

TRANSCRIPT

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INTERVIEWER: David Todd

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David Todd [00:00:02] Okay. Well. Good afternoon. I'm David Todd, and I have the privilege of being here with Kelly Drinnen. And with her permission, we plan on recording this interview for research and educational work on behalf of a non-profit group called the Conservation History Association of Texas, for a book and a website for Texas A&M University Press, and finally for an archive at the Briscoe Center for American History, which is at the University of Texas at Austin.

David Todd [00:00:32] And I want to stress that you would have all rights to use the recording as she sees fit.

David Todd [00:00:37] And, before we went any further, I wanted to make sure that that's a good arrangement for her. What do you think?

Kelly Drinnen [00:00:42] That is great. Thank you.

David Todd [00:00:44] Oh, good. Good. All right.

David Todd [00:00:45] Well, as I said, my name is David Todd, and I am representing the Conservation History Association of Texas.

David Todd [00:00:52] I'm in Austin, Texas, and this is a remote interview with Kelly Drinnen, who is based in the Dickinson, Texas area today.

David Todd [00:01:01] It is Wednesday, May 1st, 2024. Happy May Day. It's about, 2:45 or so P.M., Central Time.

David Todd [00:01:13] Ms Drinnen is an Education and Outreach Specialist at the Flower Garden Banks National Marine Sanctuary, where she has worked since the summer of 2004, coming up on 20 years. She has a strong interest in informal science education and holds workshops and presentations for the Sanctuary, and is also responsible for communicating about the Sanctuary through its website, through social media of different kinds, listserves, various publications and so on.

David Todd [00:01:44] So, today we'll be talking about Mr. Drinnen's life and career, so far, and especially focus on what she can tell us about the Flower Gardens and the associated reefs in the northern Gulf of Mexico.

[00:01:57] So, with that, I wanted to thank you, and maybe launch with a question about your childhood. And I was wondering if you could tell us about those early years and if there might have been people or events in those days that got you interested in animals and education and the ocean.

Kelly Drinnen [00:02:17] Well, as a child, my family started camping regularly when I was about five. We had a pop-up camping trailer, and my parents made a point of taking us on weekend excursions to state parks, and, every summer, about a two-week vacation to some part of the United States, focusing a lot of times on state and national parks.

Kelly Drinnen [00:02:36] So, a lot of outdoor time: we were encouraged to get out there and enjoy the environment. And I totally reveled in all those moments out there in the outdoors and camping.

Kelly Drinnen [00:02:49] I also had a fascination with the ocean. One of the places my family visited regularly was Myrtle Beach, South Carolina. We'd travel with other families on vacations for spring break, or sometimes my parents would even pull us out of school in the fall to go down at a time when it wasn't so busy with everybody else. And we would just enjoy being in that coastal environment and beachcombing and fishing and swimming and whatever else our hearts desired.

Kelly Drinnen [00:03:15] So, I always had a fascination with those beach areas.

Kelly Drinnen [00:03:18] We visited the coast of Maine when I was a child.

Kelly Drinnen [00:03:21] We did water quality sampling and things like that when I was an elementary student.

Kelly Drinnen [00:03:26] And these all just kind of continued to build my interest in the ocean and in water habitats.

Kelly Drinnen [00:03:35] And growing up, I always enjoyed going to aquariums, museums, places like that to try and learn more about these things. I was fascinated by any TV show about oceans and ocean wildlife, like Jacques Cousteau or the Undersea World of Jacques Cousteau. You know, the Flipper TV series was a favorite of mine as a child. And my favorite book of all time back then was Fish Do the Strangest Things. I've always, I guess, had a fascination with fish. And, of course, books about Jacques Cousteau. Biographies about different people involved in outdoor exploration and ocean exploration...

Kelly Drinnen [00:04:19] All the while thinking that was something way beyond my reach. It was just really cool to learn about. Never, ever thought about that as a career opportunity or something I might do in the future. It was something you dabbled in on vacations and that was it.

David Todd [00:04:34] Okay. That's great. That's a wonderful sort of vignette of your early days.

David Todd [00:04:41] And, I was wondering if, do you remember any particular incidents with your parents or your siblings when you would go to Myrtle Beach or go to Maine?

Kelly Drinnen [00:04:56] The time we were in Maine: I actually have photographs of that my mother sent me recently when I asked for something of me doing ocean stuff as a kid. And we explored the rocky coastline there and explored the little tide pools.

Kelly Drinnen [00:05:10] I also remember visiting the Bay of Fundy and going way out, and then being chased back in by the quickly turning tide, across rocks covered with barnacles.

Kelly Drinnen [00:05:18] I also enjoyed hunting for sharks' teeth on the beaches in Myrtle Beach. I would sit there for hours, combing through the sand, trying to find sharks teeth. And I found hundreds of them - little tiny ones, mostly not ones of any significance, a few maybe as big as an inch, but mostly more, you know, small scale, shark' teeth. But that was a fascination for me on those visits to Myrtle Beach.

Kelly Drinnen [00:05:42] And I still, to this day, enjoy beachcombing. I can just stare at little piles of rubble on the beach for hours on end and just find interesting things. And everybody else is like, what are you doing? Why are you doing this? It's just cool stuff. What can I say?

Kelly Drinnen [00:05:59] Yeah. Those are the best memories.

Kelly Drinnen [00:06:01] And in fifth grade, our school district had everybody go on a trip to Sandy Hook, New Jersey, and we would do exploration out in the water. And we took juice cans and covered them with Saran wrap at one end, cut off both ends, and covered one end with Saran wrap, and made these periscopes for looking down in the water, sort of kind of like a SCUBA mask, where you could put it down the water and actually see the things more clearly underneath.

Kelly Drinnen [00:06:26] And I have pictures still of me doing that. I guess my mother must have gone on that field trip with us.

Kelly Drinnen [00:06:31] And things like that: just, just I always found very fascinating, like what's under the water that I don't know about, that I can learn about.

David Todd [00:06:40] Very nice. And I think you mentioned in passing that, you enjoyed watching, Jacques Cousteau and reading about him, and seeing Flipper - I guess it was a TV program.

Kelly Drinnen [00:06:55] Yes.

David Todd [00:06:57] Any other sort of parts of the mass media, public information like that, that caught your fancy?

Kelly Drinnen [00:07:07] Mutual of Omaha's Wild Kingdom was another one. But mostly Jacques Cousteau. I would always watch and wait for those specials. I don't remember if they came on on Sunday evenings or what it was, but that's usually when we watched Mutual of Omaha too, was on Sunday evenings.

Kelly Drinnen [00:07:23] I remember every time I watched a Jacques Cousteau special, thinking how cool SCUBA diving was, and something I knew I would never do because I was just too big a chicken.

David Todd [00:07:33] So, it was something to live vicariously through what I was seeing on film, and later came to understand that he wasn't as much a scientist as he was a cinematographer. He was just the first one to really take us into the underwater realm in first person, through the lens of a camera. He wasn't a scientist by nature, but he had that science mind. He's the one that, along with a partner, developed SCUBA gear, Self-Contained

Underwater Breathing Apparatus. That's where SCUBA came from. It was he and a partner that developed that.

Kelly Drinnen [00:08:03] And so, all the cool technology that came out of his efforts to explore beneath the sea himself, it was just a personal interest. And that's the kind of interest that captured me is, "What's down there? What don't we know about. What can we learn about?" That's what fascinated me.

Kelly Drinnen [00:08:21] It wasn't that he was a scientist first-hand. It's that he was learning it as he went and helping us discover more because he was allowing us to be able to see stuff we hadn't seen before.

David Todd [00:08:33] That's fascinating. Yeah.

Kelly Drinnen [00:08:34] Yeah.

David Todd [00:08:36] Well, so, I think you've spent a lot of time in the education realm, and I was wondering if during grade school, I think you mentioned that you had this fun can-and-Saran-wrap apparatus, and you did some water quality sampling. Were there experiences then like that, or maybe when you were at James Madison University, where a teacher or one of your classmates might have turned you on to something about nature and education.

Kelly Drinnen [00:09:15] Well, I honestly have to say I never, ever, ever thought about being an education. That was not on my future plans at all. I didn't know what I wanted to be when I grew up, but I didn't plan to be a teacher.

Kelly Drinnen [00:09:30] And I honestly didn't know there were other types of education out there. Even though I had visited nature centers and been on field trips, it never occurred to me that maybe those people were doing education. That was just part of field trips. That wasn't, you know, something in that education realm.

Kelly Drinnen [00:09:46] But when I was in high school, of course, I had to take science classes, and meet all those science requirements. My only science class that I liked out of high school was my biology class. I had a teacher whose name was Ms. Butt, actually B-U-T-T. She was a slave driver of a teacher, but the kind that makes you work so hard, you love her for it. She made you grasp everything. And the biology knowledge that I work from today is all based on what I learned in her class in ninth grade in high school.

Kelly Drinnen [00:10:16] I had some biology classes in college, but nothing to the kind of depth and intricacy of animal life that I learned in her class in high school.

Kelly Drinnen [00:10:27] I was not interested in dissections. I let my lab partner take care of that. I was the one that took the notes. I didn't want to touch those disgusting things. I was curious about the insides to some extent, but really, that wasn't the crux of it for me. It was more understanding of the biology of these things and and what they could do that we couldn't and looking at things from a developmental standpoint of the simplest creatures and working up to the more complex.

Kelly Drinnen [00:10:54] I found that class very interesting. I had to work hard in that class, but it was worth every second, as I have later found out. If I could go back and tell her that I

would. I have tried, I have Googled, I've tried to find her to let her know that she was an influence on what I'm doing today, but I have never been able to make that connection.

David Todd [00:11:14] Maybe she changed her name.

Kelly Drinnen [00:11:17] It's possible. Maybe she got married. I don't know, but.

David Todd [00:11:25] Oh boy. Well, despite your reluctance, or I guess you weren't aware of the educational world, I understand that you did go there, and that from 1989 through 1996, you worked in training, education and summer camps at SeaWorld of Florida in Orlando. And I was curious how you got there and what your experiences were there.

Kelly Drinnen [00:11:54] It was a happy accident. That's the best way to describe it. So, when I went off to college, like I said, I did not know what I wanted to be when I grew up. I just knew I didn't want anything to do with science or education, because those were the directions everybody was trying to push me based on my skill sets. I was a very good science student. I was a very good math student.

Kelly Drinnen [00:12:12] But my love was for Spanish and math. So, when I went off to college, that's what I studied. And I double-majored at first, and then eventually dropped the math to a minor because I went to do a study-abroad year in Spain. And so I got my language skills up there, had a tremendous travel experience. Came back. It wasn't worth staying another year to finish a math major, because I didn't know what I was going to do with that either. I just liked numbers and I liked Spanish.

Kelly Drinnen [00:12:38] So, I graduated college and I still didn't know what I wanted to be when I grew up. And I got my first job at a computer development, software development company back in New Jersey. And I was hired actually as a secretary back in the day, and they found out I was really good at breaking their software, so they let me start being a tester for it. And I just moved myself along in computer stuff from there. That was my first exposure to even a PC. I had done computer programming stuff in high school and in college, but all with mainframe computers, which today's audience doesn't even know about.

Kelly Drinnen [00:13:12] But my first experience meeting a PC was in that product group at that software company, and they were the first PC product developers in that company, even. So, it was a really eye-opening experience. They were developing what we now think of as second nature, but online interactive training. And that was the product they were developing.

Kelly Drinnen [00:13:33] So, I found out I was really good at testing it for them and breaking it for them and sending it back and saying, "Yeah, it still does bad things. Try again."

Kelly Drinnen [00:13:42] And then I moved on from that. I moved geographically to a new area down in Virginia, and I got a job helping with computer resale. So, I was involved in customer service aspect and eventually also helping to install stuff inside of PCs, back when memory chip memory came in chips of 128K a piece that you installed individually. They looked like little bugs with legs on them. Now we have whole boards that cover a gazillion times more memory than that.

Kelly Drinnen [00:14:13] And I just assumed I would continue in computer something or other the rest of my life. I mean, I was I was happy doing it. I was challenged by doing it. It was just a career path.

Kelly Drinnen [00:14:24] But then I had an opportunity to move to Orlando for other reasons and thought, "Yay, I can get away from winter. Let's go." And I got to Orlando and started, you know, looking at job opportunities and putting my resume out to more computer-type jobs.

Kelly Drinnen [00:14:39] But in the meantime, I needed to have some kind of income to pay bills. So, I thought I'd do something fun for that. And I applied for a job as a tour guide at SeaWorld. I loved ocean stuff. I thought being a tour guide sounded like fun. It didn't pay a whole lot, but I did get a 15 cent an hour differential for speaking Spanish. So, I made 15 cents more an hour than the average tour guide, and I got it on my nametag: it said "Hablo Espanol". And I could talk to guests in the park in two different languages and help them learn more about marine life.

Kelly Drinnen [00:15:10] So, I spent three weeks training in that to get that job, to learn all about the different wildlife, be able to get up on a microphone and talk about it in public. And that was something I was not initially good at. I was terrified of it. Public speaking is one of the number-one fears in the world, and I jumped right into that. And I cried in training. And I flubbed up in training, but I eventually found my feet. And now it's like second nature to me to talk to people in public, as long as it's about things I know about and that I'm comfortable talking about.

Kelly Drinnen [00:15:40] So, I would get on a microphone multiple times a day, talking to guests about the dolphins or the stingrays or the killer whales or the sea lions, whatever area I was working that day. Or, I'd be leading them on a guided tour behind the scenes to see a manatee rescue and animal training and all these different kinds of things.

Kelly Drinnen [00:15:59] And it was a real eye-opener for me in that I loved going to work every day. Couldn't wait to go in and do it again the next day. And that was the first time that had happened to me in any job. I had a lot of jobs I liked and that I was good at and I enjoyed. But I loved that job and I thought, "Maybe I don't need a computer job after all. Maybe I can make a career out of this."

Kelly Drinnen [00:16:23] And so being a tour guide at SeaWorld in Orlando was part of the education department. So, I had training in, like I said, public speaking training about animal backgrounds, and how the park handled them, and how we did medical care and training for the animals, all these different kinds of things.

Kelly Drinnen [00:16:42] And I just loved sharing that information with guests and talking with them one-on-one. And I could do it in two languages. That's where I developed all my marine life vocabulary, was talking to guests from Spanish-speaking countries and figuring out what they called different things. I looked up some things in a dictionary, but the people themselves turned out to be a lot more helpful, and more accurate, as it turned out.

Kelly Drinnen [00:17:04] So, it was a day-to-day thing. I knew there was a step-up path within the education department, and I just excelled at my job and was able to start moving around. So, I moved up then to be a lead, that managed the people out on the grounds every day that were doing the education of the exhibits and the behind-the-scenes tours. And from there I moved up to being the training coordinator, the person that trained all the people to do the tours and the talks about the animal exhibits.

Kelly Drinnen [00:17:32] I also, along the way, developed a Spanish tour program where we trained guides to take Spanish-speaking groups around and give them a more personalized experience in the park for a small fee.

Kelly Drinnen [00:17:43] So, it was a very developmental experience for me to find that I could take my love of the ocean and turn it into a career opportunity. I had a chance to use my language skills. I got to learn more about the animals every day. I got to experience and witness first-hand how people work with marine life, what it was like to just take care of them, or to train them, and all the different things we could learn from them and about them ...

Kelly Drinnen [00:18:14] And then share that with basically happy people. I mean, when people are on vacation, they're coming to a place to have a good time. You're not very often dealing with disgruntled people. It's more, you know, dealing with people who are some place because they want to be there and they want to know more.

Kelly Drinnen [00:18:27] And that was just, that was it for me. I just totally enjoyed that. I saw myself as becoming a SeaWorld lifer.

Kelly Drinnen [00:18:34] And eventually I work my way up into an assistant supervisor position where I was helping to plan the future of the department, helping with educational programming beyond just the stuff in the front of the scenes with the public, but handling school groups, and working with summer camps, and developing what the educational shows would be at the different areas of the park for school groups that came in to visit. You know, helping to design, script and work in conjunction with an animal training staff to decide what those storylines would be. And they were different from the public shows.

Kelly Drinnen [00:19:07] Of course, everything in the park had an educational element. But the shows specific to educational school groups coming in were a little bit different, a little more focused, to try and meet learning objectives and things like that.

Kelly Drinnen [00:19:18] So, that's where I got my exposure to the whole world of, you know, school learning objectives and needs and what people are supposed to accomplish on field trips with their students.

Kelly Drinnen [00:19:31] I started helping with teacher workshops to help train teachers to teach the things we did or knew about at Sea World. I developed summer camp programs. I trained interns to teach summer camp programs. I supervised all those, and the last summer I was there, we had over 2000 students in summer camp. And it was just, it was fun.

Kelly Drinnen [00:19:52] You know, of course, it was work. And there were days I didn't like my job any better than the next person.

Kelly Drinnen [00:19:57] But overall, it was a fascinating experience. I learned what it took to develop an appropriate education program. I learned what interpretive training was about. I learned how to be an interpreter, in other words, to make things meaningful on an emotional level with people, instead of just spouting facts, just make things that were realistic, and connect to people's lives, to make them care about what was going on in the ocean with ocean creatures.

Kelly Drinnen [00:20:26] So, it was a very developmental time in my career. It was a very starting edge of my career, but it was a fantastic learning experience. And the only reason I left

is because in the meantime along there, I got married and had a child and we decided to move to Texas to be closer to family, to help in rearing that child. Otherwise, I probably never would've left.

David Todd [00:20:49] It sounds like. It was a really enriching, fun place for you to be.

Kelly Drinnen [00:20:53] It was.

David Todd [00:20:53] I think it's intriguing that, you know, sort of swinging on this vine through your career, that you found a job later at the Moody Gardens, which I guess is maybe an analogous place to SeaWorld in that, you know, a lot of public education about the marine world and I guess tropical forests and so on. I mean, a lot's what's going on there.

Kelly Drinnen [00:21:15] Can you talk about being an educational expert and curator and management coordinator at the Moody Gardens?

Kelly Drinnen [00:21:25] So, when I knew I was moving to Texas, I started looking for equivalent job opportunities like I had had at SeaWorld. And I did discover Moody Gardens. I applied and I got accepted to start a job there as part of the management team in the education department, which was the education management coordinator handling budgets and a lot of different aspects of the behind-the-scenes aspect of running the education department.

Kelly Drinnen [00:21:49] But when I got there, when I was starting, I was going to be training with another person who was supposed to be leading a month or so down the line. But they had just had a vacancy in their camp coordinator position, and they said, "You've got lots of summer camp experience. Can you take care of this stuff until it's time for you to transition over to that?" And I said, "Sure."

Kelly Drinnen [00:22:08] So, I jumped right in there and started developing camp programs.

Kelly Drinnen [00:22:11] Now, when I started at Moody Gardens, there was only the rain forest exhibit as far as biological exhibits there. They did not yet have the aquarium. And so, I threw myself into learning about rainforests and rainforest creatures. They already had a sort of curriculum there, but I felt like it needed a lot of improvement. So, I took that on as a task to start updating and changing that and molding the future of what education was going to look like. I took everything I learned at Sea World and started applying it to making a better education department at Moody Gardens.

Kelly Drinnen [00:22:44] And so, I was in that education management coordinator position for, I don't know, several years when we had a new director come in after I had started, and then that person left and I said, "I want that job." And so I applied for it, and I went and talked to the managers above me and said, "This is what I want, and this is what I can do."

Kelly Drinnen [00:23:03] And then I never heard anything forever. And then one day I got a call to go see the manager. And it's like, well, that happens. So, I went over there and he said, "We want to give you the job." So, after years of kind of acting in that capacity, in conjunction with the education manager in the department, the two of us together had been running the department in the absence of the director. They decided that we kind of kept it running without a hitch. And since I was interested, they wanted to give me that job.

Kelly Drinnen [00:23:31] So I got to take on the lead position in the education department, which they called the Education Curator, and took it from there.

Kelly Drinnen [00:23:39] In 1999, the new aquarium came online, and I got to be part of all the behind-the-scenes work that went into developing education programming for that, deciding where our educators were going to be, what they were going to be doing, what the summer camps and sleepover and Scout opportunities were going to be. So, I got to be in at the ground floor, developing all this programming along the lines of what I used to do at SeaWorld.

Kelly Drinnen [00:24:04] It was a very exciting time, again, because it was, you know, the aquarium wasn't there and it came online in my time there. So, I got to be at the forefront of developing all these programs. So, in my time at Moody Gardens, I developed a lot of new programs, some of which they are still doing today. So, it's very exciting for me to see that they had that endurance factor - they were good programs that have survived for many years. I'm sure they've been modified to some extent, but they are still there and that's a lot of fun.

Kelly Drinnen [00:24:34] I developed new curriculum, I work with staff to develop a new curriculum for the aquarium. So, the rainforest one got updated. We developed an all-new one for the aquarium. We did teacher workshops. I started the Educator Open House event that takes still takes place every year over there at Moody Gardens.

Kelly Drinnen [00:24:50] And it was, that was also a great experience. I got to learn all different aspects from the start at SeaWorld, all the way up to running a whole department, all these different levels of what it takes to make education happen at an informal science education facility.

Kelly Drinnen [00:25:09] But it was while I was at Moody Gardens that I met the folks at the Flower Garden Banks. And, I met first Shelley DuPuy, who was the Education Coordinator. I met her through a local environmental educators' exchange, where we would meet every other month or so at different locations around the greater Houston area, and just talk about what's going on in the environmental education community. And I got to know Shelley and other people in the area. So it was a good time of networking, learning more about what other people were doing, taking their ideas and kind of adapting to what we were doing, and just finding a path forward to create new things and new ideas at Moody Gardens.

David Todd [00:25:54] Well, so, and I understand that you also had a stint as a teacher, I guess, a fourth grade teacher, in Southeastern Houston Elementary in Pasadena. And I guess that also gave you some pretty intense exposure to how young minds learn. Maybe you can touch on that.

Kelly Drinnen [00:26:16] When I was at Moody Gardens, I led teacher workshops, and I thought I had a really good understanding of what teachers wanted from us and what they needed to know to be able to take what we were doing and use it in the classroom, and tie that in to maybe field trips someday.

Kelly Drinnen [00:26:31] When I got in the classroom, I learned I was mostly right. But being in the classroom as a formal educator was a very different experience from being an informal educator, which is what I had been up to that point.

Kelly Drinnen [00:26:45] So, I had 13 years as an informal educator, and then, boom, I jumped into a fourth grade classroom after doing what they called an alternative teacher certification. I took an abbreviated number of classes through the Region 4 Service Center in the Houston area, and learned child psychology and developmental education and so forth, to then jump into a fourth grade classroom in South Houston. And they consider your whole first year, then, as an internship where you're basically being mentored by somebody on staff while doing the job full-time, and still taking a couple classes. And I survived.

Kelly Drinnen [00:27:20] My first year teaching was a fantastic experience. I had great kids. I taught all subjects, not just science. I went in as strong science. That was my selling point to the school district, because they were coming up on new science tests for fifth grade students, so I could help get them ready for that at the fourth grade level. But I taught all subjects, and while science and math were my favorites going in, I want to say that reading was one of my favorites coming out. Working with kids and their reading skills was a great adventure as well.

Kelly Drinnen [00:27:53] I did that for two years, and I was ready to go back for my third year, and I got a call from Shelley at the Flower Garden Banks saying, "Hey, you had said you might be interested in working with us someday if we ever had an opening. We've got one. Would you be interested in applying?"

Kelly Drinnen [00:28:08] And that's when I applied for the job at the Flower Garden Banks. That was in 2004, and I got the job.

Kelly Drinnen [00:28:15] So, about a week before I was supposed to go back to teach my third year of school, I had to tell my district that I wasn't coming back. But they were able to find a replacement at the last minute. They asked me if I would please start the school year. Give them time to find another teacher, because they'd already finished interviewing all the people that had applied during the summer. And so I agreed to that. And the Flower Gardens agreed to that, that I could, you know, postpone it a month or so, to help to give the school some time.

Kelly Drinnen [00:28:42] And my first day back, trying to get ready for the start of the school year, somebody walked in the door, said they wanted a fourth grade teaching position. They said, "We've got the job for you." And they let me go that day.

Kelly Drinnen [00:28:53] So, it really worked out. It was meant to be, in my opinion, and I have never looked back. I have loved working for the Flower Garden Banks since day one.

David Todd [00:29:04] Wow. And so here it is, 20 years later. You know, I know this is, it's hard to encapsulate all this in just a brief visit like we're doing today, but, you know, maybe you can try to help us understand some of the highlights, or the day-in-the-life-of-Kelly at the Flower Garden National Marine Sanctuary.

Kelly Drinnen [00:29:27] You know, maybe you can tell us about the curriculum and educational materials that you were developing and sharing there.

Kelly Drinnen [00:29:33] So, first to correct the name of sanctuary: it's Flower Garden Banks National Marine Sanctuary. That gets butchered a lot. So, you should not feel bad about that. Flower Garden Banks National Marine Sanctuary is a mouthful, and it's hard to get people excited about something they can't even remember how to say. But that's been my job since I got there.

Kelly Drinnen [00:29:53] How do you get people to care about a place they're probably never going to visit, because it's over 100 miles offshore, but that is beautiful and enduring and absolutely amazing, at a time when coral reefs around the world are in decline?

Kelly Drinnen [00:30:10] It is still as healthy today as it was when they started doing research and exploration there in the 1970s. And that is a phenomenal milestone in this day and age. It has its threats, and we do have concerns for the future, but it's just such a phenomenal place. And to be excited about it myself makes it easy to want to share that with others.

Kelly Drinnen [00:30:32] But the challenge all along has been, how do you do that when they can't go there? If you're not a SCUBA diver, if you're not a fisherman, you're probably never going over 100 miles offshore to this place where you can't tell that you're there until you're there (and there's a mooring buoy there for you to tie your boat off to, you know). So, unless you put your face under the water or you're catching fish from above the water, you really don't have any idea how special this place is.

Kelly Drinnen [00:30:58] So, from day one, my job was to find ways to make those connections.

Kelly Drinnen [00:31:03] And one of the first things I did and coming on board was to learn about a recent coral coring project they had done, where they actually took a drill bit, probably, I'd say, about 3 or 4 inches across, and they go in and they core right down to the middle of a living coral head. And only the very top layer, about a quarter to a half an inch, is actually alive. The rest of it is the stony limestone skeleton underneath. And by coring through that, they pull out this rocky core that they can then slice and X-ray and examine and learn about the growth of this coral over an extended period of time.

Kelly Drinnen [00:31:35] This particular core went back over 200 years. You can count the growth lines in it, just like you can the tree rings, when you cut down a tree. And they could, scientists could, take isotopes, they could do isotope sampling, add the different layers to tell what temperatures were during each particular year, each month of the year, if they broke it down enough, and therefore get a climate history for a place we weren't keeping, we didn't have scientific instruments to track that kind of thing for the last 200 years.

Kelly Drinnen [00:32:06] And so, that was fascinating to me. And I thought this, this has potential to be a lesson. This is really cool stuff.

Kelly Drinnen [00:32:11] So, I developed, a lesson that's now called, "Coral Cores, Ocean Timelines". And, that has been available to teachers, since, I don't know how many years ago it's been now. But that was, you know, tying it in to the Texas Essential Knowledge and Skills, those school standards that are required, creating things that teachers can easily take and use immediately in the classroom and not have to do a lot of extra work for - all the things I learned as an informal educator at Moody Gardens, at Sea World, and then my time in the classroom, and kind of combining all that into developing a great lesson that could be applied and meet certain learning objectives in the classroom.

Kelly Drinnen [00:32:53] I also learned more about how we do our research and monitoring in the Sanctuary, and started putting together an activity about that. And that one also still exists, It's our reef monitoring lesson. And it shows how using actual photographs we take in

the Sanctuary, year-after-year, how you can observe changes happening over time. And that is a really major learning objective throughout Texas Essential Knowledge and Skills.

Kelly Drinnen [00:33:19] So, those were two major lessons that I developed.

Kelly Drinnen [00:33:22] I also worked on previously existing curriculum, and updating and testing some of the activities and making sure they all work. They had previously had some teachers develop stuff for them, and I just kind of refined those things.

Kelly Drinnen [00:33:37] I also jumped in to lead a teacher workshop that took SCUBA divers offshore, and that was actually how I first interacted with the Flower Garden Banks in person. And during my time at Moody Gardens, I had heard about this workshop. I am a SCUBA diver. I decided that I would participate in this, and Moody Gardens agreed that would be beneficial to us in learning more about this local environment that we could then teach about there.

Kelly Drinnen [00:34:02] So, I was a participant in what they called the "Down Under Out Yonder" workshop, or "DUOY" for short, "D-U-O-Y". And the DUOY workshop involved us a day or so down in Lake Jackson, learning about ways to teach about corals and fish and things in the classroom, and learning how to identify different species of fish. And then we spent three days out diving in the Sanctuary, and doing fish surveys as part of that time to learn more about what we were seeing, and at the same time providing important data at the Sanctuary.

Kelly Drinnen [00:34:35] So, we were being citizen scientists while we were out there learning ourselves and figuring out what we could take back to classrooms or informal education sites.

Kelly Drinnen [00:34:43] And that was when I first told Shelly, "If you ever have another education position, I'd be interested."

Kelly Drinnen [00:34:49] So, when I came on in 2004, they put me in charge of those workshops, and within two weeks of being on the job, I actually participated in a version of that workshop that we did for folks from the Tennessee Aquarium who were building a Flower Gardens exhibit at their facility in Chattanooga. So, their staff, their biology and their education staff, that were all SCUBA-certified, came down here and we took them out on a version of our DUOY workshop.

Kelly Drinnen [00:35:16] And so, within two weeks of working for the Sanctuary, I was out diving in the Sanctuary again and it was just fantastic.

Kelly Drinnen [00:35:23] So, I then stayed on as the person who led that, organized and led that workshop, every summer until 2016, which was the last time we held that workshop. So, all told, I think I counted up 13 different DUOY workshops in which I either was a participant or I was the instructor, from 1999 to 2016.

Kelly Drinnen [00:35:46] That's impressive.

Kelly Drinnen [00:35:46] So, a very long-lived program. We have a lot of alumni from this program that are still involved with the Sanctuary or with NOAA in other ways. It was a very long-lasting, deep, thrilling experience for the people who participated. It really had so much depth to it.

Kelly Drinnen [00:36:05] And then you had the camaraderie of people who spent five solid days with that had similar interests in taking stuff back and teaching others about it.

Kelly Drinnen [00:36:14] So, those workshops are fantastic, as both a participant and as a leader and instructor for the program.

David Todd [00:36:21] Well, it sounds like a wonderful program to not only teach about the Flower Gardens, but also to, build this network of camaraderie that you mentioned, and also, I guess, to leverage it through exhibits in Tennessee and elsewhere.

David Todd [00:36:34] So, I'm curious about the diving out there and, you know, being able to give people this sort of intimate, hands-on view of the reef. Do you remember any unusual or outstanding dives that you might have taken while you've been at the Flower Gardens?

Kelly Drinnen [00:36:55] Oh, definitely. So, my very first dive ever, when I went out in that first workshop, you're standing on the deck of the boat with all this heavy gear on, and you have to jump six feet down to the water surface, and in. And I had never made that kind of an entry into the water before. All my training had been coming in at more surface level. So, that was a scary experience. You can't see land anywhere in sight. And I thought, "Oh gosh, here goes nothing."

Kelly Drinnen [00:37:18] And I jumped in. And then we had to follow a line over to the mooring. And then from the mooring down to the bottom. And on my way down, before I ever got to the bottom, two manta rays came in for a visit. And they're swooping and swirling around those of us that are on our way down. And it was just, "Oh my gosh, look at this. This is a fantastic experience. If I never dive again, it's going to be okay. Because this was phenomenal."

Kelly Drinnen [00:37:45] And from that moment on, I was sold on the Sanctuary. Since then, I have never been on a trip without somebody seeing a manta ray. It's not always me, because I tend to have my head in a hole looking for the little cryptic things I've never met before. And sometimes I have to remind myself to look up every so often and look around for the big stuff. But every trip I've ever been on out there, somebody saw a manta ray at some point in the trip.

Kelly Drinnen [00:38:10] The manta rays, we have determined: it's a manta nursery out there, and that's a more recent discovery or understanding, that a lot of the mantas we have out there are smaller than people see elsewhere, and it's because they're juveniles. And we didn't fully understand that ourselves until five, ten years ago.

Kelly Drinnen [00:38:28] So, it's been a period of discovery and learning about the fascinating creatures that live out there.

Kelly Drinnen [00:38:34] I also, after doing that first trip out with the DUOY workshop, when I was still working at Moody Gardens, got asked back to be a volunteer on another trip because I'd had all this training for the DUOY workshop. I could be a Naturalist on Board, and that was a volunteer program they used to run in conjunction with the two dive boats that went out of Freeport, and they would put a volunteer diver on board each of those boats every weekend when the majority of people went out diving there, just to kind of tell people more

about the Sanctuary and help them understand they were visiting a National Marine Sanctuary and answer their questions.

Kelly Drinnen [00:39:08] And so, they had one of those people cancel at the last minute, and they came to those of us who had just finished the workshop and were local and could maybe go out, and they said (it was a like a Thursday or a Wednesday evening), and they said, "Let us know as soon as possible." And on Thursday morning I called back and said, "I can do it. I want to go."

Kelly Drinnen [00:39:28] And on that Friday night, I got on the boat with all borrowed dive gear, because that's all I had time to get. And I got on the boat as a volunteer Naturalist on Board and went on that trip, and we saw a whale shark. So, my first trip - manta rays; my second ever trip - a whale shark. It swam right alongside the boat. We were not able to get in the water with it. It went by too fast, but we were literally looking straight down on it. It was practically touching the boat as it went by. And that again was a phenomenal experience.

Kelly Drinnen [00:39:58] Since then, I have had the chance to get in the water with a whale shark at the Sanctuary. They are not as regular a visitor. They come in the warm summer months. They're not as predictable about being there as perhaps manta rays, even though if you wanted to tag a manta ray, they're not predictable at all. But whale sharks are another phenomenal creature you can possibly see out there.

Kelly Drinnen [00:40:20] So, those are, I would say, were my two most invigorating experiences as far as wildlife encounters. And that's before I ever worked there. It's no wonder I wanted to come work for this place.

David Todd [00:40:32] You know, I thought it was intriguing when you mentioned that, sometimes there's a manta ray that's present, but you're, you're looking in some sort of nook or cranny of the reef, looking for, I think, some sort of cryptic creature. And I think you referred to yourself once as a fish nerd. And I was wondering if you could tell us about any sort of less charismatic, but still very significant, animals you might have seen, perhaps during your fish survey project, the REEF project, that I think you mentioned at one point.

Kelly Drinnen [00:41:10] Yes. So, the fish survey training was done by people from REEF, an organization in the Florida Keys, when I was in those DUOY workshops. So, I participated twice while I was at Moody Gardens. And the first time I had the fish ID training, I found fascinating. If you recall, my favorite book as a child was "Fish Do the Strangest Things". So, I was, like, I am a total fish geek. I just have discovered this totally about myself at that point, and couldn't wait to get down there and do more surveys each time I went out in the Sanctuary.

Kelly Drinnen [00:41:42] I learned, you know, the certain fish that you're most likely to see. And then I kept teaching myself more fish. So, they taught you how to learn new fish by jotting down the ones you see, the key markings and things like that, and then looking it up in the book when you get back on the boat, and then putting that in your memory banks and moving on and learning more.

Kelly Drinnen [00:41:58] So, there's a good standard group of fish that I'm very familiar with. So, every time I go do a survey, I'm like, "I would love to add one more I never counted before - you know, something I haven't met yet." And the way to do that is very often to look for the really cryptic things, the things that blend in with the background, the smaller creatures.

Kelly Drinnen [00:42:15] But also there are some unusual ones out there - they're not necessarily cryptic, but you don't see them as often. And so, I was busy trying to find those kinds of fish on all my experiences: each time I went out teaching a new group of teachers, I was out there surveying myself, and trying to see what I could find and show them.

Kelly Drinnen [00:42:34] We have a fish in the Sanctuary called the Golden Smooth Trunkfish. Now, the Smooth Trunkfish itself is a fish found throughout the Caribbean, not unusual - it's not a super common fish, but it is one you can see quite easily. And it's a very triangular box-shaped fish. It's black with white spots, and we have those at the Flower Garden Banks.

Kelly Drinnen [00:42:55] But we also have a gold version. It's gold with white spots that have like little black circles around them. And that seems to be relatively unique to the Flower Garden Banks. There have been some reported in the Bay Islands of Honduras. I've never seen one there. I went diving there once, but I never found any. But in the Flower Garden Banks we have these Golden Smooth Trunkfish. And I learned about them on my very first workshop, but I've never seen one. Every once in a while, I'd see one of the regular Smooth Trunkfish and I kept saying, "When am I going to find one? I don't believe they exist. I haven't seen one yet."

Kelly Drinnen [00:43:25] And they said to me, "When you see one, then you'll start seeing them pretty regularly." And they weren't wrong. It took a few years, but I finally saw one. And then I'd see them, fairly, you know, almost every year I'd see at least one. So, they're not as common as the regular ones, but they're out there, and they're fascinating to see, especially because if you know in your head that they're unique to our area, that that's something really neat to find.

Kelly Drinnen [00:43:48] We also have a fish out there called the Mardi Gras Wrasse, and that was a new fish to science. I want to say it was somewhere around 2010. So, people had taken photos of this fish and said, "We're not sure what this is. It doesn't seem to match any of the ID books." And our scientists and some researchers down in Mexico looked into it, and they determined it was a new species to science.

Kelly Drinnen [00:44:10] So, it's a little oblong fish - about cigar-shaped and about cigar-sized fish. And it's purple, green and gold. So, kind of Mardi Gras colors for the male of the species. And the females and the juveniles are red with a white stripe down, and a black spot near the tail. And so, they identified these. They wrote up all the papers. It was "Voila, a new species to science". And our Sanctuary staff got to be part of naming it its common name, the "Mardi Gras Wrasse".

Kelly Drinnen [00:44:36] And then we named, we helped choose the scientific name. And it was to name it after the people who brought the photo to our attention, which are professional photographers named Joyce and Frank Burak. And we named it *Halichoeres burekae*. So, it was named after the two of them who had, you know, alerted us to these unusual fish in their photographs.

Kelly Drinnen [00:44:57] So,, then I would go out and try and find those because they're there, but they're not as noticeable as a lot of the other wrasses of similar size and shape. So, a little more unusual.

Kelly Drinnen [00:45:08] I also enjoy looking for blennies and gobies. They're very small, oblong fish, but they tend to be, like I said, very cryptic in coloration. A lot of things that make them blend in with their background. They're spotted and speckled, and there's very slight differences from one to the next. And being able to see those key characteristics to tell them apart, that's always been fun for me.

David Todd [00:45:32] So, you told us about some of the really outstanding creatures that you've seen. I'm wondering if you can talk about any things that have changed over time, you know, where there's something new, or maybe something that no longer appears. Any sort of trends like that that you've seen in your 20 years out there?

Kelly Drinnen [00:45:57] Well, that started with my first DUOY workshop as well. When we were learning the fish, we learned about something called a Yellow Goatfish. It's a white fish with a yellow stripe down the side and a yellow tail, but it tends to feed along the bottom. It has these little barbules that stick down to make it look like a goat beard. And they feed along the bottom.

Kelly Drinnen [00:46:17] But they're very similar looking in appearance to something called a Yellow-tailed Snapper, which is quite prevalent throughout the Caribbean and other parts of the Gulf of Mexico. But it was not previously known in the Flower Garden Banks.

Kelly Drinnen [00:46:28] And so, when they were teaching us, they said, "If you see a fish like this, you might think Yellow-tailed Snapper, but it's probably a Yellow Goatfish." We've only had a couple people say they think they've seen them in the Sanctuary, but up till now, we really don't have any confirmation that they are actually in the Sanctuary.

Kelly Drinnen [00:46:45] The species list for the Sanctuary is a subset of the rest of the Caribbean, because we're so physically isolated from the rest of the Caribbean, we're so far north. We're over 500 miles from the Florida Keys. And the next closest reefs in Mexico.

Kelly Drinnen [00:46:59] So, it's only certain Caribbean species that have made it all the way up to where the Flower Garden Banks are located in the northwestern Gulf of Mexico.

Kelly Drinnen [00:47:07] And so, since they said that Yellow-tailed Snapper hadn't been confirmed out there, I'm like, "I'm going to find some", right? So I was looking the whole time and I did find those Yellow Goatfish, but I never did find any Yellow-tailed Snapper during my years as a participant in the workshop.

Kelly Drinnen [00:47:22] Many years later, I would teach the fish ID class and I would mention that same thing every time I taught the class: "So, keep your eyes peeled. Who knows, right?"

Kelly Drinnen [00:47:30] And then on one trip, I jumped into the water and my dive buddy and I were right in the middle of an entire school of Yellow-tailed Snapper. And then my dive buddy had a camera. I'm like, "Quick, take a picture, take a picture, take a picture." I'm not good with an underwater camera. That doesn't really work for me. So, he took a picture.

Kelly Drinnen [00:47:49] We kept doing our dive. We came back up to the boat afterwards, and our Sanctuary Superintendent, G.P. Schmah, happened to be on the boat at the time, but didn't make that particular dive. And I got up there and said, "Did you see those Yellow-tailed

Snapper?", to my dive buddy. And G.P. said, "Are you sure they were Yellow Goatfish?" And I said, "No, no, no, no. I was this close to them. I know they were Yellow-tailed Snapper."

Kelly Drinnen [00:48:11] And fortunately for me, they stayed in the area. And G.P. took the next dive with me and he saw them too, and he got some pictures. So, we verified that, in fact, Yellow-tailed Snapper were now found in Flower Garden Banks National Marine Sanctuary. So, it was hinted at for years, like maybe somebody saw one or two here and there. But then we saw an entire school on that particular trip. And that was kind of confirmation that this species - it's known to the area, but wasn't previously seen at the Flower Garden Banks.

Kelly Drinnen [00:48:40] Another species that I've been, I wasn't part of the experience of figuring this out, but another species that wasn't originally found at the Flower Garden Banks was, Sergeant Major, which is a kind of damselfish that was down on the reef. It's one of the larger ones in the species, in that family. And they weren't previously found in the Sanctuary, but then they were.

Kelly Drinnen [00:49:01] And they suspected it had something to do with the installation of mooring buoys. That was something that the Sanctuary started installing in an effort to prevent anchoring, because anchoring is illegal in the Sanctuary and damaging to the bottom habitats. So we installed moorings in areas where there's not living coral. And then by a rope they attach to a buoy at the surface, and then people tie off to the buoys to hold their station.

Kelly Drinnen [00:49:24] So, they think that the shallow habitat that the juvenile Sergeant Majors would have used in a place like the Florida Keys, that we don't have out there in the middle of the deep ocean, that the mooring buoys substituted for that. So, these Sergeant Majors would hang out in the shade, cover and up near the mooring buoys, and then eventually settle down on to the reef.

Kelly Drinnen [00:49:45] So, it's possible that they had been there previously, but didn't have a way to survive into adulthood. And then eventually, that's changed. So, you did find Sergeant Majors out on the reef at the Flower Garden Banks and the Stetson Bank.

David Todd [00:49:58] That's intriguing: I mean, to have this experience over 20 years and I guess some of it is that you see changes, and some of it is that you're just discovering new things about this place that maybe haven't changed, but you're aware of them, when you might not have been before.

Kelly Drinnen [00:50:17] Yes.

David Todd [00:50:17] You mentioned in passing that these mooring buoy were installed to try to protect the coral and I think that that's something that we're greatly interested in is trying to find out steps that were taken to protect this really extraordinary place. And if there's any time, now or later, when you might be able to tell us about some of these measures, you know, very welcome to hear those stories.

Kelly Drinnen [00:50:44] So, mooring buoys were first installed out at the Flower Garden Banks by a volunteer group before it was ever a Sanctuary. The group was called GREAT, the Gulf Reef Environmental Action Team. They were part of the history. I don't know a lot about them other than they were the first ones to install any kind of moorings out there. I want to say they used cinderblocks and a few other kinds of things along the way.

Kelly Drinnen [00:51:05] But once it became a National Marine Sanctuary, they found ways to put in more permanent moorings. And that system was originally designed in the Florida Keys and then was adapted for use in the deeper reefs at the Flower Garden Banks.

Kelly Drinnen [00:51:20] And now we are in the process of trying to develop another system that will work for even deeper reefs than what we have at the Flower Garden Banks and Stetson Banks. So, we're talking moorings that are located at about 70 to 90 feet underwater is where they're attached to the bottom.

Kelly Drinnen [00:51:39] We have newer banks to the Sanctuary that were added in 2021, and we want to install some moorings in those areas. And so, they're having to redesign this and find ways to protect it and make it less vulnerable to breakage during hurricanes and from heavy vessels and other possible things.

Kelly Drinnen [00:52:01] I mean, moorings, mooring buoys, wear down over time, and they, the lines break and they go missing or float off into the horizon or whatever. They get hit by ships. All different kinds of things can happen to them.

Kelly Drinnen [00:52:14] But to install a mooring at a really deep area is even more difficult. And you got a lot more distance between the bottom and the top and a lot more wave action to affect it.

Kelly Drinnen [00:52:23] So, our mooring staff right now are designing a new system to have subsurface buoys that are part of this system, to take some of the pressure off of what's happening at the surface and allow for intended breakage points should problems at the surface become too bad. And then we don't lose a lower surface attachment to that that we can go back and reattach to without having to go all the way to the depth, which requires more technical diving and so forth to accomplish.

Kelly Drinnen [00:52:52] That is really interesting. Yeah, I guess this this addition of the new banks in 2021 introduces a whole a new set of problems about how you can moor nearby to explore them without losing the mooring or damaging the reef. Yes.

Kelly Drinnen [00:53:09] Yes.

David Todd [00:53:10] So, speaking of adding these additional, deeper banks. Can you tell us anything about the effort to enlarge the boundaries of the Flower Garden Banks National Marine Sanctuary over recent years?

[00:53:26] Sure. So, in 1992, when the Sanctuary was originally designated, it consisted of two offshore banks, called East Flower Garden Bank and West Flower Garden Bank. And that's where the name of the Sanctuary comes from, from the names of those banks.

Kelly Drinnen [00:53:39] In 1996, Congress approved adding Stetson Bank to the Sanctuary. And when I came on board in 2004, that's what the Sanctuary consisted of - three banks, East Flower Garden Bank, West Flower Garden Bank, and Stetson Bank. East and West Flower Garden Bank are situated about 115 miles due south of the Texas / Louisiana border, and are separated by about 12 or 13 miles of open ocean.

Kelly Drinnen [00:54:02] Stetson Bank is about, I think I said, 20 miles to the northwest of West Flower Garden Bank. So, it's a little closer inshore, a little more accessible. We see more

fishing there and a little more visitation there, because it's an easier boat day trip than it is out to the East and West Flower Garden Bank.

Kelly Drinnen [00:54:20] So, when I came on board, everything I was working to teach people about were these shallow reefs that you could visit with SCUBA diving, at least down to a depth of 130 feet, the recreational SCUBA diving limit.

Kelly Drinnen [00:54:31] And then we did other explorations deeper, using remotely operated vehicles to explore down in the deep areas.

Kelly Drinnen [00:54:39] During all that time, there were other explorations going on along the continental shelf off the coast of Louisiana, where we have a continuing link, a chain of banks out there, and some of its exploration was done by the Sanctuary. Some of it was done by researchers from Texas A&M, from oil and gas. All different kinds of explorations were going on out there.

Kelly Drinnen [00:55:00] And the more we learned about these areas, and the more we saw their habitats and the creatures that lived there, we understood that they were connected. And when you are mapping in the northwestern Gulf of Mexico, you also see that geologically they're connected. You can see ridges and troughs that lead from one bank to the next.

Kelly Drinnen [00:55:19] Each one of these banks is formed by an underlying salt dome, which is a pocket of salt beneath the seafloor that pushes the seafloor upwards, because it's less dense than the surrounding materials, and it keeps trying to push upwards. And so, it causes this fracturing of the overlying layers. And you get these little underwater mountains, which we call banks.

Kelly Drinnen [00:55:38] That's also what draws the oil and gas industry out into the Gulf of Mexico, because when you have the fracturing, it allows for travel of trapped pockets of oil and gas to consolidate into different areas. And it's really great areas for extracting. So, the salt domes themselves were a great attractant to oil and gas, which led to exploration, and a great attraction and solid ground for habitat to build.

Kelly Drinnen [00:56:01] And that's why it was a great attraction to researchers from Texas A&M and other universities that wanted to know more about the different habitats and creatures of the northwestern Gulf of Mexico.

Kelly Drinnen [00:56:12] So, over the years, we learned more and more about these banks. I came on to the Sanctuary in 2004. In 2005, we had our first discussions about possible Sanctuary expansion, and that was just internally with the staff, thinking this was something we wanted to look more into, and what were the steps that we should take to do that.

Kelly Drinnen [00:56:30] And over the years that developed into an Advisory Council that started in 2006, representing eight different industries that are users of those areas, including oil and gas, fishing, diving, research, education and conservation. So, that's only six I mentioned. But there was diving operations as well as recreational diving. There was commercial fishing and recreational fishing. So that added up to a total of eight.

Kelly Drinnen [00:57:02] And representatives from those industries would advise us on what to do about the Sanctuary. And they worked with us to develop a plan for expanding the Sanctuary, and gave us a recommendation in 2007.

[00:57:16] And then we went forward with that through an entire formal process of bringing information to the public, asking questions, letting them ask questions back to us, asking for public input. And that process continued on all the way till 2021, when it finally became reality. And we added 14 more banks to the Sanctuary.

Kelly Drinnen [00:57:34] So now we have a total of 17 banks in the Sanctuary, most of which have just the mesaphotic or deeper reef zones, but some of which also have shallower areas similar to Stetson Bank, and nothing quite like the Flower Garden Banks, the massive amounts of coral we have there. But McGrail Bank also does have significant hard coral reefs there.

David Todd [00:57:57] Okay.

David Todd [00:57:59] So, this is one of the things I'm really interested in. And I imagine it's been a challenge for those interested in the sanctuaries that, you know, there are lots of stakeholders and multiple users. I think you mentioned eight different constituencies. I'm curious how the administrators of the National Marine Sanctuary there managed to sort of cobble together a consensus to move forward with an expansion, or, you know, aside from the expansion, just like day-to-day management of the conflicts out there, whether it's oil and gas development nearby, or shipping lanes that pass near the site, fishermen that might want to fish out there.

Kelly Drinnen [00:58:47] The Advisory Council membership was developed ... we had to decide what seats we wanted on it, and then we advertised for people to apply for the seats. And so, we managed to choose from those people to fill the original seats on the Advisory Council. And then every two to three years, a person's seat comes up for renewal or replacement and we would advertise for new positions. We've been doing this since 2006.

Kelly Drinnen [00:59:15] Dick Zingula, who we've previously spoken about, was one of our original Advisory Council members. Frank Burek was one of our originally original Advisory Council members. He's the man who, with his wife, is a professional photographer in the Sanctuary and has a fish named after him now.

Kelly Drinnen [00:59:33] So, there are some people who had already been players, so to speak, in the development of Flower Garden Banks National Marine Sanctuary before it even was a Sanctuary. And some of those people jumped right on board when we put together the Council.

Kelly Drinnen [00:59:48] Now, the Council is different than an executive board of a company. You know, the board of a company makes decisions and hands down directives, an advisory council simply makes recommendations, and, in other words, advises the Sanctuary Superintendent. So, their goal is to put forth recommendations, get consensus as a group, and then send those recommendations up to the Sanctuary Superintendent.

Kelly Drinnen [01:00:17] So, that has been important in the development because part of the whole National Marine Sanctuary system, part of the premise behind that, is that it's publicly guided, that this isn't an invisible process. This is something that is driven by local communities.

Kelly Drinnen [01:00:35] The establishment of Flower Garden Banks National Marine Sanctuary was driven by the dive community that saw anchoring incidents, that saw problems

out there, and wanted to do something about it. It took many years before the Sanctuary finally made it through the designation process from its first recommendation, I think, in the 1970s. And it didn't become a sanctuary until 1992.

Kelly Drinnen [01:00:56] So, it's always been people who are interested in the Sanctuary that have helped drive it forward into becoming a Sanctuary and then in deciding what directions it should take in Sanctuary management.

Kelly Drinnen [01:01:11] That said, they don't tell us what to do. They advise us what to do. And that's been a very important component. The Sanctuary Superintendent and staff can then look at it and say, "We agree or we don't agree", and then move forward.

Kelly Drinnen [01:01:23] And usually, the end result is some kind of compromise between the two. We have opinions as the people who do the science out there, as the people who are educating about the Sanctuary. And we blend those with the opinions and recommendations that come from the members of our Council, so that we have a collaborative effort in deciding how the Sanctuary moves forward.

Kelly Drinnen [01:01:44] If you go back and look at the history of our Sanctuary expansion, when we came out with our Draft Environmental Impact Statement for expansion (I can't remember exactly what year that was; it's on our website), our recommendation was actually bigger than what the final Sanctuary expansion ended up being. The boundaries were wider and a few more banks were included than ended up in the final product, and that was a result of consultation with the public, and consultation with our Advisory Council.

Kelly Drinnen [01:02:13] And the inputs, especially from fishing and oil and gas industries, had a big influence on how we designated those things. If you don't collaborate with other users of the area, you're never going to have a Sanctuary at all. And so compromise is better than nothing, right? It may not be exactly all we wanted. We felt like more habitat could have been protected.

Kelly Drinnen [01:02:37] But, in the end, we still protected a lot more habitat than was previously. We went from 52 square miles up to 160 square miles. So, we expanded by three times, just about, the size of the sanctuary.

David Todd [01:02:53] Maybe you can tell us, sort of play it through in your mind, what the concerns of, say, commercial fishermen or the oil and gas industry might have been about, Sanctuary and its shape and its size.

Kelly Drinnen [01:03:09] For fishing, my understanding is that they had concerns about not being able to anchor in areas that were most useful to them for fishing. The areas that are now included in the Sanctuary were areas previously used by commercial fishers, and recreational fishers, alike. They had asked for alterations in the ability to anchor in certain places where maybe only fishermen could anchor in these places, even if nobody else could.

Kelly Drinnen [01:03:38] And, in the end, the Sanctuary decided that was just too hard to enforce. It was easier just to have no anchoring. But by drawing boundaries in a little closer to biological features we were trying to protect, we were able to allow a little more space for them to anchor closer to the features that they wanted to fish near, without being inside the Sanctuary to do that. And so that was a compromise.

Kelly Drinnen [01:04:00] Oil and gas had a lot of access-to-oil-reserve concerns. Now, sanctuary regulations prohibit drilling inside the sanctuary, but you could drill from outside the sanctuary and in and under. But if you put your boundaries out too far, is that realistic? So, there were there were concerns ...

Kelly Drinnen [01:04:22] And platforms already in existence. I mean, that was something we had to take into consideration. The existing sanctuary of East and West Flower Garden Banks and Stetson Bank had one platform inside its boundaries, at East Flower Garden Bank, when it was originally designated, and that was not done intentionally, is my understanding. I wasn't there at the time, but it was based on how they ended up drawing the boundaries that it ended up being captured inside.

Kelly Drinnen [01:04:46] And so the goal was to try and avoid that in future expansion areas, although the original draft plan that came out did incorporate a few oil and gas platforms at certain banks. The end result was not including any of them in those areas, because it would require additional involvement and consultation for any actions that would then take place around those platforms because of being inside a National Marine Sanctuary.

Kelly Drinnen [01:05:11] So, those are the two main considerations that I heard in the discussions, had to do with anchoring issues and access issues around the bank areas we were looking to protect. Not that they disagreed about the habitats needing protection, because those habitats are protecting the fisheries that these people are interested in participating in, and oil and gas already has mandates to protect particular habitats within the oil and gas regulations.

Kelly Drinnen [01:05:38] And so, making these areas part of the sanctuary just kind of gave them more comprehensive regulation and protection, whereas, otherwise, protection was a little piecemeal. This kind of regulation in the oil industry, this one in the fishing industry, you know, nothing that was kind of global. So, one person could anchor, but another person couldn't or, you know, what have you. And putting these areas inside the sanctuary made for more comprehensive protection.

David Todd [01:06:03] Got you. Okay.

David Todd [01:06:07] So, you've been sort of a handmaiden to all this research that's gone on at the National Marine Sanctuary there at the Flower Garden Banks, and I was wondering if there are any, you know, overall themes or recurrent kind of topics that you've seen over the years for research there.

Kelly Drinnen [01:06:32] A lot of the research that takes place in the Sanctuary is actually done by outside parties - a lot of universities and research organizations that work through us to do work in the sanctuary. So, we issue permits for a lot of the research.

Kelly Drinnen [01:06:49] What Sanctuary staff do mostly is monitoring of the Sanctuary, and long-term monitoring has taken place at the Flower Garden Banks, I want to say since the 1970s, and at Stetson Bank since the 1980s. We have one of the longest data sets on a coral reef anywhere in the world as far as our long-term monitoring at East and West Flower Garden Banks.

Kelly Drinnen [01:07:14] Originally, when I hired on, we had consultants that did the long-term monitoring, collected the data for us, and it was our staff that analyzed it, or not even

entirely that. The outside consulting companies collected and analyzed the data and handed it back to us. We discussed it with them and, you know, gave approval for the final reports that came out.

Kelly Drinnen [01:07:33] Later on, when we got our own research vessel in 2008, we took on those responsibilities ourselves. So, now we go out there and do the the long-term monitoring activities ourselves, collect the data, analyze the data and write the reports. So, that was a big change it that started in the 2008 timeframe.

Kelly Drinnen [01:07:53] Prior to that, the predecessor to BOEM and BSEE, which was the Oil and Gas Board. Drawing a blank.

David Todd [01:08:05] The Minerals Management Service?

Kelly Drinnen [01:08:07] Minerals Management Service, yes. So, originally the Minerals Management Service was the one that that paid for all the research and monitoring that went on in East and West Flower Garden Bank. And so, the final reports came out through them, with our consultation.

Kelly Drinnen [01:08:22] And then when we transitioned to us actually doing it, they now, in the form of Bowman Bessie, provide us with the funding. We do interagency funding agreements where they support financially the work that we do, but we are the ones actually doing it. So, instead of supporting a contract company, they are now supporting the Sanctuary staff themselves to go out and do the monitoring in these areas.

Kelly Drinnen [01:08:46] And this monitoring includes repetitive photo stations, which are pins marked out on the reef, and we go back to those pins and take the exact same photos every year. We do transects out there where we take photos along random lines around the reef, to take photos of what the benthic organisms look like. And then we analyze those and the photo station photos for how much coverage is coral, how much is algae, how much is sponge, how much is other stuff, to understand the growth, or recession of items on the reef, growing on the reef, on the benthic surfaces.

Kelly Drinnen [01:09:23] They do fish surveys. They do urchin and lobster surveys.

Kelly Drinnen [01:09:27] All these take place at East and West Flower Garden Bank every year. The first year we missed was during COVID when we just couldn't get off shore. But otherwise it's been a continuous data set.

Kelly Drinnen [01:09:39] And then Stetson Bank, as I said, was added in as a long-term monitoring program, I want to say, in the late 1980s, and that's been going continuously in the same fashion.

Kelly Drinnen [01:09:48] Now, with the newer banks on board, we're going to have to develop plans for how to monitor those areas and how we're going to get access to those areas. And that's where some of this mooring buoy stuff is going to come in. Some of the first of these deep moorings are going to go in, hopefully, this summer with the help of the Deepwater Horizon restoration program and Navy divers and etc. They've got a whole plan together. And hopefully in June we're going to get the first of those moorings installed.

Kelly Drinnen [01:10:15] And we then will be working towards setting up monitoring programs at each of these other reefs. The likelihood that they can be as detailed and in-depth as what we do in East and West Flower Garden Bank and Stetson Bank remains to be seen. We got 17 banks now, and it takes us most of the summer to get data done for three banks. So how do you do that long-term over that much more area? Maybe it's going to require more partners and more funds and all these other kinds of things. So, that remains to be seen. But we are working towards that.

Kelly Drinnen [01:10:48] We also just had a meeting in November called the Gulf Reef Symposium. It was held at Moody Gardens and brought in scientists from across the region that are interested in the coral reefs of the Gulf of Mexico, and we tried to develop a long-term science plan. What should our goals be? What do we know so far? What don't we know? What should our goals be in different areas?

Kelly Drinnen [01:11:11] And we have just recently come out with those science needs sheets, with summaries for each of the areas - under climate change, under monitoring, under all these different categories. What is it that we need to be working towards? What is it we already have to understand where we need to go as a science program? Whether it's done by us in person or by partners, at universities and so forth, that remains to be seen, but to have these goals ahead of us.

Kelly Drinnen [01:11:39] This is also leading us towards the development of our next management plan, which we will be starting to work on this coming fall. And in the past couple of years, we also have put together a condition report, which will hopefully be released this year, finalized and released. And that is to look at the status of a variety of science aspects of the sanctuary. Is the biology good out there? Is climate change a problem? All those different things and what we can tell about them.

Kelly Drinnen [01:12:09] And that was done in consultation with a variety of experts in the field over many discussions in the last several years. And then the Sanctuary staff wrote up and put together that report, which will hopefully come out this year.

Kelly Drinnen [01:12:20] All of these things are leading up to that management plan review, which in a corporate environment would be called strategic planning. So, this is the plan we put on paper that says, 'this is what we'd like to do in the next 5 to 10 years.'

Kelly Drinnen [01:12:34] Our last plan came out in 2012. It's time to get the next one underway. And it's a lengthy process.

David Todd [01:12:43] Well, that's great to see all the careful thought and monitoring and surveying that's been going on. And I am curious about whether you can give us a peek view of the condition report, you know, based on these photo sessions and the transects and the surveys of fish and urchins and lobsters and I guess you've been tracking water quality.

Kelly Drinnen [01:13:07] Mm hmm.

David Todd [01:13:08] Are there things that are staying the same or the things that are improving, things that are regressing? What sort of long-term trends do you see in a sort of ecological sense out there?

Kelly Drinnen [01:13:21] I don't know that I can speak to that without the notes in front of me. I have been a party to all these different conversations when we have had the meetings with experts and so forth. The overall picture is that the Flower Garden Banks right now is in good shape. We are far healthier and productive than any other coral reefs in the region.

Kelly Drinnen [01:13:42] But we have our challenges. Climate change is definitely an overarching challenge. We aren't as affected by visitation. We aren't as affected by runoff and marine debris.

Kelly Drinnen [01:13:54] And that's simply because of our distance from people. We're remote. Whereas most coral reefs are right up close to a coastline, ours are 100 miles or more offshore.

Kelly Drinnen [01:14:04] The challenge in putting together this condition report is we don't have any baseline data for all those new expansion areas. So, our last condition report, which came out in 2008, was just about East Flower Garden Bank, West Flower Garden Bank and Stetson Bank. And we had lots of long-term data sets that are going to go into.

Kelly Drinnen [01:14:21] This time, we've added 14 more banks and we don't have baseline information on them. We have surveys we've done in the areas with remotely operated vehicles, and we have information we definitely collected over the years, but we don't have a lot of the same kinds of data sets to help us make solid decisions.

Kelly Drinnen [01:14:38] So, some of the ratings you're going to see in the condition report are "Not enough information to tell", or "Good as far as we know".

Kelly Drinnen [01:14:47] But another thing the condition report looks at is what are the trends? Is this good now and trending down? This is good now and trending up? This is excellent and trending down? All those different things, every separate little aspect in the condition report is rated in that respect. And then also the level of confidence in those ratings based on all the experts that we discussed with.

Kelly Drinnen [01:15:07] So, there's a lot of good information that comes out in that that will help drive what we put into our management plan.

David Todd [01:15:17] All right. You know, when you're trying to speak to the public or speak to scientists who are interested in the Flower Gardens, or industries that, you know, are curious about the Sanctuary, are there some central messages that you try to convey as an educator and outreach person?

Kelly Drinnen [01:15:42] Yes, definitely. The biggest part of my job is building awareness. Most people have no idea the Flower Garden Banks National Marine Sanctuary actually even exists. Most of them don't even have any idea there is a National Marine Sanctuary system. Everybody knows about national parks. Nobody knows about National Marine Sanctuaries.

Kelly Drinnen [01:16:03] So we're already climbing a big hill here. And a lot of times we liken ourselves to national parks, but underwater, because we are a place the public can visit. We are a place the public can utilize for recreation, with the ultimate goal of resource protection.

Kelly Drinnen [01:16:21] So, if you went to Yellowstone, you can go around and visit certain areas. They have visitor centers. There's hiking trails, all these different kind of things you can do in that park when you visit. But their goal is protecting that special resource.

Kelly Drinnen [01:16:34] Same thing with the Flower Garden Banks because our goal is to protect it. But it's hard to get people to protect something if they don't care about it. And it's hard to care about something you don't know anything about.

Kelly Drinnen [01:16:42] So first we have to get them to understand it's even out there. And then the next step is to say, "This is all the really cool stuff that's out there."

Kelly Drinnen [01:16:50] The big question we always get is, "So? Why should I care? I'm never going to go there." And that has always been the hardest part.

Kelly Drinnen [01:17:02] Even today, after 20 years of doing this for the sanctuary, of helping people understand why this area is important. You can give them big numbers. 25% of all marine life, all marine life, depends on a coral reef at some point in his life. 25%! A quarter of all ocean life, you know, relies on coral reef.

Kelly Drinnen [01:17:26] That's not really meaningful to most people. They're like, "Yeah, so?"

Kelly Drinnen [01:17:29] Well, the fish you eat, some of them rely on coral reefs. And if we don't have habitat for them, they're not going to be there. And then fishermen can't catch them, and you can't eat them. That's a little more realistic.

Kelly Drinnen [01:17:40] But that still doesn't say why this coral reef is special over a kelp forest, over any other part of the ocean. And there are very special parts of the ocean that have nothing to do with coral reefs.

Kelly Drinnen [01:17:52] But how do you get somebody to care about this one?

Kelly Drinnen [01:17:55] And some of that is just that you have to hit them emotionally. Share with them the beauty of a graceful manta ray swimming in and over these reefs. Show them the beauty of the things that live down the reef, and the brilliant colors of some of the organisms that live there.

Kelly Drinnen [01:18:12] And so we rely a lot on photographs and on exhibits at places like Tennessee Aquarium, Texas State Aquarium, Moody Gardens, Cameron Park Zoo, that help people learn about the Flower Garden Banks even though they may never go there.

Kelly Drinnen [01:18:26] It's utilizing what we have available to try and bring that picture to people since they can't go there.

Kelly Drinnen [01:18:36] And to that end, we are in a struggle right now to try and find a way to bring a visitor center to Galveston. We've always thought about it, but now the pursuit is on, and we are striving very strongly to try and establish a visitor center in the Galveston area to give a place that people can go to.

Kelly Drinnen [01:18:56] It's so great to tell them about this place. "Well, how can I get there?" "Well, you really can't. If you're not a SCUBA diver or a fisherman, you're not going to go there."

Kelly Drinnen [01:19:02] So, to have a place they can visit, we feel, is really important to helping make this message matter.

Kelly Drinnen [01:19:08] We talk to people about how they affect this reef offshore. We show them satellite images after Hurricane Rita that show muddy, nasty water coming all the way from the Houston and Louisiana area all the way out there, over 100 miles offshore. They think about stuff immediate to the beaches they visit, not what's happening 100 miles out, but some of that runoff, whatever's in it - the oil, the lawn, chemicals, the fertilizers and whatever - are getting out there.

Kelly Drinnen [01:19:35] Sometimes, too, when there's big storms like Hurricane Harvey, you have a ton of just water influx, fresh water influence, that gets out there and that can affect the reefs. And so everything...

Kelly Drinnen [01:19:46] One of the focuses I always have with people is the water - the water you use, the water that washes through the areas where you live and work and play - all that water ends up in the ocean eventually and can impact what's going on with all of the wildlife there, not just the Flower Garden Banks.

Kelly Drinnen [01:20:03] And I think it's really important for people to understand that whatever you would do to save a coral reef is the same thing you would do to save the rainforest, to save the tundra, to save the prairie. It's just start being respectful of our planet. Not using more than you need. Not extracting more than you need. Just try not to be as much of a consumer society, I suppose it all comes down to, but being more mindful about how you're using our natural resources, because they do have limits and someday they're all going to disappear if we don't watch ourselves.

Kelly Drinnen [01:20:39] I also heard a statement from somebody once that I've used several times recently. And that is, "the ocean starts at your front door." Whatever you do when you walk out the door every day has an impact on the ocean, because somehow it's going to affect your local watershed that eventually ends up in the ocean. I just thought that was a great statement to try and bring it back to people on an everyday basis.

David Todd [01:21:03] Yeah, I think that makes the connection a lot more immediate and tangible.

David Todd [01:21:08] Well, how about if we sort of flip that question around? You know, you talked about the kind of message that you'd like to send out in the world about the Flower Gardens. What sort of questions do you get? What sort of interests get expressed by the public when you meet with them and they realize you're a Flower Garden expert and they start peppering you with questions?

Kelly Drinnen [01:21:33] Coral bleaching is a big topic. It's been in the news a lot lately, and just two weeks ago, NOAA came out with a statement that we are entering our fourth global coral bleaching crisis right now. We are going to have coral bleaching across the planet in the coming year. It's already happening in Australia, and it's likely to happen here at Flower Garden Banks as well.

Kelly Drinnen [01:21:54] Coral bleaching makes the news, but people don't understand what it is. And so, I spend a lot of my time explaining that coral bleaching is the loss of symbiotic algae. People don't realize that coral is an animal. And inside that animal live algae, which are a plant-like creature that photosynthesize. And the colors of corals actually come from those symbiotic algae.

Kelly Drinnen [01:22:16] Those reef-building corals can't live without those algae for any long period of time. So, when they expel those algae because of stress caused by these extreme heats and cold temperatures at different times of year, then they are entering a period of starvation. There's only so much they can catch with their little tentacles and grabbing on plankton. So a majority of their nutritional intake comes through the photosynthesis process done by those algae. It's the sugars and so forth that they create that feed the corals.

Kelly Drinnen [01:22:45] So, bleaching is when those algae leave the corals either on their own, or because the corals kick them out. Scientists are still up in the air about that. And then you're seeing through these clear little coral polyps to their white skeletons underneath. So, these stony skeletons just happen to be white in color. And that makes the corals look like somebody dropped bleach on them. There's no bleach involved. It's just a term to describe the fact that they appear white when this happens.

Kelly Drinnen [01:23:11] It's not a death sentence. If the conditions correct themselves soon enough, coral reefs can go back to their old habits, take in new algae, and reinvigorate.

Kelly Drinnen [01:23:21] But there is a cost to this. Just like when you have a cold or the flu or COVID, given recent circumstances, even once you get past that, there is a period of recovery in which you're not quite the person you were before. Your body is still repairing itself. Your body is still, you know, it gets tired more easily. It stresses more easily. All these things allow you to maybe get sick more easily.

Kelly Drinnen [01:23:44] And that same thing can happen with corals.

Kelly Drinnen [01:23:46] So, the more times that coral bleach, the more susceptible they are to other things like coral disease and pests, you know, any kind of predators that might be out there that would pick on corals when they're weakened as opposed to when they're healthy.

Kelly Drinnen [01:24:01] So, the fact that coral bleaching doesn't happen all the time is a good thing. But we are heading there. With the trends that we're seeing in climate change, it's likely that the Flower Garden Banks are going to see annual coral bleaching events starting in 2040. That's just 16 years away. That's like the tipping point for annual bleaching at the Flower Garden Banks.

Kelly Drinnen [01:24:26] And we're concerned.

Kelly Drinnen [01:24:29] Other reefs are likely to get there sooner.

Kelly Drinnen [01:24:31] We are fortunate to be in deeper water. It doesn't get as hot as quickly, and we don't experience as intense amounts of heat change for as long a period of time as the shallow areas.

Kelly Drinnen [01:24:43] But we had some bleaching last year, and any bleaching we've had each year that has happened, we've had 99 point something percent recovery.

Kelly Drinnen [01:24:52] We get to 2040, that may not happen anymore if it starts happening every year, because the corals are not going to have adequate time to recuperate from the previous stresses to be able to withstand the next ones.

Kelly Drinnen [01:25:03] And so, there's a lot of effort now. We are actually banking healthy corals at Moody Gardens. We are possibly going to be working with some other aquariums to bank these healthy corals for research purposes, to understand why they are healthy when others might not be. We collected some of them during last year's bleaching event so we could see which ones did not bleach, while some others of their same species might have. And so we can study those and learn maybe more about why.

Kelly Drinnen [01:25:31] And there's already studies like this going on around the world to understand more about how we can help coral reefs. But we're trying to bring that a little more local by studying specific ones from the Flower Garden Banks, because we tend to be a little different than all those other reefs because of our isolated location, by being surrounded by deep water. Our corals don't always react to everything the same way as shallow corals do, that are much closer to the coast.

David Todd [01:25:55] Well, this may relate to what you told us just now about climate change and coral bleaching, but I was curious, you know, with your backlog of 20 years there, when you look out at the next 20 years or beyond, I think you mentioned 2040 as being one milestone. You know, what are your major concerns about the Flower Garden Banks National Marine Sanctuary?

Kelly Drinnen [01:26:20] I think climate change is the big one. You know, if coral bleaching keeps happening and the corals start dying, there's only so much we can do. We're seeing that already. Last year, in the Florida Keys, they had all these coral farms out there growing more corals to be able to transplant back to the reef, to do a lot of restoration in areas that were already in decline. And a lot of that - all that effort they put in for years - died in the heat wave last year.

Kelly Drinnen [01:26:48] So, what else should we be doing?

Kelly Drinnen [01:26:50] And as our Superintendent said recently, you know, so many ideas that ten, 20 years ago sounded like far-fetched ways to cool off a reef or protect it from, you know, temperature fluctuations are not so far-fetched feeling now. And maybe we should be looking into them more.

Kelly Drinnen [01:27:08] So, it's a lot of going back and looking at some of those far-fetched ideas to see if they're really as far-fetched as we thought that far back. Are there realistic ways to implement some of them? Are they safe ways to implement it?

Kelly Drinnen [01:27:20] You know, a lot of times in history when we're dealing with biology, people see a problem and they bring in some other biology to solve that problem, and then that becomes a problem. And we've seen that with invasive species a lot.

Kelly Drinnen [01:27:33] You know, in Australia they have, what is it? - the cane toads - that they brought in to take care of something. And now the toads are running rampant and

they're the problem. So, we have to be careful about how we go about this. We have to learn from those past lessons in other habitats and environments and not create more problems. We want to solve one thing, but we don't want to start something else.

Kelly Drinnen [01:27:54] And so, you know, all these factors have to be looked at and studied.

Kelly Drinnen [01:27:59] And the fact that we have all these great computers now that can do modeling for us and things is certainly a plus over where we were 20, 30 years ago. But, we are heading into a situation where we're seeing situations we've never seen before as far as climate and environment are concerned. So, there's only so much models can do because they work off of past history, of what we know happens when something like this, you know, x, y, z occurs. We're heading into unknown territory. So there's only so much models can do for us too.

David Todd [01:28:32] That's really interesting. So, you can't model something you haven't really seen before. This is entirely novel, perhaps.

David Todd [01:28:40] Well, so, it's clear, and it's wonderful that you're so passionate about the Flower Gardens. It's infectious. But I'm curious, when you think about the Flower Gardens, what do you think the value of it is? What is the place of it in your heart that you try to convey to the people that you teach and interpret the site for?

Kelly Drinnen [01:29:07] For me, it's the beauty and the wonder. Natural places have always been important to people. They're a place to renew and refresh, it's a place to relax. It's a little harder when it's offshore, unless you're specialized to be out there and under the water. When I get underwater, it's just like my happy place. It's just nice, calming. I am very relaxed. I don't breathe heavy. I just immerse myself in the experience, like some people do in a forest, you know?

Kelly Drinnen [01:29:37] So, it's just, like I said, I'm always looking for the thing I haven't seen before, something unusual, something magical, something just beautiful. It's just being able to have that unique experience at all that has driven me.

Kelly Drinnen [01:29:53] And I don't know, I just have always found marine life fascinating. Even when I thought back in the days when I thought I would never become a SCUBA diver because I was too chicken. I was a big chicken. I'm still a very somewhat timid SCUBA diver, but I've been part of the dive team at work for many years, up until COVID.

Kelly Drinnen [01:30:12] I just didn't renew my credentials after COVID. My life has become too busy otherwise, so I'm not diving as part of work anymore.

Kelly Drinnen [01:30:18] But, just getting in the water, even if it's just snorkeling, I want to be able to see the stuff I'm swimming around, not just be there in the water.

Kelly Drinnen [01:30:26] But yeah, it's just, it's just the wonder. It's that there's all this stuff out there that's so different from us that has found a way to survive in amazing circumstances. I just find that really interesting.

David Todd [01:30:43] Yeah, it seems like almost a different planet, although, you know, we probably share much more than you might expect.

David Todd [01:30:53] So, one of the things that just struck me, after being fortunate to talk to a number of people in the National Marine Sanctuary - from Greg Boland to Jesse Cancelmo, Steve Gittings, Gary Rinn, G.P. Schmahl, Emma Hickerson, and now yourself, is that there's this wonderful sort of cadre, coterie of people that care deeply about the Sanctuary and they inherit, that sort of interest from, you know, people like Tom Bright. And I'm curious if you could talk a little bit about this, I think very special, tight-knit team of people that have worked at the Flower Garden. And, what do you think binds them and makes them so enthusiastic about the place?

Kelly Drinnen [01:31:45] I think my boss said it best recently. We're all just very passionate about what we do. We all have a fascination for this underwater world. We want to do everything we can to make sure it stays there. We want to find new ways to talk about it. And in the last few years, we've seen this tremendous effort from the entire team to be part of the outreach effort.

Kelly Drinnen [01:32:09] You know, for years it was Shelly and I, we were the whole outreach team. And we did all that. You know, the science team was there. And we got information about all these science things I've learned. I've learned through working with the science team and talking to them about being out there, diving with them. But, Shelley and I were the main outreach tools, you know, people going out there.

Kelly Drinnen [01:32:29] And now it's become, in the last few years, a team effort. So, I lead the effort as far as education staff, it's myself and one other person, Taylor Galavis, who is half-time education and half-time our Advisory Council coordinator. But everybody in the office is part of outreach in some aspect. Some of them do more college stuff, and they're in there talking and showing up at college networking events to help students understand what opportunities are out there, what kinds of careers are possible.

Kelly Drinnen [01:32:59] Some of them, like some of the folks who work on our buoys, they go out and work and work with ROVs, they come out with us to help run a little mini ROV and show kids that this is a potential career opportunity, to do ocean exploration. You're good at gaming, this might be something you can do.

Kelly Drinnen [01:33:16] So, we take advantage of everybody's different area of expertise and kind of blend it all in. We all do our own parts. We talk to the communities that we're most involved with.

Kelly Drinnen [01:33:26] I'm the one that talks to Dickinson High School more often than anybody else, because that's the community I live in, right? People who are A&M - Galveston graduates (many of our staff are) they're still connected to that A&M - Galveston community. And that's where they do a lot more of the outreach.

Kelly Drinnen [01:33:41] So, it doesn't fall on just me anymore, which it did for a few years after Shelley left and I was the only one for a while. And it's turned into more of a team effort. And I think that's been really critical in how we all work. And we're turning more into an outreach team. We are definitely a big science team, and science has always been a really important aspect of the Flower Garden Banks staff. But, I think in more recent years we're turning into more of an outreach team as well, as opposed to just, you know, some of us doing the outreach on behalf of everybody else. It's a team effort now. And it makes my heart sing.

David Todd [01:34:18] Yeah, I can see that. Well, I think it'd be nice to start wrapping things up by talking about some of your attitudes about your career to date. And, one of the things that I think is really interesting is that you've had this experience in lots of different venues in teaching, sharing, interpreting science outside the classroom, whether it was at Sea World or Moody or now the Flower Gardens. And I'm wondering about, you know, what you see as the opportunities, you know, what's possible, and then what some of the limitations are of that kind of, you know, field trip type, outside-the-classroom education.

Kelly Drinnen [01:35:12] All it takes is money. If we had enough money, we could do anything and everything. You know, one of the big pushes we've had lately is trying to work with underserved communities to try and get them more involved in SCUBA and in understanding what an ROV, a remotely operated vehicle, is and does, because we want them to understand that there are opportunities outside their immediate, little closed-in world. That if they could just give them these opportunities, they could be our future Sanctuary staff. They could be doing anything in NOAA, or elsewhere in marine biology or biology or wilderness protection, right, if they know those opportunities are there for them.

Kelly Drinnen [01:35:55] I had no idea informal education was a thing. I had no interest in education. I had no interest in science. And look where I ended up.

Kelly Drinnen [01:36:03] But it's because I got exposed to it, by accident, mind you.

Kelly Drinnen [01:36:06] So, we're trying to be a little more intentional about that, so that kids know that there are opportunities out there for them, despite their background, despite their current limitations, that there are other possibilities.

Kelly Drinnen [01:36:20] And I think that is a really important aspect of what we do now. This next year, we're going to be offering two "Try SCUBA" events in partnership with a local SCUBA shop. We did one last year and it was a big hit. So, we got more internal grant funding to make that happen. And that's bringing in the Boys and Girls Club kids and the kids from the other underserved communities.

Kelly Drinnen [01:36:43] We're having a fishing clinic this year in conjunction with National Park Trust where we're going to take people offshore fishing. They're not going to make it all the way out to the Sanctuary because there's a lot of reach. But understand that this is a recreational activity that doesn't have to be limiting, but that's also important if you do it the right way.

Kelly Drinnen [01:37:04] And, giving people those outdoor experiences so that they value the outdoors. If you've never been in it, if you've never had an opportunity, then you're never going to care about it, because it's not a part of your reality. And making sure that those opportunities ... take try to take down some of those barriers.

Kelly Drinnen [01:37:22] And that's a big overall push in NOAA, not just here at the Flower Garden Banks and not just in National Marine Sanctuaries, but trying to find ways to take down those barriers to people who might not traditionally end up in these careers, and to let people know through experiences like mine, that you don't necessarily have to have thought about that in the first place to end up there.

Kelly Drinnen [01:37:46] I, over the years, have been invited to talk to students for career days. And one of the things I've always emphasized is that you don't have to know by the end

of high school what you want to be when you grow up. You don't have to know by the end of college what you want to be when you grow up. And all the teachers that ever have had me and have always hated me saying that.

Kelly Drinnen [01:38:06] And I was an A student. I numbered in the top five of my high school graduating class, and I graduated summa cum laude in college. I had a lot of opportunity in front of me because of my grades. And I didn't know what I wanted to be, and everybody kept telling me I had to know. I couldn't take the next step unless I knew. And they have high schools now that require you at the end of junior high to pick a career track, to know what you're going to do in high school. And I think that's a horrible idea. If you know, that's great for you, but if you don't, I mean, I could have ended up in something that would have totally frustrated me and not been helpful to my future. I think it's a mistake.

Kelly Drinnen [01:38:51] I think kids need to experiment. You know, my son is out of college a few years now, and he's been through several jobs and I'm like, "It's okay. This is your experimental stage. Try things until something sticks."

Kelly Drinnen [01:39:04] You think you know what you want to do, but does that end up being it? You get into it and you don't really like it. Try something else.

Kelly Drinnen [01:39:10] But the biggest thing I tell kids is you spend more time in your job the rest of your life than anything else. At least like it. If you can love it the way I love mine, great. But at least like it. Don't stick yourself somewhere that you hate for hours and hours a day. If it feels like that to you, then find something else. Even if it's a low-paying job like a tour guide at SeaWorld, you never know where that might take you. It might just be the impetus for something else.

Kelly Drinnen [01:39:39] And I try to make sure that kids understand: you don't have to have all the answers now. You may not even have them when you get out of college, if you go there. Maybe you're going to go to a trade school. So, there's lots of opportunities there too.

Kelly Drinnen [01:39:51] And I think that's another mistake we've made over the years, is telling every kid they have to go to college, that that should be their goal, because not every kid's designed for college. But there should be some kind of continuing education beyond high school, because you can't grow if you don't learn. And there's always an opportunity to learn something, even if it's through a little one-hour class somewhere.

Kelly Drinnen [01:40:12] I teach classes at the Osher Lifelong Learning Institute in Galveston every year. And these are people aged 50 and up who just come for the learning. They just want to learn something new. And it might be knitting and it might be about invasive lionfish at the Flower Garden Banks. A couple weeks ago we did one, we took them out and taught them how to use the iNaturalist app to do citizen science.

Kelly Drinnen [01:40:33] But it's that pursuit of knowledge, and pursuit of varied opportunities, that's going to get kids to a place that they would like to be, as opposed to a place they have to be. And I think that's a really important focus.

David Todd [01:40:51] This is really fascinating. And one thing that you said just a moment ago, sort of caught my attention and you talked about this lifelong learning class and the effort to teach some of the students about iNaturalist. And so, I'm curious if, with your experience, if

you could say anything about citizen science and its role at the Flower Gardens or more broadly.

Kelly Drinnen [01:41:20] Those reef surveys that I started doing back in my first DUOY workshop as a participant are citizen science. They are average people in the course of their diving or snorkeling, jot down all the fish species they see and how many. And then they also record the information about the temperature and the time of day and the location they're at, and so forth, and all that goes to this huge database.

Kelly Drinnen [01:41:41] And the REEF organization has, I don't know, tens, if not hundreds, of thousands of surveys at this point from citizens around the world that contribute. And recently, just in the last few weeks, a paper came out saying that they have proved that the data from that is as scientifically valid as data from people who are trained to go out and collect data of that kind. They have compared it, you know, side-by-side with somebody who purposely went out in the same area, you know, to citizen science surveys through the REEF fish survey program, and found equivalent responses, you know, levels of data accuracy. So that's really important.

Kelly Drinnen [01:42:24] iNaturalist is a tool anybody can have on their phone. And I started using it during COVID, where I was taking a lot of walks by myself instead of being out with friends and doing other things. And I wanted to make more of what I was doing. I was getting tired of walking the same areas. I needed to make something different out of them. So, I started taking photos, and then I found out you could put those photos into an app and it would I.D. them for you. And I didn't have to walk around with a book trying to figure out what I was seeing, and so forth.

Kelly Drinnen [01:42:50] It's also key to a really cool citizen science project called The City Nature Challenge, which just happened last weekend. And this is a global BioBlitz where cities across the world are in friendly competition with one another to identify the greatest number of species in their immediate regions. So Houston / Galveston is considered a region all by itself, one region. It's one of the city regions in this competition. And several years ago we were able to add Flower Garden Banks National Marine Sanctuary to that region. So any observations taken on that weekend out in the Flower Garden Banks count towards our Houston / Galveston totals.

Kelly Drinnen [01:43:31] And that was part of the impetus behind us doing this class with the OLLI group, is that we wanted more people to know about this and get involved. They couldn't necessarily get out in the Sanctuary. We were teaching people to be able to do it out in the Sanctuary, but we wanted to also teach our local citizens, to help them understand that we are a science resource in the community, and that we care on more than just our coral reef level, about what happens to the ocean, the environment, and about biodiversity. And so, we were out there teaching this class and out there with their phones and help them take pictures of things and ID things and so forth, so they could get out and participate last weekend, in this nature challenge.

Kelly Drinnen [01:44:05] I myself, I contributed 331 observations over the weekend for the Nature Challenge, because that's just my geeky thing to do.

David Todd [01:44:15] Well, you're contributing in lots of ways from your weekday to your weekend. And, so it's very, very wonderful.

Kelly Drinnen [01:44:25] Well, I work very hard with the one dive boat that's left that goes out to the Sanctuary, that takes any kind of volume of people to the Sanctuary. It's Texas Caribbean Charters out of Freeport. And I worked with them to set up a dive trip for last weekend, specifically for people to go out and contribute data from the Flower Garden Banks to City Nature Challenge. This is the third year in a row we've done this. And we even put our own staff on the trip this year, so that would be an added bit, you know, kind of enticement for people to participate in the trip, to meet Sanctuary staff and be able to talk to them about the Sanctuary while they were doing some research out there, too.

Kelly Drinnen [01:45:00] And the trip got canceled because of weather. And it's the third year in a row that's happened. So, we haven't succeeded yet in getting one ounce of Flower Garden Banks data into the City Nature Challenge. But we're going to keep trying.

Kelly Drinnen [01:45:15] So, one of the things I thought was intriguing in your resume was to have seen that you're a member of the Galveston Nature Tourism Partnership, and I'm interested, and I'm sure you're interested and know more about it - this overlap, this meshing, of ecotourism and conservation and maybe even a little bit of research thrown in there as well. Can you talk a little bit about what nature tourism means to you and maybe to the Flower Gardens as well?

Kelly Drinnen [01:45:50] The group that I belong to is a partnership between all the different, or a lot of, the different environmental education entities in Galveston. And it was organized by the folks at the Galveston Island Nature Tourism Council, a non-profit group that manages the Feather Fest every year in Galveston. And they saw a need for us to be able to communicate with each other. We don't meet a lot, but we get together to talk about the different projects we're working on so we can maybe find connections and find ways to blend some of the things we're doing together.

Kelly Drinnen [01:46:23] Right now, the Sanctuary partners a lot with Moody Gardens. I have a history with Moody Gardens. A lot of our staff have history with Moody Gardens, and they have divers that help us with our offshore work. And so, we do a lot of collaborative stuff back and forth.

Kelly Drinnen [01:46:36] But having other partners in the community is never going to hurt. So Artist Boat and Galveston Island Nature Tourism Council and Galveston Island State Park, and I can't even think of all the other people. There's the Tree Conservancy and Audubon and I mean, all these different ... And it may seem on the surface like one focuses on birds, one focuses on fish, one does, you know, land conservation, all these different things. But we all have similar goals. And that's getting people excited about nature and wanting to do more to protect it.

Kelly Drinnen [01:47:08] So, we share each other's news. I have, I maintain five email lists, one of which is a volunteer list. We don't have a lot of volunteer opportunities with the Sanctuary other than to help with some outreach events. But I advertise what Surfrider is doing that needs volunteers. They also focus on ocean protections. I share stuff from Artist Boat. I share stuff from our local park partners that I think people would also be interested in, who have asked to be notified if we have opportunities with the Flower Garden Banks. And in that way, I'm trying to keep my community connected. I also have an education email list. And so I take resources from all these other local partners, and I share those out to my list. So people know that this is stuff that you can use, in addition to the stuff that we're offering to you to make your students more savvy about the natural world and why we need to protect it.

Kelly Drinnen [01:48:01] So, it goes beyond our little treasure out there off the coast of Galveston. Or as Jesse Cancelmo called it in one of his articles: the title was "Magic in the Middle of Nowhere". And I just love that reference to the Flower Garden, because I think that's a perfect description. It's nowhere that anybody expected to find coral reefs, and yet there they are. And they're these natural wonders.

Kelly Drinnen [01:48:24] But it's beyond our little magic place out there, and it's a bigger picture. You've got to start big and then work down. You know, it's like starting globally and working down locally or vice versa. So, we kind of spread out in both directions. We try and get people who are interested in nature more interested in the Flower Garden Banks, and people who are into the Flower Garden Banks interested in how the rest of the world is also affected by what they're doing. And it kind of goes both directions. It fans out and it narrows down. It's a two-way street and people need to, be part of both directions.

David Todd [01:48:58] Gotcha.

David Todd [01:49:01] Well, you have covered a lot of ground. But before we leave off, I always want to ask, because it's easy to skip over things that are important, if I indeed did miss something, if there's a gap, there's something that we overlooked, that you'd like to just mention before we wrap up.

Kelly Drinnen [01:49:25] I did think about lionfish when you asked, what are some of the things people ask about a lot? I talked about coral bleaching, but lionfish are also an issue.

Kelly Drinnen [01:49:35] These are an invasive species that come from the Pacific Ocean. The first observations of them were off the coast of Florida in like, 1984, I think it was. And they gradually spread northwards along the Atlantic coast, eventually down the Caribbean, finally up into the Gulf of Mexico. And now they've spread as far south as Brazil in our Atlantic Ocean waters on this side of the globe.

Kelly Drinnen [01:49:56] They are beautiful fish. They're kind of brownish red and white stripes. They have these big flaring fins. They happen to be venomous fins. They have spines in them that can inject venom into predators. It's a defense mechanism. They aren't aggressive animals in any way. But they will defend themselves with those venomous spines.

Kelly Drinnen [01:50:21] But they eat everything in sight, anything that'll fit into their gaping mouth. And they reproduce at an alarming rate. And nothing locally eats them.

Kelly Drinnen [01:50:31] So, they are thriving in all the different reef environments and mild habitat environments, as far north as North Carolina year-round, and as far north as Long Island and Cape Cod in the summer months, when it's warm enough, you'll find them all the way up there.

Kelly Drinnen [01:50:47] So one of the efforts we have going at the Flower Garden Banks is something we call a Lionfish Invitational. And I was a part of this from the start as part of the science team on these trips. And that was to take recreational divers out on that dive boat, out of Freeport and have them go remove lionfish.

Kelly Drinnen [01:51:04] We have to issue a permit for this because it requires spearfishing, and spearfishing is otherwise illegal in the Sanctuary. And then the science team, that I have

been a part of, goes out and does surveys before and after the removals happen. So, we collect data and we're collecting measurements on these fish, and we're bringing all those frozen fish back in a freezer and keeping them at the office.

Kelly Drinnen [01:51:24] And then we eventually dissect them. And we originally dissected them to collect thin clips for genetic material. We would do weights and measures on them so that we understand their growth. And once we determine their age, try and get an idea of how big these things are growing compared to how they do in their natural environment (turns out they're growing bigger and faster here).

Kelly Drinnen [01:51:47] And we were cutting into their stomachs to see what they've been eating. So we call that, you know, identifying the gut contents. And that helped us identify what specific species were being affected in the sanctuary, which are mostly the smaller fish, as well as something called red night shrimp.

Kelly Drinnen [01:52:03] And by doing this, we collect all this data. We're combining that data with other places around the region that are also doing this. It's a really massive effort to battle these invasive species to understand more about their natural life so we can figure out the best ways to combat them.

Kelly Drinnen [01:52:20] One of the things they have determined is that doing these mass removals in concentrated areas does help with ecosystem recovery. So, in reefs where we already are overfished and they're already damaged in other ways, that recovery period is really important.

Kelly Drinnen [01:52:33] It doesn't seem to be as much a problem on the Flower Garden Banks reefs, perhaps because we don't have as many other threats that have had a big impact on the Sanctuary, to date.

Kelly Drinnen [01:52:43] But nevertheless we are out there removing them in these concentrated efforts. It's a citizen science function. We have recreational divers that apply to participate. They pay, you know, 6 to \$800 a piece to come out there over the years, and stay with us on a boat for three days and eat, sleep and dive and remove lionfish.

Kelly Drinnen [01:53:04] And then when we bring them back, like I said, we do these dissections. We used to bring local college students in to help us with the dissections so they could have that learning experience, and we'd have hundreds of fish to do. So, we've spent whole days doing this.

Kelly Drinnen [01:53:18] But now we do more with taking those fish and using them for educational opportunities in classrooms. So, in the last few weeks, Taylor and I have been out at Dickinson High School. She's been at Navarro Middle School, a few other places, and we go out into classrooms and do other outreach opportunities, like at aquariums and things like that, where we dissect lionfish in front of people and talk about the problem and talk about what we're seeing, and we're showing them the biology of these animals and why they're such successful predators, but also what we've learned about them.

Kelly Drinnen [01:53:47] They all have layers of fat inside, which is not common in these in their native environment. It's because they're gluttonous. They're eating so much, because they can here, that they're actually developing fat deposits, just like we do when we overeat.

Kelly Drinnen [01:54:00] So, it's interesting to make those ... kids are fascinated. Just about everybody is fascinated in lionfish. In our social media, if we put anything about lionfish, it usually blows up. It's a way for us to get people interested in the Sanctuary. It's a problem, but it's a problem that attracts good attention and allows us to get out other messages at the same time.

Kelly Drinnen [01:54:22] So, we have this fantastic learning tool in our hands when we bring back these frozen lionfish. And then we're going out in classrooms and we're using them at public events and things to help people learn more about this problem in a way that's different than just putting a presentation up on a screen and saying, "This is bad, we don't want this. This is what we're doing about it." We're showing, you know, that that, you know, in-person experience, again, with us cutting open a lionfish and looking at its insides.

David Todd [01:54:50] Yum. Well, this is great. Kelly, you've really taught us a lot. And, I hope that I get to see one of your lionfish dissections soon. So, thank you so much for your time today and for, sharing so much about the Flower Gardens. It's been really generous of you.

Kelly Drinnen [01:55:14] You're welcome. I appreciate it.