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Anthony, Vaughn ~ Oral History Interview

Michael Chiarappa

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

Interview with Vaughn Anthony by Michael Chiarappa

Summary Sheet and Transcript

Interviewee

Anthony, Vaughn

Interviewer

Chiarappa, Michael

Date

August 15, 2016

Place

Phone Interview

ID Number

VFF_WH_VA_001

Biographical Note

Vaughn Anthony earned his Bachelor's in Wildlife Conservation from the University of Maine; his Master's in Fisheries from the University of Michigan; and earned his Ph.D. in Fisheries from the University of Washington. He began his career with the U.S. Bureau of Commercial Fisheries in the early 1960s working on quantitative stock assessments. After earning his Ph.D, he returned to the Boothbay Lab before its' closure. He then moved to Woods Hole to continue his work. From 1977 to 1980, he worked for the Maine Department of Marine Resources. He returned to Woods Hole in 1980 where he became the Senior Assessment Scientist of the Conservation and Utilization Division. Dr. Anthony retired to Maine in 1995.

Scope and Content Note

Interview contains discussion of: Quantitative stock assessment, fishery management, statistics, Boothbay Harbor, Georges Bank, University of Maine, University of Michigan, University of Washington, herring, mackerel, redfish, National Marine Fishery Service, ICES, Magnuson Act, stock assessments, New England Fisheries Management Council, population dynamics.

Dr. Anthony discusses his long career as a fisheries scientists. He provides a description of the early fisheries scientists he worked with and studied under. In addition, he discusses the changing paradigms and frameworks; the various management issues under Magnuson; his view of the challenges of the Magnuson Act and how that affected relationships between managers and scientists.

Indexed Names

Anderson, Emory
Apollonio, Spencer
Bankly, Dick
Bardach, John
Bevan, Donald
Beverton, Raymond
Burgner, Robert "Bud"
Chapman, Doug
Gollum, John
Gordon, Bill
Holt, Sidney
Jordan, David Starr
Lagler, Karl
McKenzie, Matthew
Paulik, Gerald
Ricker, William
Rothschild, Brian
Royce, William
Sherman, Kenneth
Sissenwine, Mike
Studds, Gerry
Thompson, W.F.
Van Cleve, Richard
Van Oosten, John

Transcript----RD_001

Michael Chiarappa (MC): Okay, today is August 15th, 2016. This is Michael Chiarappa. I'm going to be conducting an interview with Dr. Vaughn Anthony, a former employee of the National Marine Fisheries Service who had a career doing fishery science research. We are going to talk about his career and the various projects and publications that he worked on over the course of his career. Okay again, thank you for agreeing to participate. As I typically say in an interview like this, I generally like to start out right in the beginning and perhaps you could talk a little bit about your education and how that provided the pathway into the subsequent work, working for the Nash Marine Fishery Service.

Anthony Vaughn (AV): OK, let me check this phone hold on a minute. Do you hear me now?

MC: Yes.

AV: OK, this speakerphone is a lot easier if I can use this one.

MC: OK, yeah, that's fine.

AV: OK, uh, my education is basically I have a Ph.D., University of Washington. Late seventies, sixties, sixties I guess it was. The earlier I had one from the University of Maine, I had a Bachelor's Degree in Wildlife Conservation. Then I went to Michigan for a year and I got my Master's degree in Michigan. Then After that I went University of Washington a couple of years and got my Ph.D. there. Basically all in fisheries. An undergraduate degree just doesn't cut it for a lot of stuff we need to do and even learning about freshwater fisheries, Michigan didn't do it. But University of Washington is a great school for bionutrition and quantitative science so my background is really in quantitative stock assessments where we know how many fish are in the ocean, analyzing the surveys, analyzing the catch data and giving advice on sustainability levels and things to managers so they could get their work done. That's my generally my background.

My Ph.D. thesis was in the population dynamic of Atlantic herring. My master's thesis was on numbers of Atlantic salmon in seven Maine streams and the predation competition to those fish. It's undergraduate, I grew up in Maine and I lived a short ways from University of Maine so my undergraduate was Wildlife Conservation that's all I had in those days in that area. So as soon as I graduated from Maine, I realized I didn't know anything and after I graduated from Michigan, I learned a lot about the Great Lakes and a stereotypical graduate student, I taught labs and I had jobs whereby I work with students. I taught labs at both the University of Michigan and the University of Washington to get through school.

My biggest background, of course, is the University of Washington where we had great numbers of good scientists and I got involved in the quantitative aspect of this. The idea being that if you're going to give advice on fishery management, you have got to know the quantitative aspect, you have got to know numbers and there I worked with a lot of good people and I actually had a job working for Gerry Paulik which you don't know about and Doug Chapman and Don Bevin people like that.

MC: Those were your mentors at the University of Washington?

AV: Yeah.

MC: Yes. Could you repeat those folks again? I mean I think that's often interesting that folks know who your mentors were and could you just repeat that again?

AV: Well, the teacher that gave me as much background in statistics and quantitative science were Doug Chapman, University of Washington. The best scientists I think I ever met was Gerry Paulik. Actually the last year I was there, I worked personally with him for about a year analyzing pink salmon tagging data. Don Bevin, I worked for W.F. Thompson at the Fisheries Research Institute. Let's see Dick Van Cleve was a Dean. He advised me in all kinds of stuff. We had a lot of people come in from the outside and work for a year. We had people like Brian Rothschild came in and I learned a lot from all these people. A lot of people at the University of Washington they were basically in the halibut fishery and the various fisheries in the State of Washington, mostly salmon. What's going on in Alaska, how fish migrate up the Columbia River and so forth in that industry there. So that's basically the people I was involved with and I learned a lot. Mostly what I've learned I learned at the University of Washington.

MC: I am just curious since I spent 16, 15 or 16 years teaching at Western Michigan University I used to deal a little bit with the folks at University of Michigan. Who'd you study with there?

AV: Well, Karl Lagler was a guy I worked for. I taught his laboratories for his fish management course and some other courses he had there. When I went out there, he offered me a job. He had one job for a teaching fellowship and so I taught for him for a year. I learned a lot about fresh water and the Great Lakes so forth from Karl Lagler. Because John Bardach was there I took a course from him. I learned a little bit from him. But Karl Lagler was a big influence.

MC: Yeah, I know I ...

AV: I met with Karl Lagler two or three times a week to coordinate a course he was teaching so that was helpful.

MC: Yes, Lagler. I am familiar with his publications and I know there is that John Van Oosten ran that Great Lakes Fishery Investigation in Ann Arbor so that was, uh. The University of Washington that's always been a real hotbed for obviously for fisheries research. I believe it was the first fishery school at a University in the country. It must have been an exciting place to get your training.

AV: Well, I had a part time job working for W.F. Thompson who was the first guy in the United States to actually do a quantitative assessment of a population of fish and use it for management. And he was developing in the '50s various techniques for managing fish. And he had tea everyday at three o'clock and I would always break away and talk to him and it was a great opportunity to learn all kinds of things I never could have imagined. He was so good at what he had done. He worked with David Star Jordan in Stanford and got his degree and he worked for the Halibut Commission for a number of years. Very bright and intelligent. I learned a lot from him and just how we do things. He actually started the American Institute of Fisheries Research

Biologists and in 1990, I was Board President of that institute and I was involved with that there. I always appreciated W.F. Thompson. He was very helpful to me. I learned a lot.

Also Bill Royce, he was head of the Fisheries Research Institute. And Bud Burgner we worked for him at the University. I worked for them for a while. I was there a couple years before I left and came back to Maine. I did my thesis, then I went back and finished up. So basically that's the kind of interactions I've had.

When I went to Michigan, I almost worked for, his last name was Cooper. He was running the institute, biological institute there at the university. And he used to work back here in Maine and so we had a lot to talk about when I started out. Karl Lagler kept upping the value of the teaching fellowship so I took that and I learned a lot about teaching students and stuff like that from Karl Laglee.

MC: Yes, that was interesting, so when you said David Starr Jordan, you basically are in a lineage from him. He was obviously quite prominent in the, how would I say it, the advent or the rise of fisheries research. So he taught your mentor so you are right in that line, that pedigree it sounds like of going back to some of the early pioneers of fishery science.

AV: Dr. Thompson told me a lot about what it was like to work for him. David Starr Jordan used to be called the Father of Ichthyology.

MC: Yes.

AV: And W.F. Thompson told me how he had to analyze one species of fish to another. The red fish resources, for example, on the West Coast, there was about twenty different species and it is very difficult to separate out. Thompson's job was to take all the specimens of different kinds of fish and figure out what species they were. And how they did it and how David Starr Jordan worked it was interesting to me and I learned a lot that way. W.F. Thompson was a brilliant person and I just talked to him off the cuff a lot of stuff, day after day for a little while. A very bright person, just very helpful.

MC: Um, this is really interesting because your references to Thompson and this rise of mathematical modeling in terms of fisheries management, that became a dominant framework didn't it for the next, it obviously still is to a degree, for the next 50, 60 years, right? And was Thompson, your work with Thompson was, sort of, really at the, poured the foundational work it sounds like. Is that a correct characterization?

AV: He did the first assessment of a fish stock in North America back in '58 or so. And he had to invent a lot of techniques. At that time ,we had work from Bill Ricker and wrote a book in '58 or

so, I guess. I am trying to think of another one. At the same time that book came out, the Beverton and Holt wrote a really good text book from Lowestoft Laboratory in London, not London, in Great Britain. That was the same time W.F. Thompson was trying to figure out how the Halibut Commission worked. And you put that all together with people like Gerry Paulik. It was great, it was a real great time for me to be there and listen to all these people talk and get involved with it and I was using some of their techniques with herring.

MC: Were there particular challenges as you were going through your training and essentially building on the work of Thompson? Were there challenges in terms of, how would I say this, making the quantitative approach to fish management and population dynamics? Were there certain challenges that you folks confronted as that was getting underway?
AV: Well, this was a time when computers were coming on board. And I was out there in '60, '61. And we did have the use of the [unintelligible] at the University of Washington for analyzing lots of data. Gerry Paulik was a renowned world scientist and he was able to get onto the machine at the administration office and I was able to go up there and sort it out a lot of data working for him so it was a time that you were analyzing lots of data and developing using different techniques for analyzing information and so think back what the computer situation was in 1960 and you'll get a feel for, I used to use a box tab models for analyzing tagging data for fish, for example. We used to use what's called the BIMED system of statistics and they were developed at the University of California. We used thei system before they actually published it and BIMED, B-I-M-E-D, it became the hallmark for analytical procedures for a while, for a few years after that. But we started using that procedure before it was even published because Gerry Paulik had inside information from these people because of his great abilities and knowledge.

MC: Yeah.

AV: So my challenge there was I guess was developing how to analyze large amounts of data using Beverton and Holt and Bill Ricker's mathematical procedures. And people like Doug Chapman, he taught a course in population dynamics, a five-credit hour course with three semesters and Gerry Paulik was consulting with everyone at that time. And my office was right next to his so Gerry taught me all kinds of stuff. It was a great time to be around a lot of people.

MC: Yes, so you finished up, you did your coursework it sounds like at Washington then you went back to Maine to do your dissertation research?

AV: Yeah, I was three years at the University Washington and I was getting tired of going to school. I had been in school at Maine and Michigan and so forth. So I came back to Boothbay Harbor here and started a data collection program for herring. I did the first work on population dynamics of herring. That was my thesis it was published on herring. At the time, I started that side work for the National Marine Fisheries Service at that time and I worked for them and

developed techniques for Atlantic herring and that's when I started to become involved in ICES - International Council for the Exploration of the Sea. I started in the late '60s, going to meetings in Europe and getting involved with the different countries and analyzing and managing herring stock on Georges Bank.

We were, at that time, we were in, let's see, ICNAF, International Commission for Northwest Atlantic Fisheries, up until '75 when we got involved with that crazy Magnuson Act. That basically was what I was doing. I had to collect length and age and catch data for the Maine coast herring fisheries which at that time were catching lots of two year old herring. Much of the fisheries were for three and four and five year olds. And we had several fisheries for herring and I got involved in, collected a lot of those data. I set up sampling stations at sardine plants up and down the Maine coast. So I got involved with collecting a lot of data, analyze it. And this was '62 to '68 or so. I was at the fisheries lab of National Marine Fisheries Service here in Boothbay Harbor. Then when I had everything pulled all together, they sent me back to the University of Washington for a year to do one more year of studies. So I actually had three years of studies at the University of Washington. So I presented my thesis there and so I got my Ph.D. in three years of work.

The I went back to Boothbay in about 1970 and I was there for a number of years at the University and I got involved heavily with ICES and what went on in the world in terms of ICES is something very significant to me and something I think you fellows should look into. I don't know if you know anything about the International Council for the Exploration of the Sea but it evolved in 1905 and they had tremendous fisheries quantitative information they were analyzing every year. And I got involved with the fisheries management group there. Fisheries management, I forget the name right now but I started going over there in the '702 every year and meeting with the different groups of people and get involved. Every year, we would analyze the conditions of a hundred and twenty stocks for the EC in those days, the economic community in those days is what it was called. I got involved a lot of international scientists that involved a lot of techniques of stock assessment so that was a very important part of my education and I did that for a number of years while I was here at Maine and this lab until I moved down to Woods Hole.

MC: So you were in the '60s when you were accumulating your herring data for your thesis, you were working for the National Marine Fishery Service at the time, correct?

AV: That's right.

MC: And that was in Maine and then you obviously went back for some course work and then you returned to Boothbay or to Maine in general and continued to work for the National Marine Fisheries Service at that point?

AV: Yeah, that's correct. And finally they closed the lab here in '73 so I moved to Woods Hole and got involved with stock assessment down there and all kinds of species and I did a lot of ICES activity while I was there. And I came back here in '77, I believe, and I was Research Director for Maine Department of Marine Resources for a couple of years and I didn't get along at all with the commissioner here. He wanted to work on blue water oceanography and get involved with scientists on blue water oceanography and all the work I was starting here and working on which was really a management type analysis about the status of the scallops and the herring and clams and so that was interesting. He stopped doing all of that. He didn't want to get involved with anything to do with management because the commissioner was a political job and a job where you say yes to everybody and don't do anything. He and I didn't get along so in 1980 I went back to Woods Hole and ran all the research programs on population dynamics after that.

MC: Ah, and during this time period during the '70s you became increasingly involved with ICES you were saying. Did that work with ICES? Did that continue beyond the 1970s as well?

AV: Yeah, I was elected Chairman of the ICES Commercial Fish Committee and I was on the Advisory Committee on Fisheries Management, ACFM, for about ten years. That went on to, went on for about ten years into the '80s and I turned down offers to do other stuff with ICES. I retired in '95 because I was running out of steam. I was getting more and more involved with everything. I just couldn't do it all. I had as many as 250 people working for me at that time and I just couldn't do handle all of the administration so I just retired and came back here to Boothbay. On my farm here.

MC: So basically it sounds like you again the timetable again you said you worked from Maine a couple of years, was that in the late '70s and then what year was it again you went back to the National Marine Fisheries Service?

AV: It was January of 1980 I went back there, and they had set up an organization where I was in charge of the conservation utilization program of, for the Northeast Fisheries [Science] Center. Basically, I was in charge of analysis of all basically fish from age one up to their death and Mike Sissenwine was in charge of all the larval studies and down in environmental studies and the two of us were in charge of everything at the lab at that time.

MC: Wow

AV: It involved also the technology lab in Gloucester Tech and Gloucester Maine and work there was done over in University of Rhode Island by some of our people. Ken Sherman and so forth working on larval surveys so I got involved in all kinds of things at that time.

MC: So Woods Hole was your location from 1980 up until your retirement 1995.

AV: Yeah, that's about right, yeah. A couple years at Maine here. A long story with [Spencer] Apollonio. The commissioner, he's a good politician but he was not a good manager, not a good fisheries manager and wasn't very good at running research programs. And he and I were completely opposed to what needed to be done in the real world. And my emphasis was, of course, fish and fisheries and analyzing information about the species and different fisheries in the State but it involved managing fish. It involved getting in the management game and he didn't want any part of that so he said he wanted no part of that and so he and I had a meeting, a dis-meeting of the minds and I just quit and went back to Woods Hole. I always had a connection to Woods Hole I worked for him anyway, there was some good science down there and in Maine, there was nobody. The scientists in Maine, they all had at most a B.S. degree at University of Maine in general research but they didn't know anything about numbers or quantitative science. Anything I was involved in was the quantitative aspects of it.

MC: So those years between 1980 and 1995, those were some pretty significant years in terms of fisheries management and a real important threshold time in terms of a lot of the issues we are dealing with today, in terms of stocks and their sustainability. It sounds like you were right at the epicenter of a lot of pretty significant research and management issues during those years.

AV: Yeah, under ICES mainly, we developed a lot of procedures and techniques at that time which were brand new. Different ways of looking at stock recruitment data and information for management. We applied what's called a virtual population analysis where we could, we developed reference points for how to manage fish. As I said, in ICES, we would meet over there twice a year for two weeks each in July and in the Fall analyze. Each trip over there I would analyze sixty different species so in a year we would analyze a hundred and twenty species, really most of the work come from working groups and herring and mackerel and cod and so everything you could think of, to give advice to the European community at that time. We were developing techniques all the time for providing new data. We used a linear program procedures to analyze how to manage different catch levels. We had all these fisheries and that was the first time anybody had ever done that. I was very fortunate. I was involved with a lot of good scientists at that time.

MC: Were those collaborations with the ICES people, were they, I assume, they were very significant in terms of the Northwest Atlantic and you'd think about that whole arc between the Northern European and Western European countries and their activity. I don't think a lot of folks recognized that possibly this sort of collaboration was going on between folks our National Marine Fisheries Service and European colleagues. Can you talk a little bit about how that relationship influenced the management of fisheries from the U.S. perspective?

AV: Well, when we got involved with management, it was under ICNAF International Council for Northwest Atlantic Fisheries and that lasted up until 1975. It started because Poland and West Germany and the Soviet Union were overfishing the herring on Georges Bank and so at that time was the only time really when we would be able to be effective in management. By '75, the stock had pretty well been decimated but we ran enough science to show that if we changed the total biomass by a total amount in certain areas, we could actually improve the overall long term catches. We were in charge of doing that and National Marine Fisheries Service was in charge of doing that at that time and so we actually monitored and had total allowable catches, TAC, for Germany, Poland and lots of counties, over a dozen. They were fishing on Georges Bank and so forth. We actually improved the population sizes of most of those fish because we were able to restrict the certain mortality of certain species at those times. Then when the Magnuson Act came in '75, the Magnuson people kind of were in charge of all this stuff and most the European fisheries moved away from fishing off our shores or were actually were here to buy fish more than they were to catch the fish so the management went from National Marine Fisheries Service to the Magnuson Act which was totally inept and that was after '75. So the ICES techniques that we used early years for other stock, we used in Maine, we used out of ICES to manage herring and other species after about 1975, late '60s to late '70s.

It also showed where we should have our research programs and analyze. So, for example, we had a program of fisheries surveys that were done twice a year with randomized surveys, stratified random surveys from Cape Hatteras to Canada. It started in 1963 and we had two surveys a year and we had a tremendous amount of data and we had a lot of sea sampling work. And all our stuff, as far as I was concerned, was directed by the intelligence that came out of ICES. You might want to contact people like Emory Anderson who is now the general, well, he's retired I guess. He was the General Secretary of ICES and he was involved with that program for a number of years and he could tell you all about ICES. ICES was very instrumental in how we manage fish even though right up to the last few years even though Magnuson Act people and council management didn't really pay much attention to us after 1975.

MC: So and correct me if I'm mischaracterizing the situation, you actually saw some more effective management coming out of ICES than ultimately Magnuson? I mean it sounds like some problems started to occur in terms of management once Magnuson was implemented is that correct? Or I guess I should say, what types of problems did you see occurring as a result of Magnuson as opposed to ICES and the Northwest Atlantic Fisheries Group was doing more of the management?

AV: With ICES, as each year went by the managers would tell us more and more what they needed to manage fish. And they had total allowable catches on all our fisheries and then they would get involved with multi species stuff. We got involved with the ways to give advice, like the economics, anthropology, and the people's social problems and fish. This all went to the

European community. I don't know how the European community was affected but they actually set quotas on how much fish would be caught and we couldn't get that done here in Maine.

In Iceland, for example, Jacobsen was a very good director of the laboratory there. He had two controls over the fisheries. Effort controls and catch controls. People listened to him and they followed the science and they corrected problems they had when stock was low. They implemented strategies to bring the stock back and their procedures were to cut back in fishing intensively in one year and bring it back for four. And Norway did the same thing, but Magnuson Act didn't do that at all, Magnuson Act was a joke. We were always kind of disappointed at Woods Hole that we weren't involved in Magnuson Act development at all. Gerry Studds actually told me one time that he wished that, it used to be called the Studds Magnuson Act when it first started out. Gerry Studds had a lot to do with it. He actually told me he wished he had never gotten involved with it because it didn't work in New England and it may work in the Southern Atlantic and so on. Under ICES, we developed how many fish to catch, when to catch them and what kind of sustainable fishery we wanted and so forth and the EC passed this information on to member countries and member countries actually shut down fisheries when they were being excessive. And we couldn't do that in Maine, we couldn't do that in New England. The Magnuson Act was kind of a joke in a way. They started out requiring that species be managed for MSY, you know Maximum Stock Yields, and for every species and you can't do that. And, of course, we were very disappointed and papers were being written about that, about the demise of it, of MSY. We scientists didn't have any input into this at all and then so the Magnuson Act really went to hell and they didn't do any good in the early years and all and even when we recommended stuff, even when we recommended and they understood what we said, nothing was really done. One of the reasons I retired in '95 we really weren't making any progress we were just beating our heads against the wall. We went from ICES where we had control of our catches to where we had no control under the Magnuson Act.

MC: Hmm, wow that's so I mean I guess you feel that the folks who were implementing Magnuson were not taking your scientific research and the assessments that you folks were making as seriously as they should of or...

VA: Yeah there were about three factors came into this. They didn't believe in the science, they didn't understand the science, and we didn't communicate well enough so they could understand the science. When they did, we had programs of science that we related to them, they wouldn't pay any attention to them, they didn't have to. Apollonio went down there and was in charge of the, like a general secretary type, of the New England Fisheries Management Council and he said even though we had a committee, a scientific committee for each council like the Mid-Atlantic and a New England Council, he would not allow any science to be read to the council because the council had another dominating urgencies of how to catch fish. Their attitude at the time was catch as many fish as possible or we'll all go out of business. And they were after all just trying

to make a living so therefore they couldn't be doing any harm. And they went as far as to say that NMFS was trying to put them out of business because we were trying to reduce certain catches on certain species at certain times.

We had no clout to do anything. It wasn't restrictive at all. People didn't believe in the science and didn't understand it and when I used to give a talk to them, which I did every year on the status of the stocks, they would make sure I talked at 1:00 so that when they came back after lunches, they could come back late and miss what I had to say because they, the ones that were smart enough to know what was going on, they said they understood what we were saying. They agree with everything we said, they had no problem with our science at all. They thought we did a wonderful job. But they had other problems with that restricted their ability to catch fish. They wanted to let the fisherman harvest as many fish as possible and the recruitment to these stocks would eventually overcome any deficiencies in management and, of course, that didn't happen, but the people kept their jobs. The way to remain commissioner was to say yes to everybody and not to do anything and they did that. It was kind of a waste of our time. If we had been, if NMFS had been in charge of managing the resources here, we would have had the best managed resources in the world. Because at the time of the early '70s, during the '70s, we learned how the stock interacted and so forth and we learned that we had multi species stock management ideas, plans and numbers all prepared. But most of it was just ignored.

MC: Hmm, so the more immediate, practical economic sort of exigencies were taking precedence over long term sustainability it sounds. Is that correct?

AV: Yes, the attitude of fisherman, the managers were people that caught fish and who sold fish. There were no scientists whatsoever on the management council. Their attitude was, we are just trying to make a living, therefore we can't hurt the resource. And various people that were in a position where they could have changed this, said yes, that's right, that's right it's those scientists, we have got to make sure we don't listen to them. And so they didn't. We developed good procedures. We had multi species, multi fisheries plans for harvesting and managing fish as early as the late '70s for the whole New England region. They always said we don't have enough information and the science is not good enough so we can't follow them. We'll just hope that next year, things will get better. So we worked hard and they if they understood what we said, the attitude was they said they believed it all but they just couldn't find a way to restrict fishing on the short term to sustain high levels of fisheries in the long term.

MC: Yeah so I assume that problems with groundfish and so forth that ultimately came to pass, I'm sure, did you kind of see this coming from the research you were doing or was that, were the indicators not that dire at that point?

AV: Oh we saw this coming, we published it every year. You can go back now and look at the numbers because it's all written up. And you could see how well we did in analyzing the data. What we didn't see was how poorly the Magnuson Act was going to affect the management of our fish. We never realized that people would not restrict their fishing when they had to in certain places and certain times. You just couldn't see that coming and we did see that coming. They admitted that they were not going to follow the science, they were going to follow the politics. While they had no problem with listening to us talk with the science they would, we're not going to follow it. Because they wanted to keep their jobs. They wanted to, what the fisherman wanted to catch, 10,000 tons of cod off the Gulf of Maine. They proceeded and they caught 9,000. Well, that proved that they were there and they could catch them, well that proved that they were there and the science was wrong. And two years later the cod were completely gone just as we said and they just avoided discussing it after that. We had a very good record of analyzing the data, telling them what was going to happen. But the problem was a lot of these people didn't understand science, they weren't educated. They didn't want to hear it. If they did hear it, they weren't able to administer it.

MC: Wow, you really, that's, your explanation of the quandaries of trying to reconcile these various factors is really interesting. It really does paint a very clear picture, I have to say. And I can imagine, it must be frustrating when your job is to do this science, to ensure sustainability and to have the work basically on the one level ignored it, sounds like.

AV: If you were to look at the haddock stock and fishery and the change in haddock over four years, you have a great understanding of generally what the problems were. You could also see it in red fish as well. Very sad situation. Had we managed haddock, for example, where we wanted to manage it, we would have today, a great, great haddock fishery in New England that would more or less take care of all the groundfish problems out there because the haddock were so plentiful here and they were so easy to regulate. We could have done a wonderful job. And I look back now at all these situations and if they'd only listened to what we said in general, we would still be having a good fishery now in New England and what we have got now is a joke. We don't have any fisheries now, everything is gone. And I don't see anything to speak of coming back. And when it does come back it's just a little bump on the calculations. It's not really important.

MC: I know it gets a lot of press, the various trawl surveys that the National Marine Fisheries Service conducts and I assume that you were probably involved in a lot of that over the course of your time with the fishery service. is that correct?

AV: Oh, yes. We started trawl surveys in 1963 and we did a Fall survey and a Spring survey every year, about 375 stations off of Cape Hatteras to Nova Scotia. We had thirty minute tow, standard speed and standard direction, standard mesh size, standard type of netting to catch them. It was a stratified random survey which was good for most species but not good for everything. It

provided lots of good time series data on how a population was fairing. And we had actually published comparisons between what we would get from the surveys, what we would get from the catch analyses to see how good we were and was also what was causing changes in catches. We had lots of great information to manage that fishery and it was particularly useful for bottom trawl but amazingly the survey data were actually good for herring and herring larvae, really small herring were caught and we were able within two months to know what the size of the incoming year class of herring was, something we never expected.

So the surveys were very useful in certain areas and completed worthless for others. They were of no use at all for bluefish, for example. But they weren't very good on haddock either. There were lots of things that affected the resources like predation, migration and so forth, and the weather and where the fish were. What we did, we had to do every year was do a standardized survey every year in the same areas for comparison and fish move around and do certain things and we learned a lot about the biology of fish but the surveys had their limited ability but some cases were excellent they were very, very good. They didn't tell you how many fish were there but they were good at giving you trends, time trends by age and by fishing stock and how they moved and predation. Lots of good biological data and they were great at adjunct fisheries management if they had followed that data by themselves, they would have had a pretty good management system.

MC: Yes and as you know the kind of the new trend of course is ecosystem management. Was that, would you consider that already in play during your years or did they I know, of course, it gets a lot of play and that phrase has become more of a common parlance among people who are involved in these sorts of things. Was it difficult reconciling certain approaches to fisheries research? The quantitative and the ecological, was there, were there certain growing pains trying to make all that work together?

AV: No, not really. They worked together anyway. You could see the similarities and the differences. We tried for years to get a good survey index of ocean quahogs and surf clams and blue fish and were never able to do it. But a technique like bottom trawl surveys is very useful for a lot of species but not for everything. So we were a little bit surprised but we prepared the surveys of course with all our quantitative analysis for catches and so forth to see where we were wrong, how useful we were. We learned a lot having the surveys. They were very, very helpful. You know what you don't want to get foolish with anything in terms of math, you got to use a little common sense in what you're doing. That started to say in '63 before I got there and they had probably the best survey in the world on fishery data. And in the North Sea, they developed industries of abundance from surveys. They had what we call fixed station surveys. They went back to the same spot every time and we had a stratified random surveys and each one had its' advantages and disadvantages.

We analyzed the hell out of our data and we learned a lot and everything made sense and we didn't have any problem using the surveys for anything. Sometimes people would say to us, the trend is down a little bit, we think it's up and then they would say that they caught a lot anyway and that's because the effort changed. We went, the trends you get from the survey don't tell you much about the numbers and certain species doesn't tell you much about it either. But early on we had information from the Soviets and Poland. Poland gave us the best information we ever had on mackerel, for example because mackerel, two stocks of mackerel we had, they over wintered in the Mid-Atlantic and Poland was the only country that could find them. I received a lot of grief because in February, we couldn't find the mackerel stock and the dogfish were eating the hell out of them. We knew that and we wanted to determine how much was being eaten by dogfish and we had a hell of a job doing it. What Poland did, they would find the main, huge stocks of mackerel which were pretty large and they would dedicate one vessel to stay on the population of mackerel while the others fished it. But no other countries including the United States could find the stocks. And it was very interesting.

The herring liked to be in shallow colder water, mackerel liked to be mid depths, offshore and they'd butt each other nicely. When we ran a survey you could see, if the East wind was blowing it would mix up some of the stocks and when the East wind didn't blow, you could see where the herring and mackerel separated very nicely. You could draw a line right along between the mackerel and the herring stock based on the environment at the time. I was at sea one day and I was able to do this on board the vessel you could see where the herring were but when a strong wind would come up from the East, it would mix everything up. We knew all this so we learned a lot from it. So as I say, the surveys weren't perfect on anything. They gave us a lot of insight.

We brought the people over from the Lowestoft laboratory in the UK to work with us on our survey compared to their survey. They had a fixed station survey as I said and we used a stratified random. We compared the results of their numbers with our numbers and we used different techniques and we pretty well learned the value of each type of survey because, for example, if you're doing stuff along the Maine coast where we have tremendous quantities of lobster gear, it's where it is hard to use a stratified random survey because lobster gear was in the way. The best procedure there would to be to use a fixed station survey and adopt the methods done by the UK. Instead our status survey like that in '77 and Apollonio, the commissioner, stopped it because he was opposed to that sort of stuff. And later on they were forced to start up again, ten years later. And they had a mix survey of fixed stations and stratified random. And they didn't recognize the difference between the two. It goes on today. It's very worthless data because you can't analyze fixed stations survey and stratified survey in the same way because there is different kinds of data and they don't know that. This is where it goes back to you have good scientists that know a lot about statistics, a lot of analyzing of data to know when to use cert ten deeps for certain procedures and each survey, each procedure, gives you different insights on the population so you have to have a quite all encompassing type of activity to know

what's going on. Of course, they don't have that now in Maine, they don't have that kind of background today. They spend money on grants for doing certain things on one species and so they don't have a unified overall program where they all work together. Things are just all jumbled up at the state level. It's very, very discouraging.

MC: Yes, no I can imagine where that would be the case. Was there a particular research question, or issue or management issue during your years with the Fisheries Service you founds particularly, I mean, you certainly touched on some of these but was there a particular issue you found particularly frustrating or challenging that really stuck out in your mind? I'm sure there were lots of things that were challenging. Was there an issue in particular that gave you sleepless night?
AV: The big issue, of course was, fisherman were able to get away with saying that they were just trying to make a living and therefore they had to catch all the fish and therefore they were not doing any harm The other issue was they didn't believe the science because the science didn't give the numbers they wanted to give. And they got away with all of that. As scientists we just sat here and watched them do what they did, and fail miserably. And time after time when we were asked, we told them what was going to happen and even when they believed us, they didn't do it. They didn't believe that there was a better way of doing this. Whereas in Iceland, for example ,and Norway if they had a bad, if the cod stock was overfished, what they would do was shut the fishery down completely and stop it for a year or two. Let it come back in and when the populations was rebuilt a little bit then they would reopen the fishery again. They had some methods of resolution.

We didn't have any methods of resolution for the council. They just wished that the cod stocks would get better and it was frustrating to us to watch this and realize what we could have had had they done things the right way. And as I said the haddock situation, you could learn lot just by following what happened with haddock. So all of that was really frustrating to us. A lot of people after a while kind of gave up on the whole procedure even, a lot of people would say I got the feeling Woods Hole or just writing papers or just doing research in their offices instead of trying to doing research that would pay off for helping the management of the systems because after a while if they don't listen to you and you show them year after year that if they had done it this way, they could have had a better answer and they don't believe you, it becomes very, very frustrating. And a lot of people I think just closed the book, walked away.

MC: Yeah I would imagine that it wouldn't be great for morale among the scientists who were, you know, tried to do their work and have it taken seriously. I could imagine where that would get to you after a while. That it would be frustrating. Did this often, I know you folks since you worked for the government, you probably had to walk the line. I mean, did this create conflicts among different, did the scientist get frustrated and did it create tension between some of the

folks you had to work with in terms of the managers or how did that all, what was that scenario like?

AV: We didn't have very many problems, we just gave in. We realized that we couldn't get involved. One of the scientists one time on TV said something he shouldn't have and blamed the fisheries managers for not doing their job. He was censored for getting involved. We were told to stay out of management completely and so it was frustrating. The people that were involved with the council were awful nice people. My job was to in fact relate to the media, the TV people and so forth. Everything kind of went through me and if someone was to make a mistake, it was me. So that cut down everybody saying a lot of strange things and getting off the wall. People were really pissed off at certain times. They realized that the system was the fault and not the individuals. Some of the people who worked for the council were very nice people. They admitted they didn't know anything so with us, there were no scientists there and we could have broken through maybe and convinced them of the value of science had we been sitting on the council. I guess Mike Sissenwine is there now and he is the first scientist, I think, we have ever had sitting on the council. Brian Rothschild may have been on it for a short period of time, I don't know. There's just no science involved with the whole thing.

To answer your question, we were uncomfortable with that situation. We were comfortable with the overall situation. This came from the Magnuson Act which was created by somebody down in Washington and there was no changing it. We were careful trying to do our job. Everybody was trying to do their job and we were doing it very well. I think we had the best scientific staff in the world and we'd get great kudos for the work that we did and the only thanks that we got was when we put our publication people would say it was a good idea or when we had a technique that other people would use and so forth. We never used our talents sufficiently the way we could have. We had a lot of good scientists that moved on from Woods Hole to better places they had better kudos or pats on the back and it felt a little bit better. People in Woods Hole realized that no one's ever going to say thanks to us. We among ourselves we felt good that we were able to each year tell what was going to happen to the stocks and would come through. We actually wrote this up and many times we'd send it around and they would say well, that's nice and it didn't do any good. And we knew we weren't ever going to change it so we were told to stay out of that system completely.

I went to all, when I was there running the conservation and utilization division, I went to all of the fish management meetings in New England and so forth and all our cocktail parties and so forth and I did all the talk and so forth and they were very nice people but they weren't going to change how they did things. They finally got so bad they said that the NMFS Fishery, NMFS science were trying to put them out of business. Is all that were a great thing that we were going to do. And they couldn't do any harm because they were just trying to make a living. I bet I heard that a hundred times. That was, so you're dealing with a lot of people that were not very smart

and it was frustrating but we got along with that pretty much. A lot of people are still there. They aren't involved with the science, with the management of it all.

Things would be far better if they had two scientists sitting at the table or people with some degree you know a master's degree somewhere or some education, some knowledge. If they were a little more intelligent and could read well and speak well and understand things. And they would just have some way of following what we said for a long period of time, it would made us feel a lot better. But since we were told to stay out of this business we just stood back and watched it go. We didn't feel it was our fault. We were ready to help but they didn't want our help.

MC: Right, right. Was during your career were there particular, this could be too broad a question but, were there particular publications you were involved with that you were particularly pleased with in terms of the results and the findings that they put forward?

AV: Not so much. I was involved with administration too much of the time and a lot of our publications were the publications that were done for use in management, in ICES, for example. We did work on linear programming for managing fish. No one's ever done that before. We did that back in the middle '70s, I guess '75. I was involved in the running the program. Saturday night, for example, in Nova Scotia and working through the lab, the computer facilities in Chicago and where we had a set up in Atlanta and I had people in Woods Hole doing certain countries. I did some of the other countries and we would do the analysis in the evening and we would write it up until three o'clock in the morning and we were typing to all the members the next morning. Some of the stuff was very good. good information. It was published in the ICES groups and the ICES activities. It was a very internationally known benefit so I felt good about doing some of this work. It was a good start. But nobody else knew but me. We didn't really put out, we put something out, it was more or less the status of the stocks.

When I went to Woods Hole back in 1980, I set up this research committee, a program whereby people wouldn't have to go through a rigid review of papers. If they would just write down what they thought was important for that survey or that species for that time, they would just write it out without a review, and put it into what you would call a biological series like 2016 number one, number two, number three type of thing. We kept it in our library and the idea being was to get people to write down things that were significant and make them available in writing instead of spending a lot of time trying to come up with something great that you could get recognition from worldwide. Because our aim was really to provide information for managing and it wasn't to develop our own careers or anything like that. Most anybody who was really good down there it, had their Ph.D. and or had an extensive background on stuff. They didn't need anybody to say we were doing a good job. It helped, I guess, when people were trying to get promoted but in the federal system, the opportunity to get promoted were very few, anyway. And it more had a

function of how many people were working for you more than it did about number of good papers you put out and it took a long while to get a paper out, you had to get through two or three people and it took months and months and people would get discouraged after a while. They also had to go to some of these meetings and put together all this information for management in case they ever wanted to use it so. We didn't have a very good publication series in Woods Hole that would get worldwide recognition like in techniques and so forth. We gave information to other people to work it out and they did good stuff but most of what we did was applied and we met the constraints and the needs supposedly what we thought the councils might use. So the answer to your question is, there is a lot of good papers, a lot of good stuff around but I don't want to pick one right now of the top of my head.

MC: Sure. But you were putting a lot of data out there that a lot of researchers could certainly use correct? Yeah.

AV: Yeah, and the stuffs available if they know what they're doing. People know where it comes from and they know how to get a hold of it. They can get it through a library at the Northeast Fisheries Science Center. You look around today and the scientists at the function of a management or of a system or listen to. You probably ought to talk to Bill Gordon. If you want to know more of this kind of thing. Bill was Regional Director for a number of years out of Gloucester. And he also was a Director of Fisheries for the National Marine Fisheries Service out of Washington in Silver Springs for a number of years. He is a very knowledgeable person. He was around in the time of the transition to the Magnuson Act, he was one of the best commissioners I ever met. You could give him information and he could remember it and understand it and he could use it on the floor of different meetings and just had a good practical mind to him. He is still around. I talk to him occasionally, he lives in Pennsylvania now. He is very knowledgeable in the management side of things and the way science relates or not relates to the management system. He's a very knowledgeable guy, Bill Gordon.

MC: Bill Gordon, and was he the overall Director of the National Marine Fisheries Service at one point?

AV: Yeah, he was at one time. I'm not sure exactly what he was called. He was Regional Director for the region, this region, the New England Region for a number of years. And he served on the council. He was a Deputy for a while and very helpful. One of the best commissioners we had because you could tell him something at ten o'clock at night. He could remember it and use it the next day at seven o'clock in the morning you know?

MC: Sure, sure. Just, you know, Vaughn, just to clarify again when you were at Woods Hole, you said you oversaw a variety of scientists who were doing the stock assessments and the

quantitative work. What was that position that you held? What was the title of that position that you held at that time?

AV: My position was Senior Assessment Scientist I guess it was. Near the end, most of the time I was in charge of a group called Conservation and Utilization Division which is a potpourri of all kinds of stuff. But under than that you had the Survey Group and you had the Population Dynamics Group. You had the Gloucester Technology Lab. You had the Age and Growth Group. You add them all up, I had several hundred people working for me at that time. But my title, if you are interested in that, was changed around a couple times but Conservation and Utilization Division. It was called a Division but we had a couple of reorganizations. But they don't mean much. Everybody worked pretty well together anyway.

MC: Right, the titles didn't it was more of a collaborative effort across all divisions I assume.

AV: Yeah.

MC: Yeah. Now that's, I'll tell you your explanations are some of the, a friend of mine, I'm not sure if his term is up or not. He's on the New England, he's actually at the University of Connecticut. He's not a scientist but he's been on like a member at large on the New England Management Council and I'm sure he would enjoy hearing a lot of your perspectives on these things. It's been a real, I think it's um, he's been an environmental historian like myself. But it's been a real eye opener for him in terms of the dynamics that you describe in terms of how management and science related to each other.

AV: When are they on the council?

MC: He's on right now actually at least if he's not he just went off but I, he might still be on. His name is Matthew Mackenzie and he's based, he teaches at the University of Connecticut's Avery Point Campus which is where he does again, he's a historian but they do, that's where the marine sciences are based for the University of Connecticut.

AV: Yeah I don't know him but.

MC: Yeah, no, he is pretty young and again, this is sort of a recent development. He would enjoy a lot of the commentary you have provided today, that's for sure.

AV: We have had people that were used car salesman. People that were just good fisherman, recreational fisherman. Early on the Magnuson Act required that you had a broad representation and they pretty well, we had one guy who was a police detective and they get someone from the

University. But we've never had a quantitative scientist that I know of on the council. We had some pretty nice people though on that.

MC: Yeah, I can see where the work that, I'm sure that you were often put in the position for the folks who didn't have the appropriate mathematics background or quantitative background to do a lot of translation for people who wouldn't know how to interpret the data that you were providing.

AV: If we could be faulted for anything over the years, I think it was a problem with communication. The scientists could have done a better job at communication to the people who were not educated in quantitative science. I think we messed up there. If I were to do it all over again, I would make sure that that we could talk better to the people that didn't have a background that we have or that you need for quantitative assessments. What we would try to do when we presented our assessments every year, we put in standardized figures, standardized graphs, standardized text for every species and gave it to the council in addition to what we did say orally. With my accent, I had trouble early in places, people to trying to understand what I'm saying. I talked too fast and so forth. A lot of things didn't get through to people because it was our fault, nobody else's. Our science was very good. We weren't necessarily as helpful as we could be in terms of trying to translate the information to people.

MC: Yeah, yes, that's um. This is really great information. I don't know is there anything that I touched on or anything that you would like to add that maybe I've missed at this point. You have touched on your colleagues and the Magnuson Act, your training and um, is there anything that you'd like to add that maybe I missed?

AV: People don't seem to understand the value of having quantitative science done in the laboratory. When I was a Director of the research laboratory here in Boothbay for the State, there was nobody that had any background in mathematics or science. It was biology and people didn't feel they needed to know anything. people don't understand the value of having quantitative science. My attitude, I guess, has been if you can't write it down in the mathematical terms, then you don't really understand what is going on. It's very difficult to use the data if you can't translate it to numbers that someone can understand and use. That was always bothering me. And when I ran into people around the state here on vacation, there were mathematical professors in places, they were as amazed as I was that people couldn't understand this sort of stuff. People would have laboratories. They should bring in quantitative scientist that can analyze the data and understand what's going on. It's nice to say that fisheries down, it's not very good. We need people who can say how far down is it? And why is it down. Where are the numbers? What does it look like if we were God, how could we fix it? Very few people around that do that. And very few people today are hired that have any background in quantitative science. That part of the problem is they don't understand the value of that.

The biggest problem I had with the Magnuson Act is the requirement to have MSY for single species stock. We were writing papers at that time showing futility of this and how you should do it. And the problem was we never had any scientist input on the council. There was a scientific committee for every council but the one we had in New England the guy said, I'm not going to, you guys do work here if you want to but I'm not going to read any of it or make it available to the council because it was science. It was very blatant that science was not used and science was not known. It's frustrating to go to school and learn all this stuff you never knew and you're coming out of school thinking you know something and you can't use it because people didn't understand it so they don't understand why they might need it. I had a lot of guys that had Ph.D.s in quantitative science around the world are frustrated in this way. They are not appreciated. I worked with some of the best in the world. Some of these people have very high IQs and are very knowledgeable but they not very well understood and appreciated and they are not used properly. So that's frustrating to me I must say.

MC: Did you have yourself, I know as you know now, one of the latest trends, of course, is we are kind of going back to the earliest days of fisheries research where scientists worked closely with fisherman and then there was sort of a bit of a lull in that. Now we are back into this era where there is presumably more collaboration between scientists and the fishing fleet. Did you yourself, did you have a lot of interactions with fisherman directly in terms of research you were involved in and their actual practice and the insights that they offered? Or was that not as much a part of your work?

AV: We were involved a lot with the managers and most of the managers were fisherman. We had a nice Fishermen's Forum here in Maine that's gone on since '75. I have been to every one of those but one, I think. But we didn't have the opportunities to talk too much to fisherman, We were told to stay out of the management aspect. We talked to them every chance we got. But after a while, we had them come to Woods Hole and sit with us and give us their point of view. But I think we exhausted that. We went on their vessels and they went on ours. Part of the problem we talked about, being unappreciated, is that the idea of a lot of people they figure that if you get information directly from the fisherman, it's got to be better than the scientists because they are on the salt water every day running around, they have a better idea.

We were told to utilize the fisherman in collecting data and we did that. But between you and I, a lot of the stuff was not effective. We could have done like in sea sampling, we could have done three times the amount of work with half the effort because the scientist know what to do and fisherman, I hate to say this, but I've had people who worked for me that were fishermen that couldn't measure, couldn't measure the length of a fish because they didn't have hand eye coordination and had never done this before. And it's amazing what people can and cannot do aboard a vessel.

A lot of that stuff was done to appease the politicians who were told that we should use the fisherman because they are on the water every day and they know everything and we don't know anything because we are back in our ivory tower. The sea sampling data was very useful they kept saying we need a 100% sea sampling coverage to monitor something and that was deadly wrong. Sometimes 10% is all you need. But they always said you had 80, 90 or 100% coverage. And that was only for enforcement purposes. They wasted a lot of money actually, trying to get the fisherman involved in what we were doing. Generally the scientists could collect much better data, more information and at half the cost. We worked with the fishermen because we were told to do so. It really wasn't very effective. We worked with fisherman a lot. After the council, we had a few beers with the fisherman and I used to go to the cocktail parties and every time we had a meeting anywhere, way back when, I went to it in New England I went to it. And there were always a few fisherman there and some became pretty good friends and so forth. But you didn't have time to spend with everybody.

MC: Right, right no absolutely. That's um, well um. Vaughn, this has really been a great interview. I think we have covered a lot of ground. Unless there is something else you might want to add I think we have covered a lot.

AV: I have just been talking off the top of my head. Feel free to call back anytime you can get me. And I'll be glad to talk a lot more on things. There are lots of things I would like to talk to you about. You know, it's just off the top of my head, I haven't thought out, you know...

MC: No, this is fine, this is exactly, these are the sorts of issues, you know, the changing paradigms and frameworks that you've worked in and the various management issues and your viewpoints on the challenges of the Magnuson Act and how that affected your relationships between managers and scientists. All of these things are your perspectives are really quite insightful. O, one thing I want to mention for this interview, of course, this recording will be placed at the NOAA Archives in Washington and one of the things we need to get you to sign is a permission for that allows future researchers to use the information. If I sent you a copy of the permission form via e-mail, would you be able to download that and sign it and scan it and send it back to me, is that possible?

AV: Yeah, I think so, don't tie me down to a time constraint. A lot of things going on here, I've got a few grandsons and kids and we had a big lobster party last night. Everything's going on around here so I apologize, I can't get right back to you. Normally I get right back to someone in email. But a lot of things going on around here.

MC: Oh, no problem. I've got your mailing address here as well. I'll send you an e-mail and you can download it, you can print it and then if you could sign it and then if you have a scanner

available to you at all, or somebody who could help you to scan it again and then send it back to me as an attachment on an e-mail that would be great. I don't need it right away but I'll send you an e-mail so you'll have it and we can go from there.

AV: Yeah, Ok I appreciate that. I'll get it back quickly as I can. I kind of wish that you would talk to people like Bill Gordon who can speak more about the relationship between fisherman and the council and the scientists and Emory Anderson who was previously General Secretary of ICES who has a lot of insight into a lot of the programs under ICES that we all worked for which really was very useful. These guys have lots of information from a different point of view. They can help you a lot understand what I have said and probably could add a lot to what I said. If you really want to get involved.

MC: Well, I'll tell you, don't short change yourself, you have been a great interview. This has really been very interesting. I want to thank you very much, Vaughn. If there is any other questions that I have, I'll certainly get back to you but this has been very much appreciated and I'm sure the future researchers will appreciate this as well so. I'll send you an e-mail and again I want to thank you for your help and hopefully we will have a chance to talk at some point. You have done a great job and I really appreciate it.

AV: If you need anything else, don't hesitate to give me a call. Usually in the morning is more quiet around here. Things would be a lot easier if you just check in with me once in awhile.

MC: Ok, very good. Same here, Vaughn, thank you very much. Take care