**Interviewer 1:** absolutely cool. Okay. All right. Um, so just to start, and obviously, both Sarah and I know a lot about your work, but just for the purposes of our interview, could you just give an overview of your area of expertise and your current research?

**BD037:** Sure. So I'm a fisheries ecologist, essentially studying fishery important species and how and where they interact in the environment with respect to temperature, salinity, you know, other environmental forcings, you know, tide, seasons, things like that, essentially trying to understand why fish are, where they are, and when they are, where they are things like that. So I work on a variety of species, red snapper, red drum, amberjack tripletail. Chakra hall this morning, lots of other things. But primarily, I guess the body of my work is the most of my work is focused on coastal sharks. So small coastal sharks, large coastal sharks, a little bit of pelagic shark work, but mostly coastal species. So somewhat broad. I do a lot of life history work. So age growth, reproduction, maturation, a fair bit of trophic ecology work. So dietary studies, you know, stable isotopes, DNA barcoding of stomach contents, things like that. A fair bit of movement and migration work. So either using natural tracers or more typically using telemetry, so acoustic telemetry, or satellite telemetry, and then with my position here at Mississippi State, I do a fair bit of extension work. So sharing and or translating the results of, you know, the latest scientific findings to stakeholders, as is applicable. That's, that's me in a nutshell

to a wide nutshell.

**Interviewer 1:** Okay, awesome. Thank you. So I think like, Sarah has probably told you about the project. The really high level overarching goal of the project is to understand how experts think about biodiversity and how we manage for biodiversity and US Marine resource management. And so one of the first things that we learned during this project is that the term Biodiversity means different things to different people. And obviously, it can be measured in multiple different ways. And so as a starting point, today, we are hoping to hear what you see as the key aspects of biodiversity. And what you think about when you think about biodiversity.

**BD037:** So actually, I think a bit about biodiversity with respect to the work that I do, which again, is primarily coastal shark work. So we run a shark monitoring program, right, so just a fishery independent bottom long line survey, that's been sort of the backbone of my labs work. I started that survey in May of 2006. And so like any survey, it's just a census of the population that is selected to that gear type. In this case, again, bottom long line, big old 15 circle hooks. So whenever I'm showing that gear to a class, for example, I teach a shark stingrays class in the summer, whenever I'm showing that gear type to them. It always occurs to me that we have a large species diversity here in the north central Gulf of Mexico. So I'm always quick to point out if these students were taking this class in, in New England, for example, or in Pacific Northwest, or areas like that, the species diversity would be much lower. So I would say that's kind of one of the central themes of the class is understanding and appreciating the diversity of a lot of ranks sharks, skates and rays. You know, it could be that within the course of their two week, field course, they might see 13 to 15 different species of Alaska breaks. So when I think about biodiversity, I tend to think of it from that perspective of species diversity within Alaska breaks. Now, kind of counter counter to that when I think about reef fish, because we do a fair bit of work with reef fish. I think about how the species diversity is so different here versus areas like Southwest Florida, and in exactly the opposite way. Right. So if you go to Southwest Florida, you would expect the diversity of the reef fish assemblage there to be four or five, six times what it is here in the north central Gulf of Mexico where our reef fish assemblages really dominated by a handful of snapper species. So, kind of landing the plane on that thought when I think about biodiversity, I tend to think about species level diversity with respect to our area, which for me, north central Gulf of Mexico, like Louisiana, Mississippi, Alabama.

**Interviewer 1:** Okay, great. So some of our team's previous work has generalized for key components of marine biodiversity as we're attempting to conceptualize and define biodiversity. And so I think Sara is going to put those in the chat in case it's easier for you to visualize them. But the four components are habitat forming species, species of conservation concern, harmful organisms, and key foodweb supporting species. And so we're wondering if you agree that these are the key components of marine biodiversity? And if not, how you could change it?

**BD037:** Sure, so looking at that list, and again, like understanding that my lens, you know, the easiest lens for me to look through, is with respect to sharks. So, sort of habitat forming species, I don't tend to rank that very highly just because it doesn't lend itself well, to the types of organisms I study. That's a species of conservation concern, that is always kind of, you know, front and center, when I think about sharks, and increasingly, so when we think about rays, sort of the same thing, right, that's, that's a big, a big issue for that tax up that tax on group harmful organisms, you know, a bit, you know, we tend to, again, with respect to sharks, we tend to think about human wildlife interactions. And increasingly, there's talks about, you know, human wildlife conflict with respect to sharks, and potential increases in their populations and how that adversely impacts you know, beach goers, and things like that there was an article written, published in journal, a fish biologist just a few weeks ago, that talks about an area off the coast of New York and how they're experiencing what the public perceives as an increase in shark populations, and how that has natural downstream effects, with respect to how people interact with each other in the environment. So yeah, I can certainly see that in that context. And then key food web supporting species. You know, I think a lot of this, I would say, most all the sharks I study are what I would consider Mizo predators, so kind of squarely in the middle of, you know, the middle tier of a food web. And so it's interesting to think about this species from the concept of, you know, the removal, or, you know, the increase of those species and how there's the potential, you know, arguably hard to, hard to demonstrate, but the potential for cascades there in either direction with the changes in populations of those types of animals.

**Interviewer 1:** Okay, awesome.

**BD038:** So yeah, I mean, my one sentence kind of answer to that would be, yeah, this number two, three, and four, I think are pretty applicable to the types of animals I think, number one less so.

**Interviewer 1:** Okay. Perfect. Great. Okay. So I want to shift to talk about management a little bit. So we're wondering, like I said, at the start trying to assess if and how we manage biodiversity and US Marine resource management. And so to start, I'm wondering if you think that biodiversity is currently explicitly considered in management? And if so, with what approaches or policies?

**BD037:** So my short answer would be no. And I approach that from a fisheries management standpoint, and that would have applied both to reef fishes, and to sharks, you know, of course, managed by completely different entities. But no, I mean, the bulk of the assessments, I guess, we're all of the assessments I've ever been a part of maybe 15 or so, all approach management of marine resources from a single species standpoint. And really, if I'm thinking, Yeah, I'd have to think about it for a minute. But you know, only rarely or only recently, have we started taking broader considerations into into context. So CEDAW are, you know, the southeastern data assessment, review the stock assessment process, essentially, CDR 77. I'm a part of that process right now. And that encompasses all hammerheads, and the Atlantic Ocean. So great Hammerhead scallop, Tim, or if it's smooth Hammerhead, and Carolina Hammerhead, and we have been filling out kind of report cards essentially, that look at how those animals interact with other species and the potential vulnerabilities to changes in those other populations. So that would be the first kind of attempt in my world are the assessments I'm familiar with, to really sort of consider that in a meaningful way. Yeah, I think, you know, that's, that's something that's relatively new. In my, in my experience,

**Interviewer 1:** Okay. Okay. Are there approaches or policies that you would like to see to better manage your biodiversity?

**BD037:** You know, we talk a lot about the concepts of multi species management in ecosystem approaches to fisheries and ecosystem based fishery management. And, you know, understanding that those can be at times pretty, pretty nebulous, or at best kind of difficult to define and operationalize. I think there is the opportunity through those types of platforms to encourage multi species management. For example, and, you know, even when we think about how we set quotas for things like small coastal shark populations, historically, and when I say historically, it's only been since 1993, that those have been managed at all. But at first, you know, the quotas were built for those animals around species complexes. So all small coastal sharks managed, you know, in the same management plan, and even sometimes assessed through the same car. But, you know, as I think about it, there's been a push away from that, as we learn more and more about the individual life histories of these individual species and understand that they vary a lot more than we may have previously thought. There's this move towards assessing them more individually and more specifically, and on a basin, by basin stock by stock basis. So almost counter intuitively, you could argue that the approach has moved away from a multi species or a conglomerate, you know, approach to a more single species approach. But then, if you continue along that sort of trajectory, I see the potential to add things like sharks into at least simple ecosystem based management approaches. And I think, you know, as complicated as that might be, I think there are inherent benefits for biodiversity if those plants if those plans can be implemented successfully.

**Interviewer 1:** Okay, great. That is, okay. So I know that you are very familiar with mental modeler. For this project, we're using mental modeler to understand how management impacts biodiversity and other system components. So Sarah has been just building a concept list. While you and I have been talking in the background. Do you want to go ahead and share your screen Sarah?

**Interviewer 2:** Yeah.

**Interviewer 1:** Okay. Okay, great. So do you want to run through what we have here?

**Interviewer 2:** Yeah. Um, so those gray boxes in the center are those bins that we've identified as the aspects of biodiversity, I pulled habitat forming species out because you don't think about that in your work. The orange boxes are the ways that you personally think about biodiversity. So species diversity of sharks, and then kind of regional scale diversity, which I believe is gamma. And then the blue are either current management strategies or policies. So single species management and seed are 77 that are kind of considering biodiversity that not explicitly and then you'd be FM in multi species management that might more explicitly consider biodiversity if they were implemented well.

**BD037:** Okay, awesome.

**Interviewer 2:** Um, should we make a note? So if I understood correctly within CR 77, the component that might or that starting to consider biodiversity was those report cards of species interactions? Is that right?

**BD037:** Yes, I'm not have to go back in because that was just it was, it wasn't an afterthought, but it was towards the end of the entire process. And it wasn't. Yeah, I mean it. It was a new concept. It was something I hadn't seen from the previous seminars.

**Interviewer 2:** Yeah. Okay. Very cool. Um, okay, great. So yeah, our hope for the rest of the time is just to go through and talk about how each of these components are related to one another, as I know, you know, very well. Do you have what what time do you have until to talk? Just want to make sure?

**BD037:** Oh, I've got I've got an hour, I have to make sure it's the night but so I need you to just a minute or two to remind myself I'm going to talk about but I've got I've got at least an hour.

**Interviewer 2:** Okay. Okay, great. So I'm sure I'm okay. So maybe let's talk start with species diversity of sharks. So how would an increase in that impacts the rest of these components?

**BD037:** An increase in the species diversity of sharks.

**Interviewer 2:** Yeah.

**BD037:**Okay, so that that would increase geographic scale diversity, it would increase key foodweb supporting species harmful organisms to humans. Now for the blue for the blue blue boxes, why are those a different color?

**Interviewer 2:** I just use these different colors to color code. In other interviews, we've also included like stressors, stakeholders, different things like that. So that just kind of helps people separate the concepts. It's easier for me personally.

**BD037:** So is it logical for me to be making an increase or decrease relationship between species diversity of sharks and things like single species management?

**Interviewer 2:** Yeah, however, you see that relationship working and you know, of course, it can be bi-directional or, or just one way or the other. And however you think about this, logically, we can go through and draw the relationships. So we can bounce around however you you see fit.

**BD037:** Okay. Yeah, so an increase in species diversity of sharks would make single species management of sharks more difficult. So I guess that's a negative relationship. Same with the CDR 77 report cards that would that's a negative relationship, as would the other two boxes, honestly, ABFM and multispecies.

**Interviewer 2:** Management?

**BD037:** The way I think about that, is they're just such data hungry approaches, that we're really only somewhat able to manage at this stage for the suite of species that we have.

**Interviewer 2:** Yep.

**BD037:** Okay. And then let's see. I think increasing the species diversity of sharks would in turn increase the potential for the species to be a conservation concern.

**Interviewer 2:** Okay, great. So if you can, we can also add the weights. For this project. We're just doing low, medium or high impact on the relationships, but it's not a big deal if we if we can add them. But do you see differences in the weights of these relationships that we have so far?

**BD037:** Yes. So high a high weight between in species diversity of sharks and gamma diversity, medium weights between key food webs forming species and harmful organisms

and medium weight for swell, a low weight for species of conservation concern. And I think with respect to the orange arrows like starting on the left hand side and moving on our way down, I would say have a high level of difficulty same with the CDR 77 report cards and then medium a medium strength relationship between the final two.

**Interviewer 2:** Okay perfect so maybe let's jump to gamma diversity the geographic scale concept. So if that was to increase how would that impact the rest of the system?

**BD037:** So realize see I see those relationships as being the same so if get if gamma scale diversity were to increase you know shark species diversity would increase as would the key food webs supporting species harmful organisms to humans and species of conservation concern and if we were applying weights I would apply the same weights to those I feel the same way about the final four boxes

**Interviewer 2:** the four boxes on the bottom so the same you know.

**BD037:** Negative relationships with the same strengths

**Interviewer 2:** Great Okay, so let's go to key food web supporting species. So if those were to increase how would that impact the rest of the system?

**BD037:** okay and that so that arrow for is between species diversity of sharks and key food of spraying species that can be bi-directional yep yeah, I mean that's how I would characterize that so

**Interviewer 2:** okay

**BD037:** same with geographic scale diversity don't really see a weak relationship I guess pretty key food webs supporting species and harmful organisms same with species of conservation concern so, the arrow to multi species management I see is positive with a medium weight same with ABFM and negative but only slightly negative relationship between yes, that and the final two boxes

**Interviewer 2:** Do you mind explaining the mechanisms behind those different relationships like you did for the diversity components to management? I thought that was really interesting how you were saying would make it more difficult?

**BD037:** Yeah, sure. So if there's an increase in key foodweb supporting species, I think when it comes to multi species management that if that relationship is understood, then I think that's an easier thing to mop funnel or an easier thing to capture in both a multi species model or an ecosystem based fishery model. Because, you know, if these species are key foodweb supporting species, I feel like there's an inherently better understanding of their kind of trophic ecology so that, that makes them a bit perhaps cleaner to examine in that framework, a multi species framework.

**Interviewer 2:** Gotcha.

**BD037:** With respect to you know, the more single species CDR 77, single species management, things like that, it's kind of that same concept. Whereas, you know, with an increase in the number of species, you know, there's an almost an inherent difficulty in adequately assessing those because that process takes so long and it's so kind of clunky at times. So that's why I think there's a weak but negative relationship there.

**Interviewer 2:** Okay, great, thank you okay, so I think we're done with key foodweb supporting species so if organisms harmful to humans were to increase how would that impact the system?

**BD037:** So I see weak relationships between increases in harmful organisms to humans and the top two boxes so yeah, that one and that one.

**Interviewer 2:** and then for the gray boxes is it possible for some of these boxes just to not have relationships?

**BD037:** Oh, absolutely. Yeah. So I think to finish that box for me, the other relationships I see are with multi species management, and EBS FM and there's a gosh it's a it's a weak relationship, I think again, in sort of a positive well. So this is to say if there was an increase in in a shark that was dangerous to to humans. I mean, I think that could be well captured in something like a multi species management plan or an ecosystem based fishery management plan. But I don't know if that relationship is inherently positive or negative.

**Interviewer 2:** I see what you're saying. So we can also just draw an arrow and leave it, it'll look like a question mark. But it's just neutral showing that there is a linkage, but we can't assign an assignment or a weight to it. Okay. Anything else for harmful organisms?

**BD037:** No.

**Interviewer 2:** So if we were to increase species of conservation concern, how would that impact the system? And I want to ask you for this concept. Because we've had different interpretations of it. Would you say that your preferred state of species of conservation concern is increase or decrease? How do you think about that? How are you thinking about that term as you're building out this model?

**BD037:** So when I think about, I think about something like a sandbar shark, for example, you know, classified as overfishing and experiencing overfishing in the late 2000s. And then under a harvest moratorium, but then that species starts to recover following periods of no harvest, recreational or commercial harvest. And so, you know, there's a point after which it's no longer considered a species of conservation concern. Now, on the other hand, I think about, you know, soft fish and things like that, I mean, very clearly a species of conservation concern. So, as those populations start to recover. That's the way in which I think about that. So what effect does that have on these other components?

**Interviewer 2:** Okay, so your I think, if I'm understanding what you just said, you would prefer for species of conservation for those species to increase like you, you would want sawfish population to increase?

**BD037:** Yes. I'm saying their populations are depressed. And the objective would be to increase those populations of species of conservation concern.

**Interviewer 2:** Okay, perfect. Okay. So, with that, if those were to increase, how would that impact the system?

**BD037:** Sure. So I think the first thing, I mean, white sharks were at one point a species of conservation concern. And as those populations increase, there's a direct and a negative relationship with those population increases and harm to humans. And that's, I think that's a pretty strong and negative relationship. A lot again, for the species, I think about, they tend to be you know, at least mid to upper trophic level predators. So they increases in those populations, which is a good thing has the potential to have downstream cascading effects on key foodweb supporting species but a very strong and positive relationship with gamma diversity and species diversity. And then for the for bottom boxes. That makes things like ABFM and multispecies management. A bit more of a challenge. And I say that because a lot of these species of conservation concern, we just don't know very much about their, you know, life history, because they've been protected and sampling them is difficult. So I think that relationships weak, but I think it's negative. And then, you know, I would say a slightly positive relationship to the CDR 77 box and single species management. When we do see, you know, these hammerheads are a great example.

**Interviewer 2:** Right.

**BD037:** So there's the thought that these species are of no considerable conservation concern, at least they are in other parts of the world, or they have distinct population segments that are experiencing overfishing. And so that actually increases the impetus for their single species management so that in essence, they get bumped up on the priority list of things that get assessed. Because everything's a trade off right now we'd like to assess single species every year. Of course, we know that's not possible. But, you know, given like, it's always the squeaky wheel gets the grease kind of thing.

**Interviewer 2:** Right. Okay, great. I want to just really quick before we go on, so you said if species of conservation concern were to increase, that would increase in this example with sharks, organisms harmful to humans?

**BD037:** Right.

**Interviewer 2:** Okay, so I think we need to change that same I just wanna make sure Okay, great. Alright, so now we'll finish off with the management concepts. So the if we increased multi species management approaches, how would that increase the system?

**BD037:** I think that's a positive impact ship with species of concert conservation concern positive relationship with harmful organisms to humans key food webs supporting species and both of the diversity boxes there's a strong positive relationship between multi species management ecosystem based fishery management and and really no no relationship to the well I think. I'd say basically just a neutral relationship between that and the two remaining single species boxes

**Interviewer 2:** Perfect. Okay. So then same question, but EB FM so, I, I assume that very similarly. So, you know, essentially a repeat of those same relationships and so that I'm making sure that I interpret that correctly. What I intend for that is an increase in the prevalence of ecosystem based fishery management would have a strong and positive effect on species of conservation concern, is that not appropriate?

**BD037:** Yeah.

**Interviewer 2:** And would what hypothetically increase those species?

**BD037:** Yes. Yeah. Exactly.

**Interviewer 2:** Okay. Anything else for ABFM?

**BD037:** No.

**Interviewer 2:** Okay, so then the CDR report cards if we were to have more report card and those approaches how that impacted the system?

**BD037:** I think thats good you know that increases in a positive way both EB FM and multi species management same with species of conservation concern say same with harmful harmful organisms and key food webs supporting species

**Interviewer 2:** really,

**BD037:** no, you know, no relationship to the top two boxes in orange and positive relationship to a single species management.

**Interviewer 2:** Great, okay. And then our last one is single species management.

**BD037:** stuff moving from left to right or moving clockwise I guess positive

**Interviewer 2:** strong relationship to species diversity, geographic scale diversity good we have supporting species no relationship to harmful organisms well?

**BD037:** Yeah, no relationship increases in single species management or positively impact increase species of conservation concern. And let's see positive relationships between the three other management options. And in essence, the more you know, the more in depth information we have for single species assessments, the better that those can then be incorporated into more complex management options. Is that everything you need?

**Interviewer 2:** Yeah, yeah, that's all. Okay. So since we still have a few minutes, I wanted to ask if there are specific ecosystem services that are related to the system, or stakeholders that are affected by the system. And it's okay if we don't have time to draw all the relationships between those additional concepts. But I would love to get your thoughts on that.

**BD037:** Yeah. I think what I've spent a lot of time thinking about recently is how increases in species of conservation concern have negative impacts or at the potential for negative impacts on stakeholders in the fisheries setting, and it gets back to the idea of a human wildlife conflict. And I can I can see that relationship pretty clearly.

**Interviewer 2:** Do you think it would be I know, we have harmful organisms to humans but worthwhile to add in human wildlife conflict as a separate concept? Just conceptually, or is that too redundant?

**BD037:** No, I don't think it's too too productive. Well yeah, I guess it actually yeah, I think it is.

And so you're just to remind myself of the question, the question is, what other stakeholder groups are impacted by these boxes?

**Interviewer 2:** Yep. Exactly. Within the context of your study system, of course, as we've been talking about it

**BD037:** where was this guy when I needed them the other day? Hey, I have a few choice words for him. Let's see.

**Interviewer 2:** You can take that call if you need to. Also. Breath or not okay.

**BD037:** Josie, I'll fill you in after great so I guess the other group I'd think about it stakeholders, you know, inherent in this system our resource manager, there's you know, no fisheries you know stock assessment scientists and things like that

**Interviewer 2:** but the question then is how would something like I don't know how to quantify that sort of relationship though?

**BD037:** Yeah, it's okay if they don't directly impact certain components or if it's indirect or

Yeah, however you see it

**Interviewer 2:** I guess I should probably clarify when I say fishing stakeholders you know, I think there's a pretty big difference between recreational fishing stakeholders and charter fishing stakeholders and commercial fishermen and so I would probably I'd probably separate those out into different groups

**BD037:** I think diversity however you think about it is beneficial to all all three of those groups in the same way. But I think you know there's a positive relationship kind of as recreation as species of conservation concern are increased I think that there's a positive benefit to recreational fishermen but less so for charter for hire and even less so than that for commercial.

Actually, I think those are negative relationships between those final two Yeah, commercial so weakly negative for charter for higher and more strongly negative for commercial

it's essentially this concept that, I mean, think about marine turtles, you know, as their populations recover, you know, that creates additional frustrations for commercial fishermen to interact with those types of animals. And it's always or it seems to me to always be the case that that increase is realized faster on the water than it is through the models and through you know, management plans. So those stakeholders are sort of forced to deal with those scenarios before the fishery management managers are whereas for our recreation, a private recreational fishermen there's you know, there's really no downside to see more turtles for talking about in the same area The same applies for sharks really.

**Interviewer 2:** Yeah, I was gonna say it's the depredation conversation we've been having.

And it's not I'm not trying to beat a dead horse but I have I mean, that is where a lot of my thoughts go.

**BD037:** Okay.

**Interviewer 2:** is there anything else should we go back quickly to the to the resource managers, is there anything that those managers are connected to in this system either for the diversity or for the management boxes or for and stakeholders?

**BD037:** now I probably just say that out I mean, more think about I just don't know how to how to how to think about those relationships.

**Interviewer 2:** Okay. Okay, that sounds good. Okay, maybe for the sake of time, so I'm about five minutes left. I'll stop there, unless there's anything else that you see that you want to add?

**BD037:** No, I'm just wondering how I mean, I just want to actually make sense of this.

**Interviewer 2:** It's a great question. Yeah. So what we're using these initial interviews for so we've been interviewing folks like yourself, researchers, some practitioners know, folks, and then some regional managers. For our case studies, we have two other case studies, along with the northern Gulf of Mexico. One is Chesapeake Bay, and the other is Salish Sea. So we're trying to use to distill down the results from these models and these interviews into a base model, which I think will end up maybe being more of a conceptual model to be honest and less of quantitative FCM to understand more of these high level issues of how to frame biodiversity and define and conceptualize it for a potential decision making framework. And then we're going to use that framework in our workshop to understand more localized issues with specific species of interest, whether or not that's a fisheries, target species, or oysters for aquaculture, or living shorelines. And see if this framework can be distilled down into a more specific context dependent scenario in these case studies, and then use that as a feedback loop back up to refine the the generalizable framework for larger spatial scales for bigger picture management, decision making frameworks.

**BD037:** Okay. Okay, that's interesting.

**Interviewer 2:** So you're, you're able to come to the workshop and a few weeks. All right, so you'll, you'll see how it goes, then.

**BD037:** Yeah, no, I'm excited about that. That sounds really good. Really good.

**Interviewer 2:** Yeah, I'm excited as well, to have you there. I think that that will be really helpful. Are there key issues in the northern Gulf of Mexico right now that you think are relevant to this project and important for us to maybe hone in on during the workshop?

**BD037:** I mean, again, you know, I, I spent so much time thinking about shark depredation. And that really is the result of an increase in species abundance. But, you know. Yeah, really, more in species have been it's it's not as the biodiversity has really changed that much. But, yeah, it's a pretty it's a pretty topical issue amongst fishermen. So it depends on the audience that, you know, you're, you're around, but fishermen talk a lot about that. And I guess, with respect to protecting species, as well, like with dolphins, I mean, it's the same sort of negative interactions that are really plaguing fishermen. And so it pits like, It pits, these two groups of stakeholders, you know, in sort of opposite corners, like there's people that desire disease protected species continue to be protected, and then populations recover fully. But then it's almost as if well, the very, you know, true fishermen don't have a desire to see that because it adversely impacts their experiences on the water. Right. And, you know, like, like, anything, the devil is somewhere in the details, but I think, I think it's or not, I think it's definitely a topical issue in the northern Gulf.

**Interviewer 1:** Okay. Okay. Yeah, that's great. Yeah, as Steven has said, similar things. And that's where Sarah is doing some interviews with tourism operators as well. And so we're hoping to have representation from the tourism industry and the fishing industry to talk about just that. That's a good idea. We'll see how it goes. The cool thing about using mental models, as you know is you can run those scenarios simulations to look at trade offs. So the goal is for the second day, we'll build the model on day one, and for the second day, we'll use the scenarios to look at how different management interventions would impact these different stakeholders under ways?

**BD037:** No, yeah, no, I had, you know, I had aspirations to try the same sort of thing and a workshop we had a year or so ago. I just don't know enough about the program to really, truly do that. But I can see that potential, like I see the utility of it. I'd really like to see it in action, that would be really good. I think I mentioned this era, you know, he's these Australian guys that deal with this same issue. have proposed and subsequently had funded this series of workshops to address depredation in Australia. And they've, you know, they've invited me to attend those workshops as someone that knows how to use mental modeler and they're sadly mistaken, because I don't I mean, I'm familiar with it, but so I'm hoping I need to, I need to either brush up on my techniques, or just find someone that will travel with me that can actually do all the things as the people are talking to.

**Interviewer 1:** Sarah, I hear you, Marcus, I hear you have too much on your plate, Sarah.

I do so but I'm not gonna pass up a trip to Australia. Right.

**Interviewer 1:** All right, well, I'll let you go. But thank you so much for taking the time today. We really appreciate it and look forward to seeing you in a few weeks.

**BD037:** Yeah, likewise, me too. So sorry about the about missing my time.

**Interviewer 1:** No worries. No worries at all. No worries. All right. Okay. See you guys. Thank

you.

**BD037:** Bye. Bye.

**Interviewer 1:** Thanks, Mark.