

JG: This is Jerry Grover. I'm here today with Jim Warren at his home in Vancouver, WA. Jim, for the record, can you just state your name and where you were born?

JW: Sure. My full name is James W. Warren. I was born in Eugene, Oregon on May 2, 1934. I went through grade school and high school in Eugene. I went to college at Oregon State University for five years where I majored in Fisheries with minors in Chemistry and Journalism. I graduated from there in 1957. After college I worked for the Oregon Fish Commission in shellfish research at Newport, OR for a few months before I had to go into the military in January of 1958. I served two years as an officer in the artillery. Initially I put in for Jump School and Germany. But where did they send me? Nowhere else but Ft. Lewis, Washington. So, they threw me right back into the northwest briar patch. I was there until January of 1960 at which time I was discharged. The Army moved me from Ft. Lewis to Little White Salmon National Fish Hatchery (NFH) on the Columbia River where I reported on 01/22/1960.

JG: So that began your Fish and Wildlife Service career?

JW: That's where I started as a fishery biologist, GS-5, paid \$4040 per year, and spend it wherever you liked. I was at Little White Salmon about 18 months. In September of '61 we packed up the family and moved to Leetown, WV. I worked for a year as a trainee in fish pathology, did some research work and published a couple of papers in the Progressive Fish Culturist. In September of 1962 we moved up to Cortland, NY where I studied fish culture and nutrition for the next 9 months as a trainee. After completing that program, we moved back to Little White Salmon for the summer where I worked in the Hatchery Biologist's Lab under Harlan Johnson. In September we made a change-of-station move to the Hagerman (ID) NFH where they had built a new laboratory addition onto the office building. I was there for five years. I looked after the Federal hatcheries in Idaho and Nevada and did a number of studies on chemicals to treat bacterial gill disease. My main job was trying to keep Hagerman's fish swimming right side up. At the time of my arrival, they had trouble with "redmouth" a bacterial disease made worse because they overloaded the ponds quite a bit. Using my Cortland knowledge we worked out a new population management strategy to prevent redmouth and other disease problems that were chronic there.

In August of 1968, I was selected to participate in the Interior Departmental Training Program and we moved to Washington, DC. That training program provided the opportunity for me to pull together the details of an omnibus fish health bill, S.1151, sponsored by Senator Frank Moss of Utah. If passed, this bill would have authorized the Fish and Wildlife Service to manage all sorts of fish health matters across the United States. Regulations implementing this legislation likely would have been attached to Title 50 of the Code of Federal Regulations. When Senator Moss introduced this bill into

the Senate, I was fortunate enough to sit with my family in the Senate gallery. We heard him read the speech I had written for him describing the need for this new legislation.

At the end of the Departmental course the Washington Hatcheries Office held me back after all the other trainees went home. Because the Department of Interior now had to respond to S. 1151, they wanted me to stay a couple of months to write the Interior response to the legislation. I also prepared a companion bill that was introduced into the House of Representatives by Congressman Dingell of Michigan. This work was completed in March of 1969 at which time I packed up and moved the family to La Crosse, WI, where I had garnered a new job as Regional Fish Health Manager. I worked out of a laboratory located at the Genoa NFH.

JG: La Crosse was a laboratory hooked on with a hatchery?

JW: Our laboratory actually was located in facilities in the office building at the Genoa NFH along the Mississippi river.

JG: At Genoa?

JW: Yes. Later on, about 13 or 14 years later, we built the new facility in the FWS research laboratory at La Crosse near the airport. But back in March of 1969 we moved to La Crosse, bought a house and got squared away. Shortly after arriving there, I learned that I had been selected to be project leader for the Aquatic Animal Testing Section at NASA's Manned Spacecraft Center south of Houston. This involved the study of moon rock samples brought back by the Apollo XI and XII missions. So in June we packed up our stuff again and moved to Clear Lake City, TX. I rented our La Crosse home to Dennis Anderson and his family. Dennis was one of the new fellows hired to work at the Genoa Lab. He had just moved from graduate school at Oregon State University at Newport, OR.

My work for NASA was carried out at the Lunar Receiving Laboratory (LRL). This involved the tightly controlled exposure to lunar material of 11 aquatic animal species ranging from paramecium up to planarian worms, oysters, shrimp, and two species of fish. Critical to this work was the maintenance of healthy stock cultures of those animals. Then, during exposure tests we had to also maintain them successfully behind the biological barrier inside of Class-3 cabinetry. This is a glove-box cabinetry system that makes it really quite difficult to do your work because you are hindered by the isolation equipment and by having to pass everything from one gloved hand to another inside a sealed cabinet system.

JG: Class- 3... Jim, can you define that? Is that negative pressure?

JW: Class-3 cabinetry is really a level of isolation and containment, if you will. For example a Class-1 cabinet might be a counter-top hood that would aid in sterile technique. Class-2 may be a little higher up with filtered airflow. Class-3 cabinetry provides the highest level of containment facility that you can have where everything is isolated from contact

with the workers or the environment. We had a complicated series of stainless steel cabinets, with rubber gloves in Plexiglas windows. Every bit of the air that comes into the cabinetry system is filtered, and every bit of the air that went out was incinerated. It is really a total containment facility so that nothing gets in and nothing gets out. Class-3 cabinetry is where you would work on very dangerous disease agents, or in this case, it was on lunar material that had to be contained. The purpose was to protect the plants, animals and people of the Earth from foreign material from the moon.

JG: The Centers for Disease Control (CDC)... did they have as much cabinetry as you guys did there?

JW: No, not at that time. The Lunar Receiving Laboratory was a remarkable, state-of-the art facility. It was specifically designed to contain the spacecraft that came back from the moon, a special facility to house the astronauts and debrief them for 21 days.

JG: In quarantine?

JW: The astronauts were held in quarantine and away from anybody else, partly so the engineers could get information from these guys before it was corrupted by conversations with other people. The astronauts also served as human subjects exposed to lunar material and were endlessly examined by doctors. The third part of the LRL was a huge containment facility for the examination of lunar samples. For example, geologists had a big lab, the agriculture people exposed all different kinds of plants, public health folks exposed mice and Japanese quail, and our aquatic animal test section where we had 11 different aquatic animal species. But the whole idea was that researchers of all sorts had a safe place to examine the characteristics of the samples that were brought back from the moon to assure the samples were safe to release out to scientists for more detailed studies. Then we had to be able to do it again for Apollo 12 and again for Apollo 13. Unfortunately, Apollo 13 had an accident along the way. It encountered an asteroid or something that busted a hole in the spacecraft preventing a lunar landing. The astronauts on Apollo 13 were lucky to get back themselves, as was displayed in the Tom Hanks movie.

The LRL was a fine facility. It had more Class-3 containment cabinetry than any other facility in the world. After this program was completed, they cannibalized a lot of that equipment and carted it off to the Centers for Disease Control in Atlanta and upgraded their containment facilities so they could work on foreign disease agents like the Ebola virus and HIV and this sort of thing. These are dangerous disease agents that must be contained during research studies to prevent their spread to researchers or escape the laboratory and that sort of thing.

JG: Jim, what was the Fish and Wildlife Service's authority to enter into this kind of thing and be a part of it?

JW: Actually, the Service didn't have very much authority. There are little shreds of legal responsibility involved in Title 50 of the Code of Federal Regulations where it regulates

the movement of critters from place to place, and so these regulations could be interpreted to be saying...

JG: For health reasons...

JW: Yeah, for health reasons. . . disease control and this sort of thing, but this could be interpreted to say, "Okay, the Department of Interior has some responsibility in protecting the fish and wildlife of the United States and therefore since the astronauts are bringing foreign material in from the moon the Service has a role. The roles of Agriculture and the Public Health Service are more obvious in protecting livestock and poultry and the human population from contamination from anything from the moon. But even then, at that time, any thinking person would know that because there is no atmosphere on the moon and the moon is continually bombarded by radiation from the sun and intense heat and cold, that the likelihood of anything infectious to life on earth, coming from the moon, was virtually nil. But, nobody could rule out toxic agents in the lunar samples. Nobody knew, so nobody could say there is no danger. To determine what scientific tests must be done to prove the lunar samples safe, NASA created a large Inter-Agency Committee on Back-Contamination. This committee set up the study protocols for each of the different research groups, including the Aquatic Animal Testing Section, and justified and directed the construction of the Lunar Receiving Laboratory and all of the equipment and staffing.

We worked with a team of a half dozen contractors that I supervised in the Aquatic Animal Testing Section. Dr. Clarence Benschoter, from the Department of Agriculture, shared space with us. He supervised work on research-grade house flies, wax moths and German cockroaches. Those critters were housed within our cabinetry sections, and we all worked together, sharing the same technicians. I remember spending the July 4th holiday crawling through our cabinetry system hooking up air supply lines and aquariums and what-not for all of our fish, shrimp, oysters and the other species. I got everything organized so that when they finally did give us our share of the lunar samples that all our animals would have been living contentedly within the cabinetry for at least three weeks. We had to do that to prove that they indeed could thrive under test conditions inside Class-3 cabinetry. So when the samples finally arrived in the latter part of July, we were ready to roll.

JG: Who were these people that made up the team? You said you had some contractors, did you mention TRW?

JW: Just a second here. Let me find my notes. . .

JG: I was meaning in terms of research staff. Who were they and what were the types of the people who made up this team? Was it private contractors? There were representatives from Agriculture. What else Jim?

JW: We had a contract with TRW. Our contractor staff consisted of a PhD and half a dozen technicians who maintained the stock colonies of our shrimp and fish and other animals

and also carried out all the studies on these animals. We had a nice metal building constructed across the road from the LRL. It went up in the matter of a month because we needed a place where we could have our animals close by to where we could take care of them instead of out at Ellis Air Force Base near Houston. To get our wet lab built we convinced the powers that be that this was a mission critical thing. We filled out some forms and a \$100,000 metal building showed up in a month. It just shows that in the absence of red tape the government can act quickly. It was just built and put to work in a month's time. It was an amazing thing to come about

So, our crew of technicians did all of the work that it took to maintain these animals in the cabinetry and record the data that was collected 2-3 times a day. Our whole crew worked behind the LRL's biological barrier. The Lunar Receiving Laboratory consisted of a public lobby area and all of the support offices in the front and an extensive containment area in the back. The containment facility provided a biological barrier to the outside world. To go to our labs we would have to change into scrubs and tennis shoes and go through an airlock. The hallways were maintained at a slightly negative air pressure in comparison with the administrative area and the laboratories, where we had our cabinetry, was maintained at slightly lower pressure. Finally, the air pressure inside the cabinetry line was at an even lower level. So, the flow of air, or any contaminants would be from the outer offices towards the sample labs, into the cabinetry line through filtered air intakes, and out through the exhaust vents to the incinerators. So, it was a rather complex system. When we went to work in the morning to see how our animals were, you changed into scrubs. A little later, if you came out for a staff meeting, you had to shower out, get dressed again, go to your meeting, go back, and change into scrubs, back into the lab again. I took maybe a half dozen showers in a day's time just going back and forth to meetings and to lunch, and that sort of thing. Lunch in Texas was a wonderful thing. Lone Star Beer and BBQ was one of the greatest things that they had down there. [Laughter by both]

To go out to lunch I drove my old truck. All you could do on a hot day was to roll down the windows. As the engineers would say, it was not very good on BTU's, but it was tremendous on CFM. [Laughs again]

So, anyway, we enjoyed our time down there. We did our work on Apollo 11 samples starting in the latter part of July and finished up then in the middle of September. At that time they took all of the Project Leaders to a big meeting at the CDC, over in Atlanta, where we presented all of our Apollo 11 data. The Apollo 11 samples were declared safe on September 19th. They then could be released out to researchers. A portion of the samples, never exposed to air, were put into permanent storage in Las Alamos, NM. So, Apollo 11 was done. Apollo 12 was close on its heels and we repeated the same thing all over again.

JG: And the protocol is what you had to have your animals in there showing that they could live for what 21 days and then you had them exposed for 28 days?

JW: Yeah, that's right. That's where...

JG: It was a seven-week process then...

JW: Yeah, right. That's where I first got involved. I was selected to relieve Dr. Ken Wolf, a virologist from Leetown. Ken had been frequently going down to Houston as a consultant. The TRW crew was having trouble keeping their fish alive, especially the marine minnow, the mummichog. These brackish water minnows were shipped in from Maryland where commercial animal supply folks had snatched them up out of the backwaters. The fish were shipped by air to our initial wet lab at Ellis Air Force Base, near Houston and put into the stock cultures. Naturally any wild fish like that, especially a brackish water fish is going to be loaded with parasites and bacteria. As you would expect, about two weeks after they would get them into the old wet lab up there, they would start to roll over dead. So Ken said, "Jim, we need on-site help!" That's how I got involved; to go down there for six to eight months and help keep their fish swimming right side up.

To solve the mummichog problem, we injected hormones into mature fish brought from Maryland. After a short time we spawned them surgically into Petri dishes and hatched out the eggs in the lab. Then those fish, of course were clean...

JG: In a sterile environment.

JW: No, just a nice clean laboratory environment with no wild parasites or serious bacteria. Those fish grew fast and were healthy and they served our purposes far more reliably than fish from the wild.

JG: Before we began this interview Jim, you were relating... I want to get back to the people that were there, again, a part of this team? You were the only one without a PhD?

JW: [Laughs] Well actually the Project Leaders at the LRL had a variety of degrees. There were PhD's, MD's, DVM's and me. I was the representative for Interior. When we would have a staff meeting, we would go around the table, and there would be maybe a dozen people there including Dr. Benschoter, the Agriculture guy, who was looking after the insects. Usually there were guests so everyone would introduce themselves around the table. It would go "Dr., Dr., Dr., and Mr. Warren." Well the heads would kind of swivel around because I was only one at the table without a doctor before his name. Of course, the immediate question was, in a sense, "What are you doing here?" [Laughs]. I could explain that fairly simply by saying that I was there to keep the fish healthy. Oh – okay. That's fair enough. So that was my role and it seemed to be quite fine with everybody else.

JG: And you could hold your own with them?

JW: Oh, yes. There was no problem there. I mean these guys had to put their pants on one leg at a time. They all had the same sort of job that I had. It didn't matter if they had quail or plants or anything like that, they had to deal with the same cabinetry problems

and same control and test situations that we did, and so we could feed off one another. I could sneak over and look at all of the fancy stuff that the agriculture guys had for their plants and get some good ideas maybe about what we may be able to use in our Aquatic Animal Section and vice versa.

We were fortunate that we had a special cabinet that had a microscope built into the plexiglass wall so that you could focus the scope inside the box with your gloves, but operate the eye pieces on the outside. So you could look at the material on the microscope, whether it was examining prepared slides or counting Paramecium or Euglena or some of these kinds of things. Also, the veterinary people wanted to use our microscope fairly often. They would bring their samples into the lab and pass them down the line to get to the microscope cabinet. That was kind of a popular spot for some of the vets and the others that were doing work on other species.

JG: Jim, would you describe how you would set up a test? You said you used dust, and if you were going introduce samples to the shrimp...you were going to mix in some of the soil... If you were going to use some of the soil from the moon, what did that entail?

JW: Well what we did ...when they brought the samples from the moon... LRL technicians and geologists would open the transport box from the moon in a special, huge vacuum chamber. It was a phenomenal piece of equipment. Super low pressure. I mean, virtually no atmospheric pressure whatsoever in this box. Inside the vacuum chamber they would take the rock and sand samples from the sealed transport box, inventory everything and portion the samples out for study. They ground everything we used to about 2 micron diameter particles. Then they parceled out these fines in plastic bags to each of the test groups. We had precalibrated little scoops made out of stainless steel that you could dip into the lunar material and it would bring out exactly 0.22 g of lunar material.

JG: And this is all through gloves...

JW: This was all done in Class-3 glove boxes...

JG: Yeah...glove boxes...

JW: Everything was isolated inside the glove boxes. For example, if we had 20 guppies in a tank we would dip out 20 separate 0.22 g scoops of lunar material and drop them all into the aquarium. Well, of course, then you immediately end up with a muddy looking mess in there. It was all murky. But it did not seem to bother the fish at all. To make a long story short, it did not bother anything. It didn't look all neat and tidy, like you would like it. In a little while that stuff would settle down and it did not really create any problem whatsoever.

JG: So these exposures were all external? But you also mixed it with food and fed it to the insects?

JW: Oh yeah, that's another thing. Dr. Benschoter was raising flies, German cockroaches...

JG: Wax moths.

JW: . . . and greater wax moths through their various life stages. Each of these insects has a larval stage. The larvae, say the housefly maggots would be fed baby food mixed with lunar material. The technicians would mix baby food with a little syrup and toss in .22 g, of test material per maggot. Stir it all up. They would parcel this chow out into Petri dishes and put the maggots in there. The maggots would ingest the lunar material. They are only maggots for five days or so before they pupate. So during that five-day period, at about day four, they would sample maggots and cut histological sections so they would actually see lunar material in the lumen of the gut of the maggots. So you knew it was still in there when they pupated and you knew that it was still going to be inside them when the flies hatched out of the pupae. So, it's that kind of documentation that they had to do in the agriculture section with the flies, the wax moths and the cockroaches. Ours was an external exposure where we dunked the stuff into the water with the animals and then we monitored their survival after exposure, and there was virtually no difference between the test and the control.

JG: Okay. This is mostly Apollo 11. You went right into Apollo 12 and you stood around for 13?

JW: Actually, Apollo 11 was the spookiest. This sort of work had never been done before and the whole world was looking in on what we were doing. In fact, there was a flimsy little plywood cupola built on top of a motel just across the street from the entrance to the LRL. I believe ABC News built this booth up there and Walter Cronkite would hold forth from this little shack. It looked a lot better to the viewers. All viewers saw on the evening news was Walter Cronkite, a little of his desk and the LRL, through the window, across the way.

So we were really under the gun for Apollo 11. This really slacked off when we released the samples out to the researchers after that project was completed. With the attention of the press and the public reduced, the attitude around the laboratory relaxed quite a bit. We still had to be just as careful with our research and with the containment protocol. A punctured glove would get you 21 days of quarantine with the astronauts as one of the gals in another section found out.

So, we carried out the Apollo 12 studies. It was easier for us because we had done it before, and we sailed through Apollo 12 just fine and were ready for Apollo 13. The plan was to do the first three missions and by that time there would be overwhelming evidence that there would be nothing harmful, which we had already gathered anyway. As I said, Apollo 12 was a piece of cake and was uneventfully completed. As Apollo 13 flew towards the moon, it encountered a space object of some size, maybe as big as a quarter or something like that and it poked a hole in the thing, and so they had to circle the moon in a sling shot effect to get them headed back to earth again. That was kind of a hairy operation. So in January...[phone rings dictation pauses]

JG: So we have gone through Apollo 11 and Apollo 12, and it's about time for your career to continue Jim? What happened next?

JW: Okay, after the Apollo program and my days with NASA, we moved back to La Crosse, WI, in January of 1970 through an ice storm in Texas and ground blizzards across southern Minnesota. We had a pickup truck and a car loaded with stuff, including a cat and two kids (Mike 10, Karen 6). When we arrived at La Crosse we unpacked the stuff out of the truck and brought it in the house. We opened a box and the pots and pans would first turn frosty and then would they would thaw. It was -25° when we arrived in La Crosse. That was kind of a jolt after being down in balmy Houston.

We enjoyed 15 years in the Great Lakes Region. We lived in La Crosse and worked at our laboratory for quite a long time down at the Genoa National Fish Hatchery about 18 miles south of La Crosse. Then during the last two or three years that I was there, the lab relocated to the research laboratory at the La Crosse airport.

JG: To make a distinction, there was the National Fish Hatchery System and Research was another part of the Fish and Wildlife Service, and that was the La Crosse lab?

JW: Right. Research at that time had not moved on to the Geological Survey, as it is now, so it was an arm of the Fish and Wildlife Service, which was a good thing. I think it was good because we were all working on the same kinds of critters and we were all in the same organization. It seems fragmented now and it's more complicated. That was not a good thing that they did, but they did it anyway. That's just my own opinion on that.

The years at Genoa and La Crosse were good years. We accomplished a lot. We organized the Great Lakes Fish Health Management Program from scratch under the auspices of the Great Lakes Fishery Commission. Ours was an inter-agency committee that dealt with fish health matters. This Committee covered the length and the breadth of the Great Lakes Basin. Each agency had an administrative representative and a pathologist on the committee. We did a lot of good things. We were not a regulatory organization, but a support organization. We set forth some policies that we wanted all of the agencies and the private sector to follow. But, when we put it all in writing, the first thing that came up was that none of the agencies really wanted to say that "Yes, these policies are what we promise to implement." They did not want to have their hands tied into anything specific. An idea occurred to me somewhere at that late stage. I think I was sitting on the pot one morning and it occurred to me that a "Model" Program might be the answer. If we expressed our policy as a Model Program, everybody could accept the model. It did not mean that they had to adopt it, but it was there on paper for them to use and profit from. It was a living document that evolved over time to put in place the policies and procedures for the all to deal with the movements of fishes and the management of fish diseases. It was really quite successful. We ended up publishing that material in a book entitled A Guide to Integrated Fish Health Management in the Great Lakes Basin. The Great Lakes Fishery Commission published it in April 1983. It's

a book that I think remains valid today. It is out of print, but is generally available around the Great Lakes basin.

In 1983, when I moved from the Great Lakes region to the Pacific Northwest, we transplanted a lot of that very same material to develop the Pacific Northwest Fish Health Protection Program.

JG: Jim, what was your GS grade at that time from when you were in Houston to the project leader at La Crosse.

JW: I was a GS-12 at La Crosse and moved to Vancouver actually in 1983 with a promise of a 13, but they reneged on it until they made me move over to the Regional Office in Portland in 1987 to get a GS-13. I was fortunate in the Portland office to be working with Bill Shake. He and others there seemed to kind of take a shine to some of the things that we were doing, and I was fortunate with the performance-management-recognition system of the time in that it moved me through the steps of the 13, so that by the time of my retirement, and some nice generous awards that I received along the way, I was three years into the last step of the 13. So, that was the level at which I retired. It's been treating us well ever since.

JG: What was the focus of your years in the Pacific Northwest? You said that you were going to do the Model Integrated Fish Health Plan for the Northwest, but were you dealing with more entities out here? You had the various Native American tribes that were also in fish culture and involved in fish health management as well and the States?

JW: That's true.

JG: Plus another, the National Marine Fisheries Service (NMFS) that was funding a lot of what was going on?

JW: That's absolutely correct and we also had the private sector. The big fish producers down in southern Idaho were having the very same problems as our National and State fish hatcheries were having. They were doing some interesting research work. They discovered, for example, that by keeping birds out of rearing ponds on fish hatcheries, where the birds would come in to pick out dead fish, that they could actually avoid contamination with infectious hematopoietic necrosis virus that was really a big, big problem in the early 80's and into the 90's until they finally got bird exclusion netting put up around our big fish hatcheries. That helped a great deal in fish survival. So, the purpose of Pacific Northwest Fish Health Protection Program was to provide a forum for people to come together and discuss the many different approaches to dealing with these common problems.

This started with the very first meeting of the Pacific Northwest Fish Health Protection Committee in early 1984. Our first meeting was near the Portland airport. The Committee met twice a year, and they are still meeting now. The group is still doing the same sort of work. I attended a meeting a while back and it was like I never left. It is

just something that has picked up and taken off. It is a useful forum for discussion of common problems.

JG: The focus of these efforts and the meetings you are talking about that are still going on. That was all dealing with the health of fish and aquaculture.

JW: Yes.

JG: Okay.

JW: And there are some management aspects, obviously, that would be affected by some of the efforts to control fish diseases as far as restricting movements of fishes from place to place and how they transferred stock from one facility to another, how they handle the eggs from spawning salmon. Up and down the line, the entire gambit of the fish culture program was affected by the policies and practices by the Fish Health Program and you had to be careful about how you control these disease problems without majorly impacting the operations of the fishery management people or the fish culturists.

JG: It sounds like you are talking about, when you talk about Fish Health Program; you're talking about the total aspect. You're not only talking about the nutritional health of the fishes and the biological health of the fishes from diseases, but you're also talking about the genetic health, in talking about relocating stock and reintroductions?

JW: Yeah, that's true. The idea is that if you're going to be producing fish in artificial conditions, in fish hatcheries, where there are dense populations and artificial food, you have to be thinking of a fish that needs to live on its own in the wild after you release it. If you raise them in too dense of populations or if they get too accustomed to hand feeding, these are things that can be deleterious to the survival of hatchery fish in the wild, and so we have to be able to think of ways of raising almost wild fish in fish hatcheries so that they can cope with predators and conditions of survival in the wild.

JG: So, when did you retire then Jim?

JW: I retired from the Fish and Wildlife Service in March of 1994. In April of 1994, I took a job with the Columbia Basin Fish and Wildlife Authority where I managed U. S. Food Administration (FDA) Investigational New Animal Drug permits for the agencies, tribes, and private sector along the West coast. Their hatcheries needed to use certain drugs to treat fish that were not yet registered by the FDA. So, in order to use those drugs, we had to have a controlled program that regulated how the drugs were used, the dosages, the frequency of treatment, and the discharge of the affluent, and that sort of thing. Those procedures had to be written up and approved by the FDA. Then each of the agencies that needed to use any of these drugs could apply to our group for a permit to use them. Each agency paid something like \$400 a year per drug per hatchery. Some hatcheries used three or four drugs that they had permits for, and some would not use any at all. Anyway, out of all of the facilities in the northwest, there were sufficient funds available to hire me. I had a gal who worked for me to run this permit program and do all of the

reports to the FDA that were required so that the participants did not have to do it. All they had to do was report the use of the drugs and provide us any information they could on the success or failures in the drugs in the treatments that they were trying. We would assemble that information and pass it on to the Food and Drug Administration. I did that for four years, April 1994 to March 1998. I pulled the pin for good in 1998. Work hasn't interrupted my golf ever since.

JG: Jim, I would like to ask you a few questions on your career. You've been around...well over 30 years with the government and with military time and all. Was there any one person that stands out in your career as being a mentor or somebody that really had a major good influence on you?

JW: Yes, for sure. I would say that the one that stands out for me is Dr. Stan Snieszko who was the director of the Eastern Fish Disease Laboratory at Leetown, WV. He was the lead professor in our fish pathology training. Doc was, of course, I think a leader, a mentor, an example, and a top-notch researcher in the eyes of a great number of people. He and I had a particularly sweet spot. He believed that anyone could do research. All you had to do was frame a question and gather facts to answer the question. I was fortunate enough to do two different research projects while I was at Leetown and published that material in the Progressive Fish Culturist. Doc was a very, very interesting person. He lived on the Leetown NFH with his wife, Julia. I remember a time when I was writing up my work and I wanted him to review my manuscript. So I said, "Doc can I bring this over to the house?" And, he said "Yes, but don't do it on Saturday because there will be a machine gun on the front porch that will guard our privacy while we listen to the opera on the radio". So I knew that Saturday would not be a good day to take my material over and have Doc look at it. But anyway, he was a special, special person. He was always available to talk. He was an open and kind man and brilliant. Absolutely brilliant. I really enjoyed my time with him. He and Julia had first balcony, front row seats, at the Kennedy Center. I asked him one day. I said, "Doc, I can understand going to the opera because there is such a story involved." And I said, "What is it that is attractive to you about opera?" He said, (in his Polish accent) "Cheem", (he called me Cheem) where else can you go and see young girls running around in their underwear?" [Laughs] And so, he was a gentle and fun individual. I really respected him.

JG: He was a Polish immigrant and a...

JW: Yes, he had escaped the Nazi's in Poland. He said that when the Nazis called the Polish "brain trust" to Berlin, he and Julia took the scenic southern route out of Europe. They took a boat and ended up in the United States. He worked first at Ft. Dietrich on bacterial disease organisms that might be used in warfare. That was his very first job over at Ft. Dietrich. When he found out about Leetown and the fish research laboratory there he later joined the Fish and Wildlife Service.

JG: If you go back to NCTC Jim Dr. Snieszko's big portrait is on the wall amongst all of the heroes and some of the people that made the Fish and Wildlife Service, had been a leader in it, and he certainly stands out among them. He is the one that took the Old Mother

Hubbard's cupboard that was bare as far as doing any treatment of diseases and ended up identifying diseases, and finding a method of treatment.

JW: Of course, he was a great one to gather skilled people around him. Amongst those would be Dr. Ken Wolf who was a virologist who has published widely on fish viruses and Dr. Glen Hoffman who was the parasitologist, and Dr. Pete Bullock was a junior researcher who did the bacteriology work. Amongst those people, they probably had a collection of some of the best brains in fish health research. There were others, of course. There was Dr. Bob Rucker and his excellent crew up in Seattle. But I think that Stan Snieszko's outfit there at Leetown was maybe the best respected of all.

I was really fortunate throughout my whole career. From the time that I started, I was fortunate enough to be working on some innovative projects, even when I was just beginning at Little White. They were developing new methods of feeding salmon. That was at the time when Oregon Moist Pellets were first being developed by Wally Hublou and the people in Astoria. These pellets were made out of finely ground fish and some meal, and whatnot, and the pellets were then frozen and hand fed to young salmon. Salmon fingerlings couldn't eat hard, dry trout foods. Up until the early 1960's feeding young salmon meant grinding liver, salmon eggs, and spleens and making it into a soft diet that could be fed to the salmon fresh. Mixing feed on a large salmon hatchery was a big ordeal every day. The development of the Oregon Moist Pellet was something that I was in on early. I don't think that we have ever looked back. We finally got away from having to make diet each day for the fish. Another thing of importance would be, I think the INAD drug program that I worked on towards the tail end of my career. That was probably one of the most useful things – that we were able to make possible the use of drugs and chemicals on fish hatcheries that were otherwise not legal to use. I guess I had a knack at pulling together all of the people and the paperwork in complex projects like that to make it work with the regulatory agencies and still not be too cumbersome for the people on the ground at the fish hatchery to comply and not too expensive for them either. There are a number of things including the books that I have been able to put together. One of my most satisfying things was from La Crosse when we started having a short course. When commercial fish producers around the Wisconsin, Minnesota, and Michigan area could come in for a week in February. We had it in February – colder than hell – but these guys weren't doing much work on their hatcheries, so they would come for a week to La Crosse and I would teach a weeklong course on fish diseases.

JG: Basically laymen?

JW: Yes. These were guys who had lots of practical smarts but they did not know too much about bacteria and fish diseases. They were faced with these issues all of the time in the rearing of their fish. It all came about because one day two of these guys were in my lab at the same time with buckets of sick fish. One of bunch of fish had bacterial kidney disease and the other bunch had bacterial gill disease. Fortunately these were diseases I could diagnose right on the spot. I could make slide and show these guys bacteria on the microscope, right then and there, and explain what was wrong with their fish. They were duly impressed and said "Jim, this is really cool! You ought to have a course where we

all could come and learn this sort of stuff together.” Well they did. They really did. In the mornings, I would have to pour them full of black coffee because the night before they were hitting the bars pretty good. Finally, after about three or four years, we had to instill an exam at the end of the course, so they would pay a little more attention to the training, rather than the strip clubs in La Crosse, and so... But, it was an open book thing and it was not all that complicated, but these guys gobbled it up. This course grew like topsy. Pretty soon, the state people got a clue that we were providing this service and they wanted their fish culturists to come and do this, and so then, that was a big success. We worked it in conjunction with the Biology Department at the University of Wisconsin-La Crosse. Then, when I came out to the Northwest, I continued the short course out at Mount Hood Community College. That was also a success. I believe Ray Brunson still teaches the short course out of his FWS hatchery biologist lab in Olympia, WA. The short course was really a two way street where you would have these people for a week and there is a tremendous amount of information that would come from them in asking their questions and describing the problems they were having. That was a big help to my staff and me. I guess, one other thing in retrospect.... .

JG: In retrospect in the Fish and Wildlife Service in general?

JW: Exactly. The one thing that I enjoyed during my years with the Fish and Wildlife Service that from the time that I got through with my early training program and started my work at Hagerman in 1963 until the day that I retired, even from the Columbia Basin Fish and Wildlife Authority, my career was basically as if I was self-employed. The Service gave me such great latitude to do what I needed to do to accomplish the missions that I envisioned. The Service apparently endorsed this and they gave me my opportunity to go ahead and do such things as organize groups, and put on short courses, publish books, all sorts of fine things. They gave me a tremendous amount of freedom. Like I say, it was much like being self-employed, but I did not have the burdens of dealing with the paperwork of self-employment. So, I really enjoyed my years with the Fish and Wildlife Service. The only thing that I guess I regret, and one of the things that probably pushed me toward retirement, was the moving of the research program out of the Fish and Wildlife Service and the diminished emphasis on training of hatchery people in fish health and fish culture. These are areas where we coordinated closely with all the other agencies in research and training, and fish health. The outreach program of the Service had an instrumental leadership role across the United States that I think has greatly declined in recent years. That is a great disappointment to me. I don't think that any other organization has the potential or capability to reach as many others as does the Fish and Wildlife Service in this field, and with that, that may be kind of a down-note, but at the same time, it's just part of the evolution of politics and government, and the whole thing. It leaves me satisfied with working at a time when those programs flourished and now that I have retired, I am a little bit sorry to see that maybe they are not doing as well as they did.

JG: Uh, you say that you almost felt like you were self-employed, but Jim, weren't you without peers? I mean, there were not that many people who were experts in the scientific approach to fish health in the management. We had fish health centers and we

had a lot of fish health biologists, but weren't you the leader of the pack? Pat yourself on the back!

JW: I don't know. [Laughs] Somehow it came to me at various times during my career (I can remember some of the unique spots). For example, I was the one who led the development of the Fish Health Section which was the first section of the American Fishery Society. That came to me at a meeting of the Western Fish Disease Conference down on the Washington coast. We had all been at the bar and had gone back to my room. Some of the guys were shooting dice up against the wall. Hal Wolf, from California and I were talking about how great it would be if we had a national organization of fish pathologists? (Which there wasn't any at the time?) So, in April of 1970, I wrote a letter to the American Fishery Society proposing the development of a Fish Health Section in the AFS. This would provide, under the umbrella of the AFS, a professional organization of fish pathologists. We could have our own organization and our own meetings, professional standards, that sort of thing, and develop our profession in that way. And low and behold, we came to the annual AFS meeting in Salt Lake City where this proposal came up for a vote. It was approved. So then the Fish Health Section was formed and shortly thereafter Arden Trandahl and a bunch of the fish culture people developed the Fish Culture Section. There has been a proliferation of sections developed under the Fishery Society ever since. That's the kind of thing that I did. After I organized the Fish Health Section one of the guys from the Great Lakes Fishery Commission said, "Jim, you need to do this thing for the Great Lakes." And so I did. So I guess that is the kind of thing that is the essence of my career that I enjoyed the most was pulling people together, picking their brains, gaining their support and defining the mission, and going ahead and doing it. We did it with the AFS. We did it with the Great Lakes Fish Health Program and we did it with the Pacific Northwest Fish Health Protection Committee. So, those kinds of things were really what I did. I was really more of an organizer and program developer than an out-and-out fish pathologist. I enjoyed doing diagnostic work where people would bring me a bucket of fish and I would figure out what was wrong with them, but I think my basic career was that of a program developer.

JG: Thank you Jim. I appreciate you taking your time for this and this will conclude this oral history.

JW: Thanks, Jerry, for your time. I had no idea where this would go.