he did from an enforcement standpoint. Beyond that – I don't know if you're hearing a beep or not.

SSD: Well, I just keep hearing you cut out.

CO: Well, we have this call waiting. So, somebody's trying to call me, but I never pay any attention to that. It'll go away in a second. It's gone now. I just want to explain that beep.

SSD: Thanks.

CO: In 1990, because the U.S. industry was so concerned about having to use TEDs, and since approximately eighty or eighty-five percent of the shrimp consumed in the United States is imported, a certain fisherman went to their congressman, John Breaux in Louisiana, most notably, and said, "Senator Breaux, we have to use TEDs now, and we're doing that. But all these other Central and South American countries, they catch shrimp, too. They sell it to the United States. They have turtles down there. They kill turtles, and they don't have to use these TEDs. Fair is fair." The congressman says, "Yes, you're right." So, they modified – the Commerce, Justice, and one other agency that I don't recall – our appropriations bill to require the introduction of TEDs to the foreign countries that exported shrimp to the United States. I left out an important – the State Department. Commerce, State Department, and Justice are all funded under the same appropriations bill, so they modified that bill to insert this requirement. So, we then embarked on an effort to introduce TEDs to foreign countries. Initially, it was only

to Central and South American countries, because that was the interpretation that we had of the legislation. Later, it was determined that that interpretation was not correct, and it did not just apply to the Americas, if you will, but it applied around the world.

SSD: Is there a lot of shrimping done around the world?

CO: Oh, yes.

SSD: In most seas?

CO: Any warm water country is going to have shrimp, and they're going to have turtles. They're likely going to have some kind of trawl fishery to capture those shrimp.

SSD: Well, I would venture to say that in some of those countries, they are selling the turtles to eat as well.

CO: Oh, yes. True. Probably so. But we embarked then on a major effort. For the last twelve years of my career, that consumed a majority of my time, going around to these foreign governments and saying, "Okay, this is a TED. We have a U.S. law that says, if you don't use these TEDs, we're not going to buy your shrimp anymore." We phased in the use over a three-year period. We gave them time to learn, just as we did with the U.S. industry. Then coupled with the State Department, the international arm of the government that deals with foreign governments, we, myself, and gear people from Pascagoula, went on periodic inspections working with the enforcement outfits of the countries – because we had no enforcement power – to go out and physically inspect and determine use of TEDs in their shrimp industry. If it didn't meet certain standards, then the State Department – obviously has the final call – would actually embargo the country from exporting shrimp to the United States.

SSD: Do you think that it had a big effect on compliance with the use of TEDs overseas?

CO: A big impact from what standpoint?

SSD: Do you think that the embargo made shrimpers comply with TEDs requirements overseas?

CO: Oh, absolutely, because in some economies, the exported shrimp may be the number one or number two or number three most valuable export they have.

SSD: Do you have any outstanding memories of adventures that you had overseas doing that work?

CO: Well, you talked about safety, yes.

SSD: Well, tell me about that.

CO: I was more concerned with my safety in some of those foreign countries than I was protests from U.S. shrimpers.

SSD: Does a specific example stand out?

CO: Well, yes. I was followed by malcontent in Rio de Janeiro, Brazil, once that had a knife. We were fortunately warned by a cab driver that this guy was following us. Well, I had my pocket picked on a subway in Venezuela, but that's not really threats to my life. I had some fairly harrowing airplane rides in those countries. It's a different world down there.

SSD: How so?

CO: Pardon?

SSD: How so? How is it different?

CO: Well, we're going into some pretty undeveloped areas of the world. Guyana is kind of a scary place. Columbia can be scary at times. India is kind of a rough country sometimes in terms of accommodations and so forth. I got lots of stories that I could go on and on about, but it was interesting.

SSD: Yes, it sounds like it was. Is there any anecdote that you would be willing to put down on the record for?

CO: Well, if you talked to Gary Graham yesterday – I'm surprised he didn't tell you this story. Maybe he did, because he jokes with me about it all the time. When I was in India, I was in a very remote part of the country in the south, and I was stuck in a government guest house that wasn't the nicest place in the world. There was really nothing around there. I'm pretty sure I was fed a rat for dinner that night. [laughter] It wasn't actually too bad because they put a lot of curry on it and so forth.

SSD: Just think of it as squirrel.

CO: Yes, that's true. Anyway...

SSD: There were those kinds of adjustments to make.

CO: Yes.

SSD: Does anything else come to mind when you think about your work enforcing compliance using TEDs?

CO: Anything else come to mind? No, nothing specifically, Stephanie.

SSD: Well, let us move to question nine. Do you know how compliance regarding TEDs and their use has changed over the years?

CO: I think that the shrimp industry now has, albeit reluctantly, accepted the use of TEDs. I

think, generally, enforcement is probably easier than it was in the earlier days. I'm still not saying they don't make cases for TED use, and there's still probably some cheating going on. But I think pretty much law-abiding citizens are out there now. There's always a few bad apples in every situation, but I think it's largely been accepted.

SSD: Has enforcement of the use of TEDs changed over the years? Are there any new technologies or methods for enforcement that you know of?

CO: Well, when you say technology, when you're really dealing with a physical piece of gear, and the only real way you can determine whether it's being used legally or not is – at-sea boardings are critical. You can look at a vessel at dock and examine its TEDs. They might be perfectly legal, but you never know at sea, when that trawls in the water, whether it's being used legally or not, because you can pretty much disable a TED with a six-inch piece of string if you want it to. You can just tie the flap shut, and it won't be functional. Then you can just cut that thing off and make it inoperable. The National Marine Fisheries Service has a few Zodiac-type boats primarily used in the Western Gulf, but not a lot. So, we rely heavily on Coast Guard patrols. We'll put agents and gear people on Coast Guard vessels, and they're doing routine patrols. They're doing fishery -boarding, but they're also looking at vessel safety and for drugs. They have a multitude of responsibilities. We're kind of at their mercy to do TED patrols. So, you really got to have the at-sea enforcement component for this to be successful and operational.

SSD: Did your agency engage with other agencies to enforce the use of TEDs? You mentioned the Coast Guard. Is there any other...

CO: State agencies, too. We do have cooperative enforcement agreements with states. Some states have passed their own TED laws, and they use their own enforcement people to enforce their state law. So, it's a combination of things, primarily Coast Guard, our own vessels, and through states.

SSD: In your opinion, how have TEDs affected the shrimp industry?

CO: How have they affected the shrimp industry? I think they've had a minimal effect on the shrimp industry. I think, probably, they've caused some marginal operators to go out of business. I say marginal, because you will hear from the shrimp industry – and legitimately so, that yes, there is some shrimp loss with TEDs. But if the TEDs are used properly and installed properly and monitored properly – and I mean, as the net stretches and the angle changes slightly, yes, it can affect shrimp catch. You've got good operators and bad operators, and fishermen in general are no different. If you've got the guy that doesn't really maintain his gear properly and just kind of goes out there and throws the nets over and just drags away, and he was barely making it to begin with anyway, some of those people may have gone out of business. But I think, in large part, the TEDs are not the biggest problem the shrimp industry faces. I would say it's, again, competition for a finite resource and competition from foreign, primarily, aquacultured shrimp.

SSD: Those are much bigger problems than carrying a TED in your net?



CO: In my view, yes. Even though you might have a little bit of shrimp loss, the shrimp haven't been lost to you forever. They're still there. You may lose three percent on one drag, but you may pick those back up on the next tow. So, it's not like they're going away. They're still there.

SSD: I actually interviewed one shrimper who is inshore. He does not go out into the Gulf. He is in the Mississippi Sound and the estuaries. He thinks that the TEDs actually increased his shrimp catch because they get rid of a lot of other bycatches that was taking up the space in his net.

CO: Well, that's very encouraging to hear that kind of statement from a shrimp fisherman. Well, TEDs do in fact have a side benefit of eliminating trash and unwanted catch. They do, in fact, do that. The jellyball problem in Georgia, and they're towing for shrimp in the midst of jellyballs, they couldn't tow without a TED, basically – and call it a jellyball shooter or whatever you want, the predecessor. They couldn't do it. I've had fishermen in Indonesia tell me that they like TEDs because it eliminated sea snakes from their trawl.

SSD: What is that? Oh, sea snakes.

CO: Sea snakes, yes. A very poisonous animal, and they're prolific around the Indonesian islands. Even though there's not a lot of shrimping in Indonesia, in the very far eastern part of Indonesia, they have a shrimp fishery there, conducted primarily by the contract to Japanese trawlers. But we visited them and evaluated their TED use, and they were quite pleased with them. That was a side benefit that fishermen told me. They said, "Yes, we like them. They eliminate the sea snakes."

SSD: That is great. Sea snakes are very venomous.

CO: Yes. They don't want a twelve to fifteen-foot sea snake flopping around their deck.

SSD: Have to get rid of that, yes.

CO: They also eliminate big bat rays, as they call them, or sting rays, lots of times. They'll shoot those out.

SSD: Also, venomous creature that can hurt you or kill you. I remember taking a first aid class. There is a chapter on venomous creatures and what to do, get to the hospital as quickly as you can for the antidote. But for sea snakes, it was making the victim as comfortable as possible, because I do not think there was any anti-venom at the time that I...

CO: Yes, if you get bit by one, you're pretty much a goner.

SSD: Question number thirteen. How have TEDs affected the sea turtle population?

CO: I think they've definitely helped the sea turtle population. I think, even though no one probably has accurate counts and numbers for how many sea turtles there are, we have been relying on trend data for years and years and years. I believe I'm correct, even though I don't

follow that closely anymore, that sea turtle nesting numbers – even though they vary and there are cyclical periods, I think, generally, they are up from past years.

SSD: Is that T-R-E-N-D? Trend data?

CO: Trend, nesting trends. Yes, numbers.

SSD: Anything else you want to add to that?

CO: Well, I think that it should be pointed out to people that are partial of the shrimp industry that the agency is fully cognizant of the fact that death in shrimp trawls is by far not the only cause of sea turtle mortality. We are and have been looking at other fisheries and other kind of operations to reduce the mortality from those sources. Even before we introduced TEDs or required TEDs, we know for a fact that when channels are deepened or dredged, turtles are taken in those dredges. We have worked for years, even as early as 1980, long before TEDs were required, to basically restrict channel dredging operations to minimize the take of turtles in hopper dredges. They have these big vacuum cleaner type things that suck up dirt and silt and mud from the bottom. From time to time, they suck up sea turtles as well.

SSD: So, the dredger is a big machine that moves the bottom around to make a channel deeper or to put sand up on the shore, just for the record. Are the restrictions, say, during a time when turtles would be known to be congregating there?

CO: Absolutely. There is an interesting area just south of where I live here in Flagler Beach, in Cape Canaveral. For some reason, that is a favored sea turtle habitat, the Cape Canaveral channel. In fact, when we were first testing TEDs, we used to call that our sea turtle library, because the amount and abundance of principally loggerhead turtles in that channel is just phenomenal. The Corps of Engineers is in a pretty frequent mode of dredging that channel and keep it deep enough where there's a naval submarine base there. We documented it as early as 1980 that turtles were being taken in these hopper dredges. So, we have now prohibited that area – at certain times of the year now, when turtles were present – from hopper dredging. We've looked at other types of dredging to maintain the channel. We have expanded that dredging window, as we call it, to other major ports along the Atlantic and Gulf of Mexico seaboards to ensure to reduce the extent possible of any mortalities of turtles in dredging operations.

SSD: What other kinds of dredges are there besides the hopper that would help the turtles?

CO: Well, some of them are probably not as efficient as hopper dredging, at least for channels. But you have bucket dredges that are simply like a crane with a huge bucket on the bottom that you drop into the water, and then you close the jaws of the bucket like an old steam shovel, if you're familiar with that technology. Then you just pull it up and you dump the spoil into a waiting barge or onshore or whatever.

SSD: That is not as hard on the turtles?

CO: No, because a hopper dredge is a moving mechanism. There are two of them, one on either

side of the dredge. Well, it's like a big vacuum cleaner is the way I would describe it, with an opening in the front of probably four, five, or six feet, and it's got the sucking action. So, it's sucking up everything in its path.

SSD: Maybe compressing it and just physically damaging the turtles?

CO: Yes. It funnels it through a big tube attached, and there are grates inside of it that reduce and break up the solids. A turtle is a solid, and it's going to just pretty much chop this turtle to pieces, and then you're going to get the pieces out in the hopper. We put monitors on the dredges that inspect the hoppers and look for turtle parts. We do allow some take of turtles. That's a requirement in the law under Section 7 of the Endangered Species Act, that you can legitimately allow a small take of animals. Certain species, the quota might be one. But if there are more of the animals present and they're not as endangered – it could have the threatened status, which is not as severe – you might allow four or five or six of those per project. But once that quota limit is reached, then that operation is totally shut down.

SSD: Any other dredges besides the bucket dredge that are...

CO: There's the pipeline dredge too, which is a stable, non-moving operation. Usually, those are used for beach renourishment where they have a pump and a long, long tube that will go out into the water and just through a sucking action – but the business end of the dredge is not really moving like a hopper is. They will suck sediment out and then suck it through the tube and deposit it into the beach or wherever they're trying to deposit the material.

SSD: In Mississippi, the beaches are completely man-made. We would not have any sand beach if we did not dredge, so I am hoping that it is the pipeline dredge that we are using.

CO: Yes, that would be pipeline. That would be pipeline dredging.

SSD: So, if the turtle gets deposited in the sand on the beach it is just going to automatically go back into the sea?

CO: Well, the take of turtles by that method is nil or close to as possible. I think we had one instance – and we have monitored these types of dredges. We have put observers at the outfall. I think in one rare case, once, down at Canaveral, we saw one turtle. But for thousands and thousands of hours of observation, it's not really been documented to be a problem.

SSD: Good news for turtles. Number fourteen, the question is kind of a philosophical question that I thought it would be interesting to ask everybody involved in this work. Why are sea turtles important?

CO: Well, they're important from a couple of different viewpoints. Number one, they have certain aesthetic value. People like turtles. They like to see them. They like to think that they're a wild, natural creature and part of our environment. You can't really put a value on the aesthetics of a turtle, that people like turtles. Secondly, they do have commercial value. For years and years, the meat was used. The skin was used to make leather. The eggs are consumed

probably legally and illegally. Some countries eat turtle eggs. A lot of countries, people in foreign governments – countries do. You can make various products out of the shell, particularly of hawksbill turtles. They're very decorative and shiny and pretty. I know they used to make eyeglass frames out of hawksbill turtle shell and jewelry. You can still find that in some places. But again, there's a commercial value. Now, will we ever get to the point where we recover the species enough where they will not be protected anymore, then it would be a commercial commodity again? I'm probably not going to see that in my lifetime, for sure, but you never know if things work the way they're supposed to. The goal of the Endangered Species Act is you protect and recover a species until such time as you don't need to protect it anymore.

SSD: The wolves are kind of getting it. They are in the crosshairs right now. They have been endangered, and as soon as they were put off the list, they started being hunted.

CO: So, the cycle started all over again. But it takes years and years and years for some of these things to happen.

SSD: For them to come back, but it does not take so long to wipe them out.

CO: Well, that's true. That's true. You're right.

SSD: Number fifteen, do you know what the penalty is for netting sea turtles?

CO: Well, the maximum penalty for killing a sea turtle used to be – at least in 2001, the fines were a monetary fine of up to ten thousand and up to one year in jail. Now, those penalties may have been modified since I was involved, or they may still be the same. I don't know.

SSD: Well, we will just put 2001 on that as the date.

CO: Yes. In 2001, the penalties were ten thousand and up to a year in jail.

SSD: Well, that is the end of the questions that the grant actually required that we ask. If you have time to go through some of the other questions, these are questions that we would have asked you. If I had been interviewing you strictly for the Center for Oral History, I actually would have started out with the question number sixteen, "Where did you grow up, and tell me a little bit about that," because we feel that in years to come, researchers are going to be interested in just the...

CO: Who are these persons, right? What does he know? Where does he come from?

SSD: Yes, but also just the things that seem ordinary to us in one hundred or two hundred years will be arcane. So, do you have time to talk about that a little bit?

CO: Yes, I've got some time. Yes, sure.

SSD: Where did you grow up? Tell me about that.

CO: Well, you asked me first of all where I was born. I was born in Pittsburgh, Pennsylvania. I lived with my grandparents, mostly. They retired and moved to Florida in 1952. So, I was ten or eleven years old. I grew up in a little town called Sanford, Florida, which is only famous because it's only twenty miles north of Orlando, which everyone's heard of. So, I spent my developing years there, and even after my marriage in 1968, I resided in that area. When I went to work for the Fisheries Service, my first job was in Little Rock, Arkansas. My job as a marketing specialist was to promote the farm-raised catfish industry. Then after a couple of years doing that, I was moved into the regional office of National Marine Fisheries Service in St. Petersburg and spent virtually most of my career there until I retired in 2001, and then moved to Flagler Beach, Florida.

SSD: Why did you decide on Flagler Beach?

CO: St. Petersburg is wall to wall people. It's very crowded. I moved to an area of Florida that was less developed and less crowded and found my dream place over here. That's where we are.

SSD: I looked it up on the internet. It looks beautiful. I grew up in Gulfport, Mississippi, so I was a beach rat. But it is just a little different kind of a beach there. How has Sanford, Florida, changed since 1952?

CO: Well, it's become a bedroom community of Orlando. When I drive through there or over that way – I go to St. Pete from time to time. My wife has brothers in Orlando – and I see signs for bedroom communities that didn't exist when I lived there. There used to be only a two-lane highway from Sanford into Orlando when I lived there. Now, it's all interstates and traffic and everything. But just like anywhere else, it's expanded exponentially from what it used to be.

SSD: Very developed now. Why did you choose your career path?

CO: You mean for the government or in development or protection of endangered species?

SSD: Well, I guess, really, why did you decide to study what you studied in school and go into the work that you have done in your life?

CO: Well, I went to the military after high school. I couldn't afford to go to college, and I wasn't quite athletic enough to get a basketball scholarship or quite smart enough to get a scholastic scholarship. So, I went and served my country for four years.

SSD: What date did you go in?

CO: I went in right after high school in 1960.

SSD: Vietnam was just starting up then?

CO: I just got by the skin on my teeth. I was in from 1960 through [19]64 and spent a couple of years in Illinois and a couple of years in North Africa. Then came back and decided I better get some more education if I wanted to be a success. So, I worked various jobs and went to school

at night and on the weekends and got a business degree, and then, ultimately, got a master's degree. It was ironic I was taking a marketing class in graduate school on how to market smoked fish. Our instructor talked to someone with the Fisheries Service at the marketing department and said, "I've got this class that's done this project on how to market smoked fish." We had a final presentation at the end of class, and he invited him over. He said, "Well, I'll try to make it," but he didn't. But he said, "By the way," he said, "I'm looking for some recent graduates. I have an opening or two for fisheries marketing specialist." So, the instructor just mentioned that in class one day, and just on a whim, I called [inaudible] talk to this person. He said, "Well, come in for an interview," and I did. I guess he liked what he saw, and I was graduating. So, I said, "Well, this is pretty good opportunity. I'm going to take it." So, I did, and he said, "I want you to go up to Arkansas and help out the farm-raised catfish industry get their production and marketing programs going." So, I was a one-man office up there.

SSD: About what year was that?

CO: That was in 1972.

SSD: Was farm raising of catfish just starting out then?

CO: It was just starting, and the production at that time was on the order of ten million pounds a year. Now, I've seen recent numbers that it's probably up close to two hundred million pounds a year.

SSD: That is a lot of catfish.

CO: When we talked earlier, I talked about how the mission of the National Marine Fisheries Service changed over the years. Back then, we were hopefully providing some services to the fishing industry and helping them develop their products and increasing seafood consumption across the country and foreign countries. Then over the years, we evolved from a – not that services is still not a function of the Fisheries Service, but more from a service organization to a regulatory management agency.

SSD: Do you think that overfishing had a lot to do with that change?

CO: I think overfishing, increased seafood production, overall growth in populations – a combination of factors, yes.

SSD: More people eating, more consumption.

CO: The thing that really, I think, was the impetus for passage of the Fishery Conservation and Management Act was the fisheries off of New England that were traditionally – the cod and the haddock and the flounder and so forth, the bottom fisheries up there, and the foreign – intrusion is probably not a big word, but that's what comes in my mind. Foreign vessels were capitalizing on those fishery resources and those productive fishing grounds, and New England fishermen were somewhat upset by that. Really, I think the New England fishing community is the one that lobbied their Congress. They were saying, "We want these fisheries for ourselves. We need to

extend our fisheries jurisdiction out from three miles to two hundred miles." The Congress listened to their constituents, and therefore, they passed the Fishery Conservation and Management Act, and the foreigners were pretty much booted out. That was really what started the whole process of fishery management in the United States.

SSD: Well, you are retired now. If you do not mind just sharing for the record, what is a typical day of retirement for you in Flagler Beach like? [laughter]

CO: Excuse me just a minute. I have to cough on you. [coughs] I'm sorry.

SSD: That is okay.

CO: Well, retirement isn't all that I thought it was going to be. It was for a while. After I retired, I enjoyed the fishing and laid back. I actually did do some contract work for seven or eight years after I retired. Not that I really wanted to, but I did have a three-year contract with the Fisheries Service to participate in these foreign TED evaluations. There's a lot of countries that need to be visited. I had experience, so they contracted with me to do that for a couple of years. Not full time, but I would work on that for a couple of months each year. Then I talked about channel dredging. I left out one part in terms of turtle protection, and that's a requirement to go out and put – some trawlers, believe it or not, trawling through the channels that were being dredged, for the purpose of capturing turtles, not using TEDs. We wanted to capture them – and using very, very short tow times, of course, to not kill the turtles. Then we moved them, relocate the turtles offshore.

SSD: So, were you doing that before they dredged to try to protect them?

CO: Well, during dredging.

SSD: During? Okay.

CO: Yes, during a dredge, we'd be working. These projects go on for four or five months. So, I actually was employed by a company that did that under contract work to the Corps of Engineers. I was an observer on the trawlers to capture and tag and weigh and measure and release the turtles. So, I did that for a while. Additionally, I did some contract work for the same company working on naval vessels in something called ship shock testing – S-H-I-P, S-H-O-C-K, testing. What that entailed is when the Navy comes out with a new class of vessels, they conduct testing using explosive charges to test the structural integrity of the hulls. I did two projects of that nature; one in the first year after I retired, and most recently, the year before last. I served as an observer and assistant chief scientist to be on board the ship along with a cadre of ten or twelve observers to look out for sea turtles and marine mammals to ensure that there were none present when they set off these explosive charges near the ship. So, I did that, but I got off track a little bit. So, in addition to some of the contract work I did, my wife and I have now moved back into what we call the sandwich mode. We have three darling little grandchildren that we babysit two days a week. We also care for my wife's aged parents that are both in frail health and in assisted living facilities. My wife is a nurse, and we monitor their care and wellbeing. So, the days that I have to actually sit and relax and enjoy are more limited than they

were.

SSD: It sounds like you have your hands full.

CO: We do from time to time, but we still enjoy life. We take a cruise now and then and travel a little bit. I try to get in a little fishing now and then.

SSD: So, you are still fishing after all those years dealing with fish?

CO: Yes, I like to fish.

SSD: What are you trying to catch?

CO: Well, mostly, it's inshore stuff – trout and redfish and flounder, things like that. We live across from the beach, so I try to get over and do a little surf fishing now and then, or take walks on the beach, count the turtle nests.

SSD: Oh, really? You just can not stop.

CO: Quite a bit of turtle nesting here on Flagler.

SSD: That is great.

CO: Believe it or not.

SSD: Do they generally go undisturbed by people?

CO: Yes. There is a voluntary group of people that monitor and keep track of the nests. I'm not part of that group, but I used to – on my early morning beach walks, if I happen to see a fresh crawl and a nest, I would report it to them and so forth.

SSD: Now, what is a fresh crawl?

CO: Well, that means when you see fresh tracks that haven't been washed away, that means that a turtle came up during the night and laid a nest. I mean, as soon as the tide comes in, those tracks will be washed away. So, it's important to get out there and mark the nest while you still know it's there.

SSD: Anything else come to mind for your typical day of retirement?

CO: Well, we have a homeowner's association here. We kind of maintain the area ourselves, and I'm active in that. So, there's always something to do – or do yard maintenance or work around the house. I don't quite understand how it is that my day is always pretty much filled up with things to do.

SSD: I know. Vacations turn out to be like that, too.



CO: Yes.

SSD: Well, in your opinion, does bottom trawling harm the ecosystems of, say, the Gulf of Mexico or even off the Atlantic coast?

CO: Yes. I think bottom trawling has to have somewhat of a detrimental effect. If you've got a nice flat bottom and there's not too much flora or fauna down there, it's probably not really harmful. But trawling, you're dragging a big chain and these drawers across the bottom. So, it's going to upset the aquatic environment to some extent. There are certain areas nearshore in the Gulf of Mexico and all. They've been trawled so much, it probably doesn't really affect them too much. But if you get close to rough areas or even close to coral, you're obviously going to do major damage there.

SSD: I know that there is the John Pennekamp Reef off of Florida. Is there any other coral that could be harmed around the Gulf of Mexico?

CO: Yes. You have coral reefs, certainly, throughout the Keys and the Dry Tortugas. You do have shrimping down in those areas, and there are restrictive areas where there are no trawling. But there's still the odd case of – whether intentionally or unintentionally – a trawler venturing into a closed area and destroying bottom habitat, coral, and so forth. Then you've got a fairly large natural reef off of Texas, the Flower Gardens Reef, which I believe is a national marine sanctuary that got a lot of coral formations. Certainly, trawling is going to have an adverse impact on those areas.

SSD: Are there any additional ways to modify nets besides TEDs that you know of that would prevent harm to sea turtles?

CO: There have been a lot of different methods tried throughout this TED experiment development phase. The very first approach that was taken by the Fisheries Service was to put a series of metal grates or bars over the front of the net. If you can envision a very wide platform made out of metal with vertical bars spaced from top to bottom that served as kind of a cage that would prevent turtles from even entering the trawl...

SSD: How big would that be?

CO: Pardon?

SSD: How big would that be?

CO: Well, a trawl width is generally at least thirty feet, and sometimes as wide as sixty feet. But they tried the metal grate – and there's actually some shrimping, particularly off the upper west coast of Florida, the bait shrimp fishery uses – they call them beam trawls, where there's actually this front beam, the trawls are smaller, but they're trying to catch live shrimp for the live bait market. So, they employ these kinds of trawls. That idea was tried, but it was just too big and cumbersome for commercial shrimping, other than non-bait shrimping. Then we tried webbing

mesh barriers across the front of the trawl. The first approach, let's keep the turtle from entering the net to begin with. They tried an upward shooting configuration and a downward shooting configuration, using fairly large-sized mesh like five or six or eight, ten inches. It basically worked somewhat on turtles. I think the turtle exclusion rate was something on the order of seventy percent, because you would have occasionally a turtle that would get entrapped in the mesh webbing. Also, the shrimp losses were too high. Shrimp losses were on the order of thirty percent. So, even though the mesh was big, if the shrimp happened to hit the twine of the mesh, it would be excluded as well.

SSD: So, all those other methods really did not work?

CO: No. You've got to remember, the Fisheries Service spent probably ten or fifteen years working on technical solutions to this problem. This research started in the mid-[19]70s, really. We knew there was a problem. We knew that turtles were captured in shrimp trawls. But it was just a very long, arduous process to try to come up with a technological solution that was "acceptable" to everyone.

SSD: Do you know what the dead zone is in the Gulf of Mexico?

CO: I've heard of the dead zone, yes. Not being a biologist, I'm not sure I could adequately describe it. But I think it's a case where very few, if any, life forms exist, vegetative or otherwise – basically a very low oxygen content of the water. What causes it? I've read speculative reports, like in the summer, when there's not a lot of wind or tide movement, these zones can develop – basically low oxygen zones.

SSD: They develop in other places besides just this one in the Gulf of Mexico?

CO: I have not heard it described from other areas other than the Gulf.

SSD: Do you know if it has any effect on shrimp and sea turtles?

CO: Well, yes. I would think you would find any in those anoxic areas or low oxygen areas.

SSD: They just avoid it.

CO: Yes. They will avoid it, sure.

SSD: What happens to bycatch that die when shrimpers snag them?

CO: Well, there's some bycatch that's marketable. If they catch some fish that are legal and marketable, they will certainly take those to the fish market and sell them. But that's a very small percentage, I think. I mean, they're after shrimp, let's face it – a high-dollar, high-value crop. So, they shovel it overboard through the scupper holes on the deck. It's fed on by birds. There's always a flock of birds following every shrimp trawler I've ever seen. Then of course, other fish and wild animals in the Gulf – or in the sea will certainly feed on that bycatch.

SSD: Somebody else will eat it?

CO: Something will eat it, yes.

SSD: That is good news. The last question that we would like to ask is this one. Is there anything you would like to put on the record that we have not talked about?

CO: I would just like to pass on to anyone that listens to this recording to try to approach it from an open-minded standpoint, and to try to take a long look at the big picture and to gather as much data and information as they can to formulate their opinion if they're working on a problem to develop a solution to it – primarily for students and other people, just go into this whole issue open-minded and try to look at the whole picture.

SSD: Well, I want to thank you so much, Chuck, for taking the time to talk to me today and sharing all this experience and expertise that you have had.

CO: Well, thank you very much. It's been a real pleasure. I hope that my contribution will make your project a very successful one.

SSD: Well, it will. Thanks so much. I am going to turn off the recorder.

[end of transcript]