

S2E5: Watersheds: Watershed Citizenship in Baffin Bay, Texas

The Gulf Podcast

Last Time

<<slow string/piano music fades in¹>>

[Dr. Paul Montagna]: Last time on The Gulf Podcast.

[Scott Murray]: For some time down on the West End, we were experiencing a lot of talk in the community every time we'd go somewhere, to a restaurant or to the store, people were talking about what is wrong with the bay, and these are people that you have to listen to because they lived their whole lives down there, and you don't disregard that. So I began to listen, and I also saw big changes myself, and decided that it was time to really do something about it, so we called a meeting at my bay house. We invited commercial fishermen, fishing guides, sport fishermen, a bed and breakfast owner, a restaurant owner, a couple other entities. I also invited Dr. Mike Wetz and, uh, Jace Tunnell with Coastal Bend Bays and Estuaries. They came, and they listened, and we vented for several hours. We all knew there was something wrong with the water because of the blooms we were having and the episodic fish kills, you know, were getting more and more frequent. So, that's how it started. <<music fades out>>

<<a few musical notes as a short interlude²>>

Introduction

[Brown]: Hi Gulf Podcast listeners, this is Jen. Today's episode is part two of our look at Baffin Bay water quality. As we learned last time, this Texas bay is known for its trophy trout, but many of the longtime anglers and guides had witnessed the decline of the bay over the last few decades. In Baffin, poor water quality affected seagrasses, shrimp and crabs, and of course those gigantic seatrout. That's why I wanted to highlight this story on our Watersheds series. Freshwater inflow, both quality and quantity, has cascading effects for the coast.

What's even more interesting was that one of the longtime fisherman, Scott Murray, became determined to do something about it. So, on today's episode, we're going to hear more about the citizen science project they created and the scientific discoveries they found. This is a great example, I think, of watershed citizenship—and I want to come back to that later.

¹ Lee Rosevere, "Going Home," *Music for Podcasts – The Complete Collection*, April 6, 2021, <https://leerosevere.bandcamp.com/track/going-home-2>. This song is licensed under a Creative Commons attribution license (CC-BY).

² Lee Rosevere, "Curiosity," *Music for Podcasts – The Complete Collection*, April 6, 2021, <https://leerosevere.bandcamp.com/track/curiosity-2>. This song is licensed under a Creative Commons attribution license (CC-BY).

Before we start, I'd like to let you know that the Watersheds series of The Gulf Podcast is supported by the Harte Research Institute for Gulf of Mexico Studies at Texas A&M University-Corpus Christi. HRI integrates marine science with expertise in policy, social sciences, and economics and brings together leading minds across the United States, Mexico, and Cuba. The views and opinions expressed on this podcast, however, may not represent the views and opinions of the Harte Research Institute or Texas A&M University-Corpus Christi.

<<musical interlude³>>

Chapter One: Getting Started

[Brown]: Back in 2012, after that initial meeting at Scott Murray's house, Dr. Mike Wetz got on board. Mike's the Chair for Coastal Ecosystem Processes at the Harte Research Institute. He became concerned after hearing about the problems in Baffin.

[Dr. Mike Wetz]: So they were having some pretty big fish kills. At that time, I think they had probably four or five major fish kills just over the past five years, and this is trophy trout and drum. They'd also had the persistent brown tide algal bloom, and also the black drum that they were catching, something like seventy-five percent of the adult drum had this jelly flesh. Like, you basically couldn't sell them or eat them or anything, they just had no muscle on their body. It was really weird. So, just kind of all these things coming together to say, um, something's off with this bay.

[Brown]: Unfortunately, there hadn't been any recent scientific studies of the bay, but given the fish kills and other problems, they needed to work quickly to figure out what was going on. Here's Scott Murray again.

[Scott Murray]: Long story short, developed a very low-end water quality program because we didn't have a lot of funding. Our first funding actually came from the commissioners at Kingsville, and that's kind of how we got the first little bit of funding to get it started. We decided fairly quickly that for lack of resources at the university that, you know, we needed to do this on a volunteer basis. My job basically was to source and collect a group of volunteers and to manage them, and that's what I did.

[Brown]: In a slow-moving world driven by grant deadlines and the bureaucracy of many agencies, it made sense to do some sort of citizen science project to test water quality. Murray's group teamed up with scientists and students from Mike Wetz's lab.

[Wetz]: Well, we wanted to get started quickly, there wasn't a lot of funding, so they offered to provide us their boats, they took us out every month. We were able to get started and get data quickly, relatively inexpensively. But on top of that, you know, they just had a lot of great knowledge about the bay and gave us some ideas on where to sample, and we also knew that,

³ Lee Rosevere, "Curiosity."

if there were issues, that we were going to need this group of individuals to kind of help shepherd us and push us towards solutions.

<<musical interlude⁴>>

Chapter Two: Citizen Science

[Brown]: To get started on the project, Scott Murray needed grassroots support.

[Murray]: First of all, it's a small community. It's a very rural, kind of agricultural, people make their living farming and fishing, commercial fishing, and so you really kind of had to know which people to source to get the right heads there to talk and kind of discuss and decide, but people were not shy, not bashful about telling what they knew about Baffin. For example, one of the commercial fishermen has seen his catches go from thousands of pounds to a few hundred pounds of drum, and so there were a lot of good anecdotal stories there to get people motivated. As far as the volunteers, those are folks that I've really known, for the most part, for years and I knew that they were really, really interested in Baffin and what was going on.

[Brown]: Murray then enlisted some of his fishing buddies, Baffin Bay guides, and local business owners who had boats. People like John Sutton, a local retiree who grew up along the Texas Coast, in Brownsville, Corpus Christi, and elsewhere. He first fished Baffin Bay in 1957 with his grandfather. But since then, things had changed.

[John Sutton]: I hated to see something like that just fade away and get to a point where, well, a lot of bays, fishing places have done, they get overcrowded and no one does anything to improve it, and we had an opportunity to improve it. One thing that kind of stuck in my mind at that time was the fact that no one did anything for Baffin Bay...The, uh, water quality was off. You get little patches of brown tide during that time, more than just a solid bloom. Then Scott approached me with the idea of doing this study. I said, "Yeah, sign me up. I could do that."

[Brown]: Another one of the volunteers was David Rowsey, a fishing guide and captain known for winning big trout tournaments and promoting catch-and-release and conservation on the Texas Coast.

[David Rowsey]: I believe Scott Murray was the first one that brought this to my attention, that they were going to start this program and when he told me what they were going to do, you know, we were in the midst of a brown tide. I was just disgusted with the bay because this thing keeps reoccurring. We'll get a year or two of beautiful water, then it comes back and it's just, it's just horrible and I was like, "Look, I don't know what y'all need or what, but I'm in as a volunteer." I said, "I'll volunteer my time, my boat, I'll pay for the gas just to get y'all, whoever needs to be where," and so it really just started off like that, just a simple conversation and it was a subject close to my heart.

⁴ Lee Rosevere, "Curiosity."

[Brown]: And Scott Murray, who enlisted all the volunteers, has fished the bay for years with his family.

[Murray]: We're a catch-and-release family, particularly for big trout. Every once and a while, we'll keep a couple of small fish to eat, but our emphasis has always been on trout conservation, and I've been involved with trout conservation since, uh gosh, I don't know. For the last thirty years, I guess...And, you know, what was special too, from a trout fishing standpoint, is that I got to be with both my wife and my son on different occasions when they caught their personal best trout, we were together. And my wife caught one that was a thirty-three and an eighth...it still holds the Murray trout record. She's caught the biggest trout. My son caught one that was between thirty-one and thirty-two, close to thirty-two, and it was an awesome fish. We also released it as well.

[Brown]: The Murray grandchildren also grew up fishing Baffin Bay so catching big trout runs in the family, but Scott Murray's background in marine biology and decades spent on the water helped a lot, too.

[Murray]: Well, it was great, I mean we, uh, you know, I had a boat and some of my neighbors that I got involved had boats...it was just a group of people that really cared about Baffin Bay and were willing to learn. We had people from the university that trained us in how to process the samples and how to work the instrumentation, record the data, report the data, pack the samples, get them over to the university.

[Wetz]: They learned how to use our handheld, it's called a sonde, it's an instrument you drop in the water, and it measures the temperature, the salinity, dissolved oxygen. So they learned how to do that and then we also showed them the proper ways to collect the water samples so we could be confident in the data we were getting back. And then just more basic stuff, just like how to record your field observations, things you were seeing out there, and any kind of notes that needed to be taken.

[Murray]: We did water quality sampling once a month. We had eleven stations. I had two teams. I had an east team and a west team, and the reason I did that is because it's such a long bay, you just simply couldn't beat the wind unless you had boats on both ends. We sampled for, uh, I guess, a little over four years, right in there somewhere.

[Brown]: For those four years, rain or shine, the volunteers collected samples. Here's John Sutton again.

[Sutton]: When we out to get samples, it was just volunteers, two in a boat usually is what I did. We covered the area at the mouth of Baffin. We could launch here, go down and then people from Riviera could catch the back end of Baffin. We'd go down, we'd take our samples and so forth, and then on the way back, fifteen, twenty minutes before we got to the ramp, I'd call, somebody'd come down and pick up all the samples, and then over a period of time, a lot of the students would come in and help us.

[Murray]: I mean it was quite a process, but everybody was willing, and let me tell you that keeping people pointed in the same direction for forty-eight months, is not an easy thing, unless their hearts are in it. That’s the difference.

Interlude: Watershed Citizenship

<<slow string/piano music fades in⁵>>

[Brown]: I’m really impressed by these citizen scientists. And that’s why I consider it an example of watershed citizenship. What do I mean by that? The poet Gary Snyder writes that “Watershed consciousness and bioregionalism is...a move toward resolving both nature and society with the practice of a profound citizenship in both the natural and social worlds. If the ground can be our common ground, we can begin to talk to each other (human and nonhuman) once again.”⁶

Texas is a big state that doesn’t just have one landscape, but many, from the high desert of Big Bend to the central Hill Country to the Pineywoods in the east, to the Gulf Coast Plains. So the state’s political boundaries encompass a variety of bioregions. But what if we start thinking on those scales rather than on a state level or a federal level? What if we’re not separated by political parties and other divisions, but instead we’re brought together by the goal of living better in a place.

So the work done the citizen scientists is commendable in many ways, but for me, their place-based civic engagement stands out. They truly are citizens of Baffin Bay. <<music fades out>>

<<musical interlude⁷>>

Chapter Three: Scientific Discoveries

[Brown]: As the water quality sampling continued, scientists started to discover the problem.

[Wetz]: We were trying to figure out what the levels of different nutrients like nitrogen and phosphorus were, how it changed over time, how it varied with natural conditions, and then also how the algae responded to those nutrients. And so we were just really trying to figure out, “Okay, is there a problem with nutrients in this bay?” because a lot of the symptoms seem to point in that direction but we didn’t have great data to suggest that. And the other thing was, you know, there was a lot of early work done on brown tide that essentially concluded that it was just this sort of natural phenomenon, seemed to not indicate that there were any

⁵ Lee Rosevere, “Going Home,” *Music for Podcasts – The Complete Collection*, April 6, 2021, <https://leerosevere.bandcamp.com/track/going-home-2>. This song is licensed under a Creative Commons attribution license (CC-BY).

⁶ Gary Snyder, “Coming into the Watershed,” 235. See also Tim Waterman, Jane Wolff, and Ed Wall, eds., *Landscape Citizenships* (London: Routledge, 2021).

⁷ Lee Rosevere, “Curiosity.”

nutrient problems. But then when you look at that those older studies, you realize that they were missing a huge pool of the nitrogen that's in the water. They just didn't measure it because it was kind of hard to measure it at that time. So that kind of left us with this perception over ten, fifteen years that there was nothing wrong with the bay, and so what we did is we tried to get a more comprehensive look at the nutrients in the bay, and sure enough what we found is that the levels of nitrogen in this bay and in particular, a certain type of nitrogen, it's on the order of two to three times higher than anywhere else on the Texas coast and about as high as you would measure in just about any other bay system in the US.

[Brown]: Normally, freshwater inflow brings needed sediments and nutrients and fresh water into bays and estuaries. But in Baffin, the quality of the water flowing in was, well, not good.

[Scott Murray]: We've got three streams down there that depend on heavy rainfall for any flow at all. That's Los Olmos and San Fernando and Petronila, and they actually feed Baffin. Unfortunately, we've also been fed with a lot of pollution. So, we've seen a big change in the agricultural community. There's been tremendous land clearing and tremendous agricultural development over the last, I'll say, thirty to forty years, but you can see the changes. We've had episodic blooms of brown tide and other algal forms, which have created many issues at times, particularly during the warmer months low oxygen values, and low oxygen values have a detrimental effect on many different species of organisms, so we've seen all those things happening. We've also seen, probably related to all the land clearing, quite a bit of erosion and deposition. Yeah, with the agricultural practices, of course, when you strip the land with of brush and grasses, you get erosion, and many of the serpulid reefs, particularly like in the back end of Alazan, some of those places, have now been covered or partially covered with sediment.

[Wetz]: And I think what the data has shown since then is that, you know, the nutrients that go into Baffin Bay, it's coming from a lot of different places. You know, I'm sure there's some agricultural component there, that's hard to deny, but we also have major problems with sewage treatment in that watershed. There are some of the sewage treatment plants, they're not up to code. I mean, instances of raw sewage being dumped into the creeks. You can imagine, it's not great, and it is what it is. It's a rural, poor watershed. It's hard for some of the communities to maintain their infrastructure, and to hire people to maintain it, so we have issues with wastewater. We have issues with septic tanks that are discharging, and not doing a great job of treating the water and putting stuff into the bay. It's a combination of things that are contributing to the changes in the bay.

[Brown]: The nutrients from all those different sources led to the poor water quality in Baffin. That, in turn, caused a variety of negative effects, including the brown tide events.

[Wetz]: Basically, it's like a very small nondescript little ball and there's all kinds of plankton. There are really charismatic ones that have all kinds of spines and things and brown tide's really not, it's just this little ball. And it seems to be well adapted for environments like Baffin Bay that occasionally get really salty. And one of the things that it does, is it produces this sort of nasty

mucus layer around itself to kind of protect itself, and so that's why there's this perception that it maybe isn't great for food webs either, like who wants to eat that? But it is capable of using that form of nitrogen that we found to be really in high levels in Baffin Bay.

[Brown]: Brown tide, as we know from the last episode, had some historically bad years, and it kept recurring. It's interesting that something so small could have such big impacts. A single brown tide is three microns in size. A micron is one millionth of a meter, which is almost incomprehensibly small, so small that you can't see it with your naked eye but, to give you a sense of the size, from my cocktail napkin calculations, about fifty brown tides can fit into a single grain of fine Texas sand.

[Wetz]: It basically makes the water look like chocolate milk, and I mean, we've all kind of been out here in the bays where it can be turbid at times, but just imagine, persistent water looking like chocolate milk for months at a time, and the problem is, it prevents the light from getting to the seagrass beds and so they die off...and then of course when the seagrass dies, that releases even more nutrients back into the water. So that's that cascading effect. There have also been some studies saying that the brown tide is not a great food resource for other plankton, which suggests that, you know, there may be impacts further up the food chain at some point.

Chapter Three: Reflections on Citizen Science

[Brown]: Through their testing, the citizen scientists' work yielded valuable results in figuring out the nutrient problems and brown tide. Unlocking the scientific mysteries was the first step towards a solution. That's what motivated volunteers like John Sutton.

[John Sutton]: I really hoped for a way to change the water quality in Baffin Bay, to make it a place where the general public, everybody could go and enjoy it like I did when I was younger.

[Brown]: It helped that the volunteers all remembered Baffin as it used to be. Here's David Rowsey.

[David Rowsey]: Anybody that knows me knows I'm a man of that bay. That's my number one passion outside of my family. I've spent my whole twenties and now fifty-two years old, I've spent my whole life just being there and I just want it to be healthy, I want it to be full of giant fish again, and anything I can do, as little as it is, as one guy, if I can participate and lend a hand, I want to do it.

[Brown]: It was quite the learning process for everyone involved.

[Sutton]: I learned the value of knowledge. So many rumors and so forth about the fish, about the brown tide and stuff, but once you start learning, and you're able to teach other people. You know, I'm a big believer in education. You educate people, that sure knocks out a lot of ignorance (laughs).

[Murray]: You know, the other thing that I certainly learned is that if people really have a passion about something, you know, they'll commit to it, and they'll stick with it...You know, people care enough about an environmental issue, and what's happening to one of their treasures, to go out and do something about it.

[Brown]: And the scientific work done on Baffin has held import around the world.

[Wetz]: It's really become a focal point of my career so, you know, I owe a lot to the folks down there and it's been a real honor just getting to work on this—this challenge, and it's also just been very rewarding intellectually. I mean, we've started off really not knowing anything, and I've learned a lot about it. So now, for example, we're putting together a special issue of a journal looking at similar systems, working with colleagues in South Africa and the French Mediterranean and Australia. So trying to look more broadly at these types of systems that are in these more arid and semi-arid regions and some of the challenges that their facing and so I think Baffin Bay's been getting out there, you know, on the world stage too.

[Brown]: But more than that, Dr. Wetz enjoyed seeing the passion of the citizen scientists.

[Wetz]: I think what they're doing is really special. They're a role model to me, but I think they could be a role model to a lot of Texans, and beyond Texas just by virtue of them being willing to put their time and efforts towards solving these issues. That's, that's really amazing.

[Brown]: Since the initial water quality study, more and more scientists have become interested in Baffin. There have been recent scientific studies on water quality in the bay and in its tributaries, groundwater, septic systems, black drum, serpulid reefs, seagrasses, and sediments. Just to name a few. Plus, it directly related to the work needed to restore the bay.

[Mike Wetz]: From a practical standpoint, we were able to get more data, more frequently than I could ever imagine just by us doing it on our own, but we're also, by working with these folks, you know, they have so many ties in this community and in Baffin Bay in general that gave us this natural stakeholder base as we made that transition from getting the data to trying to find solutions. We had this sort of built-in network of people who could help us start to expand our network and reach the right individuals.

Conclusion and Credits

[Brown]: Coming up on The Gulf Podcast, we're going to have episodes in our Watersheds series, including ones on the very recent efforts to restore Baffin Bay and episodes on seagrass and more. I hope you all can join us!

Thanks again to Scott Murray, Mike Wetz, John Sutton, David Rowsey, and the other citizen scientists for the interviews and for their work. If you want to get the latest podcast updates, you can follow us on Instagram and Facebook. For episode scripts and our digital archives full of Baffin Bay oral histories, please visit The Gulf Podcast's website. Production help came from

Alyssa Lucas and the music came from Lee Rosevere. This is Dr. Jen Brown. Before I sign off today, I want to share a fish story from Baffin Bay, but as a warning, it has some salty language.

[Sutton]: I met Rowsey at Roy's Bait and Tackle. I saw him in there, and I'd wanted to talk to him about, he was writing for the *Texas Saltwater [Fishing] Magazine*, and I wanted to tell him how much I appreciated some of his articles, you know, that I really enjoyed them. So, I introduced myself, and we started talking and so forth, back and forth, and at that time, I had a pretty unique boat that was a Majek commercial skiff, just a small eighteen-foot, flat-bottom skiff, but it was a great fishing boat for me. So, David and I began to talk and this and that and he's like, "Oh, you're the guy with the white Majek," and I said, "Yeah," and he told me, he says, "You sure fish a lot in my spots," (Brown laughs) and I said, "I was fishing your spots before you were born" (all laugh). But anyway, we talked a little more, and we seemed to hit it off real well, and he told me, he says, "I want to tell you this story, and I hope it doesn't offend you," and I said, "Nah, you're fine." He said, "Well, I can remember one morning. I told my clients, 'Be there early. We've got to beat this other guy to this place because I know, he knows the trout are there,'" and so they got there like an hour early, something like that, loaded in their boat, and said, "I got everybody in there, and we took off, you know, it's still in the dark, and...found the place we wanted to cut into the shoreline, and then we started easing up there in the dark, in the dark. I got closer," and he said, "I looked up to the shoreline and there was your little white boat sitting there already. All I could think of to tell the clients was 'that old son of a bitch beat me here again'" (all laugh).

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