Speaker 1: Okay, yeah so like i started to mention in the email, the really high level overarching goal of the project is to understand if and how we’re managing for coastal and marine biodiversity in US marine resource management. It’s a really big research question. So we have a case study approach. It’s a three-year project, and we’re in the last year of the project right now. So the first case study was Northern Gulf of Mexico slash Mobile Bay, Alabama. So thats where Sarah is at the University of South Alabama and one of our PIs, Stephen Scyphers. Second case study was Chesapeake Bay. Where I live in Annapolis, Maryland Smithsonian Environmental Research Center. The third is Puget Sound. And so initially we’d fill Levin on our team, but then when he left for the White House, he’s no longer on our team So that’s why Sarah and have been here for two weeks kind of having these meetings doing some on-the-ground scoping and having meetings to get away with the land.

BD088: supposed to be here a Puget Sound Partner?

Speaker 1: Yes, exactly. Yeah so we wanted we wanted three case studies one logistically that we like had team members at but then also we were hoping to find three regions that had somewhat similar social ecological dynamics but We’re looking for opportunities to look at commonalities and differences across three regions. So that’s why we kind of landed on those three.

BD088: Okay.

Speaker 1: Bays sounds

BD088: Yeah. i’m guessing there's probably like shellfish and all I can try to think of some similarities right now.

Speaker 1: Yeah. Exactly. Yeah. Yeah. And so for each of these case studies, Sarah and I have been doing individual meetings like this and interviews with community members. And we’re talking to a wide variety of community members, resource users. So oyster farmers is one group we’ve talked with at every region. And charter fishermen, to a lesser extent commercial fishermen, it’s been more recreational focused. And then waterfront homeowners, so like living shorelines comes up a lot. And ecotourism operators and then tribal community members and managers has been much bigger here. Yeah, and so like thinking about commonalities and differences like tourism, like that exists in each of the three regions, but it’s different type of tourism. So we’ve been speaking we’ve met with dive instructor whale watching naturalists here, but then less of a theme in our other regions. Yeah. And so in those meetings with community members, our goal is to understand what local aspects of coastal and marine biodiversity those community members value and rely on for different services. And then we’re meeting with resource managers to understand if and how they think about biodiversity when they’re making decisions and then understand if those two things align. If managers are thinking about the components of biodiversity that community members value. And so then we’re running a workshop in each of those three regions where we bring all of those groups together and look at trade-offs of different management approaches to understand how we can better balance access to biodiversity with conversation of biodiversity.

BD088: And your workshop here is late October to the right?

Speaker 1: Yeah, yeah.

BD088: Can you just tell me what, when you sort of are, you know… Determining or exposing them to trade-offs how you do that is that sort of like through a presentation?

Speaker 1: Yeah, so we’re using are you familiar with a mental modeler?

BD088: I mean I saw yeah a little bit and I the link that you

Speaker 1: Yeah, yeah, yeah, yeah, so that’s the tool that we’re using so we’re drawing conceptual models I’m using as like a collaborative participatory modeling tool in the workshop and so we do that on day one with the community members and then Sarah and I like rapid-fire build a community model from the discussions day one that evening and then day two we present it back to them to validate it and then we use it to run some scenario simulations where you can look at if we were hypothetically pull one lever in the system what components would impact how to impact biodiversity and then how would that potentially you know then indirectly impact the ecosystem services that community members receive from that biodiversity.

BD088: Okay yeah sounds good,

Speaker 1: Yeah so yeah so to start to kind of take a step back but within that framing we’d love to learn more about your research and your area of expertise.

BD088: Okay well similar to Matt McPherson, I trained as an anthropologist. I did a year of field work with a small-scale island community between Australia and Papua New Guinea. So like a thousand people that were dependent on fishing for commercially and also but you know traditionally in you know sort of indigenous practices it was very much part of their life there’s a lot of subsistence fishing ect. I stayed there for one year focused on one community of thousand people and then I got this job where they like tell us about fishing communities on the west coast

Speaker 1: yeah

BD088: all 250 of them with like places like LA with two different areas of commercial fishing. So it’s totally different. To me it’s more like a kind of geography or sociology and just like the, know, traditional methods for anthropology where you focus on one place and you do deep hanging out isn’t as available and it’s kind of working. But anyway, so I’ve shifted gears a little bit, a little bit more quantitative ina lto of what I do. But essentially, the social scientists who aren’t economists at the National Marine Fisheries Service were hired over the years to help do research that supports the agency in addressing national standard eight as part of the Marine, or short of the Magnusin-Steven. So it’s like what do we mean by fishing community? How do we describe and measure impacts on them from changes in ocean conditions or changes in management? So that’s kind of the, yeah, that’s been the nature of work ever since I got hired. Obviously we’re kind of big picture thinkers. We’re like, you know, things like, like my colleague Suzanne, also is a social scientist has done research on the whale watching industry. It’s sound because, you know that’s a big part of it. Partly she’s responding to the Marine Animal Protection Act and the sort of Dangerous Species Act with those southern resident killer whales. So, you know, we kind of sometimes think beyond national standard eight and think about other mandates that no one needs to respond to. So, yeah. Like I’ve done some stuff on… human and community well-being, how could we measure that? What are the indicators? And that’s kind of bigger than just, you know, national standard age, or like what are the fishing impacts, but like, kind of getting more to what you guys are interested in. Like, what, you know, what kind of is the available biodiversity and how does that help people’s well-being?

Speaker 1: Yeah, okay. Okay, yeah, we’ll definitely want to circle back to that. Okay, yeah, so to start, one of the things that we have learned early on in this project is that the term biodiversity itself means different things to different people and of course can be defined in many different ways. And so we are wondering to start what you think about when you think about biodiversity and how you think about biodiversity and how it relates to your research?

BD088: So one of the broad domains of when we’re thinking about indicators of human well-being, individual or community level, we started with kind of the large, and work our way down to more narrow little measures, right? So one big category, domain was resource access. So, and that could mean you’re a commercial fisher and you have access through permits or whatever it takes or availability of the resource that is critical to your income and livelihood. But it could also mean do you have actress to, you know, sort of the aesthetic values that… benefit you when you take a stroll along the shoreline or all the birds there or the things you’re used to seeing on the beach on the shorefront. And so that was kind of, when we did that work, was, like I said, we thought, really big picture about what well-being meant, but also what the resources were. They weren’t just sort of the commercially important ones. So that’s where I guess the diversity comes in.

Speaker 1: I see what saying. So it’s not, itt was not just about commercial harvest, the

BD088: Yeah, it wasn’t just about harvest. I mean, resource access, some of the measures that we eventually developed in that big, bigger domain were about like what you could harvest and so on, but some of them were just about, do you have access to these natural resources, some of which are living marine species that are important to your well-being?

Speaker 1: Yep, okay.

BD088: Obviously like for example if the shoreline is all private and you can’t access it and you can’t see the shorebirds or whatever it is that benefits you then.

Speaker 1: Okay. So in that work, did you get it all into what components within biodiversity related to human well-being and were important for the community?

BD088: I mean, I can refer you to some of the papers that are being published. Actually, Phil was part of that. There was a big working group called the Social Well-being and Mareine Management working

Speaker 1: interesting

BD088: And there were, think, three or four, maybe five even papers that came out of that.

Speaker 1: Okay.

BD088: One of which was called operationalizing human well-being for… Anyway, but I can refer you guys to those papers.

Speaker 1: that’d be great.

BD088: I would say that biodiversity wasn’t like a central topic in them. We were more concerned with how do we define or measure well-being vis-a-vis… Marine management and even more broadly ecosystem management, not even necessarily marine.

Speaker 1: Gotcha

BD088: Okay. It was aimed at informing the big integrated ecosystem assessment work that was developing with the agency.

Speaker 1: Yep

BD088: know, biodiversity, guess, was in there more implicitly and less explicitly. But i can definitely send you those papers. They’re now like, I to say like eight years old or six, seven years old. That was like a while back.

Speaker 1: Okay. Great. Okay. So one of the things that, we did early on this project when we kind of discovered that the term biodiversity means different things to different people is we generalized four key components of marine and coastal biodiversity to help frame how to define it and how to conceptualize it potentially for some sort of decision support framework in the future. And so I’m wondering if you agree with the framework that I’m going to run through and if these are components that you think about in your research maybe when you were just talking about that human well-being work. I know you said biodiversity was important not explicit, maybe if these are things that came up in that well-being framework or that other previous research. So I can run through the four bins and then maybe circle back to each of them but it’s habitat forming species, key food web supporting species, species of conservation concern, and harmful organisms. So does that framework resonate with you? Has that come up in that well-being work or in any of other research?

BD088: I mean, just like at the outset, I would say that framework sounds pretty good. You talk to fishermen and they’re often like, or especially shellfish growers. You know, they’re concerned about, crabs or other things are invasive like that was kind of your harmful category right

Speaker 1: yeah

BD088: that comes up a lot as a useful category in those kind of discussions and then was the other one species of conservation concern I mean yeah that comes up too with things like whale enlightenments with commercial fishermen because it’s a concern there’s a lot of regulation around it which affects how we do our how our livelihoods happen

Speaker 1: yeah key food web supporting species this one

BD088: Yeah, think, I guess like I might, I’m not really necessarily thinking about that human well-being effort, but more just in general, like what kind of field research we do or when we talk to people. I would say that the key food web one I find and counter more often amongst my research colleagues who are concerned with food webs, unless so with like say fishermen or other members of the public that we work with.

Speaker 1: Okay.

BD088: And then the fourth one, what was that?

Speaker 1: Habitat forming species.

BD088: Habitat forming, yeah. Yeah, again, I would just say that’s probably more of an inside specialist category. I mean, not to say they’re not important.

Speaker 1: yeah, yeah, yeah. OK, yeah. Know. OK. But you’re saying the harmful organisms and species of conservation concern. Resonate more, it seems, from your perspective, with the fishermen or the community members that they come up more often.

BD088: I think those categories would make, I mean, I’m just, I’m speculating a little but, but like, if you presented those categories to the community members, which I’m assuming you’re maybe going to do in October, like if someone was a commercial fisherman, they’d be like, yeah, the species of concern, like that’s, you know, we couldn’t, get, you know, what’s it called? The constraining species when we trawl harvest fish, you know, it’s like, Words that I use all the time are something that’s good.

Speaker 1: Yeah, I get it.

BD088: Bycatch.

Speaker 1: yeah, yeah, yeah, yeah. Gotcha, gotcha, gotcha, gotcha.

BD088: So yeah, that would definitely like when they talk about bycatch, that’s kind of what they’re talking about. First pieces of…

Speaker 1: Sorry, what’s bin, you think?

BD088: The conservation concern.

Speaker 1: Gotcha, okay, yeah.

BD088: The other one is like you would think more about the invasive species like a lot of fish, or just species that are filling their nets like those pyrosomes with, know, there was some concern about whether like marine hate waves were leading them to suddenly being really abundant, like why are our nets filled with these pink weird… things that are important to us. So just I’m saying those two categories probably resonate.

Speaker 1: Gotcha. That makes sense. Okay, Great. So then We’ve been talking about well-being. One of the other things that we’re interested in is what ecosystem services community members receive from these components of biodiversity. So aside from well-being, or we can talk more about that as well, but what ecosystem services from your work have you seen that community members receive or value from these components of biodiversity?

BD088: I know the ecosystem services is really important sort of framing for research and stuff, I’m just, I’m trying to, I gues I’m putting myself in like the shoes of commercial fishermen, which is a lot of people that I, or where my focus is supposed to be. And, It’s often a hard concept for them to get their head around. Ecosystem services, you know, it seems a little fuzzy. So yeah, I’m trying to think of like a good example of how someone might say, this is a value to me, but that the biodiversity generates an ecosystem service that helps me in my life. You know, may not find that. Good sort of places to latch on with commercial fisher and you might find it more with the some of the other community members you guys are talking to. Yeah, recreational interaction with the marine environment or something. I obviously, yeah, I mean, I think if you talk to a fisherman, like things like food web, where they had like the species that they catch have prey that kind of make them abundant. That would be a service, I guess. Right.

Speaker 1: Okay. Thanks.

BD088: But yeah, obviously divers, would imagine, recreational divers, that service that kind of emotional recreational value of something that’s really important in their lives is provided by the biodiversity they encounter when they’re out there, right? They’re not seeing that octopi or whatever that would be really cool to them. I would say with tribal communities for sure, you know, having salmon runs is crucial to their very identity, right? So that’s definitely, that’s a place where biodiversity provides. I mean, it’s almost kind of diminishing it to call it an ecosystem service, right? It’s like far bigger and deeper than that even really. But not just salmon. Like if you guys go out to Nea Bay, I don’t know. Are you traveling around the area at all?

Speaker 1: We are in Nea Bay. Have we been that? Have we been all over?

Speaker 2: Is that near Padilla Bay?

BD088: No, it’s way out. It’s like basically the far northwestern tip of washington.

Speaker 1: no. We’re trying to constrain within like Puget Sound. Although we know that also is like…

BD088: Yeah, this is where the Strait of Juan de Fuca meets the coast.

Speaker 1: Yeah, okay.

BD088: But I’m sure other tribal communities in the Sound would say things similar. Like it’s not just salmon. It’s like we have all kinds of species that we harvest and have uses for that are part of traditions that cannot be easily abandoned or certainly you want to abandon them. So yeah, definitely like tribal communities.

Speaker 1: Okay.

BD088: so I should, yeah, I should say like there’s a lot of tribal members that are also commercial fishermen. And so, you know, I should have like thought about that for a minute when I was first asking you the question.

Speaker 1: No, that’s helpful. And it’s funny. I was going to ask about, you know, what are the key stakeholders in the system or rights holders and who are affected. I think you just kind of answered that question to the answers. That’s great. Okay. Are there any stressors that are currently impacting? Biodiversity and how does that relate to the stakeholders that we’ve been talking about.

BD088: You know what? I’m not a natural scientist, so I just learned from my colleagues, like Jamil or something, but yeah, clearly there are stressors on biodiversity. Question acidification, or sorry.

Speaker 1: No, I was just gonna ask about like, we’re thinking about going back to the list of stakeholders that we were just talking about. Like, from your work with commercial fishermen, are there specific stressors that like they talk about that you’re hearing about that are impacting their livelihoods or, you know, the biodiversity they rely on, the different species they rely on?

BD088: Sure, I mean, one that was the harmful algal blooms. There’s some debate about whether those are generated by marine heat waves, but there was a massive marine heat wave in 2015, 2016 that was associated with a major harmful algal bloom that really impacted the crab, dungeness crab fishery, which was like the big, most lucrative. I should say something else, though. I often am focused on the outer coast.

Speaker 1: You read my mind. I was just going to ask you about that.

BD088: Because, partly because like, as a federal agency we’re often dealing with those federal waters and so Puget Sound but anyway a lot of these things do apply in the Puget Sound as well because people get crab you know fish for crab in the Puget Sound and so on but I don’t know I don’t remember how the harmful algal bloom impacted people within the sound

Speaker 1: yeah yeah okay

BD088: but anyway a lot of these same things they do apply in the sound too like ocean you know more acidic waters and hypoxia events and hood canal okay, these are all stressors and there’s stressors that That yeah tribal members commercial fishermen in the sound.

Speaker 1: Yeah

BD088: shellfish growers are all all gonna identify

Speaker 1: yeah

BD088: biodiversity

Speaker 1: Okay, so you’re saying habs will impact these fishermen in these groups in the Puget Sound, but you like that example of the marine heat wave, like you’re not sure that specific example.

BD088: Yeah, that was like a West coast thing. What it did in the sound, I’m not sure about, definitely like fishermen in California and Oregon and to a extent, Washington were really impacted and not just fish, actually not just fishermen, like some of those communities where they would have traditional for them to have crab and stuff in the holidays and not having access to like those kinds of, you Not even like on a tribal level, but just like local traditions.

Speaker 1: yeah, Yep. yeah, we’ve been talking about this because we haven’t had, we’ve talked with a few charter and rec fishermen. We’ve had a hard time connecting with commercial fishermen. Well you like assuming Sarah and I are really naive about this because we aren’t ignorant. Like what is the lay of the land of commercial fishing, non-tribal in the Puget Sound? Cause we’ve gotten, we’ve also met with some tribal marine resource managers. So I think we have a pretty good understanding of that at this point, but it’s been harder to like lay of the land of non-tribal commercial fishermen.

BD088: There definitely are non-tribal commercial publishers that fish in the sound. There are a lot of reasons. Think there’s a little bit more money to be made out on the coast. The sound is kind of a little … and market there are local fishermen who catch stuff and sell it directly. I think usually people are really serious about commercial fishing or it’s their main source of income. They might do some in the Sound and some out on the coast or they might do some in the Sound and then some up in Alaska.

Speaker 1: Okay, yeah, we’ve been hearing like a lot about folks going up to Alaska. What, like the folks that are fishing in the Sound, what are the key species that like are mostly commercially fished nowaday?

BD088: Yeah, I think there’s some salmon, some rockfish. I think there’s some crab, although I don’t know, I feel like when people do, I mean… The sound is just not as familiar. I’m sorry.

Speaker 1: No, no, that’s okay. No, it’s okay I do think when people get done just crabbing the sound it’s often like

BD088: like you and I could go get a permit I like eat a lot of it, but then wonder if there’s commercial activity

Speaker 1: Okay, okay So then to kind of move on to our larger question that I started with about if and ha=ow we’re managing for biodiversity in US marine resource management. From your perspective and your research, are thee aspects of biodiversity that we’ve been talking about, are they currently considered in US marine resource management? And what approaches do you think are needed in the future to better manage for biodiversity?

BD088: I mean, I think in the council system, definitely like they are concerned with the diversity of species because of things like, you know, constraining species, right? Like if there aren’t enough of, you know, rockfish X and they are getting pulled up in nets when you’re targeting rockfish Y, then it’s the managers are, you know, trying to deal with that for sure. SO basically the bycatch problem.

Speaker 1: Yeah

BD088: was gonna say though, Puget Sound thing, there are people that know better than me here at the center who can tell you the total state of commercial fishing, so you definitely shouldn’t take my word for it. Yeah, so.

Speaker 1: Okay. Yeah. Okay.

BD088: And there’s also something called the Puget Sound Partnership.

Speaker 1: Yeah, we’ve met with some folks from there. They’re really helpful.

BD088: They would probably know,

Speaker 1: yeah. Yeah, okay, cool. Okay, yeah. And then are there management approaches that you think are needed to better manage for biodiversity and specifically within, you know, your framing as an anthropologist, are there management approaches that you think would help with the delivery of ecosystem services or these other, these other values?

BD088: I think like, I mean, maybe Jamil talked to you about this, but there has been this tendency to think about single species management and definitely like if you’re concerned with ecosystem services or biodiversity that just seems like it’s a little bit too limiting. So the move toward ecosystem-based management approaches, developing those, the move toward multi-species management probably would, to me, seem like, would be likely to produce better outcomes in terms of thinking about biodiversity. So those things I think are helpful. There’s still, there’s a big push for them, but they’re not really, you know, they’re still kind of in their infancy, I guess, in terms of actually being implemented in the management world. I also think like, this, this, the whole ism, guess, holistic perspectives that are required of thinking about things like ecosystem services and biodiversity. They’re not always amenable to like, like the fish Pacific, Pacific fishery management council, right? Like, they’re just really focused on fishing, you know, commercial to some degree. And these, you, you know, you kind of. There’s these interrelated parts of the system, on the social side the biological side. It’s not like they always have the sort of on ramps to bring those in.

Speaker 1: Yeah. Yeah. gotcha.

BD088: And sometimes they’ll say, like, when we presented our human well-being work to them, they’re like, well, we don’t really have levers to help human health in a community. Then you can come back and say, for some communities, like having access to their local seafoods is a really strong sort of indicator of health or whatever. But one of these other things that we’ve included aren’t related to something that the managers have a lever. So the kind of levers that are available are definitely sort of more important. Like, yeah, just thinking about kind of biodiversity. It’s like they can set a harvest control rule.

Speaker 1: yeah, right.

BD088: The suite of species that are connected to that, gets little tricker.

Speaker 1: Right, right. Okay, so before you were mentioning like. For your indicators of human wellbeing, you were mentioning access, scenery, you just mentioned human health. WHat are some of the other indicators that came out of that framework?

BD088: I’ll send you the paper.

Speaker 1: Yeah. Yeah. That’d be great.

BD088: the table of all the domains and see about I’ll set it to you.

Speaker 1: Okay. Yeah, sounds good. Thank you. Okay. Cool.

BD088: There was one called self-determination, which is about governance structures. And it relates to management, like your question. Like if you don’t feel like you socially some ability to… Self you know like social travel community have some level of self-determination or any really or you don’t have like a way to influence governance structure then your well-being might suffer and that you know could be specific to fisheries and yeah, was things that are involved in managing for biological creatures and biodiversity

Speaker 1: right, right, okay,

BD088: I your question though about like bringing these things into management like I’m always here work for the fisheries service and I guess you soon will also, right? Like it’s always like often the client of the research is the council system which is like the thing that manages commercial and wreck fishing but you know for biodiversity management in the marine environment there are these other players. So it’s hard for me to answer thinking about those other players like the state or the… you know local communities or trying to think I mean like tribal governments they have their own know agendas and so on so

Speaker 1: yeah yeah

BD088: so it’s so I can’t really answer for all those

Speaker 1: no yeah yeah yeah okay okay great I think those were all of my questions. Sarah, did I forget anything?

Speaker 2: No.

Speaker 1: Do you want to share what you’ve been working on?

Speaker 2: Sure. Yeah. are you familiar with mental modeling or fuzzy kind of thing?

BD088: I mean a little bit. Yeah, a little bit. I haven’t used it myself.

Speaker 1: We started talking about when you were in the bathroom.

BD088: I mean, I looked quickly at the link you sent the emails.

Speaker 2: So yeah, while you’ve been talking with Kelsey, I’ve made, a mental model of how you view the system as it relates to biodiversity.

BD088: Wow. Scary.

Speaker 2: Yeah, I just want to talk through a few things. So to orient you, a blue arrow indicates an increase or positive effect. Resource access or scenery improves human well-being. Orange is the opposite. So hypoxia and OA decrease or have a negative effect on biodiversity. So this top area is this human well-being work that you had worked on previously. And then things that influenced biodiversity so commercially and aesthetically important species as they relate to human well-being and then biodiversity in general increases recreational importance like diving and tribal importance for like salmon runs and other traditional things and then we started talking about the commercial fishing industry and some species species are beneficial to that But then by catch restrictions as a result of like whales and the council process considering a single species management and the negative effect here One thing I wanted to ask You mentioned these pie pie resounds. Is that how that spell

BD088: I think it’s this I think it’s PYAA. PYROSOMES a free-floating colonial tunic. But they were just popping up like crazy. Don’t know about the sound again. That’s kind of outer coast.

Speaker 2: Okay. So does this just to validate with you, does this make sense? Are there connections you think might be missing here?

BD088: No, it’s pretty cool that you can do that while I’m talking. Thought seem clear

Speaker 2: I’m glad you think it seems clear.

BD088: Turned gibberish into like, an amazing monologue. I will say though that like I should forward to those papers because there’s definitely a lot more that could be added. Maybe like look at those. Yeah, in terms of like conversation we’ve had, this is a nice model of it.

Speaker 2: And this is yeah, simply your view of the system, like physical representation of what’s in your head. So yeah, there might, you mentioned there might be limitations just because you're not that familiar with the system. And so that’s just reflected here, which is why we’re talking to a bunch of different people. To try to get a really holistic view of the Puget Sound ecosystem.

BD088: Yeah. And does this stand for a single species fishery management?

Speaker 2: Yeah, that’s single species fisheries management, Pacific Fishery Management Council. Ecosystem-based management.

BD088: I will say things like, no, you said whales are… Blue line, right, so by bycatch restrictions, you’re saying would be beneficial to whales, like to prevent them getting caught along with.

Speaker 2: Yeah, this. Under species of conservation concern, you brought up fishermen are concerned. They think about whales in terms of bycatch restrictions. I guess it would be implied that this would help. Maybe that’s not true.

BD088: I mean, that is one thing to think about is that like the direction of whether for lack of saying it in a more complicated way, like a simplified version, like whether some biodiversity is good or bad. There’s, are commercial questions that will tell you like, if all the sea lions were gone, i’d be glad because I wouldn’t have to compete with them for salmon. So we’re like whales, right? Like, but then of course, for a of people, whales are, tribal communities, have cultural significance, even just for non-tribal people, they’re like, we love wayholes. Anyway, it’s kind of where you’re coming from. You guys already know all this. Thi is gonna depend on, it’s gonna affect how you view biodiversity.

Speaker 1: what about, sorry, I… was typing up some other notes, but is there any space there to connect the ones that aren’t connected like the green crabs and shellfish to the rest of the model? Like does shellfish connect to any of there other system components from your perspective that we have, for example?

BD088: Yeah, mean shellfish. So actually that is a good example. Like shellfish growers, you know, the availability of shellfish is obviously really essential to their livelihood, but also even the diversity of shellfish. There’s some evidence maybe that Some native species of shellfish are more resistant to OA and so You know, I forget what the growers and this is definitely Puget Sound stuff. The growers right now tend to emphasize I think it’s a Pacific oyster. No, I think they’re big.

Speaker 1: Olympia?

BD088: Yeah, so I think Olympia are native. Anyway, the point is that is the introduced. Yeah, introduced. Yeah, so But anyway, there’s some suggestion that like having the diversity of native species could benefit them if they could switch, if they need to switch in future because of ocean, because of acidic condition, know, like, so in other words, I mean, not all growers are sold on that right now, but there is some work being done that suggest like that could be beneficial to them, that biodiversity among shellfish. Gives them other options. I guess you could say the same thing for commercial fishers, right? If one species, like if maybe you guys talked to Jameel, if one species disappears from the sound that was commercially valuable, but another one is still there and could be harvested commercially, then that is, it’s like a substitution that they could maybe have. So that is one way that I think you could get a lot of people to talk about the value of biodiversity. Even the people who on the hardest side of species verses the… Cause yeah, a lot of Jamil’s work has been focused on like know, outer coast stuff where ground fish species are moving away from nutritional fishing areas. Definitely like the sound because it’s contained like if it’s more acidic or it’s warmer or whatever, then some other species might be able to. Tribal community in San Jose know we want them all here

Speaker 1: right yeah

BD088: as they’ve been from time immemorial But I guess that is there’s an overlap right where it’s like the biodiversity in some ways is like an option value for commercial harvesters and it’s a part of suite of what’s important for travel communities have always known the rain environment in a diverse way.

Speaker 2: And we heard that in the Chesapeake too. Like some managers were talking about Okay, well maybe there’s functional redundancy here. So the system changes. Then maybe it’s okay because all the roles are still being played. And then we had some tribal representation there and they said, no, it doesn’t matter how much is there or what species are there. Everything has to be conserved because this is the way that the system was. So we have to keep it the sweat.

BD088: Yeah, no, mean, tribal members, like there was once a discussion around like, is the rule? Salmon like is it like if salmon weren’t here what would be the just like what is the dollar value of salmon a lot of tribal members were like we’re not gonna put a number on that the expected result is you’re just gonna be like here’s million dollars for us to not try to deal with dam issues or anything else.

Speaker 1: What about sarah adding in, I just like really like that term you just used that we haven’t heard before of option value versus cultural value and the importance of biodiversity for that and how it relates to commercial versus tribal. I think that would be really cool to represent. Then biodiversity increases option value. Increase option values, yeah, yeah, exactly,

BD088: We have a paper right now in review on this shellfish. It’s an internal review, but it’s not the whole shellfish issue around. It’s a survey of a bunch of growers asking them about. Sort of introduction or the use of native species that are more resilient to OA and how they feel about that and stuff so.

Speaker 1: Yeah, do you have like resilience to stressors in there as well?

Speaker 2: No, it’s reflected in genetic diversity.

Speaker 1: Yeah, because you were talking about like native versus invasive and like having more biodiversity increases resilience and that could be good. And then like how resilience distressors then is important for commercial, but less so right for tribal because it’ more like the commercial it’s like they can, the biodiversity helps them have that option. But the

BD088: But yeah, for tribal there, it’s not about option value, it’s like an interconnected system that is culturally significant

BD088: Right. That’s really cool. We haven’t gotten, we’ve heard that stuff before, but it’s more concise framing on it than we’ve gotten before, so it’s cool to have that in there. I you think about it, it’s obvious, right? If you’re a commercial fisherman and you catch x, you get money and you stakes. For tribal communities, it’s like, we harvest, There’s

Speaker 1: Alright, well I think that was all that we had unless there’s anything else you want to add? Well, yeah, we’ll definitely put that paper and see if we can add in some of those other indicators.

BD088: Yeah, that’d be cool. Are you guys headed out of town today?

Speaker 1: yeah.

Speaker 2: Tomorrow at 6 a.m. Yeah.

BD088: I’m going to say, it’s kind of crazy in the city right now because there’s this big festival called Seafarer. They have, like, boat races on the lake, but t hen these military planes fly over at, like, three and, like, traffic is… Anyway, if you’re trying to get to the airport, would be kind of… Luckily, tomorrow…

Speaker 1: Yeah, okay, you know we’re actually this good to know though because we are headed to To lay low to me at the resource manager.

BD088: Okay, that should be fine going north.

Speaker 1: cool Yeah Yeah, worked out well that like we were able to be back to back to back here at NOAA this morning and then we have a fisherman that we’re also Trying to connect with today and he’s calling us at an undetermined time

BD088: He got his PhD in anthropology in my department. But he’s also, in fact, he’s a commercial fisherman.