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David Todd [00:00:03] All right. Well, good morning. I am David Todd. And I have the privilege of being here with Dr. Benny Gallaway.

David Todd [00:00:12] And with his permission, we plan on recording this interview for research and educational work on behalf of the Conservation History Association of Texas, a nonprofit here in the state, and for a book and a web site for Texas A&M University Press, and finally, for cataloging and preservation at the archive that the Briscoe Center for American History at the University of Texas at Austin manages.

David Todd [00:00:42] And of course, I wanted to stress this: Dr. Gallaway would have all rights to use the recording as he sees fit. It is his.

David Todd [00:00:52] And I wanted to ask you before we went any further, if that's okay with you, Dr. Gallaway?

Benny Gallaway [00:00:57] Yes, sir.

David Todd [00:00:59] Great. Okay. Well, then let's get started.

David Todd [00:01:03] It is Thursday, August 25th, 2022, and it's about 5 minutes of 11, Central Time, in the morning. My name again is David Todd, and I am representing the Conservation History Association of Texas. I'm in Austin and we are conducting a interview remotely on a platform called Ringr with Dr. Benny Gallaway, who is based in the Bryan, Texas, area, as I understand it.

Benny Gallaway [00:01:36] Dr. Gallaway is a fisheries and marine ecologist and he is president of LGL Ecological Research Associates. He has been a leader in studying the impacts of oil and gas development and improving management of fisheries, including the red snapper. And today we'll learn about his general background and experiences and his insights about fisheries. And I think we'll try to take some time to focus in on the conservation of the red snapper, which as I understand it, is the most sought-after offshore fish in U.S.-controlled waters in the Gulf of Mexico, which means it's important.

David Todd [00:02:16] So with that introduction, I wanted to just ask you a first question, and that would be if you might be able to tell us about your childhood and early years, and if there might have been some people or events in your life at that time that sort of influenced your interest in animals and in fish in particular.

Benny Gallaway [00:02:40] Sure. I grew up in the country, in north central Texas, in the general vicinity of Glen Rose, Texas and Weatherford, Texas, just west of Fort Worth, west and south of Fort Worth. And as part of that, we, we didn't have playgrounds, but we were

allowed, land was open, woods and streams were our playgrounds. And my mom would, would, her rule was that, we like to fish, and anything we would clean, she would cook. So I grew up with an interest in fishing, and then that was topped off by every summer, my dad insisted on taking a vacation to Port Aransas every year and he would go quote, unquote, "deep sea fishing".

Benny Gallaway [00:03:34] And that, the combination of those two things, piqued my interest in fisheries, and especially marine fisheries, because the ocean was a, it was quite different from our, from our home place and it just captivated me from the very beginning. So that's how I got interested at the beginning.

David Todd [00:03:55] Do you recall any particular trips with your father on these deep-sea fishing outings?

Benny Gallaway [00:04:06] Yes. This, this would have been, you know, quite, quite early, you know, in the fifties. And things were not so good in the red snapper world. They targeted red snapper on their offshore trips. He was able to take one offshore deep-sea, quote, fishing trip a year. And one year he came in with a 15- or 20-pound red snapper. And that to me was the most remarkable thing I'd ever seen.

Benny Gallaway [00:04:34] So, that, that experience and saying, where did these guys come from? What do they do? How did they get so big? And if you're, you know, catching bluegill in north Texas, to see a 10- or 15-pound red snapper, a big pink fish, is impressive. So, I never got over it.

David Todd [00:04:57] Well, and you mentioned the bluegill from, I guess, some creek in the Glen Rose area.

Benny Gallaway [00:05:03] Yes.

David Todd [00:05:04] What would a typical fishing trip might look like if you're hoping to bring something home for your mother to cook for you?

Benny Gallaway [00:05:12] You'd have a willow pole and a piece of string, a cork and a, quote, unquote, small hook, or perch hook, and you'd dig some worms, and you would come home with 15 or 20 fish, mostly smaller than your palm. You'd cut their heads off, cut them and scale them, and she would fry them up crisp. And you can basically eat the whole thing, bones and all, they were so small. So that would be a typical trip.

David Todd [00:05:37] Sounds like fun and very tasty.

Benny Gallaway [00:05:40] Was! Like potato chips.

David Todd [00:05:45] Well, so your parents both seemed to introduce and support this interest of yours. Was, during your education, which went on, of course, for a number of years, from grade school on to, you know, a doctorate at Texas A&M, were there any teachers or classmates that might have shared that interest or encouraged it in you and fisheries and conservation?

Benny Gallaway [00:06:13] Yes, I was. Two, two people come to my and one ended up my major professor. His name was Dr. Kirk Strawn. He came down through the Hubbs lineage, which is a famous fisheries lineage, actually at the University of Texas.

Benny Gallaway [00:06:31] And Dr. Strawn had an unusual way of teaching marine ichthyology. He would have a two-semester course, where in the first semester you were divided in, your class, was divided into collecting teams, issued collecting equipment. And then we traveled to Brownsville, Texas, and sampled from Brownsville to the mouth of the Louisiana River. And the team that collected the most species at a given site got the 100 grade, and everyone was graded down from that, depending on the proportion they got of the total from the winning team.

Benny Gallaway [00:07:10] And in doing that, that encouraged you to go out and sample places where you might not have sampled If it hadn't been competitive. And so, in doing that, we were taught in a unforgettable way, the life history and habits and habitats of the fish that we were interested in.

Benny Gallaway [00:07:35] The second semester was from the Mississippi to the Florida Keys. And then the next year's course was sorting and identifying and collecting, doing all the research on those specimens. So, in those days, we had hands-on experience with dealing physically with the subjects of interest. It was not taught mainly in the laboratory and from books. It was hands-on experience, which I, I don't think happens anymore. And I'm sad, sad to hear that. But anyway.

Benny Gallaway [00:08:08] The other was, he was my life history ecology, and the other was a department head. Actually, his name was Dr. Richard Baldauf. And I thought when I interviewed with him for going into the Ph.D. program, I thought I was pretty knowledgeable about fish. But he very quickly set me back a few notches by going into kidney function. So I learned that there was a lot more to just the life history, that there's also physiological and behavioral aspects that one needs to know as well.

Benny Gallaway [00:08:47] So, the combination of those two field and laboratory, and "how does a fish work" type information, I think contributed to my career immensely. And they were, if I've had any success at all, is probably mostly attributable to those two persons.

David Todd [00:09:04] It's great that you can track it back to these people that have such a great influence. It's like seeing the family tree.

Benny Gallaway [00:09:16] And were there any classmates that you were out sampling or looking at the specimens? Any company there that might have helped you understand this is a good career for you?

Benny Gallaway [00:09:33] You know, I think the ones who survived these types of courses (it wasn't for everyone), but the ones that didn't drop out, they became colleagues for the rest of our lives. We became very close and attached, regardless of how we dispersed over North America later. We became very good friends. So, very close.

David Todd [00:10:03] Yes, I'm sure that's rewarding to have people that that understand what you're talking about.

David Todd [00:10:09] So now you've had this this you know, really, I want to say excruciating, but I'm sure it was it was fascinating, and challenging formal education. But I like to ask people if there were some kind of informal kind of schooling that they might have gotten from general interest books, or films, they saw, or TV shows they might have caught on the boob tube, that might have also excited and propelled you into this, this career.

Benny Gallaway [00:10:42] There was one that comes to mind. It was a Texas show, it was, and probably, it was the Harley Berg Show. I don't know if you've ever heard that name or not. It was in the fifties, seventies or eighties. I can't remember. And he had a weekly show in which he focused on interesting life history aspects of various fish species and terrestrial animals as well. So it was Harley Berg's Wildlife Show. That made it personal. And it was a bridge between the academic, scientific community and the general public. And the ability to communicate detailed technical information to the general public: he was a master. And that impressed me that I wanted to try to do that, in my career. I've never been quite as successful as he, but I try.

David Todd [00:11:46] It's hard, I imagine, to be that kind of translator where you want to get over big points but not ignore the small details that count.

Benny Gallaway [00:11:58] It's a balance between being perceived as talking down to your audience, versus really trying to communicate. You have to be very careful. So, anyway.

David Todd [00:12:13] So, as I understand it, a lot of your career has been spent at LGL Ecological Research Associates. And I'm curious how you came to work there and what that work entailed over the years.

Benny Gallaway [00:12:31] Yeah, particularly since when I started, it was a Canadian company, in Texas. So at the time I started, LGL became interested in me, I was leading a research effort on Toledo Bend Reservoir, which had been proposed as a site of a large, I think it was a nuclear power plant. It never, it never was built. But anyway, we were doing the baseline information.

Benny Gallaway [00:13:00] One of the professors over there from A&M lived in the town that we were located. And to make a long story short, he eventually married my secretary at the research program. And then he had a friend who went to work for the Canadian company and hired hired him to see if he could start work in the U.S.

Benny Gallaway [00:13:26] And he found that all the work was not terrestrial, that it was mainly marine and freshwater ecology. So my former secretary said, "Well, that's what Benny does. You should hire him." And they offered me a job and I took it. He went back ultimately to academia. And so within a couple of months, I became the leader of the Canadian company called LGL Environmental Research Associates at the time. Ultimately, we reestablished ourselves as a U.S. corporation with the name that you have now. And I've been with them since '74, most of the time as president.

David Todd [00:14:11] Wow.

Benny Gallaway [00:14:12] Happened.

David Todd [00:14:14] Isn't that amazing? You found a niche there that must have been a good fit.

Benny Gallaway [00:14:21] What I found was we had research freedom, without the fetter of academic politics. And the company that, LGL has a philosophy that the focus is doing good, publishable science. And if you Google our company and look at the publication record, you'll find that we have more, we look more like a university in terms of quantity and volume of peer-reviewed publications versus gray literature reports.

Benny Gallaway [00:14:53] So, it was a perfect fit. It was just a lot of freedom to do research, and unfettered by having to be unduly influenced by, maybe "you might not ought to say that" kind of issues. So, so we had freedom.

David Todd [00:15:12] Well, that seems to be, from looking outside the scientific world, just essential for inquiry, to feel like you can go where the facts lead you, and not worry about the repercussions.

Benny Gallaway [00:15:27] You're exactly correct.

David Todd [00:15:31] Well, maybe you can tell us a little bit about what this, your inquiries over the years have taught you about this one species. I know you've worked on scores, but the red snapper seems to be one of such importance that I thought maybe to give an idea of your background and experience and insights, that that might be a good one to talk about it.

Benny Gallaway [00:15:56] Sure.

David Todd [00:15:57] Could you give us a brief introduction to the life history and the ecological niche that's filled by the red snapper?

Benny Gallaway [00:16:05] I can. But if I can preface that with what built the shift in focus to almost entirely, you know, concentrating on the species: our first big offshore marine project was in the Buccaneer gas and oil field, which was an oil field about 30 miles off the coast of Freeport. And every year, in that oil field, the field would be inundated with small two-year old red snapper. You know, you could fill an ice chest with them. There were no limits. They were recruited in waves. And that wave each year would be, basically, completely harvested by the private recreational sector.

Benny Gallaway [00:16:57] But the next year, another wave would come. No big fish were taken to speak of. Where were those fish coming from? And so that, you know, solving that was an interesting question that ultimately got resolved. And, but that's what directed me at red snapper.

Benny Gallaway [00:17:16] And what we've learned since then, if you look at red snapper, it's a really unusual finfish. First of all, it matures as early as age two. It can produce and reproduce at age two. It lives to over 50 years.

Benny Gallaway [00:17:39] It has extremely high fecundity. And by that, I mean that the females produce a lot of eggs. A ten-year old female, for example, will produce about 60 million eggs per year.

Benny Gallaway [00:17:53] The, interestingly, the eggs, larvae and the eggs, are in the water column. They hatch into larvae. They float around for about a month and then settle to the bottom.

Benny Gallaway [00:18:04] And these life stages show a very high degree of natural mortality. For example, if you take the 60 million eggs I talked about by a 10-year old female, about 450 of those 60 million would survive to about two inches long.

Benny Gallaway [00:18:20] And that's the size at which they enter the shrimp fishery as bycatch. And what we've learned over the years is that they have not only high natural mortality but it's probably density dependent.

Benny Gallaway [00:18:37] In other words, the mortality rate, the percent that die per year at age zero, that first year in life, the production, because they have such high fecundity, is basically sufficient to carpet all the bottom of the Gulf of Mexico.

Benny Gallaway [00:18:57] But the only guys that are going to survive are those that fall out, or find, or are able to move on to some low-relief structure like relict oyster reefs and things like that.

Benny Gallaway [00:19:10] All those over soft bottoms that don't find that habitat are not going to survive. So, if you have a really large year class, you get even larger natural mortality rates. But, it doesn't really affect the total number that are going to enter the population because that's fixed by the carrying capacity of the habitat that supports them.

Benny Gallaway [00:19:32] So. It's, when they get into the age two, and recruit to reefs, that they're more natural mortality, this is natural as opposed to fishing mortality, slows down considerably. And then fishing mortality becomes a major factor.

Benny Gallaway [00:19:51] And then you have issues of what kinds of habitats they use, artificial versus natural. And then there are shifts in distribution of the fish by size. For example, they will come in to reef habitat, be it natural or artificial, and be pretty much resident, with some movement, but pretty much resident on those habitats until they get older and larger, if they survive the fishery.

Benny Gallaway [00:20:20] And then they have the ability to move off. And you may have seen in recent estimates that the total numbers of red snapper, the ones on reefs are a small fraction of the total population. Which are said to be living over unchartered bottom or uncharacterized bottoms, which implies they're all out over mud bottoms. A large fraction of the population is basically out over a large part of these soft bottoms.

Benny Gallaway [00:20:54] However, when you, when you actually survey that, which we have done and researchers like Dr. Stunz has done, you find that they're mostly associated with small, uncharted structures and lumps and depressions on the bottom. So it's not like they're randomly distributed over a soft bottom. They're aggregated in high-density spots here and there that are not generally known. Well, are not known much at all.

Benny Gallaway [00:21:24] So, there's, there's a high fraction of the population that's not really vulnerable to the fishery, because they're hard to find.

Benny Gallaway [00:21:36] And of course, the big concern is the technology is improving to such, not only can the commercial and charter boats have the ability to find those fish, but the private recreational angler is also getting the technology to target those. So those fish may start being exploited.

Benny Gallaway [00:21:58] In fact, there was a long-line fishery that attempted to develop, but the catches of large fish were so staggering they quickly shut down the long-line fishery because of this high population of spawners that are basically invulnerable to to most of the fishing gears.

Benny Gallaway [00:22:22] As reef fish, you know, if you look at a red snapper's mouth, you realize that he's not going to be swimming around eating worms off the bottom. He's got, he's got teeth. They're a reef fish throughout their life history. And even the ones that are on these smaller structures are typically associated with, with reef-type habitats.

Benny Gallaway [00:22:47] So. Of interest, that's where most of the fish are. Most of the recreational harvest is occurring at natural, I mean, artificial structures like petroleum platforms, which is which is good. The density on these platforms is probably 20 times higher (that's a published number), than the density on natural reefs.

Benny Gallaway [00:23:14] But the area of artificial versus natural reefs is so small, that even despite that harvest, you're not having much of an impact on the stock. So artificial reefs, I think, contribute to management, in that it gives a good place to fish and go get your limit. And yet the harvest from those habitat is not an appreciable portion of the stock.

Benny Gallaway [00:23:41] So, I don't know where to go from there.

David Todd [00:23:45] Yeah. No, this is so helpful. Gosh, you've covered a lot of ground just in that little introduction to the life history of these fish.

David Todd [00:23:58] So, what is, you think, the ecological niche that's filled by the snapper? You say, it's a reef fish: what, what does that entail?

Benny Gallaway [00:24:08] The reef fish component is, is that it needs the habitat as cover from predation to do well. And it's also very well adapted to feeding on not only the smaller reef fish that are associated with these structures, but in addition to that, if you've been diving these structures, you'll find large schools of silvery, quote, unquote, I'll just call them, "baitfish", for the purpose of our discussion. But they come and will temporarily aggregate around these reefs, swirl around, get preyed upon by red snapper and move on. But there's a continual coming and going of these, these types of fish which, which gives them a real survival advantage.

Benny Gallaway [00:25:03] So, so, they've got, they're reef fish because they've got cover and they've got food. And they've got not only food on the reef, but food that are temporarily attracted to the reef for a sufficient time for them to make a living eating them.

David Todd [00:25:21] Okay. And you've, I think, mentioned just in passing the kind of harvest that that these red snappers undergo. I was hoping that maybe you can talk a little bit about how these, I guess, changes in the technology for harvest, and any other factors that might be connected with the how the numbers have fluctuated. I understand that that the snappers dropped a good deal from when your dad used to go out deep-sea fishing and that really troughed, what, about 30 years ago, is that right, about 1990? Maybe you can help us understand what might have been responsible for that, that drop?

Benny Gallaway [00:26:14] Yeah. I mean, if you, if you look, you know, there was a period from the mid '70s to the late '70s to when management finally started being effective, where, you know, that it started off earlier than that. What I like to use as an index to population size is something called, "spawning potential ratio", which takes into account not only how many fish there are, but what the size and age composition. Because as I mentioned earlier, a large fish produces a lot more eggs then small fish.

Benny Gallaway [00:26:58] So I use, and spawning potential ratio is simply the number of eggs that would be produced in a population that didn't have any fishing, versus the population that is being fished at the current level. So an SPR, which a goal for red snapper is like 26% SPR. So that means we're trying to manage it where you can get to an SPR of 26% of what it would have been if you had no fishing, and that would be sufficient to contribute to maximum sustainable yield.

Benny Gallaway [00:27:37] So if you look at those trends over time, they're supposedly, I'm looking for a graph here, but they were high in the early years, you know, in the '40s and '50s, declined during the '70s and '80s were low. Management activities began. And then they've started to increase. And the history of what's caused the increase is something we'll probably want to talk about sometime in the conversation. But we're looking at achieving an SPR of 26% probably in about 2030.

Benny Gallaway [00:28:19] So, so, it's been increasing.

Benny Gallaway [00:28:23] But at the council meeting that I was just in, the fishermen, for the first time that I can remember, in public comment period, a high proportion of the fishermen were asking no increases in red snapper catch allowances for fear that we're again overharvesting, because they're seeing declines in the size and catch rate of fish. You still catch a lot of red snapper, you can still catch a lot of big red snapper, but it's taking longer, and you have to go further and further offshore.

Benny Gallaway [00:28:54] So I think they're, everyone's beginning to think, you know, we're setting our, you know, we were, in the old days, 9.12 million pounds was high. And today, our overfishing limit is set, is proposed for the coming year at about 18.9 million pounds. I think everyone is getting a little bit nervous. Are we, are we doing the right thing? Are our numbers good enough to, to do that.

Benny Gallaway [00:29:26] So. Probably got off track there.

David Todd [00:29:28] No, no, this is, this is really helpful. Thank you very much.

David Todd [00:29:33] You know, when you talk about the conference and these fishermen who come, I guess that part of the pressure is just the number of fishermen that are seeking to harvest these red snapper. But, but as I understand it, their individual effectiveness is kind of linked with the technology that they have access to - these fathometers and the reels and the wire fishing lines and, I don't know, fiberglass boats, and all that good technological, you know, equipment that they can buy.

Benny Gallaway [00:30:13] Yes. When you can go over a spot that you've never seen before, and you see a school of fish on a reef that's not charted. You punch a button. You go fish that place. Yes, yes, indeed, that's red snapper. You enter it, enter it into your system. And then you

can go back to with, you can go to the beach then, and come back to within a few feet of that place. Then with your Yamaha motors, you can get out there, you know, pretty, pretty fast.

Benny Gallaway [00:30:42] So, the ability to find and locate and exploit these previously unexploited habitats is changing continually in a way that we need to be keeping a close eye on.

David Todd [00:31:00] I see. So, it's not only the power of your boat or it's, I guess, the strength of the hull, but it's also this ability to log a location and navigate back to it.

Benny Gallaway [00:31:13] That's correct.

David Todd [00:31:20] You know, something I'm curious about and maybe you can help me understand, is the Gulf is a very large and, to me, very mysterious place. And I wonder how you arrive at numbers, how you calculate the population and the age structure of these snappers. I mean, it seems like sort of a black box. I mean, how do you, how do you calculate that? Is there an approach to doing that? I had read a little bit about the Great Snapper Count.

Benny Gallaway [00:31:57] Mm hmm.

David Todd [00:31:58] Maybe you can help us understand how those numbers are arrived at.

Benny Gallaway [00:32:05] Yes. And it varies. And, you know, we've long been, it's only recently that we've had the ability to go from indices of abundance like catch rate and those sorts of things, which are, which are not an absolute abundance estimate, to obtaining absolute abundance estimates.

Benny Gallaway [00:32:26] And that technology has emerged to where it is feasible now. And for, for example, I'll give you how we typically do a reef. We have hydroacoustic gear, which is a glorified depth finder, if you want to think about it that way, which quantifies the number of blips in the water and those blips can be sorted based on their characteristics as to whether they're finfish with air bladders, or sharks without air bladders, or a jellyfish versus a fish, those sorts of thing. You can identify which of the blips are fish. So you can get a total count.

Benny Gallaway [00:33:05] And if you run transects back and forth over the reef, you get a distribution of blips that are fish.

Benny Gallaway [00:33:13] Then you go back, at the same time... Oh, incidentally, and you can also, to some degree, determine size. You know, a big blip versus a little blip has some feasibility.

Benny Gallaway [00:33:28] But then you don't know what the species composition of those fish is. But now, with camera technology, you can go back and survey through the water column, stratified by depth. Your blips are stratified by depth. And you can go film what those fish are and do the relative abundance of the individual species, and then assign your total blips.

Benny Gallaway [00:33:54] So, now you have an estimate of what you think is total abundance. But, you know, you're never quite sure.

Benny Gallaway [00:34:00] So, what we do is follow that up with a short-term marker capture estimate, where we mark and release fish, come back a week or so later, and census the population.

Benny Gallaway [00:34:13] And if all those numbers converge to a similar estimate, then we feel like we've got absolute abundance.

Benny Gallaway [00:34:22] So, you've got that index of abundance for that type of habitat. But you've got a variety of habitats in the Gulf, some of which are charted, most of which are not. But you have to multiply, here's my sample, and I've got to multiply that times how many like samples there are in the Gulf of Mexico.

Benny Gallaway [00:34:40] So, that's how we're getting to abundance estimates nowadays.

Benny Gallaway [00:34:44] We also run the transects over these, quote, unquote, "uncharted" or "uncharacterized" bottoms. And we will encounter these places with high density of fish. And we'll go back and do the same thing and get the numbers.

Benny Gallaway [00:34:57] So, but you don't know how many shipwrecks and boulders and beer cans. Beer can will have a cloud of little baby red snapper around it usually.

Benny Gallaway [00:35:10] So, it's, usually you restrict your estimates to age two and older fish.

Benny Gallaway [00:35:17] And but the ability to separate abundance estimates, from actual abundance, is getting better all the time.

Benny Gallaway [00:35:28] If we had, what's missing, are good bathymetric chart showing the distribution of the habitats, which is surprising. It would seem like we would have that, but we don't.

David Todd [00:35:42] Interesting.

David Todd [00:35:44] You know, you mentioned something in passing that I kind of perked up about, and that was that you have this step in your abundance surveys where you mark and release fish.

Benny Gallaway [00:35:59] Yes.

David Todd [00:36:00] How do you do that? How do you track a fish in the sea?

Benny Gallaway [00:36:05] Okay. Over the short time interval that we're talking about trying to verify these estimates, the fish are largely going to be resident. They may be caught. And so that's why you put big rewards on the tags. So, if they're caught, you get that return as well. But you go in and mark and very carefully release them to avoid mortality, to the extent that you can, and then come back later.

Benny Gallaway [00:36:35] So, now you've got this many marked fish in the population. So, you come back later, and usually only one or two weeks later, and take another sample, which some of them will be recaptured marked fish, and the others will be unmarked. And using those ratios, and your initial numbers, there's mathematical procedures for estimating the

population estimates with a high degree, or a specified level, of confidence. Samples can be very tight and very good, or they can be very poor. So but that's, I hope that answers the question.

David Todd [00:37:14] Yeah. It sounds like there are some statistics involved.

Benny Gallaway [00:37:18] Unfortunately, there are. You'll find that, you know, guys like me that grew up seining fish sometimes when we went to the university, we were doing statistics on a Monroe calculator and the computer was so large it filled the basement of a building, and we had to work at night. But now, you know, you can get a hand calculator that does more than that computer did in those days. But you need someone that's capable. So to be successful in the research arena today, you need a highly qualified statistician that has biological background. And finding that person is usually the limiting factor of doing good research. And I happen to think we have one of the best in the United States, but that's neither here or there.

David Todd [00:38:14] Well, so I think that when we were visiting earlier, you mentioned that some of your early work was on the Buccaneer Field.

Benny Gallaway [00:38:28] Yes.

David Todd [00:38:28] And I gather you've done other work in the oil and gas industry, which, of course, has got a big presence in Texas and in the Gulf.

Benny Gallaway [00:38:37] Mmmhmm.

David Todd [00:38:37] And, and I was hoping that you could talk about what you've learned about this interaction between snappers and the fossil fuel industry, whether it's, you know, hypothetical oil spills or about these offshore platforms which seem to act as artificial reefs. You know, the, I think you've also looked at some of these offshore LNG terminals. Can you can you help us understand some of this?

Benny Gallaway [00:39:07] I can try. The, as I indicated, the density of red snapper around these artificial reefs, especially petroleum platforms, which are unique in that they extend from the bottom to above the surface. So you actually have habitat for big fish at the bottom. And this is, this is a perhaps an unfair generalization, but I think it'll hold: medium-sized fish in the middle, and small fish hiding in the barnacles and whatnot at the top.

Benny Gallaway [00:39:42] And so the density of even catchable fish, as several studies by the National Marine Fisheries Service have demonstrated that the density, the number of fish per unit area, around these platforms was 20 times higher, plus, the natural reefs.

Benny Gallaway [00:40:00] So, you can go to a platform and usually you drop a hook and you start catching red snapper. So, you can get your limit quickly, efficiently, and, and you can harvest them quite successfully. And there are a lot of recreational, commercial, and for-hire groups that do just that.

Benny Gallaway [00:40:23] But the beauty of it is, is that despite the harvest rate on those structures, that is a very small proportion of the population. So, you're basically getting access to the fish without unduly influencing the total population, if that makes sense.

Benny Gallaway [00:40:43] So in a sense, the artificial reefs are not necessary for maintaining stock size in the Gulf of Mexico, but they're an effective fisheries management device, for lack of a better term, so.

David Todd [00:41:03] Gotcha. Okay. So, not significant for the stocks, but they're very significant for the fisheries.

Benny Gallaway [00:41:10] And if you go off like western Louisiana, that, that's what they have. I mean, that that is the stock. So in western Louisiana, where they don't have the, you know, they got the effects of the Mississippi River to the west. So they've got broad expanses of, of mud bottoms with no reefs, that these artificial reefs, and the highest degree proliferation of platforms anywhere in the world, they're very important to the fishery as well as to the stock which occurs in Louisiana, although again, that's a small proportion of the stock.

Benny Gallaway [00:41:48] In fact, if you look at it, I've got some numbers for red snapper. And this is, we did a study for the Bureau of Ocean Energy Management on coming up with absolute abundance estimates for reef fish on petroleum platforms in the Gulf of Mexico. And that's published recently in the North American Journal of Fisheries Management in 2021. And that, I'm turning to the numbers now. If, if you look at red snapper on oil platforms, make sure I get to the right numbers, the total red snapper stock size in 2017 was about 38 million fish at age two-plus and older. And on all the platforms in the Gulf of Mexico, the maximum, the 5% of that stock, was on those habitats, oil / petroleum platform habitat.

Benny Gallaway [00:43:02] And the estimates range from about 5% to as low as 2%.

David Todd [00:43:10] Interesting. So really a small minority of the fish are there, but they're just, I guess, easy to find and easy to catch for.

Benny Gallaway [00:43:18] That's correct.

David Todd [00:43:19] People out there.

Benny Gallaway [00:43:20] Which tends to make everybody happy, especially the fisheries managers.

David Todd [00:43:26] Yeah, sure, sure. Absolutely.

David Todd [00:43:30] Well, so I understand there's been a significant effort over the years to retire abandoned rigs and, you know, sink them and also old ships and other kinds of structures. Has that had a significant impact, either on red snapper populations or on their, you know, the ability of folks to harvest them?

Benny Gallaway [00:43:58] It has not impacted the populations per se, as we've been discussing, but it's influenced the ability to harvest. And if you, for example, in western Louisiana, if you, all those platforms are required to be removed by law once they're no longer productive. So if you take all those out, the Louisiana fishery is going to be in really bad shape. So they need an extensive artificial reef program.

Benny Gallaway [00:44:31] But you also have to be aware of user conflicts. In other words, the reason they're required to be taken out is that was a condition made to the shrimp

industry to enable them to get their trawlable bottoms back, after exploitation of the oil and gas. So there's always the user conflict issue that you have to address and you have to address fairly to make it work.

Benny Gallaway [00:44:58] So what's happened, you know, it's, the shrimp industry has been using electronic logbooks which enables them to exactly plot through distribution of fishing effort. And so they can say, you know, we don't fish this area so much. It's in the right depth range, the right salinity regime. Why don't you put your artificial reefs there?

Benny Gallaway [00:45:26] So, there's, the ability to communicate and interact is improving all the time, which is a good thing. Hasn't always been the case, starting with the, the problem we had early on with believing that managing shrimp trawl bycatch would recover the stock, which turned out to be not true.

David Todd [00:45:53] Well, I would really like to learn about that. Before we get too much further, does your dog need to go out?

Benny Gallaway [00:46:02] Thank you so much. Yes, I didn't think of this. My wife went to the store and left the dog in the house. Let me see if we can take a short break, I would really appreciate it.

David Todd [00:46:13] Absolutely. Yeah. Let's do that.

Benny Gallaway [00:46:17] Sorry about that. I'm assuming... I'm hoping this thing happens more than, more than just to me.

David Todd [00:46:22] No, no. I have a dog that, you know, can get pretty vocal. Not a problem.

David Todd [00:46:29] Well, so you were telling me about these artificial structures. This might be a good time to just touch on the value of the natural reefs in the Gulf, and particularly the Flower Garden banks, which I guess are pretty remarkable if you sample those. Are they significant for the snapper populations?

Benny Gallaway [00:46:50] They are. And it, as I say, the natural reefs, I think like it constitutes over 80% of the total reef habitat in the Gulf of Mexico. Artificial reefs are the balance, which is not that large. So, so, the natural reefs are very important.

Benny Gallaway [00:47:22] But what, what turns out is the really important habitats for my... well, they're all important, don't let me. But on a relative basis, in my view, the most important habitat is this string of uncharted relief spots, each harboring a population of red snapper around it that are not well known. And that's where most of the fish are. That's the part of the stock that we need to, we need to protect. They're unfished. They have lots of large fish. They're, they're the main contributors to our spawning potential ratios.

David Todd [00:48:05] You know, this reminds me of, of dark matter from the universe. You know, that what you but you don't see may be very large.

Benny Gallaway [00:48:15] That's correct. It is.

Benny Gallaway [00:48:23] And then, red snapper has been enigmatic from the beginning. You know, if you look at the, the history of the fishery where, you know, the big populations of red snapper was, were found off panhandle Florida. And they were, you know, this was huge, 10-pound plus fish and lots of them. And the fishery began there around Pensacola. And, but, it didn't take very long at all to deplete those stocks.

Benny Gallaway [00:49:07] And so they fished from the panhandle right on down to the tip of Florida, and essentially just extirpated, caught out all the fish, and they haven't really recovered in those numbers and size distribution till this day.

Benny Gallaway [00:49:25] They moved from there to Campeche and then they finally discovered red snapper in the western Gulf of Mexico and began fishing those. But those seemed to manage fishing pressure better than the eastern Gulf population.

Benny Gallaway [00:49:47] So it may be, it's my bias, that the red snapper is a western Gulf of Mexico species which occurs in Florida. A lot of them are displaced by hurricanes, etc. They can reproduce, but there's not the habitat for the juveniles.

Benny Gallaway [00:50:06] If you look at Florida, you think of it as a grouper habitat. And they have a completely life history difference than red snapper.

Benny Gallaway [00:50:15] So I think that those fish that, where the fishery started, and people got the idea that it was an eastern Gulf species, was an artifact of accumulating fish over centuries.

Benny Gallaway [00:50:27] But the reproductive success of those fish not perhaps not being so large. And they're not easy to bring back, although we're trying to do it.

Benny Gallaway [00:50:39] So there's, even though the Gulf of Mexico red snapper stock is managed as just one Gulf of Mexico stock, it should be actually managed, in my opinion, as 1 to 3 different stocks.

Benny Gallaway [00:50:53] But I'm probably getting off track from our, from our discussion focus.

David Todd [00:51:01] No, this is, it's all really valuable.

David Todd [00:51:06] You know, maybe we can talk a little bit more about this management and just kind of split it up into the different kinds of harvest.

David Todd [00:51:13] And I think you noted, kind of in passing, about the effect of shrimp trawling and bycatch, and that it may have been overestimated as a factor. Can you give us a little background on this interplay between shrimping and the red snapper abundance and harvest levels?

Benny Gallaway [00:51:39] Absolutely. I think the whole "we've got to manage shrimp trawl bycatch to have a fishery", starting with the 1995 stock assessment, which basically came up with a strategy that required shrimp trawl bycatch mortality of juvenile red snapper to be reduced by 50%.

Benny Gallaway [00:52:03] And, and as shortly thereafter, federal regulations mandated the use of specific bycatch reduction devices to do that. They had been tested and they had been tested in a way where you have a net with a bycatch reduction device and if it's, okay, I'll call those "BRDs" , B, R, D, S, in one net, and without a BRD in the other net. And sure enough, you would reduce the number of juvenile red snapper you put on the deck by a large amount.

Benny Gallaway [00:52:40] The problem is if you observe that the escapement of those fish is at the end of the tow when the net is being retrieved. It's more like the fish are being burped out at the end of the tow. They're not continually released in a nice, healthy fashion throughout the tow.

Benny Gallaway [00:52:58] So there were some questions, "Are these things really effective or not?"

Benny Gallaway [00:53:03] And then, the more we looked at it, we found out that, at that time, the natural mortality rate for these age zero and one fish, fish in the first and second years of life, are the ones that come in to the shrimp trawl bycatch, and they're called, "age zeros" and "age ones".

Benny Gallaway [00:53:23] And the effectiveness of saving those from being killed by a shrimp trawl all depends on how many would die naturally. And we started out with the idea that the natural mortality rate was like, for a relative basis and we probably don't want to get in the weeds, but for comparison, it was point five and point one, which is very low rates of natural mortality. So if you save that fish, you've got a big influx of new fish into the population as aged two and three fish.

Benny Gallaway [00:54:00] But it turns out, as we discussed earlier, though, is that those aren't the natural mortality rates. So, mortality rates are more like 2.0, or four times higher, than what was originally estimated.

Benny Gallaway [00:54:15] So, even if you save them, most of them are not going to survive to get to the to the directed fishery, because they were going to die from natural causes, whether or not they were caught in shrimp trawls or not.

Benny Gallaway [00:54:26] So, if you're banking on that influx of fish, you're in bad shape. And that's what we did for many years.

David Todd [00:54:37] Just as an aside, what would be a typical cause of natural mortality for one of these young snapper.

Benny Gallaway [00:54:46] Predation. If you're a little pink fish on a mud bottom, you're going to be noticed. And there are lots of things with a mouth big enough to eat you. So I would say predation is the main factor. And then, you know, you know, finding food, all these sorts of things that some fish are more successful in surviving those early years than others. So I would say predation is the main factor.

David Todd [00:55:18] And what are the major predators for small or young red snapper?

Benny Gallaway [00:55:24] Sea basses, trouts, croakers, you know, the gamut of, and things you might not think of, like shrimp eels, and anything with a mouth big enough to ingest a two-inch fish, which is basically a lot of things out there. So.

David Todd [00:55:44] Okay. Thank you.

Benny Gallaway [00:55:45] If you look at, if you look at, if you look at... let's just start thinking about, let's just start our discussions in, say, '95, just to kind of go pretty far back, but not all the way back to the beginning. But we're back into when the period of time when red snapper were low.

Benny Gallaway [00:56:06] And so, at that time, the harvest had been set at 9.12 million pounds for the directed fishery. And BRDs were not required until 1998. So from 1998, to 2006, BRDs were required. The total allowable catch was set, was retained at 9.1 million pounds, with the idea that these BRDs were going to be contributed with a lag, you know, get them up to size three and four year olds. We're going to build a population.

Benny Gallaway [00:56:46] It did not.

Benny Gallaway [00:56:48] It wasn't until it was recognized that, in 2007, that the BRDs alone were not going to do it.

Benny Gallaway [00:56:58] So, in 2007, the total allowable catch was dropped from 9.1 million pounds to 6.5 million pounds. Then the next couple of years, to 5 million pounds.

Benny Gallaway [00:57:15] And the population began the increase that we've seen in recent years and that, you know, has may have been bended over and flattened out and maybe going down today because we raise our take back up to 18, nearly 19 billion pounds.

Benny Gallaway [00:57:35] So, you know, that's another story.

Benny Gallaway [00:57:38] But to make a long story short, it wasn't until control of the directed fishery, and I am not saying BRDs have no effect, but not the effect that people thought.

Benny Gallaway [00:57:52] So, but, but the appropriate combination started to be struck in the late 2000s. And the population has, has done what we've all seen. It's improved with more and larger fish and it's no longer overfished, or overfishing is not occurring, but it's not rebuilt either.

Benny Gallaway [00:58:15] We've got to get to an SPR of 26%. And that's, that's not going to occur till about 2030. So it's still rebuilding, so it still requires a significant management activities, if we don't over harvest in the meantime.

David Todd [00:58:36] I was reading a little bit, which is always a dangerous thing, but I had understood that some of the sort of epiphanies that came about, about the lack of impact for shrimping might have come after Hurricane Katrina in 2005. And shrimping was so devastated. Is that, is that so? I mean, did that give you a new view of shrimping grow in the red snapper abundance and harvest?

Benny Gallaway [00:59:11] What it was, what it did, was a natural experiment which tested the hypothesis that BRDs were not going to work. You're exactly right.

Benny Gallaway [00:59:22] If you look at the effort, the changes in shrimping effort that occurred, it went down from ... let me get this chart here to make sure I've got the right numbers ... in the, oh, say, '95 to Katrina, we're talking about a shrimp fishing effort as an index in days fished per year like 200,000 days fished per year. That's a net in the water pulled for 24 hours.

Benny Gallaway [01:00:00] Now, after Katrina, it's gone down to between 50 and 60,000 days per year. That's a huge decrease.

Benny Gallaway [01:00:11] What did the red snapper do? Basically nothing until, you didn't, you didn't see an impact of, you did not see, it was demonstrated that you would not see the impact that many had believed would happen if we could only control shrimp trawl bycatch. That was a... as scientists, we made a mistake, because we did not have good data on natural mortality rates.

Benny Gallaway [01:00:48] And so I'll put that in a plea for basic research is necessary for effective management, and it's not irrelevant academic interest. It has a direct bearing on successful management. If you don't have the proper information, you're by guess, and by golly, and more often than not, you're going to be wrong.

Benny Gallaway [01:01:12] Yes. It's a humbling thing, I bet.

David Todd [01:01:17] Well, so it sounds like one of the other pieces of the pie chart in mortality in the Gulf for the snapper would have been the directed fishery, both commercial and recreational.

Benny Gallaway [01:01:35] Those are the main drivers, yes.

David Todd [01:01:37] Can you talk a little bit about the role that that directed fishery has played, whether it's, you know, the party boats, or the individual anglers, or then these commercial fishermen?

Benny Gallaway [01:01:52] Yes. And here's where what I say is my belief as a scientist, even though it's a focus of considerable political dispute as to who has the, who has the big, big impact. But, let me just start speaking to that.

Benny Gallaway [01:02:18] One, control of the directed fishery is essential to, that's the major lever we have in terms of rebuilding stock. Two, for the, when the scientists estimate, "Okay, this year we can catch 10 million pounds, and how are we going to divide that up?".

Benny Gallaway [01:02:42] And it's, I believe, 51/49, I haven't looked recently, but let's just use that number. I think that's correct. So the recreational fishery has 49%, commercial has 51%. And they're allowed to harvest that in various ways.

Benny Gallaway [01:03:03] One, is that they have to be totally accountable. And one of the ways in which they've achieved that is going to individual fishing quotas, and where they're allowed to purchase a quota and they can harvest that amount of red snapper at their leisure.

Benny Gallaway [01:03:22] So, that's taken away the, you know, historically when it was just a, "season's open and everybody go fishing", there was a race to the fish. Gluts on the market. Price varied all over the map. It was a terrible situation.

Benny Gallaway [01:03:37] So, with assigning individual fishing quotas, a commercial harvest was able to be spread over time. They could harvest at their leisure. They were guaranteed this amount of fish.

Benny Gallaway [01:03:48] But in return for that privilege, there's extensive and exact reporting requirements. You'd have to, when you go fishing, you have to hail out, and say, "I'm going fishing." When you get out there and you're coming back in, and also you tell them when you'll be back in, and when you're on the way back in, you have to call and say, "I'm coming in and I have 50 pounds of fish, whatever the number is, 500 pounds of fish", whatever. And then they're subject to being intercepted at the dock to verify those numbers.

Benny Gallaway [01:04:24] So, they're monitored very carefully. As a result, the commercial fishery has, is always, right at their quota. They're usually under it.

Benny Gallaway [01:04:41] So, that's been, in my view, a very successful management technique.

Benny Gallaway [01:04:49] There are, you know, always with a program like that, there are social issues that have to be addressed, that are being addressed. And at the council, I gathered, there were some focus on doing away with that, perhaps. But I hope not. It's been successful.

Benny Gallaway [01:05:08] On the other hand, on the recreational fishery, the for-hire sector of the recreational fishery is similarly monitored to the commercial fishery, mainly through their insistence that they, that they be monitored. So they do the same sort of thing.

Benny Gallaway [01:05:28] And, as a result, you know, the recreational sector or allocation is divided between the private and the for-hire. The for-hire, like the commercial, because of the reporting, usually comes in at or below their target.

Benny Gallaway [01:05:48] But then on the other hand, the recreational fishery, we do not have a good way to monitor the recreational fisheries and the catch. In historic and recent years, there are overruns, where they typically go way over the quota. And then the adjustment for that is next year their quota is reduced by the amount that they went over from the previous year.

Benny Gallaway [01:06:16] But it's a, it's an interactive nightmare. We need to find a better way of managing the private recreational fishery. But most of the problem that we still face in red snapper fisheries management, in addition to, you know, just the basic biological, "do we really understand red snapper," kinds of question, is being able to manage the private recreational fishery, which, you know, is it's important to do so. It's our responsibility to find a way to find an acceptable way to do that.

Benny Gallaway [01:06:50] And there are a lot of fingers being pointed. But I think I think everyone at heart is on the same page. And if someone could come up with a good way to do it and the step towards state management, which you're probably familiar with, where each state has been delegated a fraction of the quota for the recreational sector, and they monitor the success over the year. You know, that's a step forward, in my opinion, but it's not perfect. But it's, it's better than it was.

Benny Gallaway [01:07:22] And then the other thing is, where are we in the overall rebuilding scheme? Well, I've indicated my concerns about what's going on. I think we're getting too high with our allocations again. But the reason we know we're still overfished is we still have, the proportion of older fish in the population is still very low, and you're getting smaller fish nowadays, what's been referred to as, "localized depletion" - smaller fish, and they're harder to catch, and you have to go further to catch them.

Benny Gallaway [01:07:57] So, so, we're not out of the woods yet. We need to step back and reevaluate our management activities, in my opinion.

David Todd [01:08:09] So, maybe you can talk a little bit about the levers and tools that fishery managers have. You got the quota, and I guess some of these are tradable, and are there are also uses for, I guess, weight limits or size limits, or, you know, a season. Is that still in effect?

Benny Gallaway [01:08:35] Absolutely. Particularly. Yes. Yes.

David Todd [01:08:37] How does, how does that work? Well, your size and weight limits are directed mainly at the recreational fishery. And used to be you could go out and catch five fish, as long as they were bigger than 13 inches, you were great.

Benny Gallaway [01:09:00] Now, I think, it's you know, it's gone down to two or three fish, depending on the state and the situation. So, yes, those are effective, effective ways to manage fish, fisheries and control catch if, big "if" you can monitor it accurately.

Benny Gallaway [01:09:20] And if you're monitoring red snapper ... I'm going to ... I do it already, so it's not a new thing. I'm going to probably raise eyebrows and ire of the Texas management system, but I do not believe you can monitor red snapper fishing success by conducting creel census at public docks and jetties. You need to be looking at private marinas and household people fishing out of coastal residences and need to be on the water getting an index. I think we have, in Texas, a particularly poor way of estimating a red snapper harvest in the recreational sector. So this will probably get my interview scrubbed.

David Todd [01:10:13] So the thought is that there may be a large number of recreational fishermen who instead of going to the public docks and public marinas, they may have their own place to moor and tie up that's a private home or someplace where Parks and Wildlife doesn't really have the manpower or the time to check.

Benny Gallaway [01:10:38] Correct. And the focus has always been on our coastal and estuarine fishes like red drum and spotted sea trout, etc. And it's, it's costly to manage red snapper, you know, offshore, where the fishermen are going 30 miles offshore to start, at minimum, you know.

David Todd [01:11:01] I'd like to, if you don't mind, just go back a little bit to talk about these fishing quotas, which I gather were a real revolution. At the time they were introduced, maybe about 25 years ago.

Benny Gallaway [01:11:21] Yes.

David Todd [01:11:22] And very different from the old, I guess, derby-type races, sort of a Wild West situation, sounds like.

Benny Gallaway [01:11:32] Exactly, as you characterize it.

David Todd [01:11:35] How did those quotas come about? They seem to have been really effective for the the commercial and the guide service, the for-hire fishery.

Benny Gallaway [01:11:47] Well, as you might imagine, it was considerably, it was a controversial approach, one that met with a lot of contention. Who gets the fish? Who gets the initial permits? Who, who, how do you get a quota? And, you know, if you've been a red snapper fisherman all your life, do you have preference over getting a quota as to someone that just says, "Oh, here's an opportunity, I'm going to buy in and get a big share of the quota."

Benny Gallaway [01:12:17] So, you know, once, I don't know that I'm the right person to relive how that came about exactly. But it did. And today, like at the meeting, you know, there were several people that own a larger than what you might expect fraction, because they've, they've they purchased: you can buy and sell these quotas and they purchased more than, than say other people.

Benny Gallaway [01:12:49] But what they've done, they've also, they lease or resell those. And so it's become, I hate to say, like the stock market or something, but it's become a, a business. And people getting in may have to start off by leasing a quota from people who own it. And they're, surprisingly, they develop business models where, you know, that's another cost of the fishery and you take that into account in the price. And if you, if you can't make a living leasing at this price, you don't do it.

Benny Gallaway [01:13:29] But they seem to be working through that. I got the idea that, of course, the people that were there were people with quotas. So, how you deal with people trying to get in is another matter, but they are available for sale or lease. The degree of course is ... so far it is still America, the businessmen have the opportunities. So, so, it's become a business which seems to be effective. It's effective for management. It's effective as a business model from...

Benny Gallaway [01:14:06] You know, I'm not a snapper salesman or dealer. So, I'm really talking outside of what I know physically, for a fact, but I've been impressed from looking on the outside. It seems to be working, in my opinion, quite well.

David Todd [01:14:25] I see. Okay. Well, so, I guess the question that occurs to me is that these snapper of course don't live in a vacuum. You mentioned earlier that they had this, of course, overlap with the shrimp or perhaps with, you know, the predators that prey on them, you know, the sea bass and eels and croakers and so on. I'm curious if the attention that's been paid to red snapper management has, has changed the kind of pressure that's seen on other fish - the vermillion snapper, the red grouper and so on. Is there any kind of spillover that you see that needs to be taken into account?

Benny Gallaway [01:15:19] There is, and it's worth from my, again, opinionated view, it's been both positive and negative. Yes, there has been management approaches that have been developed because of the focus on red snapper, because, you know, if you look at it, that's the only fish we have in the western Gulf of Mexico in that category. We don't have a high diversity of fish. So learning how to manage that has made real contributions to both biological understanding of the population dynamics, as well as to management ability.

Benny Gallaway [01:15:57] On the other hand, it's potentially that other species have been ignored because of the focus, and not ignored, but there isn't the effort and the allocation of funds, etc. devoted to other species.

Benny Gallaway [01:16:14] We're sitting here, all of a sudden, off Texas, with no kingfish, no baitfish, no cobia. And these are you know, these are relative terms. And I'm not speaking as a scientist now. I'm speaking as what the fishermen are saying. But the landings reflect that they're the correct. And so we need to realize that other species are important as well. They have different life histories, different ways to manage that we need to focus on.

Benny Gallaway [01:16:57] And I, like if you look at the recreational fishing effort, it's primarily concentrated in the eastern Gulf of Mexico, as opposed to the western Gulf of Mexico. So if you're, if you're managing amberjack, you say, amberjack has really gone down terribly because they're not catching many and not many big amberjack in the eastern Gulf of Mexico. We recently did a study for the Bureau of Ocean Energy Management where we looked at not only red snapper but other reef fish like amberjack on petroleum platforms. And we did a study for the state of Louisiana looking at red snapper and other species across all habitats - artificial natural reefs and uncharacterized bottoms.

Benny Gallaway [01:17:43] And there's the western Gulf of Mexico appears very different in terms of the numbers, size, and age composition of, say, amberjack, but in the eastern Gulf of Mexico that were being managed on the eastern Gulf of Mexico data.

Benny Gallaway [01:17:59] That said, all of a sudden we had no amberjack. So we're, we're almost a step zero for many of these species. And we need to be able to pivot to addressing the data needs for these other species to the same level that we historically done with red snapper. But that requires a huge investment of time, resources, and the budgets aren't there in the agencies. So.

Benny Gallaway [01:18:34] Well, this, this discussion about the amberjack, and the snapper, make me think about just the difficulties of managing something that has very few boundaries. You know, this, you know, as far as the size of the resource, and the number of people, and where they're coming from, and the jurisdictions that are involved.

Benny Gallaway [01:19:01] Mmmhmm.

David Todd [01:19:01] And I'm wondering if you've come away from your many years of studying this - any sort of insights about how you manage a wild fishery? It just seems so different from most other businesses where, you know, there's clear lines of ownership and control, and it just doesn't seem an easy kind of thing to control and manage. Am I touching on something that's real?

Benny Gallaway [01:19:36] You're, you're talking about something that's very real. And when, until you have the understanding of what's going on, you're not going to be able to demonstrably, successfully manage any species. You have to understand things like growth, the natural mortality rate. Is this fish resident? Or, is this population have a residence component, as well as a migratory component? Is it a mixture of stocks from the South Atlantic and Gulf of Mexico, or from the Caribbean?

Benny Gallaway [01:20:13] And many of those things are totally unknown and have huge impacts on our ability to successfully manage. And we don't have the understanding that we need to be able to manage.

Benny Gallaway [01:20:27] In my view, in those situations, I tend to shut them down or reduce them, and hold them constant, to see what happens at various levels.

Benny Gallaway [01:20:39] But on the other hand, if you've got a coastal economy that's dependent on people catching those fish, you know, the biologist sometimes doesn't have a big say in how it goes. So.

Benny Gallaway [01:20:55] And we're getting better at incorporating economic and social aspects into biological management, but we're still a long way from being to a point of success.

Benny Gallaway [01:21:11] But those are going to be big issues. You've nailed what are going to be the big issues, and are emerging as big issues as we speak. I expect it's being discussed at the council meeting right now. Well, maybe I might take.

Benny Gallaway [01:21:25] Actually, they're at lunch.

David Todd [01:21:27] They're at lunch. That's right. Well, then, I should let you go.

Benny Gallaway [01:21:30] No, no, I'm not. Don't worry. I'm not curtailed by time at all. Whatever you want to ask.

David Todd [01:21:41] But I don't want to waste your time. I did want to just ask one last question..

Benny Gallaway [01:21:46] Sure.

David Todd [01:21:46] And that is sort of leading on what you mentioned earlier. That that. You know, there's a lack of knowledge about the fishery. And I'm curious what sort of things you anticipate being areas where inquiry would be, would be needed and where management might need to go in the years to come to assure the future of the red snapper.

Benny Gallaway [01:22:14] My honest opinion is that there are management approaches where we can better monitor the private recreational fishery and better control that fishery. And I think the private recreational fishermen are all for having some management. But, somehow we've got to do something, something different than what we're doing right now. And you know that, you know, as you've indicated, the IFQs were a big step away from what we've always done. I think we need to do something similar. Not IFQs, not in that regard, but we need to step away from what we've always done.

Benny Gallaway [01:22:59] And it might be something as simple as selling tags, you know, and quantifying the harvest and getting a handle on it. We need to look for innovative ways to manage the private recreational sector, is the big, is the big problem in the fishery. And of course, fingers are pointed, and blames are assigned, and people perhaps don't communicate as rationally and as dispassionately as they should. So we need to get the politics out and the science in, and the communication flowing and come up with a management strategy for the private recreational fishery, in my opinion.

David Todd [01:23:47] Well, that's really helpful. Thank you.

David Todd [01:23:52] Well, I think we're sort of coming to the close of a nice conversation. Is there anything you might want to add about red snappers in particular, or fishery conservation in general, that you've learned over the years that you might want to share?

Benny Gallaway [01:24:09] Yeah. I have a, I have a real, I have been amazed at the way the management councils and the agencies have stepped up and taken some hard decisions and are rebuilding the red snapper fishery. And they've taken it to where I never thought I would see it, already. But I just hope that they will persevere and not, and believe the indices if they ... we may be, you know, they need to really evaluate the magnitude of the landings that are being allowed.

Benny Gallaway [01:24:52] So, let's don't lose what we've gained over these past 30 or 40 years. That's my concern is that we're on the verge of doing that.

David Todd [01:25:01] Hmm. Well, I hope that the meetings at the management council are successful, and they go in the right direction.

David Todd [01:25:11] And thank you so much for your visit today. It's so interesting what you told me. And I deeply appreciate it.

Benny Gallaway [01:25:19] Well, thank you, sir.

David Todd [01:25:20] All right. Well, you have a good day, and I hope our paths cross sometime soon.

Benny Gallaway [01:25:25] I do, too. That'll be great.

David Todd [01:25:27] All right. Thank you so much.

Benny Gallaway [01:25:29] I'm signing off.

David Todd [01:25:30] Yes, you can.

Benny Gallaway [01:25:31] Thank you, sir.

David Todd [01:25:33] You bet. Thank you.