**Colorful Gifts of Coral Reefs! – S1E25**

**Dr. Sandra Rideout-Hanzak** [00:00:21] Welcome to a talk on the wild side. Your biweekly tour of all things wild in Texas. I'm your host. Dr. Sandra Rideout-Hanzak

**Andrew Lowery** [00:00:29] and I'm Andrew Lowery. Howdy, howdy.

**Dr. Sandra Rideout-Hanzak** [00:00:31] Yeah. And Tre' Kendall will join us later for our interview. Before we do our What's Wild and New segment, I just want to ask all of our listeners to subscribe or to like or both to us on your favorite podcast app, whatever it is that you listen to if you subscribe. You'll get an update every time we put out a new episode, so you won't miss a thing. But even more importantly, we are still looking for new listeners. So if you could share, you know, this wonderful new podcast that you found with your friends and family, we would really appreciate it.

**Andrew Lowery** [00:01:06] Yes, we would. And if you guys, you know, if you want to interact with us, we got like two Facebooks,Twitters two Instagrams, we've got two YouTube's a fan and an official, and we are on there all day long. So if you guys have any thoughts, any ideas, any constructive criticism, even, you know, please send it our way. We're happy to receive it.

**Dr. Sandra Rideout-Hanzak** [00:01:23] Definitely. Great ideas for people that we should have on an interview. We'd love to hear from you guys. So for our What's Wild and new segment, we are going to talk about bass. So listen up. Fishermen and fish are women. Texas Parks and Wildlife need your help on freshwater bass. There has been an ink like spot problem going on that's being called blotchy bass syndrome, and it's caused by a virus. Apparently, the virus has not been identified in humans or common domestic pets. So if you catch a fish like this, it's still safe to handle and to eat if you cook it properly. The spots are caused by a virus that was recently identified through gene sequencing. This new virus is a family called Douma Varadi, and it's been associated with disease and other fish species. So Texas Parks and Wildlife is just interested in hearing about this. If you catch a fish with these ink spots, so if you do catch a fish that looks like it has these spots on it, you're asked to take a photo of the fish and to also report the location to Cynthia Fox at Texas Parks and Wildlife. Now her email address is Cynthia dot fox at TWD Dot Texas Dot gov. So pay attention to your fish if you're out there fishing for bass, and do you report it if you see something that looks a little fishy? Sorry, couldn't help myself. So anyway, we're going to stick to water today, but we're moving to salt water and you guys are going to find this interview so fascinating. We're going to talk about coral reefs and Andrew and I, we just, you're going to hear us say, Wow, that's so fascinating over and over and over again, and I hope I hope you'll be as fascinated with it as well. Well, we're here today with Dr. Keisha Bahr. She is an assistant professor at Texas A&M University, Corpus Christi. Hello, Dr. Bahr. Thank you so much for joining us today. Welcome.

**Dr. Keisha Bahr** [00:03:30] Thank you so much for having me. I'm really excited to be here with you all.

**Dr. Sandra Rideout-Hanzak** [00:03:34] I'm super excited to learn about corals. I love corals.

**Dr. Keisha Bahr** [00:03:40] So that's great because I can. I can talk forever about coral.

**Dr. Sandra Rideout-Hanzak** [00:03:44] Good. Good. So tell us a little bit about yourself and your work with Texas A&M University Corpus Christi to get us started.

**Dr. Keisha Bahr** [00:03:52] Hello, everyone. My name is Kisha Barr. I am a marine ecologist and actually I trained in coral reef ecology. And I also like to tell everyone that I'm also a first generation scientist. So I was the first member in my family to go to college and pursue this dream of becoming a marine biologist with all these unknowns and trying to navigate a lot of those unknowns as well. So my research group at Texas A&M Corpus Christi focuses on understanding how organisms respond to environmental change and how that change might influence our future marine sources and keep our coastal ecosystems. And the goal of our work that we do is to provide some science driven solutions so we can ensure that there's long term, sustainable use of our own protection and conservation for our future generations.

**Dr. Sandra Rideout-Hanzak** [00:04:44] Wow, that's really cool. So interesting to be a first generation scientists, that's that's really exciting. I love to hear about new people getting into science. Your your work is largely centered on corals. And I think a lot of us have heard about coral reefs, but maybe we don't know what roles they play in marine ecosystems. Can you tell us the function of corals in what ecosystem services they provide?

**Dr. Keisha Bahr** [00:05:13] Yes, of course. You know, I love talking about Coral. One of the jokes that I make to my students is that corals are more than just snotty rock. They are actually really important. They are animals themselves and inside of the coral. It does have this microscopic algae that we like to call those in valley that is important to an interval for the survival of corals in the reef that they build. So when we think about coral reefs, they are literally the foundation of our marine life. They may only encompass about a percent or less of our ocean floor, but they do support nearly a quarter of all marine life. And thousands of fish species are dependent on coral reef at some point in their history. And when we think about what's going on in the ocean and how they support marine life, we all do provide a lot of services to us here on land. And even if we are far away from coral reefs, we still benefit from them. So when we think about coral reefs, we they do protect us in terms of our coastlines from storm and erosion, and we provide jobs and livelihoods for hundreds of thousands of people and offer opportunities for us to go to these really warm places and see this under water world. And they also are a major source for the food that we eat, and they provide a lot of new medicines that we're continuously discovering. So when we think about what we wanted to put a price tag on reefs and how much do they provide, how how do we quantify all this together? It's estimated that they do support. They're estimated at about tens of billions of dollars, US dollars per year. So we're not talking about a little bit of funds that are supported and quantification of those ecosystem services. They do provide a lot of services to us here on land.

**Dr. Sandra Rideout-Hanzak** [00:07:00] Wow, I did not know any of that, especially the medication that's really cool, and your work is largely centered on corals, and I think a lot of us have heard about coral reefs, but maybe we don't know what roles they play in marine ecosystems. Can you tell us the function of corals and what ecosystem services they provide?

**Dr. Keisha Bahr** [00:07:22] Yes, of course. Like I said, I could talk about corals for hours on end. But let me just tell you that when we talk about corals themselves, they are much more than just knotty rocks, or that's how I joke to my students. The corals are animals themselves, and as animals, they have this really cool relationship with this microscopic algae that lives inside of them. And with that relationship, the algae and coral benefit from having each other and coexisting together. So the corals themselves are an animal, those living there thriving, and they're building these three structures, which is hundreds and hundreds of individual coral colonies. And when we think about coral reefs, they are literally the foundation of our marine life. They may only encompass less than one percent of our ocean floor, but they do support more than a quarter of all marine life. And there are thousands of fish species that do depend on coral reefs as some aspect or some association with their life history. And you know, aside from just thinking about corals and the ocean and supporting animals in the ocean, they do provide us with a lot of services here on land in our coastal communities that are near coral reef. They do protect those coastlines from storms and erosion, helping break down the waves or that wave energy that says come from sea. They also do provide jobs and for local communities and livelihoods and food for them as well. And of course, when we think about coral reefs, do you think about scuba diving and snorkeling or surfing? Coral reefs do provide these opportunities for recreational activities and tourism revenue from that as well. And what's really, really cool about corals and coral reefs is that we're discovering new medicine daily that comes from our oceans, that come from our coral reefs. So the really, really important. And if we wanted to put a number a value on coral reefs, combining all these goods and services that they provide, it's estimated that the net economical value of coral reefs is tens of billions of US dollars each year. So they're extremely valuable, extremely important to everything that we do and why we might not feel connected to coral reefs. We really are connected to them.

**Dr. Sandra Rideout-Hanzak** [00:09:36] Wow, that's exciting, I mean, tens of billions of dollars and new medications had no idea.

**Dr. Keisha Bahr** [00:09:42] Yeah, they're fast. I mean, they're just an unlocked mine of information and medicine, and I know that there's this large need to really understand these systems.

**Tre Kendall** [00:09:54] And you know, I've always thought that coral reefs are kind of like related them to more like our forests and rangelands. It's such a such a crucial piece of habitat in the ocean. So in some of your work, has focused on evaluating coral bleaching. What does that term coral bleaching mean and what causes it?

**Dr. Keisha Bahr** [00:10:16] You know, I really like this question and, you know, talking about coral bleaching, because one of the best things about studying corals while they are extremely complicated animals, they do have this visual stress response. And that's what we call coral bleaching. And I just want to tell you a little bit more about the coral itself to really understand what bleaching, as I mentioned, that corals are animals and they have this special relationship with this microscopic algae and not microscopic algae or that goes on belly lives directly in the coral tissue. So then living together in this relationship, then if it's both of them from being there, the animal, the coral itself has energy that comes from the algae, from photosynthesis, and then the algae have somewhere to live in some protection living inside the coral tissues. So they both benefit from the presence of one another. What happens is that this relationship is very delicate, and we do see that this relationship between the algae and the coral, it does break down if there's something stressful in the environment or if there's some change in the conditions where the corals really thrive, such as warming acidification, changes in light level or sediment and other nutrient loading impacts and cause coral bleaching. And the reason why we call this coral bleaching is because the algae not only provide up to 90 percent of the energy for corals, but they are responsible for the color that we see with the corals, a majority of that color. So is we see a breakdown in the relationship between the coral and the animal, or sorry, the coral and algae. We do see a loss and not algae, meaning a loss in color from the algae and in turn, the coral tissue itself is transparent. So what you're seeing is the coral skeleton, which is a white skeleton. So that's why we call it coral bleaching, because the coral then appears white because of the loss of those dozen or the microscopic algae inside of it.

**Tre Kendall** [00:12:16] And do you think this is mostly due to climate change?

**Dr. Keisha Bahr** [00:12:20] That's a great question. So what we are seeing is we have seen coral bleaching happen locally on a few reefs and a few areas in the past. But what the problem is now is we're seeing that this bleaching response is happening at large scale across all of our oceans, and that's due to the warming that's caused from climate change, the increase in the warming or the capacity for oceans to really retain this heat with corals. Like I said, they're complicated, they're very sensitive and they have this relationship with algae. They only live within a certain temperature window, so the temperature gets too warm. We see more and more bleaching happening. You can kind of think about it similar to like when you have a fever, you have a fever, you're not feeling well, that's a response that your body has similar things. We see increase in the temperature that's causing a breakdown between that relationship between the algae and the coral and causing bleaching. So essentially, it might seem like just a couple of degrees Celsius or a few more degrees Fahrenheit changes in the water temperature. But it does cause bleaching to happen, and it's happening more frequent, more extensively and more severe each year.

**Tre Kendall** [00:13:32] Yeah, and climate change often does come up in our discussions. Is there any evidence that corals are able to adapt or acclimate to these changes in our climate?

**Dr. Keisha Bahr** [00:13:43] That's a really great question because we know Coral Atoll if U.S. corals and quarries have existed for nearly two hundred and forty million years. So these things have been around for a really long time, they've had to experience a lot of rapid change that has occurred on our planet. And what we know about these changes is that they have survived this period of time. They've been rapid warming and acidification of our oceans. The problem is that this amount of warming and the rate of warming that's happening is more extensive and more rapid than we've ever seen before. So one of our biggest questions was we know how much warming has happened. Can we really evaluate the capacity for corals to keep up with this rate of warming? Or how have they already kept up with it? Have they shown some evidence of adaptation or climate adaptation to the changes in our? And some of the earliest work to really define the thresholds for the temperature of coral, so how much warming is too much for coral was done in the 1970s, so not too long ago, but about 50 years ago now. And that was done by my Ph.D. advisor, Dr. Podger Keel. And he did some experiments on corals and just let's warm them up and see how they respond and let's see how much they can take. And we decided that, hey, it's been about 50 years since these experiments were done. We're still working in the same system and this is out in Hawaii. And also, we're still working with the same population of corals. Why don't we see if these corals in Hawaii have been able to keep up with the warming that we've seen? We've seen about a degree Celsius or about two degrees Fahrenheit change over the past two years. So we did this work in 2017. It was the first type of work that has been done, replicating experiments that were done 50 years ago, and we were extremely surprised. We exposed the corals. It was three different species of corals expose them to these high temperatures where we're supposed to see bleaching, and the corals today were able to withstand bleaching for a longer period of time and they were continuously growing under these elevated temperatures. Compared to corals, these same population of corals 50 years ago and we were we were astonished like, there's no way let's double check this. Let's do this again. And we do see that there had been a capacity for them to withstand the warming that's already occurred over the past 50 years. But our concern now is this rate that we're seeing and is projected to see by the end of the century is going to be too much for the call to keep up. But if we can slow down this rate of warming, perhaps we can get these corals a fighting chance if we slow it down. Maybe they can keep up. Maybe they can acclimate to that. Those changes, and that's what we're really urging people. Yes, corals have the capacity, but we need to slow that rate so they can keep up with the changes that are occurring.

**Dr. Sandra Rideout-Hanzak** [00:16:43] That's really interesting because I think a lot of times people say, Oh gosh, it's just a couple of degrees. These things have been around for millions of years, whether it's corals or whatever they're talking about, you know, it can't be that big of a deal, but we don't often talk about the rate of change might be the problem. Not not so much the amount of change rate.

**Dr. Keisha Bahr** [00:17:03] And we have to think about not only that rate, but when we have these really warm summers, are these really warm weeks that deviation a really bad that spike and not temperature causes more harm than we expect. And that's that's a concern that we have. If we keep having these spikes, then we're going to keep seeing more and more bleaching. And once you call their beach, they can recover. But the conditions have to return to optimal or comfortable conditions for the coral if they stay too hot for too long. They will eventually die. So that's something that we're concerned about is how long has it been this hot and how high is that temperature? How extreme is that stress that they're enduring?

**Dr. Sandra Rideout-Hanzak** [00:17:46] Interesting. So that kind of leads me to another question that I had in my head. So these wild swings that we see as the climate is changing, those are going to be a problem. You mentioned that the algae might be able to recover in some instances. So when we talk about coral bleaching. You said that the coral is white, they've lost that algae. Is the coral itself dead or is just the algae gone? Am I? Is that a dumb question? No.

**Dr. Keisha Bahr** [00:18:20] First of all, that is not a dumb question, because people still believe that corals are just rock, which is fair because it is an animal with an algae inside of it and it makes a rock. Sure. So that's completely understandable. But I'm really happy that you asked that question because it helps me clarify and make sure that people understand why corals are so cool and they're so complicated at the same time. But when you do see a white coral, the coral itself is still alive and a majority of the algae is lost. So it's gone. There might be there might be some still in the tissue, but not visibly in an abundance of beds.

**Dr. Sandra Rideout-Hanzak** [00:18:58] So when we see those white corals, there's a potential that they might come back and we we still need to leave those guys alone to.

**Dr. Keisha Bahr** [00:19:08] Right, right. Yeah. So think about when the corals are completely white, they're essentially starving. They don't have their algae inside of their tissues, their algae. That's photosynthesizing and giving that energy to the coral. They're essentially starving and trying to hold on to the conditions to return to optimal for their and value to come back or their algae to come back. Now, corals can feed themselves some coral species. Have more capacity to feed or filter feed from the water. Some others not so much, but they do have stored energy reserves. And once those are depleted and they're no longer able to maintain function or their normal capacity, so they do succumb and they do die.

**Dr. Sandra Rideout-Hanzak** [00:19:52] OK. Fascinating. So when we talk about colors of the different corals, one of the projects that you and your team have worked on is creating a coral bleaching card that looks at the colors of the corals or evaluates the colors. I guess I should say for Hawaii. Tell us about this card. What's its purpose? Who uses it? What are the details there?

**Dr. Keisha Bahr** [00:20:19] Yeah, and you know, I just want to tell everyone a little bit of a story associated with the development of this car, because this this came from when I was doing my Ph.D. in Hawaii and I was trying to assess if a coral is healthy or not. And usually other scientists, we have all these complicated measurements to determine if something is healthy, especially in coral biology. And I was working with my major professor, my advisor, Dr Paul Keel, and he asked me, How do you know if the coral is healthy? And I started listing all these different types of experiments that we can do these different measurements that we need to do and so on and so forth. And he just smirked at me and said, You just look at it. Which I was like. I mean, yeah, I guess you do just look at it because what essentially is if the coral appears to be healthy, it will be dark in color, it will look healthy. And the problem with that, though, is you need to have a lot of experience of looking at corals, OK? And that's what I do now. I just look at corals all the time, but not everyone does. So what we wanted to do is kind of take that idea that he had and really develop it into a tool. So if we're having these ongoing bleaching events across the Hawaiian Islands and across the world, we need to equip the public with a tool so they can assess how healthy the clothes were and this become. This became really important when we had bleaching events in Hawaii, our first in '96, and then we had 2014, 2015 and 2019, and we noticed that there just wasn't enough people in the water that could really make these assessments and that we needed to give the public a hand and a tool to help us go out and characterize the corals that they were seeing. So part of this process ended up being a four year project, a really, really cool project. But essentially we collected corals from all across the Hawaiian archipelago. We simulated a bleaching event. We increase the temperatures and then we photographed each of those corals and took those health measurements that are typical in the field of coral biology to develop this coral swatch essentially like a color wheel. Mm-Hmm. So each of these colors isn't just a random color, it actually ties to how well the coral is performing, how well the algae inside the coral is photosynthesizing, how much algae are inside those corals, and how much chlorophyl that they have. So how much capacity do they have to produce energy? So as we we put all of this, these colors together, we looked at thousands and thousands, tens of thousands of different colors. I learned so much about the different types of color and what seemed like he was an RGV and how to design. But essentially the outcome of this was to really give a tool to everyone and to be able to help us characterize that I'm characterize the health of the coral based on the colors that the corals were showing.

**Dr. Sandra Rideout-Hanzak** [00:23:22] That's cool. So just anybody who's going scuba diving could use that card.

**Dr. Keisha Bahr** [00:23:28] Yeah, anybody. Anybody who is in the water, circling or swimming, they could use this card. The idea behind it was a city really easy to use, you know, not necessarily needing any training to use it in just matching the color that you see on the card with the coral in the water. And then we even took it a step further where we partnered with the Pacific Island Ocean Observing System, where people could report their reports, report their reports online. So if you were snorkeling on the street and you saw a bleached coral, you could physically drag and drop a pin to show where you saw that coral. And then if we saw a lot of bleaching in that area, we could deploy a team to really investigate it and look at why do we see bleaching this area?

**Tre Kendall** [00:24:13] And yeah, that's very interesting. And it kind of leads me to another question. So you're like empowering all these citizen scientists scuba diving and snorkeling enthusiasts. If they do identify a coral skeleton, how detrimental is it if they were to remove that? And as for like a souvenir or something like that?

**Dr. Keisha Bahr** [00:24:34] Yeah. You know, Coral themselves are already a gift. And by removing corals from their environment and, you know, giving them has a gift to someone else is not necessary. It's physically removing them from their natural environment and using them in some other way would not be optimal. And I do not condone that at all. Especially corals where they are in one of the biggest things with this education that we developed or this card, this Hawaiian card pull up, meaning a coral in Hawaiian. We wanted to make sure that people had a better understanding of what corals actually are. What happens if you touch them? Why it's important to assess them and respect them and not stand on them or touch them or anything like that? We've integrated and made all these educational videos to help communicate that to the public so that they become stewards, environmental stewards for coral and understand why they're so important, why we should keep them in the ocean and not remove them at all.

**Dr. Sandra Rideout-Hanzak** [00:25:34] Well, that's so important to know. I think now you and your team are currently working on a similar card for the corals at the Texas State Aquarium. I think you can correct me if I'm wrong. Why? Why is it an important tool for an aquarium to have?

**Dr. Keisha Bahr** [00:25:51] Great question. You know, we started working as soon as I started my position at Texas A&M Corpus Christi. I reached out to the Texas State Aquarium because I've heard so many great things about the people working there and the work that they do. And I told them about this card that we developed for Wayne's World and they were asking, Can we use this same card for Hawaii and coral on our Caribbean corals? And I told them there has been a cards about for Australian corals. Now there's a price for boiling corals, and there were different coral species with different colors in different areas. So the best thing that we can do is to develop a card for corals and the Caribbean corals, for the corals and Texas State Aquarium. So part of this process, and it's interesting, the importance of it, is because the aquarium is very diligent on the wellness of their animals. They do these assessments almost every day of the week to really make sure that the animals that they have in captivity are doing the best that they can. Or they're they are doing really well and they want to help improve or change anything to make sure that those animals are thriving in these environments. And one of their needs was to have an assessment for the coral that they had, and this was a tool to help facilitate that. So what we decided to do actually one of the undergraduates in my lab led this project and we assessed all of the corals that they had. We took photos of all those corals and develop individual swatches. These ones look more like painter strips for each of the coral species that they have in captivity, so they can continually assess how healthy that coral is based on its color. And again, these colors are then correlated with the health parameters that we typically measure for corals or how well photosynthesis is occurring.

**Dr. Sandra Rideout-Hanzak** [00:27:37] Okay. Yeah, the aquarium. The Texas State Aquarium is one of my favorite places to take people because it's such a terrific place. And my graduate degrees are in forestry. So if I think about a forest, I know that there are forests all over the world. But each forest has its different tree species. And you're saying that corals are the same thing. We're going to find different coral species in different oceans, in different parts of that ocean and so on. Right?

**Dr. Keisha Bahr** [00:28:05] Correct. Yeah, it's the same. You know, I actually make the analogy because a lot of what we do in marine ecology or marine biology is borrowed from our terrestrial system. Really? So essentially, yeah, we're essentially copying you. We're just like 30 years late.

**Andrew Lowery** [00:28:17] You have you deciduous coral over here, right?

**Dr. Keisha Bahr** [00:28:21] Exactly.

**Dr. Sandra Rideout-Hanzak** [00:28:21] That's right.

**Dr. Keisha Bahr** [00:28:23] Well, that's usually what we say is corals are essentially the trees of the ocean.

**Dr. Sandra Rideout-Hanzak** [00:28:29] Oh, very cool. Did not know that.

**Andrew Lowery** [00:28:34] Now, that's really cool, and I also I want to say what Dr. Rideout said, I absolutely love the Texas State Aquarium. They do a lot of really awesome things. So what are some of the other projects that you're currently working on, like with your your students in your lab?

**Dr. Keisha Bahr** [00:28:48] Yeah, great question. So like I said, a majority of our focus in the lab or understanding how animals or organisms respond to environmental stress. So we have a lot of projects that are focused on corals and their response to different stress, such as nutrient loading or temperature like we've been talking about with bleaching. We've done some work with sediment that's ongoing and we have a huge project going on right now to understand how changes in our ocean chemistry impact corals and diet question is really, really interesting because we're really trying to understand not only how calls are growing and how they're calcifying or building their structures, but how that potentially will change in the future and what kind of impact do we expect to see? So we're looking at those things with corals. We're also looking at similar impacts on oysters. And here, of course, in the coastal bend of Texas, oysters are our readers here. We are building the risks that are protecting us here locally and also providing food and livelihoods for our coastal communities. So we want to see how oysters are impacted by changes in temperature and salinity and acidification or changes in the ocean chemistry as well. So those are, you know, we're really focused on these foundational species that provide the structure that support all these other species and how they may be impacted and how in turn, that impacts our our livelihoods and our coastal communities as well. And then the other thing you know, we have so many things going on. We're only we're just under three years old, but you know, we're just so excited and we're so excited to work with different communities and different groups here. And we've also looked at some of the corals that we have actually in our coastal waters here. These aren't the same refilling corals that we think about and those nice, warm, clear waters. But these are corals that don't build reefs, but they're still really important to understand how they're experiencing these changes. So we call them are cryptic corals because they're very small, but they're really important still. And we've been doing work on those for the past two years. We found some of these in our manmade channels, such as Pakiri Channel in Port Aransas Channel. They're growing on those cinder blocks and we're trying to understand, Hey, how are these coral growing and surviving in these very dynamic waters like they survive with breathe? Like what the heck is going on with these corals are so cool. So I have a student who's working on that. It's presenting that work in two weeks as well. And the last thing I wanted to mention that we've been actively involved in is we have a community led, a community involved cleanup effort that we have at our university beach, where we've been raising awareness about plastic pollution in our coastal waters and conducting monthly beach cleanup on our beaches to really understand how much plastic pollution is there. How is that impacting our marine system? And I think the most important part is we do audits of these beach cleanups so we can identify the sources of the solution. And all of this information is being communicated not only through our university, it's communicated to our local government officials and also to the state as well to help show who we're seeing a lot more COVID related products or we're seeing a lot more plastic bags. And what kind of actions can you take to help reduce the amount of plastic that's entering our ocean?

**Tre Kendall** [00:32:18] Yeah, I actually just saw an article that saying that scientists have found plastic in the human bloodstream for the first time, so it's like it's everywhere. So what other questions or mysteries would you like to investigate next?

**Dr. Keisha Bahr** [00:32:32] Oh, the fun thing about research and the reason why I really got into science is because once you answer or you kind of answer one question, you come up with 40 more. It's always like more and more questions that come from that come from the research that you do. So we're continuously trying to answer a few questions or trying to attempt these new questions. And like I said, one of our biggest questions that we're just getting into right now is understanding how organisms calcified and how that cause the calcification or that growth of that organism changes with the environment as well. And you can imagine working with corals is so complicated because they're, you know, they're the animal, they're the algae, they're the rock and the actual living tissue of a coral, or just a few millimeters thick. So really, understanding what's happening at that really, really small scale is really important, as we're trying to understand that because it is such an important thing. Three dimensional structure, corals and oysters provide support, so many more organisms, and it's important that we understand how they grow those structures and what happens if we lose those structures.

**Andrew Lowery** [00:33:45] That's that's really interesting.

**Tre Kendall** [00:33:48] It is a few millimeters. It's it's got to mean that it just sounds so sensitive

**Andrew Lowery** [00:33:54] that you don't like thinking about how, you know, I mean, we see the same thing with with plants on the terrestrial field. But you know, we have basically these little chemical factories that are existing all over nature. So I kind of have a side question for you. I know some people who raise coral in captivity, you know, like the saltwater fish trade and that sort of thing. What's your take on that? Is it? Is it some good, some bad?

**Dr. Keisha Bahr** [00:34:20] Well, first people who raised corals in captivity, I have the utmost respect for them because since corals are very sensitive animals, they're really hard to keep in captivity because if you change something just a little bit or you forget to add water and the salinity increases, you'll you'll lose them. There's extremely sensitive. Honestly, I cannot keep corals in captivity and I'm a coral biologist, so I am beyond impressed with people who can keep them in captivity. And also the people who do keep them are admirers of that. They appreciate and understand that they are important organisms. They're very sensitive. And it also provides another way to show people who might not be able to go to the ocean or go to coral reefs, that these are amazing organisms and we need to see them as a tool to be able to do that. Hmm. What the other side of the coin is. Well, are we potentially if you do remove them from the ocean you're taking from that? Most of the sources that these people get to raise corals are coming as a restoration up or coming from the farm that is sourced in a way that isn't destructive. So there isn't a huge concern for that as long as they're being sourced properly. And there has been a big effort from the Texas State Aquarium with the disease outbreaks that we've seen in the Caribbean, where they have taken in coral individuals coral colonies to help keep them so they they don't succumb to disease as well. So there are a lot of great efforts going on to keep corals in captivity so that they are still around. They are still alive to provide a form of education to our public as well.

**Andrew Lowery** [00:36:02] That's that's awesome. I was going to add on to that. If you thought that, you know, captive cultivation would play a large role in the future, but I guess it kind of already is to an extent.

**Dr. Keisha Bahr** [00:36:14] Yeah, there's there's rescue efforts with corals and having them in captivity to keep them to hold on to the species that we might be losing. One of the biggest questions we have is what happens when you want to put them back. What are they different? Do they introduce some other disease or some other really compromise that system in a different way? And also what happens with other the other organisms that are associated with them? There are some butterfly fish that are species specific and only tied to certain types of corals that you remove those types of coral. Then what happens to that fish? What happens to that sea slug, or what happens to those, you know, those other organisms that are directly tied with those particular species?

**Andrew Lowery** [00:36:56] I need to keep just saying that's so interesting, but I just like my mind, like, I'm soaking this up.

**Dr. Sandra Rideout-Hanzak** [00:37:01] Well, restoration is is difficult. I work. I I have some restoration projects here on land, and it's just it's just so hard. And so I can imagine that it is similarly hard, if not harder in the ocean.

**Dr. Keisha Bahr** [00:37:14] Yeah, yeah. But, you know, very important to understand what's happening. And I really like that reference to terrestrial systems because the same challenges you face in terrestrial systems with those species faces. And once the marine system, except for we have to hold our breath. Yeah.

**Dr. Sandra Rideout-Hanzak** [00:37:30] You know, literally.

**Dr. Keisha Bahr** [00:37:34] So, you know, there's that like I said, we brought a lot of the techniques and approaches. And you know, a lot of the principles are from terrestrial systems and they rely in marine systems as well as separate just a lot more dynamic. I guess you can say. Sure.

**Andrew Lowery** [00:37:49] So do you have like a favorite mind-blowing fact about corals to share with us?

**Dr. Keisha Bahr** [00:37:56] Oh, I do. Actually, one of my favorite things to share with my students and I'm just always continuously blown away by it is coral that the sexual reproduction of corals is just so fascinating. It's not an area that I study directly because of logistical reasons. It's really challenging to study for reproduction that sometimes only happens once a year. And if it failed, fails, you can imagine that those people on you. But that being said, corals themselves can be both sexes or they can be gone aquatic, meaning that they can be one sex or the other. Really cool. And it just depends on what species that you're talking about. But what's really cool, even cooler than that is some corals change sex. And a teen sex based on the environmental conditions, or they might also change sex based on how big they are or how small they are, and they can go back in for some species can go back like a male this year and produce sperm, or I'll be a female next year and produce eggs and so on and so forth. And it's just it's so freaking cool that they can produce energy or reproduce in a way that is directly responding to the environment that they're in.

**Dr. Sandra Rideout-Hanzak** [00:39:09] That is incredible. Just incredible.

**Dr. Keisha Bahr** [00:39:14] Yeah. And you know, that's the thing is people just think, Oh, those are just snotty rocks. They're, you know, they're not going to be the are very complicated and they are very sensitive to their environment. They're just amazing.

**Dr. Sandra Rideout-Hanzak** [00:39:30] I love this snotty rock reference, and I make sure I know right hashtags.

**Dr. Keisha Bahr** [00:39:35] So you send me a search here.

**Andrew Lowery** [00:39:40] Oh, okay, so we've got one last question for you, and this is kind of our crowd favorite while working in the field. Sometimes we take our foot out of our mouth to put the other one end or stumble over them. Do you have a favorite biology blunder you would like to share with us today?

**Dr. Keisha Bahr** [00:39:57] Oh, yes, actually, you know, I have multiple blunders, you call them? My first is early on when I was doing a lot of my work in the field. We'd go snorkeling a lot and usually I would wear a tire that was comfortable. So like a shorty. So having you know some of it down to my knees and then just, you know, up across my shoulders and I was out in the field with some students and there was just one week that we were in the water every single day. And I don't know what it was about. Maybe that was tied to the Moon or, you know, just the energy of the environment. But every day that week, I got stung by a man or, oh my god, every single day. And you know, I don't have a sensitivity to them. You know, it does hurt. It does go away with like 15 minutes. But the funny thing is, I would be in a crowd around my students and then every time it was just me that would get and like, What the heck is going on in there? Give it a try. It's going across my face and I had my snorkel in my mouth. I took out my snorkel to tell my students, Hey, watch out, there's a man or there's metal wears around here. And then I put my circle back in my mouth and it stuck inside of my Oh no. Well, you know, it's fine. It's just like, Okay, of course. Like, it would happen to wrap around my circle and I'm just trying to warn everyone else. And I was like, This is just man or weak. This is just not my week. So then I started wearing completely covered gloves, no skin showing as much of my face as I can cover as possible, going in the water to help prevent that moving forward. And then the last day, we wanted to take some measurements from the boat. So we were dropping in just an instrument to collect data on the temperature, the flimsy and dissolved oxygen on the boat. And I still got stung by a man.

**Dr. Sandra Rideout-Hanzak** [00:41:51] Or, my gosh,

**Dr. Keisha Bahr** [00:41:53] I'm just like, Are they out to get me today? And the reason the way that this happened, I was wearing shorts on the boat. I was pulling up the probe from the water. It got caught on the probe for the water it rubbed against my leg and it was attached to my leg on the boat. Oh no, that's terrible. All of that being said, I was, you know it, it hurt it. Some people, it can be life threatening if you're allergic to bees, but I'm not. It was just one of those times where you tell your students, be very careful, make sure you cover up. And then I became the example for that entire week for my students.

**Dr. Sandra Rideout-Hanzak** [00:42:27] Sadly, many times our biology blunders include something painful, physically painful.

**Dr. Keisha Bahr** [00:42:36] So another one? Yeah, the other one I wanted to share with everyone because I think the important thing about being a marine biologist, any particular coral biologist, is that sometimes just because you're a marine biologist doesn't mean you're a marine biologist of all things. So my my spouse is actually a shark biologist. Oh, neat. And we went to grad school together. And really cool thing about it is I got to learn not just about corals, but I also got to work with sharks and do some work with them. And part of this was, you know, going out and fishing for sharks and tagging them and assessing them and letting them go. Well, the first time I went out with him and his group, I was in charge of the tail rope and I was like, Okay, you know, I'm not near the mouth. I should be okay. All I have to do is put this Karl Rove on the shark. And they brought up a think was a four meters or about 13 or 14 foot six gill shark, which is a very deep old kind of dinosaur fucking shark. But you very large shark that. Relatively docile, but it's very flexible, so it could touch its nose to its tail.

**Andrew Lowery** [00:43:48] Oh wow. Made out of cartilage ?

**Dr. Keisha Bahr** [00:43:50] Yeah. And they're like, Okay, you grab the tail. I was like, Okay, I'm going to do this. So I lean over the bow of the boat, go to grab the tail, and it just slips out of my hands. Is so flexible. I try and I keep trying multiple times and they're trying to secure the shark. And I'm just like, I'm sorry, guys. I just can't do this. I can't. So I got promoted to data recorder. Oh, and someone else had to do it. And then from there on, I was like, You know what? I work with things that don't move on purpose. Yeah, and it's totally fine.

**Dr. Sandra Rideout-Hanzak** [00:44:31] That's funny. I can't imagine how how slippery a shark would be, though.

**Dr. Keisha Bahr** [00:44:34] Yeah, I just I didn't know what to expect, but you know, it didn't. It didn't pan out the way I want it to be. And then I found that I'm not cut out the shark biologist. And that's okay. I'm only okay with any data.

**Dr. Sandra Rideout-Hanzak** [00:44:47] Recording is pretty darn important. Let me just say that.

**Dr. Keisha Bahr** [00:44:49] Oh, very.

**Dr. Sandra Rideout-Hanzak** [00:44:50] So maybe you had the most important job that day? Dr. Bahr. Oh, those are great stories. So is there anything else you'd like to talk about today?

**Dr. Keisha Bahr** [00:45:03] I don't think so. I think we covered a lot of fun things. Yeah, it's it's really fun. Corals are really interesting things to study. I do teach some classes at the university about corals, and I'm really fortunate that I get to share my experiences with my students and get them involved and interested in corals. Because even if they don't directly want to work with corals, they understand how everything else in our oceans is dependent on them. So they have that connection moving forward.

**Dr. Sandra Rideout-Hanzak** [00:45:30] Well, thank you so much for being here. I've learned so much about corals and now I want to go snorkeling today

**Andrew Lowery** [00:45:36] and thank you so much for being here. We appreciate. Yeah, thank you.

**Dr. Keisha Bahr** [00:45:40] Thank you for having me.

**Dr. Sandra Rideout-Hanzak** [00:45:42] Thank you, Dr. Bahr. Bye bye. A Talk on the wild side is a production of the Caesar Kleberg Wildlife Research Institute of Texas A&M University Kingsville. Funding for this project is provided by the Harvey Weil Sportsman Conservationist Award by the Rotary Club of Corpus Christi. Editing was completed by the talented Gaby Olivas, Andrew Lowery and Tre' Kendall. We thank the Distance Learning Lab for all their help and cooperation.