[BD076: I don't know how to follow that intro.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: No, that was that was great. That was lovely. And these are so. I guess I'm I was saying say this morning I haven't dove in a while, but I was. I guess I still am AAUS Science diver. But I haven't dove in so long and I'm, like, thinking about getting back into it when I go to North Carolina.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Where did you do your AAUS training?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Northeastern university. That's where I did my bachelor's and pH.D. But I got to do some cool. Actually I studied at UW Friday Harbor Labs, so I like to film there. Yeah.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: I've always wanted to dive there. I did my AAUS like six months ago down, I was down at Scripps Institution of Oceanography. So for the last year, I was like working remotely for the shop while down there doing my masters. Since I did their a AAUS. I mostly specialize in like kelp, kelp research like.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: OK, cool. I've heard the kelp diving there is like crazy cool and kind of terrifying, right? 'cause. You're like in the Kelp Forest. And there's like, marine mammals and sharks and things that can pop up.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Yeah, I frequently have. Sharks, just like right in front of my face. Hey buddy. Love it though.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Oh gosh. OK. So that is a good point to start. So I know you already told me a little bit, but if you don't mind sharing a little bit more to refresh my memory about. Your background, your research, your work here at the dive shop. That would be great.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Umm, a little bit about background. I originally went to school for environmental policy up at Western Washington. And then I've been working for this dive shop for about I'm coming up on my four year anniversary. So I learned how to scuba dive and kind of went zero to 100 with it, became a professional and then eventually did an instructor course. So I am an instructor here. We teach. Right here in Seattle, in the cold water. Last year I was down at Scripps Institution doing my Masters program and then still kind of working remotely for the dive shop. So I did a really like interdisciplinary masters program. Was a lot of like communications. Policy and some lab science. Like I said, I mostly specialized in kelp and seaweed. And now I am back, I actually just moved back like 3 weeks ago and so back teaching and. Yeah, figured out what's next.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: So yeah, I'll give you a little bit more background on our project, so. The really big like high level goal of the project is to understand if and how we're managing for marine and coastal biodiversity in the US. And so to do that, we're doing 3 case studies and Puget Sound is one of our case studies are third and final. We’ve been here for a week. We were. For another week, two week little adventure and. Two of us. And so in each of our case studies, we're going around talking with community members like yourself and resource managers, researchers, practitioners, to understand what key aspects of local marine biodiversity, community members value and rely on for different services. And then to understand if. Marine managers and researchers what components of biodiversity they're thinking about when they make their decisions, and if those two things align. Yeah. And then in each case study, we are convening those managers with the researchers and community members together in a workshop setting to have a collaborative discussion and and talk about what management approaches are needed in the future to better. Balance the trade-offs between access to biodiversity with conservation and preservation.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: That sounds so cool. Yeah, what an awesome project to be working on.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: It's. Yeah, it's been really cool. Our first case study Was down in the Gulf, which I'm sorry I didn't have. Introduced – Do you want to introduce yourself?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I2: Yeah. OK. I'm a fourth year PhD student at the University of South Alabama in Mobile, so I'm down on the Gulf Coast. In my dissertation research, it is like interdisciplinary social science, so looking at like impacts of management, mostly to fishing communities.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Was our first case study and then down in mobile AL. And then our second was in Chesapeake, which I live in Maryland working with Smithsonian.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: What made you? Pick the Puget Sound the third one?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Yeah. Initially, we had a team member. His name is Phil Levin, and he was a professor at UW and a scientist at TNC. And so he was one of our team members. And so he was. Are like on the ground person here. He is really crazy cool. He right before right after the project started, he got called to the White House. He's on leave. White House right now. He's doing this national national nature assessment. So is a conflict of interest. He left our project. So we that's kind of why we are here for two weeks because we don't have like a team member on the ground, but we're building some collaborations right now with folks at UW. So that's part of the reason we are here, but we really wanted 3 case studies that had some commonalities we could hypothesize or some commonalities. And like the ecological dynamics, the size of the system, some of the environmental variables in terms of like being asteroids and. And then some differences in terms of the social ecological System.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Yeah, it's cool that you got like. Like 3 of the corners like, they're so like dispersed.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Yeah, exactly. Yeah. OK. Yeah. So like I said, you're the 1st. Dive diver that we've talked to so we would love to hear what kind of the key aspects of rainbow diversity are for diving here and you know kind of what you see as a specific aspects that. Maybe your customers care about or that are like really important for.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: I think for diving like obviously I feel like a lot of people come to go diving because they want to see sea creatures, they wanna see animals. Lest you're like. And stuff, but I'm not. So I feel like on the the business side of things, you know it is really important to us to have healthy ecosystems that are easy for us to access. But on more of a personal level like. I've lived in Washington my entire life and I I feel very, very passionate about, you know, the biodiversity and the health of our ecosystems and, you know, being a scuba diver, I get a very. Very like. Like I see. I see it first hand. What I think a lot of people might not necessarily know is down there. Like we have some really cool, interesting ecosystems. We've got a lot of seaweed ecosystems, a lot of you know, eelgrass, a lot of kelp. These kind of foundational species like I see how how many different things they support in the ecosystem and how important it is. It's been kind of a big issue out here the last few years with losing our a lot of our kelp. And I've seen like, I feel like that is kind of a really specific case study up here for biodiversity. I don't know. How familiar you all are with our Kelp problems, right now, But basically there was a big die off of sea stars in the last 10 years that led to an explosion of purple sea urchins. Sunflower Sea star was like the main predator of these urchins. They are like 99% locally extinct and so there's some areas where. The sea urchin populations have just exploded and they're devouring kelp forests. And like I've seen, even just in my less than 10 years of diving here, I've seen kelp like year to year differences where, like kelp forests, have. Turned to just complete urchin barons where it like they used to be kelp and fish and marine mammals and all these things that live there and now it's just like a desert of like spiny urchins. But on kind. An upside there I actually this weekend did see a really big Sunflower Sea star come back. Only see like a couple of them. Year and. So I think there's a video of Me, like screaming underwater. Very excited about that. I'm not sure if I answer your question. I'm just kind of I'm just rambling.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: No, no, that's that's. No, that's exactly the like type of stuff that we're we're hoping to hear about. And like one of the kind of really like big picture abstract questions we ask is when you think about biodiversity, what do you think about? So you kind of answer that question but is. Like anything else that really comes to mind when you think about biodiversity.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Seeing a lot of different species and seeing habitat that's doing well. Yeah, versus seeing like just thousands of sea urchins. It's very clear, like this weekend, I was down on the Hood Canal a little bit further South and there's some really cool, healthy ecosystems out there. We were diving in a marine preserve and it was just like it saw so many different species, so many things that I don’t See as much here in the city. And like the big Sunflower Sea star, I saw a little dogfish sharks and like. So many different members of the ecosystem that I don't see as much up here. It just. Yeah. Makes me break up.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: What about like when when you have customers, there's a lot of local people or tourists, or I imagine they're both, yeah.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: It's it's a big mix. We do have a lot of locals who are kind of regulars that will come dive with. A. Of our. So we teach classes, but we also guide tours and a big. Part of our customer base for tours are folks who are already certified divers, but they either don't know the local environment or they're maybe not comfortable and confident to go out on their own. They want like a safe guide. Take them. So a lot of what we do is showing people critters underwater and always do a big like environmental spiel with any of our tours. And yeah, we have a lot of local people, but we do also have a lot of people who Travel here to dive. So we get a big majority of people. You know, have maybe only dove in Hawaii or Mexico. Yes, we do have a lot of folks who travel. Typically, a lot of people I think learn to dive in warmer places. Mexico, Hawaii and then they come visit here and a lot of people I think come with the assumption that it's just like dark and murky and like, yeah. Full of garbage and nothing lives there, so I. Like proving that wrong. And you know, showing people the amazing biodiversity we have and all the different critters that live here and getting to. Kind of hype. Up about an ecosystem that. Lot of people just haven't really thought about before. And I love when people come out of the water and they're like, Oh my God, I had no idea. There were so many things that lived here. Like, I thought it was just dark and green. It is dark and murky and green. There's also cool stuff there.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Are there specific species that like you personally or like your customers you feel like are really excited about the like really important for?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: So I get excited about almost everything, one that I is kind of a. Like quintessential Washington thing, that people get excited about is the giant Pacific octopus. On the slate. That's the. It's the biggest octopus. In the world and some people come from all around the world, 'cause. Want to see it? They're like, don't quote me on this, but I think they can be like 100 lbs which. An octopus is huge. Like I've seen ones where their arms like are as big around as like my thigh. I'm like you're terrifying. It's so cool. So we do get. We call them Gpos here Giants pacific octopus. So that's one that people get really excited to see. They are obviously a bit rare. So you know it's not something I ever guarantee, but we. Have. Sites where. Are more likely to see them. Also, wolf eels. Not as much in Seattle. But a little further South, we get a. Of wolf eels. Which are this guy is actually not technically an eel. They're a fish. They just look like an eel. Another one that is really exciting are now I'm just giving you my dive spiel. Chimera or Ratfish there are typically, yeah. They're usually like a really deep sea species, but we have a subspecies that comes up shallow here and they look very alien like. Got huge. They kind of. They're a little spooky, but so cool. I was. Diving underneath the Seattle Aquarium pier once and I saw a gang of 12 of them together. I was like, I don't know what meeting I just stumbled into. I think I should probably leave. Go. So those are some of the ones I get excited about. I also really like rockfish. They are a really important species here. They live a super long time, like over 100 years for some of the species and. Sometimes we see their little young of year babies and that makes me happy because I'm like you’re going to live for so long. Yeah, in the nudibranchs, I think nudibranchs are something that a lot of people. Here to see you. A lot of nudibranchs around the world are like, you know, the size of a grain of rice or your fingernail. We get some here that can be like. Really big. Yeah, like I saw. I saw one of these. The clown Dorid, that was like the size of a sweet potato. No, it was like massive. Just so weird. Yeah, those are some of the species. There's a lot of really cool ones here that. We get a lot of seals and. Sealions and stuff too. On land, people come to see orcas. Obviously we don't see. Them underwater, but I have heard them. Underwater, which is kind of cool. Yeah, we're real weird about the nudies here. Washington people get really excited about that.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Yeah. Oh, yeah. Yeah, the program I was in. We were at the Smithsonian down in Panama for for the first part of the program, and it was like sea cucumbers everywhere. And then we came up here and these nudibranchs and there's. So much more.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: We have sea cucumbers here too, Too the California. Cucumber, which is like one of the biggest species. They can get to Be like a couple feet long. Yeah, it was all kinds of.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: OK, so I can kind of you know, guess what the answer is going to be given that it's a dive shop, but. What are some of the like social or economic benefits that you all get from this biodiversity that you've been describing?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Yeah, I mean. As as a dive shop it is. Our livelihood. And I mean, it's our livelihood, but it's also a lot more than that for us as dive professionals. It's also our passion, like we work in this industry because we love the marine environment and I think most of us work at this specific shop because it's so. Environmentally Focused. Yeah, I mean. If it's just, yeah, if we wouldn't exist if there. Wasn’t cool stuff to see here. Something kind of cool that I think sets this shop apart from some of the other ones in the area is that we do guide tours and a lot of the shops here are more geared towards training cause a lot of people who live in Seattle will like take their. Certification here so that they can like go on vacation. Right. And we've really in past years been trying to. Work on kind of creating our local dive community and you know, so doing these tours and showing people. On the business side than those are. Who are? Who kind of keep coming back and? Yeah, makes us. Happy too.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Yeah, yeah. Yeah. Do you mind sharing like a bit more about some of the stuff you are all are telling us when we first got here about, like the environmental work and policy work?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: So like Scott mentioned, I'm the conservation coordinator here, so I. I helped set up some of our we do underwater cleanup events, so we do a twice yearly volunteer cleanup event where we'll get volunteer divers and we'll have we do one in right here in West Seattle that's under the water taxi pier. So there's like one day a year that they'll let us. Dive Under the pier. Usually no dive zone for. But they open it one day a year, and so we go underneath and we pick up all kinds of trash. We've gotten over the years like. Probably thousands of. Worth of trash, you know? Over years doing this like we've pulled some crazy stuff out of the water like the lime scooters that people rent, televisions, bikes like, we get all kinds of stuff. So we do that one and then we do one down in Des Moines. In partnership with a couple other nonprofits. The area. So SR3 is 1. Umm these guys that we partnered with on this project so they help us with it and some other nonprofits in the area. So we'll do those two cleanups every year. And then I think Scott was also talking about our distinctive specialties, which are basically. Scuba classes that we've written through PADI, which is our like certified certifying dive agency. So we wrote like our own classes. And so we're like the only people who can teach them. 'Cause theyre ours. So created them, one is the. Salish Sea diver and it's basically just a crash course in cold water diving and Salish sea ecology. And then we also did a nudibranch of the Salish Sea one. You can come and take an entire class about nudibranchs like how to passively observe them without, you know, harming them. And like learning all about. And then. Have one on marine mammals as well. That's and all three of them donate to different nonprofits that are related. And so we have like, different expert nonprofits that also, like, helped us write them, and the nudibranch one is my baby 'cause I helped write that one, but. Yeah. When people take the class, they get the free slates. Little educational materials. That's we do a lot of projects. Yeah, that's very, very cool. So that's he was mentioning some of like the Marine. Stuff. That's that program. That's the clean up.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: And then you said you. Work for SeaDoc Society. Will you tell us a little? We've heard a little bit because do you have the book we are putting the sounds?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Sounds familiar?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: OK, we met with some folks at the NGO Water Conservation Action downtown and they helped write this book. It has in. Back list of like all the. Organizations in the region working on these issues and Seedoc was in there. We've.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[Speaker 4](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[Yeah, yeah, they're a big.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1:](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[Heard about it?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[Speaker 4](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[So SeaDoc society, they've been around. Here for I think about 20 years. They are a branch under UC Davis. So it's their wildlife veterinarian program. So this man, Joe Gatos, he is a wildlife veterinarian and he helped found this organization C Doc. And they do a ton of really cool science and conservation work. They give grants out to, like, independent scientists. They have an educational like little TV series you can watch on YouTube called Sailor Sea Wild. So there's a lot of cool stuff. Can. About the area and like other groups that are doing conservation work there. And they've got a lot of cool educational stuff on their website as well. Happy to connect you with someone if you want to talk to someone. There too.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Yeah, that would be great.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076:](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I do like communication, social media type stuff. For that. Oh yeah, so like an Instagram. We can look up or. Yeah, just SeaDoc society. If you send them. A message? It'll probably go to me. Or if you message Seattle dive tourism, go. For projects.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: I love it. I love it. OK, cool. So then you are also talking a bit about. Some of. Some of your work in policy and like your background in policy. What are some of the management dynamics here and what management? Approaches or policies currently like affect this system and potentially affect divers or the diving.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Yeah, I mean, so I went to school for policy, but I haven't worked too much in policy professionally, so it's not something I can speak to as much locally, but. Like I've mentioned, I'm very involved in like health restoration and so that I know that that is a big kind of policy. Landscape right now in Washington. Like how to restore kelp forests? Because there's so many different stakeholders and it's now, you know, the state. They're they're kind of trying to incorporate some restoration projects, but as you imagine with any policy, it's like everyone has a different idea of how things should be done and. So I know that is a big kind of policy thing that's happening right now. Also, there's a constant policy landscape involving worker conservation out here, which I'm not directly super involved with, but I am. Aware of, yeah. The Southern resident workers are super endangered and kind of nobody agrees on how to save. And there's a lot of issues at play like, you know, should we remove dams that are depleting salmon stock and, you know, things like that and obviously. There's with any policy things, there's a lot of different stakeholders. And so I would say like some of these policy issues indirectly affect us like as a, you know, dive shop business. There isn't a lot currently that is like super directly impacting our business, but just as people who care about the ocean and care about the environment, it is something I think we're. Pretty aware of. Hopefully that answered your question. I1: no that. That makes a lot of sense, OK. Are there any like management approaches and it sounds like you know you were saying it doesn't necessarily directly affect you all, but are there any approaches that you think are needed or be helpful? To, you know, directly manage this biodiversity that we've been talking about.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: I'm not sure right off the top of my head, but I think. Yeah, especially with, like policy at the state level. It's like so many things are just they're theoretical and we talk and talk and talk and talk. It's just like I'm not seeing. A lot really get done, like especially with. The kelp forest and you know the the sea star wasting disease. You know, I know there's some groups that are trying to, like, reintroduce these sunflower sea stars, but I'd imagine that's probably a policy nightmare too, like the introducing endangered species.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Yeah. No, no, that's that's really helpful. That's still helpful. And then what? Stressors are currently you're talking about like the kelp rest and the need for. Restoration C star disease? Are there any other stressors that are currently impacting the biodiversity that you all rely on?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Yeah. I mean, the big kind of elephant in the. Of climate change. Yeah, warming. Like. Temperatures are, I think, impacting marine environments everywhere. They do think that that is one of the causes of the sea star wasting disease. Something to do with warming water. We also get things like habitat creep when the water warms where species are moving further and further north because they need that colder water. So we are starting to see some like invasive seaweed species and things like that. That, you know, haven't typically moved here and. I know with like the. Killer whales. There's big problems with pollution. You know. Of salmon warming water that do kind of. Affect that? You know, while we're not really seeing orcas in our day-to-day work, it is, you know, kind of that top down predator interaction where you lose them, it is going to have really.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: That's. So then the last thing I was going to ask you about so and you just were talking about top down predator prey dynamics, so great segue. So to circle back to the beginning about, you know, the types of biodiversity that that you think about and care about. So one thing that we've learned in this project is that everyone kind of has a different idea of what biodiversity is or it means something different to. And so we've been trying to build some sort of framework to help. Conceptualize or define biodiversity and think about what the key components are for decision making. So you've already touched on a lot of them, but I just wanted to kind of. Introduce that framework to you and see if there it resonates with you and if there any you know, things you would change or specific components that we haven't talked about. One of them is habitat forming species. We've talked about kelp. Are there any other key habitat forming species field grass? Grass, yeah.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Here too, and not just kelp like kelp forest, but also a lot of the understory seaweed as well. Those are kind of our main. And then we have, like Rocky reef avatar as well.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: And then, umm, what about species of conservation concern? We've talked about that a bit as well.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Yeah. I mean, orcas, Sunflower, sea stars, rock fish. For the rockfish, there's actually a really good episode of that. The Sailor Sea Wild YouTube series that talks a. More about. The rock fish Conservation policy management stuff for them. So that's another one that comes to mind. They their bottom dwelling fish and so they're very easily. Overfished and got, you know, we live 100 years so. Them. Kind of reestablish. Those are kind of the top. Three that come to. I know there's definitely others. Yeah. OK.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: OK. Perfect. And then yeah, to go back to the orcas and what you were mentioning about predator prey dynamics, what about key food web supporting species?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Yeah, I mean. I I think everything everything is important for. Food web. Yeah, food web, supporting species. I feel like back to the Sunflower Sea stars. They are a really good one. A kind of smaller version of that top down predator prey interaction. So it's like. When the Sunflower Sea stars and the Big Sea stars are gone from the food web, then we have so many urchins and they're out competing. All these native species. And it just isn't really much else that eats those urchins. It's really easy for them to just kind of blow up. You know everything. Everything eats something but. I think those are kind. Some of the main ones.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: And then the last thing that I'm not sure, maybe we. Talked about is harmful organisms.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: I know we have some invasive seaweeds because again, that's kind of my wheelhouse. Like Sargassum is one that's kind of been making its way up. West Coast. I think they're still kind of studying. I'm not sure if it's been deemed fully invasive or just not native. But then the purple sea urchins are a really tricky one because everyone wants to call them an invasive species because they see how much they're taking over. But they are actually native. Always been here. They're just blowing up without their predators. So that's a native species that is becoming harmful. But of course, with any introduction of invasive species, you know. That was a common misconception. Are not invasive. They look you. They're just popping off, but just.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Yeah. Yeah, that's right, we. You're the first person that we've heard about that. I mean, I I've, like, I learned about it when I was studying here. But you're the first person that we've been talking to for this project, I think has brought this up and we've heard a lot about how people. Define invasive species and how like that's very value oriented with humans of how we define and think about those.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Yeah, and I this is kind of not strictly ocean, but I used to work in forest conservation, so I did a lot of invasive species control. More in like river ecosystems for salmon. And so a lot of it was like cutting back Himalayan BlackBerry because it you get these giant thickets that just will destroy whole forests or. English Ivy and yeah. Then it's kind of an interesting. Like who? Decides that something has become invasive versus non-native. At what point is it doing enough damage that it's invasive? Also have a ton of non-native species that aren't like really hurting anybody, right? Yeah. So I always do something I find very interesting. I think people do throw around the term invasive species a lot and it's like. That’s not Necessarily always the case. You know where you get native species that are causing harm like. You know, it's like the whole when they got rid of the wolves in Yellowstone and all that going crazy, it's like, well, they're not invasive, but they are kind of. Behaving in that way? Interesting.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: We had the same conversation in our other workshops too about when do we consider something invasive and when is it just like it's?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Especially now. Like the world we live in, where there's so much movement around the world like we've got boats going to all these different countries and there's just so many opportunities for. Different species to spread in. Way that they. You know.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: And before I get down. Yeah, definitely. OK, cool. Is there anything else I'm thinking about that framework in kind of those four bins we just walked through, is there? Anything that? Would change that framework with anything that we're missing. No, I feel that I was asking if there's anything else that you would add to that framework or change that you know and think about those 4 bins. Man cool, OK. Well, those are all my questions. Do you want to show what you've been working on?](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I2: Yeah. So while you've been talking, I've kind of designed the system model. Basically what you've been saying and how all of these different species and stressors are connected to each other and how. Those aspects of biodiversity impact diving and like your livelihood. So I'll show you. Wow. The spaghetti model. Yeah. And just to Orient you. I'm sorry I can't make it any bigger. So a blue arrow is a positive. On something. So like all of these species you mentioned, increase biodiversity and then orange is negative, so like disruption of predator, prey dynamics has a negative effect on healthy ecosystems. So just to talk through a few things to make sure that this makes sense. You started with a lot of like habitat species and how. Those contribute to healthy ecosystems, which contributes to biodiversity. These are all these. Cool. Exciting. Not so common species that folks get excited about when they dive. And so these and biodiversity in general, reduces this perception that this area like isn't biodiverse, especially among tourists. The until all of the biodiversity positively affects your diving company. And then you know, that helps with livelihoods. Creates. Here it has a positive effect on people's like personal passion. And then in the top, there's a couple stressors and about the orcas, you start talking about predator prey dynamics with sea star wasting disease. And just like the resident orca population not doing so hot. And then up here. So these are question marks. Works because we were talking about management and. Yeah. State agencies are supposed to be helping with kelp restoration and possibly helping with the work of population.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: But like how many levels of bureaucracy do we have to get through to? Actually make things. So like what is really happening up here is kind of an unknown. Yeah, to me it is. Maybe hopefully someone else can figure it out.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I2: OK, cool. Yeah. The only question I had and it sounds like no, But at the beginning, when she asked, like what? What do you rely on for your diving company and you mentioned like healthy ecosystems and just access diving access, yeah. Are there? Is there anything like management stressors around this area that would limit your access? Is a concern.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: Not necessarily. I mean, thankfully, most of the diving we do here is from. So, you know, laws involving like boats and things like that don't impact us like they might in like some parts of like Hawaii and how they they're getting like more regulation on dive boats and things. Here, you know it's we're so so blessed to. Just like shorelines with like ecosystems 10 feet in. So it's like you can just literally put on your gear and walk in the water. Which is wonderful, Not a lot of places in the world have that, yeah. Yeah, that's something I don't really see changing, hopefully.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Awesome. Well, yeah. I mean, I guess the only other thing I would ask that sometimes we ask. Have a little bit of time is are any of these. Components or relationships you think like driving the system dynamics cause what we what we can do, what we do sometimes as we go through the relationships and we can add weights to show what components are driving the system dynamic. Is there anything that stands out to you? That's like, yeah, really.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[BD076: I mean, I think These two healthy ecosystem and variety of species and biodiversity. I think those two really. Kind of impact. Everything. Yeah. If you take away. The biodiversity and the healthy ecosystems, then you know why no ones going to want to come here and go diving. So like from a business perspective that impacts everything. You know, without biodiversity and healthy species, you know, you also can potentially lose a lot of a lot of those really. So this is just like a. Cycle. Essentially, yeah.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)

[I1: Yeah, OK, awesome. Well, that that was. That was what I want to talk to you about. Really, really appreciate you chatting with us. Is. This is like.](https://onedrive.live.com?cid=35262dc0995d5aad&id=35262DC0995D5AAD!s08b43b29e43a4c24a95e561c5d56460f)