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## Powers, Joseph ~ Oral History Interview

Suzana Mic

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

# **Interview with Joseph Powers by Suzana Mic**

## *Summary Sheet and Transcript*

### **Interviewee**

Powers, Joseph

### **Interviewer**

Mic, Suzana

### **Date**

July 11, 2016

### **Place**

Miami, Florida

### **ID Number**

VFF\_MI\_JP\_001

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### **Biographical Note**

Dr. Joseph Powers was born on February 19, 1949 in Gustine, California. He has earned degrees from the University of California, Davis A.B. Zoology 1971; California State University, Humboldt M.S. Fisheries Biology 1973 ; and Virginia Polytechnic Institute and State University Ph.D. Fisheries Science 1975. He began his career with National Marine Fisheries Service at the Southwest Fisheries Science Center in 1975. He then moved to the Southeast Fisheries Science Centers in 1979. During his time at the Southeast Fisheries Science Center, he served in many roles including as the Senior Stock Assessment Scientist and Acting Regional Administrator. He also served on ICCAT committees related to his work with blue fin tuna. Dr. Powers retired from NOAA after 31 years and as of this interview in 2016, he is a professor at Louisiana State University, living in Miami.

### **Scope and Content Note**

Interview contains discussions of: Southeast Fisheries Science Center, Southwest Fisheries Science Center, Magnuson Stevens Act and changes in role of NMFS, ICCAT, conflicts between fishery scientists and fishers, fisheries stock assessment procedures, mathematical modeling in fisheries, king mackerel, surveys, population dynamics, histogram, ecosystem-based fisheries management, single-species assessment, blue fin

tuna, tuna quotas, tuna fishing in the Mediterranean Sea, future of modeling in fisheries science, fish tagging,

Joseph Powers' interview is a detailed explanation of his experiences working for NOAA at the Southeast and Southwest Fisheries Science Centers; in particular his work with stock assessments and modeling. He explains various procedures that fisheries scientists perform, as well as the politics of working for a government agency. He discusses the value he sees in maintaining a separation of science and management. This interview also provides a description of his work with ICCAT and blue fin tuna both domestically and internationally.

### **Indexed Names**

Brown, Dr. Bradford

Fox, Jr., Dr. William

Gordon, William

Hogarth, Dr. William T.

Rosenberg, Dr. Andrew

### **Transcript -JP\_001**

**Susanna Mic:** So, I'm going to start, I'm going to put this tape here.

**Joseph Powers:** Right

**SM:** So, I'm going to read to you, like, a brief introduction. This interview is being conducted as part of the Voices from the Science Centers Project, funded by the Northeast Fisheries Science Center. It is also part of the Voices from the Fisheries project that is supported by the National Marine Fisheries Science Office of Science and Technology. My name is Suzana Mic and today I'm speaking with Joe Powers, at his home office in Miami. The time is, sorry, 3:31p.m. Um, so as I mentioned before, and you can stop me at any time if you need to take a break, and if there's a question that you don't want to answer please let me know. I'm going to start by asking you, optional, information; your date of birth and place of birth.

**JP:** Uh, February 19, 1949, in Gustine, California, G-u-s-t-i-n-e, which is a tiny town near Fresno, California.

**SM:** Fresno. Um, so...

**JP:** But I only lived there for about eight months.

**SM:** So, um, what lab or labs did you work for NOAA?

**JP:** I started my career in NOAA at the Southwest Fisheries Center in La Jolla, California, and I worked there for about four years. And then I moved to Miami and worked for the Southeast Fisheries Science Center and then about, what was it, 1998? I was still a, an

employee of the Southeast Fisheries Science Center but I was Acting Regional Director and so I spent most, almost, well, all my time in St. Petersburg. So I was Acting Regional Director for the Southeast region, which is the non-scientific arm of the agency.

**SM:** The science, Southeast region. And before, before, you are still working for NOAA, or not anymore?

**JP:** Oh, now, no, I, uh, I retired and I'm a university professor

**SM:** Right, at Louisiana...

**JP:** At Louisiana State University.

**SM:** What was your last position before you moved to, um, being an assistant professor?

**JP:** Um,

**SM:** ...associate professor...

**JP:** Um, I was a Senior Stock Assessment Scientist at the Southeast Center.

**SM:** Okay, perfect. Um, do you know how many years you worked, total, for the ...

**JP:** Agency? Uh, 31,

**SM:** 31.

**JP:** 31 and a half, something like that.

**SM:** And now, how many at the Southeast Center?

**JP:** Uh, ... 27.

**SM:** 27. So, I would like to ask you how you thought, or how you started working for the, for the Fisheries Services.

**JP:** Well, I was a graduate student at Virginia Tech and basically you're looking for a job. I was in, uh, I was, had gotten a degree in fisheries and and wildlife but my expertise was in the mathematical modeling and that sort of thing. And so there was the opportunity. I applied for a number of jobs, both in academics and with the federal government, and I got the one working for the Southwest Fisheries Science Center in La Jolla, and I accepted it. I was, again, I was, the, uh, what they were looking for was basically people with quantitative backgrounds and I, uh, and I had that and essentially what they were looking for is what we in the profession would call "stock assessment," in other words doing the assessment work to determine whether populations are going up or going down and what to do about them. So that was, it was sort of where I was coming from.

**SM:** I see. So I'm going to ask you to think a little bit back at the, and tell me what do you think were the largest, or the most important moments in the history of fisheries science and management...

**JP:** In the...

**SM:**... since you started working. What did you observe, what did you think the major, most impactful...

**JP:** Well, one of the more impactful things, I started work in 1975 so one of the more impactful things was the passing of the Magnuson Stevens Act, 1976. I so, and when that happened I'd been working for the agency about a year and I was kind of naive and didn't really know the significance of what happened, but it was of big significance because it changed, kind of, the role of scientists within the agency and it become, became much more responsive to management needs and particularly for the expertise I was in that was important, because it brought to the forefront people that did what I did, in terms of stock assessments sorts of things.

**SM:** So can you expand a little on that. Why was it so important for management? For the management...

**JP:** Well, you had, prior to that, basically there was no management of fishery resources in federal waters within the United States, it was just sort of a mishmash. There were some agreements here and there. The, with the establishment of the, of the Magnuson Act it basically gave responsibility to the federal government to manage resources outside of state waters. And what it meant though, was, from a science standpoint, is you actually had to determine how much of the resources were out there and what sort of productivity they had so therefore you could convert that into allowable quotas and total allowable catches and things like that. So, that was sort of a paradigm shift, I thought, within the agency, in terms of the role. Because prior to that a lot of the science that was going on wasn't all that much different than what people did in academics; individual projects, less focused on management sorts of issues. And of course, there were many in the agency that didn't like that change. I was, I was there just about the time it happened so I didn't have any choice one way or another; and it changed and I evolved with it.

**SM:** Why do you think other people didn't like the change?

**JP:** Basically, doing academic research versus doing research applied to management. I mean, it's sort of, if you go to an academic environment that's, you, to this day you get the same sort of dichotomy that goes on.

**SM:** So, a lot of your work and research is related to stock assessment. Have the paradigms changed over the time, scientific paradigms, or the approach...

**JP:** Uh, a lot. Um, a lot has to do with technology too, because with the development of computer capabilities. When I first started, you know, there weren't, in the, uh, weren't personal computers. A computer you had was with cards and you, plugged, well, you're probably too young to remember this, but you actually put in cards and they sort of chugged through and you had to, uh, you know, take, the results weren't instantaneous like they are now. So, there was a lot to do with the technology. Also, just the math associated with it. People started developing mathematical models, and it was, to me it was always this joint development between developing the models and the technology in order to be able to estimate things in reasonable time frames. And so, particularly I guess about five years into my tenure, so this would make it roughly about 1979, well, which is when I came here to Miami, you know, you started getting more of the modeling aspect, stock assessment methods that were computer implemented and a lot, uh, a lot of development in the sense that you could, you could develop models that were useful in terms of predicting what would happen to the populations, that sort of thing.

**SM:** So when you, uh, when you arrived to the Miami lab what differences did you notice? What similarities, or, how was it different?

**JP:** With the lab or with the culture? [laughter]

**SM:** Both.

**JP:** Uh, well, Miami is quite different than, um, than San Diego or La Jolla. San Diego is where I lived. Uh, so, yeah, and this was in 1979, you know at that time, and you know in terms of culturally, Miami still is largely a Hispanic community and, you know, so from my standpoint, I was not somebody that was, that came here with the idea that this all that different. I, it was their home, it wasn't my home so it was up to me to adjust. So there's that part.

The laboratory itself, the La Jolla lab, probably at the time was probably a little higher profile than the Southeast Center at the time. The Southwest Center was kind of higher profile. And some of it had to do with the research that was going on there. Also, in terms of competing for resources amongst the centers, the Southeast Center tended to not compete that well. There was a lot of political factions within the Southeast Center, because remember the Southeast Center was a, uh, it's more than the Miami laboratory, it's all the other laboratories too, and so you had groups of people that tended to operate independently and particularly with the advent of the Magnuson Stevens Act, one of the overall goals, I thought, was to try to get the centers to act more organized in terms of the same sorts of goals in order to meet the overall NOAA National Marine Fisheries Service objectives. So yeah, it was, it was, uh, it was different. You know, physically the building wasn't as nice as La Jolla, but other than that..

**SM:** Um, what were some of your, of the challenges you encountered working here?

**JP:** Uh, well, a lot happened about the time I came here, and part of it was, um, indicated in terms of this advent of the Magnuson Stevens Act, but also responsibility for tuna

resources were a big part, or were becoming a big part of the Southeast Center's mandate. And that, um, because the politics of tuna and tuna-related species it, it, it wasn't just here in the Southeast. It was dealing with constituents in the Northeast United States but also dealing with inter-, well, a lot with international sorts of things, so we were involved with ICCAT, International Commission for the Conservation of Atlantic Tunas, and that was kind of my first involvement with that. And so, you know, it was, I think, um, the constituents they were dealing with both the fishing level and the fishing, fishing organization level, they're all kind of feeling their way about how best to work things, and with that there was an awful lot of conflict at the time, between fishing groups, and. And because in the role that I was in as a stock assessment scientists, and also quite often the one that explained the stock assessment to fishers, I was kind of the, uh, contact point. So you get a lot, lots of criticism, and...

**SM:** Can you, can you expand on that; what, you know, first what, how this interaction with the fishermen and fisheries took place and some of the conflicts?

**JP:** Well, a lot of it, um, I mean, just then you're starting to set up public hearing processes it's, uh, the Fisheries Management Councils, which don't deal with tuna, but, it was sort of similar in that, you know, they're developing fisheries management, FMPs, which means that you actually, that, there are some very structured things you have to do and to implement those, including public hearings and things like that. And so we in the center would be tasked with doing certain kinds of assessments and then you explain the results. And quite often they were at a public hearing and the thing is that, I mean, on an individual, individual basis, we would deal with the fishermen. I mean, it's not like we worked with them that much, it's not like they help you crank the computer or anything like that. But rather you're trying to use, almost all of the data you get is associated with catches and so you're trying to understand and use the catches and, and there's always been interplay with how fishermen report catches and what you can interpret from them, and not. So, um, you know there was that level of interaction, and you know I was on a, um, personal level at that point, I mean some people you liked, some people you didn't, some people liked you, some people didn't. At the organizational level, public hearings, at that point, that's usually when you're coming close to a decision and so when people, fishers, show up at those meetings, they're worried about something, and so they tend to lash out. And, and, you know, just, styles of, of certain groups of people is one of attack. And, and, you know, and I think fishers, fishers in general tend to be that kind of, a little more aggressive, so.

**SM:** Can you, do you remember a particular conflict, something that stood, stood out for you in this history, with the--

**JP:** Lots.

**SM:** --this interaction?

**JP:** Well, this was probably about 1980... well, this was later in the game, 1989 or '90, I can't remember. This was about blue fin tuna, and the major U.S. catch of blue fin tuna is in the north, is in the northeast United States, but the Northeast Center doesn't deal

with it, it was the Southeast and because it was an international organization and there were issues with, the, the same fish up in the Gulf of Mexico and there are a lot of organizational reasons why we did that. But anyway, we were having a hearing prior to an ICCAT meeting and, this was, it was, it wasn't really a hearing it was a, a, um, it's not like they were giving testimony, although in a sense they did it anyway. But this was about 1989, it was in Washington, D.C., um, Silver Springs, actually, where the NMFS offices were, and I was given a thing about what was happening to the population and this guy jumped up and tried to push a bag over my head, so.

**SM:** Wow.

**JP:** And that, that one I remember, because that was the one where I, uh, I don't think I was physically intimidated, the size, um, I'm a pretty big guy, but that was the one where I almost lost my temper. But I didn't, so.

**SM:** So, this fisherman was concerned about the restrictions?

**JP:** Yeah.

**SM:** Based on...?

**JP:** Yeah so we were talking about the, the proposal at that point was to reduce the blue fin tuna catches by about half. So.

**SM:** How was this conflict solved? Or, how...

**JP:** Well, you had to go through, uh, uh, I mean, the actual quotas and things like that are determined at ICCAT. Because the thing, you know in the case of blue fin tuna, the major players for western Atlantic blue fin tuna were U.S., Japan, Canada, and so you, uh, Japan, uh, U.S. had a lot of clout in terms of that. Um, but, in essence, the agency decided not to implement that fifty percent reduction in quota, and so it was, um, basically, um, kept the same quota for the next ten, fifteen years. It would go up, uh, ten, twenty percent or down ten to twenty percent for the next... twenty years, something like that.

**SM:** I see. Any other major events or major...

**JP:** Uh, probably, well, the first one was uh, king mackerel here in the Gulf of Mexico. This was probably about 19-, uh, well, '83 or '84. And this was a council-related species, and it was actually a joint council-related species, between the Gulf of Mexico Fisheries Management Council and the South Atlantic Fisheries Management Council because king mackerel go around Florida on both coasts. Um, so anyway, uh, we had done some preliminary assessment work in the, real early '80s that were, um, I mean we didn't have much data and so there were some very broad-based recommendations that weren't very good. And then once we started accumulating data, and this was about '83, '84, um, we actually could go through some real assessment methods and the results were indicating that the, um, stock size, or the stock abundance, had gone down



considerably and that you needed to take more rigorous actions, and some would say drastic actions.

At the time I don't believe the either one of the South Atlantic or Gulf of Mexico Fisheries Management Councils, they had never implemented a quota on anything and so I mean, they had some broad-based sorts of recommendations; that you shouldn't allow effort to increase, or something like this, but the hard and fast kind of quota thing, that had never happened before, so this was a first one. And so there was lots of pushback about that. And there were a couple of events.

One of them was, uh, I had to present the results to the Gulf Council and it was at, uh, a, the meeting of the Gulf Council was at the Pavilion Hotel, La Pavilion, which is on Poydras Street. The reason I remember all of this was I used to live at, um, since then I have lived in New Orleans so I remember all, I know exactly where it was. But I remember that hotel in particular because they had kind of a U-shaped, uh, um, meeting, you know, about thirty people around the edges, and, it, I was in a chair, literally in the middle, and they were firing questions at me for about three or four hours. And, you know, jokingly, to myself, I would, I would look up and, you know, at the, all the, cartoons, of somebody would be getting, uh, interrogated, by the police with the little light hanging down in front of their head; no, obviously there was no light hanging from the, but uh, but the image always stuck in my mind. Uh, and so I, we continued to be questioned about that. I, what was, uh, also, um, well, we, um, we continued to be questioned about that but at the same time I think the councils, a number of people on the councils, both councils, realized they needed to do something. There were threats of Congressional, needing a Congressional inquiry and things like that. But, um it, I remember one sort of outside group of people, both at the management and science level, that I had to go before - this is in Charleston, South Carolina - kind of to explain what was done, things like that. And so that seemed to suffice, in terms of that.

What really, one of the problems at the time, in my mind, was not only the limited science that we had before versus later, which is also limited but not as limited but it's, neither one of the councils were really geared up to addressing these sorts of things. Plus, it was a joint council activity and so one council would decide to do something here, another council decided to do something there, but they were different, so you, uh, so you physically, at one point, you'd have to physically come together and get some sort of agreement between the two and it took a long time, it probably took two years for that process to go through. But eventually they did establish quotas and things like that. And in the case of the south Atlantic things weren't so bad, so people sort of accepted that sort of thing. In the case of the Gulf of Mexico, things were a little bit worse, but, and so, but eventually it bit the bullet and reduced catches and you could actually see from the science and stuff that the stocks started returning and people, quite often, a number of people would view that as one of the first success stories along those lines.

It was interesting also, this was about 19....88, '89, I can't remember exactly. There was another crisis about king mackerel because they were approaching the quota and there was some question about whether you had to actually live by the quota or not and I was

called to Washington to talk to, a, in a Congressional staffers in a Congressional hearing room. It wasn't the Congressmen themselves, but I was there with the head of the agency named Bill Gordon, who actually was from Massachusetts originally, and again I was sort of young and naive and I thought I'd be just giving a scientific talk and I had overheads and this is before PowerPoint but you had overhead transparencies and stuff like that. And of course they weren't interested in that sort of thing and they were just interested in firing questions. But I remember it was one of the more stressful things that I'd dealt with and I seemed to have dealt with it well because Bill Gordon actually was real complementary towards me, afterwards. But it was also sort of the evolution in general within the agency about how stock assessments were being used and what sorts of conflicts would come about it, come about. So that, those are some of the points. Because I was involved with so many different species, both tuna and domestic, domestic meaning within the United States, you know, there, everyone has a little bit different story associated with it and some of the conflicts were big and some of them weren't, so...

**SM:** Can you, um, clarify for people like me who don't know too much about stock assessment, some of, a little bit on this evolution on how stock assessment was done and...

**JP:** Okay, essentially you get data, what are the main sources of data? One of the main sources of data is actually what are, what are the catches, who's, who's caught, how much weight, how much, how many numbers. Uh, you know, that's a first level of exploitation because if you have less population than you have the catches, or too much catches relative to the population, the population goes down. So that implies that you need also other things, things that will measure productivity. And the things you measure productivity with are things like individual growth rates and those are done by, not people like me, like fisheries biologists where they'll, uh, take the ear bones and you section them and you count rings and you can, it's like tree rings essentially, you can get how big, get how old they are. And so you can get growth rates over the lifespan of the fish. So that's one thing related to productivity.

You also have surveys, both, um, uh, what you would call fishery independent surveys, so research vessels, essentially, and every region has a research vessel. In the Southeast region, it's actually located in, in Mississippi, where they're located. But anyway, they do, they do survey, standard surveys, a couple times a year, well, the vessel time is used like 250 days a year, so it's completely utilized, but there's key, key things that you need for the assessment and one of them would be these surveys. And so you're doing it the same way every year and essentially the same places every year, and I stratify random design, and so, if last year you caught ten fish and this year you caught twenty fish, that's telling you you probably have, ideally you'd say there's twice as many fish there now as there were last year. And so it's an index, it's not an absolute value, it's an index. So that's one other thing. Um, the other thing is you often get what they call size frequency data, where basically somebody goes, for example, to a fish house and as they land the fish, you catch, you measure individual fish and then with that you get a little histogram, that's most of the fish are twenty inches long, fewer are ten inches long, and so on. So that gets a nice distribution. Now, as populations change that distribution will

change, depending on, you know, and so what you're trying to do in that is taking these sizes, using the growth rate you translate that into ages and so you have, instead of a size frequency you have an age frequency. And the movement up from one age to the next is a measure of how the population is growing and how many, in a relative sense, how many there were of individual ages. Because population, the way the populations grow is yeah, individuals can, can gain weight, but basically you have young fish that become a year older next year, a year older after that so what you're trying to do is track that because that'll give you an idea about the ups and downs of the population depending on how many younger aged fish were born.

So those are more or less the three types of sets of information, and what you do with the mathematical modeling is you have a mathematical model which is a depiction of, all right, this is how we think the population is growing in general, and that implies that there's certain parameters, like mortality rates and things like that. And so what you do is say, here's a set of data, here's a population model, if we say the parameters of the population model are X, and you match the two together, and they don't match, then let's change X until we get them to match, and so it's like linear regression, but multi-linear. And, and so that's essentially what's going on. At the time, early on, those mathematical models were much simpler. Now they're much more sophisticated. You estimate hundreds of parameters. The technology to do that is there and so there's lots more debate about what you can and can't use in terms of the data. But back then it was, it was pretty structured, about, uh, about the, those three different kinds of data sets that you were using.

**SM:** Um, so how does, how does this assessment interface more recently, I understand, with ecosystem management?

**JP:** Um, that's, that's a debate. Because you, you hear a lot of people, and I'm not one of them, I don't like it when people actually say this, but a lot of people say "I believe in an ecosystem-based fisheries management; I don't know what it is, but I believe in it." And it basically, what they're saying is, it's unclear exactly what you want to do in terms of ecosystem management. The mantra I give to colleagues and also students is that you, it's unlikely, certainly within my lifetime, that you're going to end up with large-scale ecosystem models that you actually use for management that helps you come to a decision about TACs, or Total Allowable Catches, that sort of thing. And there's a couple of reasons for that.

One of them is that, you know if you have five, five species, uh, interaction with five species that the interaction rate, all the different kinds of parameters you have to have because it becomes a matrix then, and the dimension goes up, you're just not going to get that kind of data, that level of things. So that's one thing. And so, and actually, estimating something for ecosystem models, you can kind of guess but in the fisheries assessment world you also have to be cognizant of the litigation, and so when you get sued and stuff you want to be able to have some statistical basis about why you did things, and so, that sort of thing. So ecosystem-based fisheries management, I sort of view it as, we will be doing single-species stock assessments for a long time to come. One of them, one of the reasons is because single-species are quite often the economic

unit that people want to know about. They want to know what to do about this particular species. The way we do assessments is we typically, is you make very broad-brushed assumptions about what a natural mortality rates are and also broad-based assumptions about what the reproductive rates are and you need both of those things for an assessment.

Well, what does, where is an ecosystem more or less going to enter into this process? It's more refined information about natural mortality and more refined information about the reproductive rate. So to me, that's kind of where it's going but, but in some sense though, ecosystem-based fisheries management isn't really...what it's trying to do isn't necessarily trying to predict what's going to happen but rather to be able to detect changes as quickly as possible so that you can respond to those changes. And so, you know, to me that's a lot of what the fisheries assessment science and world is coming to, or has been for a long time, is how do you detect something as quickly as possible, how do you respond to it?

And so ecosystems-based fisheries management, what you're interested in, I mean, single species information will kind of tell you over the next three to five years what to do and you're not likely to be too wrong about it over the next three, three to five years, that's because fish grow at a certain speed. Most fish, not all, but most fish, you know, they don't really start coming into reproductive state until three or four years. You know, so there's that kind of lag, but and so you have a time to kind of accumulate information, but ecological sorts of changes or major shifts in the whole ecosystem which can change how you interpret your own assessment, and more and more, I mean, people will look at the assessor's results and say, well that's not, um, why is that happening, and it could be happening because of changes, shifts in the ecological sorts of things. And so it's hard to actually estimate those sort of things but nevertheless, in my mind, what you want to do, is to begin to assess the probability that something like that could happen, and then therefore what can we do now, a more robust strategy, so that again, so that you can respond more quickly when they do happen, or detect where you were wrong prior to that. So. Eco, I mean, it's a, uh...an academic I think would look at ecosystems that you must use ecosystems models. Old school assessment persons would say, no, just do the single-species assessment. I'm kind of in the middle and I want to see the ecosystems stuff being implemented, but I want to move in that direction.

**Francine Powers:** Hello, good afternoon.

**SM:** Hi

**JP:** Susanna

**FP:** Hi, I'm Francine Powers

**SM:** Nice to meet you

**JP:** This is my wife, Francine

**FP:** Nice to meet you

**JP:** Anyway, we're being recorded

**FP:** yes, sorry

**JP:** She, she can edit this out.

**SM:** That's okay. Um, okay. So, I'm sorry. I mean, I'm still thinking about ecosystem management and this evolved, part, in part, after the 1976 Magnuson Act. It's a more recent..

**JP:** The ecosystems stuff?

**SM:** Yes

**JP:** Yeah, I would consider that, really hasn't really got going until probably the 2000s.

**SM:** Do you see, you already talked a little bit about that, do you see the ecosystem management evolving more and becoming more part of, of --

**JP:** Well...

**SM:** --the management and science--.

**JP:** Yeah...

**SM:** --in the future

**JP:** I mean, it seemed to me, what you're going to end up with over the next ten years or so, is instead of saying, here's a quota, you say your objective is maximum sustainable yield, I mean, you've heard that term before?

**SM:** Mm hmm.

**JP:** Okay. And that's really defined in a single-species context. Well, in my mind what you're going to have to do is based on this other knowledge you're accumulating is you're putting in buffers so that instead of taking maximum sustainable yield you're taking some percentage less than that. And so that'd kind of, I think, where it's evolving. Also I and others make the distinction between ecosystems management and ecosystems-based fisheries management.

**SM:** Okay, explain that?

**JP:** And the reason is ecosystem, uh, if you say ecosystems management you're talking about how to manage the watershed, South Florida water policy that affects pink

shrimp in the, in South Florida in the Keys, things like that. So it's a whole different scale of management. And there's other management bodies that you'd have to deal with. In the case of California, the California Coastal Commission. You know, there's a whole slew of things. And so if you really want to get into that, you're going to have to get some sort of organization about who has more power and how do they, how are the decisions made. And so I think what most, and fisheries policy sort of people are, tend to focus more on the ecosystem-based fisheries management which basically means fisheries management but what can we do to deal with those issues that I was just talking about. And I think in terms of the National Marine Fisheries Service, I think that's more or less been their focus over the last five, ten years.

**SM:** Okay. I want to ask you a little bit about your, the career evolution, your career evolution. I know you, you've went from being more on the policy or regulatory side to science and back, back and forth, multiple ...

**JP:** Well, I, I started on the science side.

**SM:** Okay.

**JP:** Basically, I was always good at, at math and to me all it was a puzzle. When I first started, you know, I didn't care how they managed things, they just wanted the numbers to work out right. And so I was, I, I was really sort of, uh, it wasn't that I was standoffish of the management part of it, I just wasn't really cognizant of it. And then, because of the situations where I was in, when I first started working at the agency in La Jolla, it was on tuna porpoise issues, and so at that time there were hundreds of thousands of marine mammals, dolphins, who were killed by the tuna fishermen in the eastern tropical Pacific. And so we were doing assessment studies of the populations, and you were trying to establish management procedures to reduce that mortality, and over time it actually happened. But at the time, you know, the tuna industry is, in general, throughout the world and the United States, is a, has a, is a big, um, political clout, particularly at that time in San Diego.

So anyway, so there was, there was that sort of thing that I wasn't, I kind of came into that, like I said, liking the puzzle but not really caring what happened to it. And then you got much more involved in how that management process works. Then as I came to Miami, one of the reasons I, the guy that was my boss in La Jolla, his name was Bill Fox, William Fox, William W. Fox Jr, he actually eventually became head of the agency, and is now with the World Wildlife Fund. But anyway, he got me, he moved here to Miami and then about six months later, he got me to move as well. And some of the reason I moved was because I wanted to get away from the politics of the tuna porpoise issues and again, I think I was pretty naive, because what I ended up getting involved in was the politics of blue fin tuna issue here, where there were much, much worse, I think.

Then relatively early on in the process, I started taking on supervisory roles, not by choice it just sort of evolved, I think, there's a lot of, a lot of things like that happen. I think they still happen, where basically you have a choice of being a supervisor and getting paid for it, or being a supervisor de facto and getting paid, not getting paid for it,

so you, you know, you sort of make those choices. In many cases, you don't realize the life choices you're making at the time and, you know, that's the way it is. Um, and so being a supervisor, you know, I kind of coordinate the assessment activities of other people then you also end up being, becoming more and more the spokesperson for the results and then presenting them to managers, lay public, and other scientists. And that's, that kind of evolved with me, because I mean, you know there's always this discussions about scientists need to be a better communicators, and, maybe, but it's a skill. You can't ask everybody to do it. And one of the things that always bothered me was, was you're asking scientists to communicate it at all kinds of different levels and you can't expect their products, particularly written products, to fulfill all of them because at a scientific level, you want to be able to defend yourself scientifically. At the lay level you're trying to be, kind of explain it in a broad sense, and at the, at the management level you're trying to cover your ass, basically. [laughter] You know, and, because you want, it, particularly, communicating at the, at the manager's level you're trying to say what you know, don't oversell it, answer the questions they ask you but also answer the questions they should've asked you because most, I mean like any political body, most questions they ask you are loaded. They want to, um, most people will want to make a point with other people so they ask you certain questions, so you kind of, got to, anyway, I developed a skill with that, unbeknownst to me. And I, so I ended up doing that more and particularly with the Gulf Council. I was doing that and then also evolving into tuna issues and dealing with ICCAT, I started doing that. I, I was the chief scientific delegate to ICCAT for, from about 1992, or something, '90, something like that, up until '98 I guess. And what that meant was that all the people that worked on ICCAT related species, the tunas, bill fish, in the Atlantic, the U.S. people, I always tended to be the one who coordinated and I was the one that was more or less coordinating the presentations to the U.S. Commissioners and then also dealing with the other scientists throughout the Atlantic for ICCAT, so Spanish and Japanese and French scientists and so on. So I, you know, I, that sort of went along. Then in 1998? I guess, yeah. I became, I was elected the chair of the scientific committee for ICCAT. This was an elected position of the scientists, or the delegate, scientific delegations within ICCAT, so I did that for four years. I was still, I was still employed here and I am, part of that time I was actually at the regional office doing the management issues there, so that was, that was an interesting time period. A lot of travel. So.

**SM:** Why was it interesting?

**JP:** Well. One of my goals as I became the ICCAT chair, there was a lot of, at the scientific level, conflict; the U.S. versus France, versus Spain, and so on. Also, at about that time was when instead of being Spain, France, Italy, et cetera, being individual countries, members of ICCAT, they had switched over to become the European Union and so they started having to coordinate a lot more with each other and so, you know, I made it a point to try to build some bridges and stuff and I think it worked out. And so nowadays that sort of conflict isn't there. You still get conflicts about individual stocks, um, and that sort of thing, but most of it people have been around the game long enough is they know why people have to react certain ways. Even at the scientific level, you know, the politics of it, is, as a scientist you know what's of particular concern to your managers' constituents so you are very sensitive to how that, how things get worded and that sort

of thing, so. So that was, yeah, that was a good thing. And then, and then also as I mentioned I took a stint as the Acting Regional Administrator for the Southeast region whose offices were in St. Petersburg. And so then I was the voting member, uh, the agency's voting member for the three councils that we dealt with, the Gulf Council, South Atlantic Council, and Caribbean Council. And so, essentially I was the chief implementer of regulations and laws for about a two and a half year period while I was the Acting, within the southeast United States. So you got much more involved in, you know, what's the regulatory process, public hearings, etcetera, etcetera, like that.

**SM:** So, um, so and then you returned back to doing pure science stock assessment at one point, right? Towards the end of your career, right?

**JP:** Uh, yeah.

**SM:** How come?

**JP:** I got fired. [laughter] No, I wouldn't say it that way. Um, essentially I was acting as the regional director and the head of the agency was Bill Hogarth. He, his position, he was acting as head of the agency for a long time. His position of record was the Southeast Regional Director. So I was kind of filling in for him, that's why I was Acting. But it went on for a couple of years. Then, as he got his job, he um, then the position of record came open and I applied and I was not selected. So I came back to the Southeast Center. And at that point I started realizing that politically I'd kind of run out my string and it was time to leave the agency.

**SM:** Can you talk a little bit about, since you've really experienced both the regulatory side and the scientific side of fisheries management and science, can you talk a little bit about the differences and similarities or relationship between them?

**JP:** Ah, I think anybody within NMFS that kind of get up high, like Center Directors and things like that, you understand the roles of... In terms of actual experiences, have you talked to Andy Rosenberg? Do you know who...

**SM:** No.

**JP:** Do you know who he is?

**SM:** No.

**JP:** Oh, okay.

**SM:** Is he somebody I should interview?

**JP:** Uh, I don't know, he's actually now works for the Union of Concerned Scientists in Massachusetts, in Boston. But he was the, he was very much like me, a little bit younger than I am, coming from a stock assessment background, he kind of got involved in the management, he was the Regional Director in the Northeast Center and then he became



the Deputy Director of the agency and then when there was a change of administration he was kind of left out. But anyway the reason I bring him up is because he and I probably, more than anybody I know, have similar sorts of experiences in terms of being involved in both the scientific and the hardcore part of the management where you have to worry about how rules are written, the legalities of it, dealing with litigation and things like that.

So...so when I first started working for the agency, there really wasn't a strong separation between science versus management. And I've heard friends of mine refer to it as separation of church and state. And there's a good reason for that. Particularly early on in my career, I remember situations where Regional Directors would put subtle and not so subtle pressure on individual scientists, myself included, about what the results of some study might be and so they, yeah, when you're, you know, 28 years old, and new to the government process, it sort of, you feel the pressure. And part of that was again, at the beginning there wasn't this agenda of management for the agency at large. People didn't really know their roles and so all the politics that would go on, I think it was much worse then.

Nowadays people really understand the different roles of the science versus the policy. And so much so, I mean, you know and that's one of the reasons that the agency is organized in a certain way, that the centers report to a person in Washington, the regions report to a person in Washington; they don't report to each other. And at one time they did and it always comes up that every once in awhile some Congressional type would say it would be more efficient if you did it the other way. Well, what it means though is then you start robbing one part of your budget to do another part of your budget and at the management level, you want to solve constituents' problems because they're the ones who are giving you the most heat and if you start taking money away from the longer term viewpoints, or, uh, of the centers, then there's a price to be paid for that. So that's one of the reasons that I liked the separation.

Also, having been on the management side of it, I always felt that when you have very structured sorts of management, that have evolved out of the Fisheries Management and Conservation Act, there's certain rules you have to play by, certain objectives, the ten National Standards and so on and like that. And so one of the things that I felt was good as a manager is to say well, the scientists said to do this. It's not my fault, it's their fault. You know, knowing full well that, what the science really entailed. The, and so, by having those roles then you also can avoid some of the "it's my fault," sorts of things. And it's, I say this sort of tongue and cheek about blaming the scientists, but again it's part of this separation of church and state, science versus policy.

Even now, I mean, I know less of it in the last ten years, but I'm still, well, for example, I'm still on the south, on the Gulf Council's Scientific Statistics Committee, so I know kind of a lot of the conflicts that still go on between the center and the regions, and not only here but other places as well. And, you know, depending on the regional director, they are going to always, I mean the tension will be that they want to push to get things done that will solve an immediate problem. Whereas a center also has an obligation to not only this regional director but the one five years from now and the one five years

after that. And so that's kind of the tension that always exists, I think. And to me, if you, if you had centers reporting directly to the regions, that tension would go away because one side would win out, the regional office would win out. And I think, again, I think the agency realizes this and nobody has really pushed hard for those changes. I mean you get Congressional sorts of interests and doing stuff like that but in general you can resist it.

**SM:** Can you talk to me, talk a little bit about the, maybe some of the most contentious moments or subjects that you encountered in your experience that took place in this conflict between the region and the centers in the Southeast? Particularly in Miami.

**JP:** Between the region and the center?

**SM:** Yes.

**JP:** Uh, a couple things. One of them had to do with king mackerel in the early '80s. This was back in the days when people wrote memos because you didn't have email so you, everybody had to put in a memo, some statement about something that ticked them off or didn't tick them off, or something like that. I, you obviously had telephones and, but I was doing the assessment work for king mackerel and this was in a point when the data was really limited and you know, this best available data stuff, you still have to make your best judgment about what the data implied and to characterize the uncertainty appropriately and stuff like that. Then as we get evolved into it, into more data it became much more clear that we had to do something. And the Regional Director at the time would actually call me up and, I'm a lowly GS 12 - I don't know if you remember the old system of GS 12 - I'm a lowly GS 12 or maybe I was a 13 at that point. And this is the Regional Director, which is quasi-politically, no not really, but there's always a political component, and he was pretty hardcore - this is my opinion anyway, pretty hard core and I'm not going to mention his name, actually, either, somebody that knows the situation could figure it out. But he was pretty hardcore industry supportive and so he was not too keen on the idea of establishing TACs [total allowable catch] and total quotas and stuff like that. So he, he actually would be lobbying me and I felt really, really, really uncomfortable. And finally, I mean, it kind of reached a head and I actually flew over to St. Pete to meet with him one time and it was just he and I and again, I was, I was pretty young and naive and I, you know, it was, we basically came to an agreement about how we were going to, our behavior and I felt like I did it without losing any integrity, so.

**SM:** Also I want to go back. You mentioned at one point about when you moved to Miami, the blue, the blue fish...

**JP:** Blue fin tuna.

**SM:** Blue fins tuna, sorry

**JP:** It's still blue fin tuna.

**SM:** The blue fin tuna politics was in a sense...

**JP:** Well, blue fin tuna, uh, these are things, fish that they get to be about nine feet long. Probably the biggest ones maybe a quarter of a ton. Individual fish on a regular basis get sold at the Tsukiji Fish Market, when they're, when tuna are caught and they're used for sashimi and a lot of them are shipped to Japan in these coffins that are iced down and so they're frozen when they get there and they'll get there within 48 hours of when they're caught; they're sold under auction there. If you're ever in Japan go see this place, it's really interesting. Fish from all over the world, not just blue fin. But anyway they have an auction and, you know, blue fin tuna, an individual fish, on a regular basis will go \$20,000 to \$40,000. There are certain key ones, key times of the year where, you know, there's been an individual fish that were several hundred thousand dollars. So it's a big deal.

It's also important in the United States. The magnitude of the catches in the United States is not that large compared to other places, but in New England they've always, they've caught blue fin tuna there since about the 1980s, '70s a little bit. At one time, if you've talked to Brad Brown, he's probably told you this story, about when he was a kid they would catch blue fin tuna and just leave them on the beach because there was no market for anything; they'd just do it for fun or something. But anyway, there's a market for them. If you get a little chunk of sashimi like that, it would be \$75 or something like that, so it's a huge amount of money.

Japan, at one time, was a major player in terms of the catch, and there's still a lot of conflict between the U.S. and Japan in terms of who catches it. And again, this was about 1981 where there was no quotas or anything like that, and so you, that was the first time you started to try to establish a quota and like most things in fisheries management, the conflict comes because somebody wants more than somebody else. And so it's not only the magnitude, it's who pays the price for cutbacks, who gets the benefits, and things like that. So there was a huge battle between Japan and Canada, or Japan and the U.S., and also within the U.S. you had the fishing industries associated in New England, which were the, caught most of the big fish at the time. You had recreational groups and you had conservation groups and it was pretty important.

About the time that we were recommending a 50% cut in the quota in the early 1990s, in order to delay this process there, they, uh, Congressional pressure and consistent pressure established that there had to be a, an NRC, National Research Council study about blue fin tuna, what to do about them. This is, uh, this is a long story because it's one of the more eventful things in my life. The, the NRC, uh, the mandate of the NRC was, you know, evaluate the stock assessment and decide what to do about it. In my mind, the selection of people they got was a little heavily weighted toward pro-industry sorts of situations, one. Secondly, I felt like the, um, that they really didn't meet the mandate that they were given; they criticized the assessment but they didn't say what to do about it and said they weren't going to say what to do about it. In other words, they were, in the assessment process you're always saying, all right, here's a set of information, we're, here's the best I could do with it, here's how I want to characterize the uncertainty, and so on. And to me, they didn't do that. They just basically said here's

things that are wrong with it, bye, see you later. And then the third thing was the NRC themselves, they put out a press release with a title of the press release that was particularly damaging to the agency. And so that cut the wind out of any hope of a reduction in the quota at that time.

And that, we had meetings in Washington, you know, called on the carpet by higher ups in the agency. I had meetings in, where we're meeting with other members that were on the NRC review panel where we were told not to be very demonstrative in terms of our response to this. You know, so, it was, it was a very, very difficult situation. And, I was, I was actually, I had to go to Washington and meet with the Chief Scientist of NOAA who is still around, I'm not going to say her name, but she's at a higher level now. And one of the things that had happened was somebody that worked for me had actually made an error about how, how to do one of the calculations. The NRC report highlighted that but didn't look at the significance of it, and the report and the effect was not significant at all, in terms of the overall conclusions. But, if you look at it in terms of credibility, it was hugely significant, and that's, that's one of the things probably that I learned about all the politics now. That perception makes a huge amount of difference.

And so, I was kind of the one that took the brunt of that. Brad took a fair amount of it too. And I probably got much more bothered by it than he did. He, he adapts pretty well to things like that. So it was, it was a tough time. I, over time I became, I mean I continued to be involved with blue fin tuna. As I said, I became chair of the scientific committee and we did assessments of the blue fin tuna in the Atlantic. I chaired lots of those meetings, so over the, over the years, you know, I've sort of weathered that particular point in my life. And things have gone on. I think something, some things I said at that time, I think have rung true and that it, you know, if you keep the quotas more or less the same, then you're never going to find out whether you should've gotten them lower or bigger, and basically, in my mind, the decision process is not that you want to recover to some prior level, but rather that you're going to accept where you are now. And it's not like, it's not sustainable to do that, I mean basically you can keep populations level at the same levels now that, that's not, I don't see that as a real problem. It's not like there's going to be extinction.

But at the same respect, I felt like we were being asked to provide information about what it was to recover to a certain level and now it just seems that nobody worries about what that level is. So that sticks with me, a little bit. But anyway, like I said, I've sort of weathered that, and amongst the scientific world people think of me as being involved in blue fin tuna. I actually went to a couple Pacific blue fin tuna meetings in the last year, one in Taiwan and one in La Jolla, doing assessments stuff. So, you know, so I guess I'm still involved.

But, so blue fin tuna has been a big part of my life and it's always been highly important as a, as a conservation icon, you know, one of the big fishes, particularly here in the west Atlantic, there is, there isn't all that many of them because, I mean, anything that big, there's not going to be all that many of them, per se. But it's, uh, but it, you know, even in the ensuing years, because I was much more involved in the western Atlantic blue fin, there's also an eastern Atlantic population with some mixing between the two. And the eastern Atlantic also is managed through ICCAT so I was involved with that as well. And

that has gone through some major management conniptions as well, because at one time they were probably over catching quotas by 40 or 50,000, you know, 200%. And there were threats of listing them and CITES, the Convention for the, um, for, CITES, what's the "I", Convention for the International Trade of Endangered Species. And so there was some movement amongst other countries to list blue fin tuna under CITES and, that forced the ICATT Commission to actually impose some reasonable quotas and, so that's been a good part of it.

**SM:** When you say "them" do you refer to Japan again or?

**JP:** "Them," well, in Europe it's a little bit different because it's, a lot of that catch was in the Gulf area and in the Mediterranean, and if you are looking around the Mediterranean there's twenty or thirty countries, I don't know how many, including North African countries. Libya, probably, at one time Libya caught more blue fin tuna than the U.S. did. They don't anymore because they don't really have a country anymore, in terms of this. Uh, Turkey, Greece, a lot from Spain and France, and a lot, uh, from Italy, also Morocco.

What's interesting about blue fin tuna is in the Mediterranean people have been fishing for blue fin tuna for literally thousands of years, going back to the Greeks and that sort of thing. There they have what they call these trap fisheries; several that are still exist in Spain, a couple in North Africa, several in Italy. And what's interesting about them, and these are sort of community things, and when I say traps, basically what they are is a maze and so when the fish go further in shore, they get caught in the maze and they end up in the pot, and you'll see things all on the internet, you can go see it, where the community goes out and catches, pulls them up through the net and catches them all at one time. And so various ones of these have kept records for a thousand years so you can actually go back and see what some of these records are going up and going down, that sort of thing. One of the other scientists that he and I collaborated on a couple, on a paper about the blue fin tuna, and one of the things that you would argue now is that at that time, you know, fish came in to shore and get caught and if the wind was blowing the wrong way they wouldn't get caught, if they weren't pushed or weren't enticed to come in the... Whereas nowadays you have purse seiners and a lot of purse seiners within the Gulf, in the Mediterranean so there's basically no place for a fish to hide anymore, and that's what really happened. Plus you had what you call ranching or ...

**SM:** Farming?

**JP:** ...pens, essentially this happened, started in about the late 1990s, and it's sort of gone down a little bit now because of the price and stuff, but basically what it is, is you take a purse seiner, you catch a bunch of fish, and you dump them in this pen that holds them there. And these pens could be like a hundred yards across or something like that. You hold them for three months, you feed them, and you fatten them up and they gain like 25% of their weight or something like that, and then you sell them. And that, I mean that just really hit big time and it caused all kinds of problems because one, you'd have a vessel from one country that was dumping fish in a pen from another country and another, a third country is dumping fish in the same pen, and so you lose, you lose

track of what the catches were, people weren't reporting them. It's interesting, the pens themselves, then what they'd do would be to haul them towards shore where they would hold them for the three months at a relatively low speed like five knots or something like that so it would take them a couple of weeks or something to bring it in, but you know, that, that process, I mean the catches just went off the roof.

We were, at that time, we were recommending quotas for the eastern Atlantic and Mediterranean of about 25,000 tons. The current level is about 15,000 tons, in terms of the recommendation. At that time we were recommending 25,000; they were reporting like 35,000, and the actual catches were probably in the order of 50 or 60,000 tons, and so that was, you know, it was just chaos there. And so, and the actual resource for the western Atlantic is much, much higher than that, or excuse me, the eastern Atlantic is much, much higher than that, than the western Atlantic, just naturally. It's probably ten times as high. And so you have these huge amounts and you also had mixing going on between the west and the east and so if you start catching lots of fish in the east, not only are you affecting the resource there but to some extent you're affecting it in the west as well. And so that has been some of the debate. And so in the eastern Atlantic, the European countries, their, in terms of fisheries management, their major impetus was to get a handle on what they were doing they weren't worried too much about the west because it was small potatoes to them. Uh, I mean obviously within the ICCAT framework, you had to play by a set of rules, but the real issue is, was that, in the eastern Atlantic and Mediterranean.

**SM:** How is the..

**JP:** So..

**SM:** I'm sorry, continue.

**JP:** ...go ahead.

**SM:** How is, um, how is the situation in the U.S. catches? Is it more sustainable?

**JP:** Well, because, because, we went through this process in the early '80s, actually establishing of quota for the western Atlantic, and so it was divvied up between U.S., Japan, Canada; as I said, an argument was made to reduce the catches in order to recover the stock to some levels that were probably closer to what they were in the early 1980s, late 1970s. Or no, early 1970s, late 1960s. And so that was kind of the standard that a lot of us were working toward. But, uh, the, with the current quotas and everything else, the population has sort of leveled off and like I said, it's not like it's going to go extinct within the next five years or anything like that, but it's, you know, by establishing those quotas you got a handle on it anyway. And so a lot of the fights that we used to have as well, do you, do you raise the quota 1,000 tons? 250 tons? Reduce it 250 tons? Whereas in the east, we're talking about overshooting quotas like 40,000 tons, and so that's kind of the scale of what the problem is.

But, but there, the western blue fin tuna, uh, I mean, you, they are, the only known area for their spawning is in the Gulf of Mexico and so they are largely a U.S. resource. I mean, obviously in international waters, but a lot of concern about it. And in general, Japan early on in the game, you know, they were big exploiters, and not only in tuna but they had a reputation of going to other countries, and this is before 200 mile limits, and going in and slaughtering fish and kind of leaving the dregs there, and so a lot of countries were real, really anti-Japanese about fisheries. Maybe understandably.

More and more, I mean, so early on in the blue fin game there was always this debate with the Japanese about blue fin in the Atlantic and fighting about who gets it, and they caught a lot of fish in the 1970s in the Gulf of Mexico, but as time has gone on Japan actually, they still control a lot of the market because a lot of the fish get shipped to Japan for this Tsukiji Fish Market, like I was mentioning to you, but their vessels are kind of being phased out; they're not, it's become less economically viable for large-scale far seas fleet for them so they tend to be more, I mean they're, they're very much more involved in management of this. A lot of blue fin tuna is highly valued but it isn't a big volume compared to other things like skipjack and yellow fin tuna and that sort of thing. And so Japan is, has focused a lot of their management effort on trying to put limits on it, on effort from other vessels, and what's called IUU, Illegal Unregulated and Unreported catch, which amounts to vessels that don't have a license or bought a license from some African country that's kind of cruising around the ocean, nobody keeps track of them and so on and so forth, so that, over the last decade there's been a lot of emphasis on trying to get rid of those sorts of boats.

**SM:** How do you estimate the amount of fishing that's unreported...

**JP:** The actual...

**SM:** ...or, yeah.

**JP:** Unreported?

**SM:** Or underreported, or...

**JP:** Well,

**SM:** Yeah, yeah.

**JP:** By definition, you don't.

**SM:** Right.

**JP:** I mean you can kind of get an idea. One of the things we did for the blue fin tuna in the Mediterranean when I mentioned that they were overshooting the quota by 30, 40,000 tons or whatever. One way is to look at trade statistics and fish that were shipped from point A to point B and kind of interpolate what had to have gone on. It's nothing official. You can't say, this boat caught this or you can't say this country caught

this, but you, from an assessment standpoint, you can utilize this information and kind of get a feel for it. Uh, and the other, other thing that we used was actually to get some information about vessels and how much a vessel holds, how many trips they can take a year, do things like that. And, uh, like I said, in that particular case you got an idea about what the level of unreported catch was. And so you can kind of couch your assessment in those terms. But again, you can't, it's not like you can make a case that this is a bad guy, this is a bad country, because there's so much you can't, you know, it's just assumptions in some cases. But.

**SM:** It's unclear to me, and I apologize for that, how do the boundaries work in the ocean? And at sea? I mean I understand now we, U.S. has 200 mile--

**JP:** Yeah.

**SM:** --limit off the coast.

**JP:** And I mentioned that, that happened about, in the late '70s, that was when I first started working there. Um, and of course with tuna these are highly migratory species; they go all over the place, both inside and outside of 200 miles. And so that's why they established these RFMOs; Regional Fisheries Management Organizations. And so, in the case of tuna RFMOs, there's five of them around the world and ICCAT is one of them. And so basically it says, all right, we've got these resources, we're going to have to have some sort of commission, um, it's actually a treaty that the U.S. signed, you know, agreeing to how these things worked. And it's basically agreeing to, we're going to get together and decide as a group how we're going to manage these things, and, like I said, in the early '80s that became how those groups functioned in terms of real management and keeping track of things and so on, has really evolved. So they got much more in terms of the assessment part of it, much more in terms of compliance issues, trade restrictions for other countries that are not members, that are scofflaws, that sort of thing.

**SM:** How, um, how do countries become members? Is there like a ...

**JP:** Pay your money.

**SM:** Yes. A fee. Okay.

**JP:** And that was a, still is a big issue, because, particularly in the late '90s, the U.N. [United Nations] agreements on law, not laws of sea, but you, that happened about the same time too, but U.N. agreements about straddling stocks, which basically says, you know, you need to join these RFMOs if you want to be a player. Well, the problem is that you have these, the history of, take blue fin tuna where individual countries have been catching these for twenty years and in some cases way before the actual convention actually existed, and so these countries join with the idea that I'm going to get something for it, and then everybody says, wait a second, you're not going to get anything for it because we've been catching these for, so on and so forth. And so that, that's one of the issues that, that still comes up is how do you kind of, get these,



particularly developing countries, involved in this process. And it, I don't think it's totally resolved yet. Because, I mean the arguments are, well, we've been catching blue fin tuna for hundreds of years and, over the last twenty, thirty, forty years we've been making investments in vessels and stuff and, and now when things are getting a little bit better, or, you want us to not reap any of the benefits. Well the counter argument is yeah, but you, you're the ones that caused the problems, so. And so that's a non-winnable argument, depending on where you're sitting. So.

**SM:** I see. Uh, so you talked, you touched a little about, on modeling and how things have evolved from, you know, more simple models to more complex models. What do you think is the future of modeling and stock assessments?

**JP:** Well I think, uh, in terms of improvements...well, there, there's... I'm not sure that, in terms of the modeling itself, in terms of improvements. I think we're gotten pretty good at it. The issues are the data. And with a couple of exceptions which I'll get to, and so as I mentioned, we've gotten to very detailed models so you can use data that, this kind of survey you can use it, that kind of survey, this kind of size information, yadda, yadda, yadda, like that. So, the methodology allows us to utilize all those kinds of data and how do you utilize that? You create models with very detailed numbers or parameters, and that's what I meant when I said you could estimate now hundreds of parameters where in the old days it might be ten. And so you estimate those parameters which basically are converting these indexes of abundance into absolute abundance. And so instead of saying, um, there's a relative number of fish here, and ten years later a relative number of fish there, you're saying well, that means because of all the issues of how many were caught, productivity, things like that, you can say well, there were actually 200,000 tons then, and 100, or 100,000 tons now. And so, so that's basically how the assessment works and when you have lots of parameters, you have lots of data.

The limitations that we have now are, basically you might relate it to the ecosystem sorts of things, is that the natural mortality rate, how is that changing, can we monitor it, what to do about it when it does change, and what's the natural mortality rate is basically predator prey kinds of things, the ecological interactions. And the other is the recruitment process, or the reproductive process. I refer to it as the reproductive process. And it, it's, uh, in order to decide what's a good amount of productivity, which is basically a maximum sustainable yield, what you're trying to determine is what's the biomass that would support maximum sustainable yield, and that's kind of the standard criteria about whether things are good or bad. And so if you're below it you're bad, if you're above it you're good. Lots of leeway in terms of interpretation there, but still. And in general that's what you're doing. And so that relies on knowing what the reproductive rate is, but if you look at the ecology over the first year of life of any fish, you know, if it's a good year 98% of them die, if it's a bad year 99% of them die. You know, so it's, you're always going to have a lot of variability associated with that.

And so that's what I mean by instead of really trying to predict what recruitment is, in my mind that's a waste of time because you're never going to do it because that variability is driven by all kinds, whatever oceanographic condition exists at that, any particular point in time. But it's rather, can you develop things to, to measure

recruitment at the end of that first year, measure things more precisely and be able to respond to that. And so the modeling - single-species modeling - you never say never. You can get better at it. You're going to be limited by the data, and I think if you actually could measure mortality rates at age on a year to year basis, that would be a real godsend for a lot of the modeling. And it wouldn't take very much, if you had that information, implementing it in a model is sort of, it's easy, you just plug it in. But in terms of interpreting it, it might be a different story. And so, and then the other thing like I said, is the recruitment. I just don't see major improvements in predicting what recruitment is and so to me, rather what you should be doing is trying to understand the variability. If you have a, instead of saying, you know our best estimate is there's going to be a hundred thousand fish of age one next year, you say all right, here's a probability of the distribution, it's going to be, you know there's a ten percent chance it's going to be less than 10,000, and if you do it again next year, it might be a ten percent chance there's less than 20,000, you know, so you see how the distribution shifts. So I think that in my mind that's where improvement is needed, but it's going to take awhile.

**SM:** Um, what is, what are some of the disciplines, like scientific disciplines involved in the management of fisheries, or...

**JP:** Everything.

**SM:** Okay.

**JP:** The reason I say that is, and to me that was one of the more gratifying things of being in stock assessment. You were forced to learn a lot of things a lot of, a lot of other studies because you had to use other data. Okay, a general fisheries biologist might do age and growth studies where you go measure fish, you take these ear bones, otoliths out, you section them you read the scales, and there's lots of sophistication that comes with that about how to do it. For some fish, you can actually get daily rings, in other words be able to age them reasonably well by the day, particularly in the first year of life. It's all microscopic kinds of stuff that I don't want anything to do with, but it's really important work. You get other things, you know if you have mixed populations, where did they originate from? And so there's people that will study the micro constituents within bones of fish and say, if they originated in this area, because of the chemistry of the water, they have this chemical signature. And if they originated there, they have that chemical signature. So they're mixing together, you catch a fish older and you try to, to determine where it came from. And ideally then you would say, you know, 30% of the fish that were there at this time actually originated here, and 70% originated there. That's, that's still hard to do, I mean conceptually people have done it, but the logistics of sampling is hard.

Another thing a lot of emphasis has been put on is electronic tagging, archival tagging and pop up tagging, in particular with blue fin tuna, but a lot of species in general. What this is, is a, in the case of an archival tag you get a, a tag that's kind of a cylinder maybe about the size of a cigar. You implant it in the body cavity of the fish and let them go, and put another tag on it so you can see it, and you can, you can actually detect where they

go on an individual basis. Because traditional tagging, you tag some fish and let it go and you catch it and it, um, and it started here and ended up there, but what it did in between you don't know.

Well, with archival tagging you can actually tell what it does in between and what it's doing is detecting, um, light, temperature and things like that, and converting it into actual locations, both on latitude and longitude. Also the technology is you can, but also you're recording this data and so when you get the tag back you can download it and it's all electronic. But you can also record things like temperature, depth of dives, so up and down sorts of behavior, things like that. And then the, the newer sort of version of this, is what they call pop up tags, where instead of putting it in the body cavity, you attach them as a tether. After six months, well, let me go back, the archival tags, you can put them in there and they may last for, the battery may last for a couple years, something like that. And of course, there's always this trade off of battery size versus size of the thing and how long you can actually put them in there.

With pop ups, it's still the same sort of tradeoff, but you have this tether and that erodes away after three months, six months, a year; goes up to the surface and you download it from a satellite. And so, that's been really influential in terms of understanding the basic behavior of lots, particularly oceanic fishes, in terms of where they're going and that sort of thing. A lot of it hasn't been, uh, well, one of the reasons for the pop up tags, if you have an archival tag, it's like any other tag, you've got to catch the fish to get the information back, where a pop up tag goes to the surface and you get the information back and so it's much more cost efficient. Individual tags are still fairly expensive, depending on the size and stuff, a \$1,000, fifteen hundred dollars, something like that. But, uh, so, you get this information and it, um, you usually, in terms of an assessment standpoint, you usually don't get enough information that you can implement it directly into the models, but to me it's been extremely useful in terms of how to structure spatial aspects of the models.

You know, when I've talked about single-species assessment, in a lot of cases, uh, you do that assuming there's just one area, that everything in that area is acting the same. More and more we're sort of branching off into spatial models and you know, which basically means a fish can be here, it could be there, so you have to have some measure of how many, at this point in time how many moved from there to there and what they did when they got there; did they just get together to feed and separate out to reproduce? Or did they get together to reproduce and separate out to feed? You know, things like that. And so those are pretty important in terms of the assessment process. So that's, that's been really interesting to me, and again the technology, my own abilities with it, you know, I don't know, exactly how they work and stuff, I just know that they have these algorithms that do it, and they've been pretty important in the process of it.

But it also, it goes into economics, policy, game theory, you know, how does, how are decisions made, and that's partly my own interest because by being much more involved in watching this policy process take place is, how decisions are made and that sort of thing which gets into game theory. Economists in terms of, you know, how fisheries operate, in terms of short term or long term sorts of decisions that are being

made and things like that. And it helps explain responses to different regulatory packages, sort of what they like or don't like, and why they don't like or don't like them.

**SM:** Fascinating. Um, just a few more questions. I'm curious, you've worked for the federal government now for thirty years or more, what are some of the challenges and what are some of the good or positive things that you've encountered and you can speak of?

**JP:** Um, let me give you the challenges first.

**SM:** Sure.

**JP:** From a scientist's standpoint, you want to do things that are interesting, you want to do those sorts of studies and you want to get credit for them. And the way you get credit is getting publications. And in the assessment world, that's really hard because in a lot of cases, the publications are not, the work you do is really innovative but it isn't, it's hard to get it published because they tend to be very focused on a particular issue. Plus the people that have these sorts of skills are often of demand so that if you finish one assessment, you have to do another one and so you don't have time to do the publication sorts of writings. So there's always a, as long as I've been with the agency there was always this issue of the grind that you get caught in. And some people I know that were quantitatively oriented just said "no, I'm not going to do it, I'm going to take other jobs because I don't want to get caught in that grind." You also, particularly in my era going from my era to the more modern times, is I've given you all these stories about personal confrontations and stuff like that.

One of the ways to deal with that is you set up committees, assessment committees, you make it as transparent as you possibly can, so that everybody knows what's been going on. And that's good, even though it ends up, NMFS people doing all the work, it's good because it is transparent. But what's bad about it is there's no ownership, no real benefit to some of these scientists, and so, you know, I think that's a downside of this. I mean in my case, probably the, the reason I did as well as I did is because I ended up being the front man, so, you know, I'm confident in my own scientific abilities, but I realized that wasn't why, um, you know, told you I was good at that. And so there's that sort of thing there.

There's also issues about government in general, that, you know, somebody, some politician or change of administration feels that there's something wrong with the government so everybody has to do things and it isn't necessarily the most efficient way to do things. You know, and all the associated paperwork and that sort of thing, with being a supervisor is, can be a real drag. And so to me, I mean I'd say this about government in general, when you have lots of these sorts of constraints to make sure that things are open and transparent and things like that, yes it does that but you're sacrificing efficiency for it and that's a, to my mind, that's a conscious decision. It isn't a criticism, per se, but rather you have to, you have to live with that, and that's something you have to live within the government.

The, you know, I think in terms, even nowadays the gripe that a lot of people have is about particularly in the assessment world, it's about the grind or the continuum, that sort of thing. Uh, there's also other things in government like, I don't know the details of this, but a higher up in the Department of Commerce lost their laptop computer while they were traveling overseas, so everybody has to have encrypted computers which slows things down considerably. This happened about eight, nine years ago or something, but you know it's just sort of typical.

There's also, because of the way assessment involves, there's a lot of, particularly in the tuna world, there's lots of travel involved with it, and so one of the ways government manages, because it looks bad if you have too much travel because people view travel as not relevant to your goal, and so what they'll do is if there's a budget crunch, you actually have travel ceilings. Now most, most supervisors would say, "all right, you just tell me what the budget is, I'll decide what's the best way to allocate it between travel and other things and go on from there." But that's not how government works. You'll do, you'll basically set travel ceilings, and some of them will be, at various times they're managed through Washington, and so you have to apply for this, and you can't have too many people from the agency going to the same meeting at the same time, you know stuff like that, that irritates you, but.

The benefit, obviously, in my own case, you know I've experienced lots about how the world operates in terms of fisheries. And also I, I'd say this to students and even at the time I'd say it to younger people that I was supervising, one of the real benefits of doing this assessment work is people care. They care about the results. They care about the outcomes. And they care about it enough to fight about it, to criticize you, put you at risk a little bit, in terms of that. And to me that's good because it, you go through this whole process and you actually see, well, five years ago we did this, and this is what happened to the population, things got better. Five years ago we didn't do this, and things stayed the same or got worse. And you can actually measure these sorts of things. And to me that's one of the more gratifying things about it, is it's, you know, that it's, it was a useful profession, in terms of what I did, I think, so.

**SM:** What, um, what is the one project, or one contribution that, that you look back and feel the most proud of, or?

**JP:** I think a couple things. Actually, one of the things is there's been a number of people that worked for me that are well-known in the profession, and I take some pride in that. And another is this situation where, where things you, where you went through this process, it was fairly painful, but in fact you do see populations increasing. The, uh, this isn't a personal accomplishment, but I think all these things that I've talked about, transparency, assessment workshops and things like that, the evolution of modeling and so on, it's resulted in there's, in my mind, there's a lot less conflict nowadays than there used to be about the assessment. Part of it is, is technology, part of it is this transparency, how things are organized, part of it is data collection, and also part of it is the political process that special interest groups really know more now about how to interact and how to be effective, and it isn't necessarily attacking the scientists, and it isn't necessarily litigation, it can be at other levels as well. And so that reduces some of

the conflict. You know, there's key points where people that are representing people are earning their money; they're representing them. And so, but again, it, how that gets done, to me, is much better from the scientific standpoint because it, you recognize, I mean it isn't so personal as it used to be. So.

**SM:** Is there anything you would like to add to what we've discussed, or something that I didn't cover, or ask you?

**JP:** No. Like I said, I uh, I look at wins and losses, you're not, are you a baseball fan, do you know anything about baseball?

**SM:** Very little, unfortunately.

**JP:** Okay, I'll tell this story. So, uh, there's a term in baseball. It's called a "Mendoza Line", and basically that is when a batter is batting less than .200, and .200 is 20%. And so, I used to joke that I'm barely above the Mendoza Line for management. In other words, of the things I've been involved with, things that have actually gotten better were barely above 20%. Actually, when I, when I originally said this that was probably true. But I think nowadays it's actually better than that. I, uh, you know, and, and secondly even the things that weren't really successful to begin with that, as time's gone on I've probably had less influence on it, as time's gone on, but things I think have gotten better. And, and that shows up in actually the agency's accounting procedures about, they have an annual status of the stocks report and how many species are underfished, overfished, and things like that. And it actually has gotten better. So that's it.

**SM:** Well, thank you very much, this was a very pleasant interview, thank you.