Molly Graham: [00:00] This begins an oral history interview with Dr. Quay Dortch for the NOAA Heritage Oral History Project on June 23, 2023. The interviewer is Molly Graham. It's a remote interview with Dr. Dortch in Washington, DC, and I'm in Scarborough, Maine. I thought we'd pick up with – if you could give me an overview of how your career at NOAA unfolded. You talked a little bit about being recruited and getting started in 2003. But how did your job change over time?

Quay Dortch: [00:23] So I was recruited to be a program manager, managing ECOHAB [Ecology and Oceanography of Harmful Algal Blooms], which was already in existence when I got there but had only been in existence for a couple of years. At the time, it was interagency, so I was a coordinator, besides being a program manager, for this interagency effort. I was surprised – and I can't remember if I told you about this, so tell me if I'm repeating myself. Within two weeks of arriving at NOAA, the person who was the acting director put the legislation on my desk, the Harmful Algal Bloom and Hypoxia Research and Control Act, and said it was up for reauthorization. Are you nodding your head because I already told you about this?

MG: [01:18] Yes, HABHRCA.

QD: [01:22] HABHRCA, yes. Anyway, that was the start of my involvement in legislation. I sort of have two tracks in what I've done until I retired. I retired as a program manager, so I never moved into an administrative position. And that was my choice. I just really enjoyed doing the science and didn't want to move up. I figured I would get away from the science and spend more time doing things like timesheets, which I was not interested in. Anyway, the program management part proceeded – every year or every other year, depending on how much money we had, we would put out calls for proposals. Then, you read through the proposals and select an expert panel to evaluate the proposals. They all come in for a couple of days; you sit around talking about the science of the proposals, which is lots of fun because when do people ever get to just sit down and talk about science for three solid days? Then, after they left, we would sort of put together what they had said about the proposals and decide. They would rate the proposals, and that would give us a ranking. We would choose from that ranking the ones that most fit the needs at that point of the different agencies that were involved – later, it was just NOAA – but it was always the top-ranked ones. Depending on how much money we had, how many of those we could fund. Early on, we had lots of money. Then the budgets went down, down, down, down, down. Then Trump came into office, they zeroed out our budget, and Congress put the money back because HABS and the things that our office did – all of NCCOS [National Centers for Coastal Ocean Science] was of interest to Congress, and so they put the money back and often put the money back [with] more money. So budgets went up, up, up, up, up. So now they're back; the budgets are back to where they were when I first got there. One of the reasons I haven't fully retired is that in a time of rising and high budgets, there are all sorts of things you can do that you weren't able to do when you were pinching every penny that you possibly had. Anyway, eventually, this whole thing – all of ECOHAB was formed because of *Pfiesteria*. It wasn't the first HAB to occur in the United States, but it was the one that grabbed national attention. Slowly, it became clear that *Pfiesteria* was not a major problem, and interest by the other agencies waned, so eventually, it became not an interagency program. But in the meantime, we got to talking about how we needed other programs. And already another



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program before I got here had been established called MERHAB, Monitoring and Event Response for HABs. And there was a program manager for that. But then we decided we needed another program, and it was sort of called for in the legislation called Prevention, Control, and Mitigation of HABs [PCMHAB]. As a result of some activities that I was doing on the congressional side, we wrote a description of that program and started it, and that was about 2010. I got here in 2003. This was about 2010. On the congressional side, what had happened is I'd been involved in getting HABHRCA reauthorized. I ended up doing, over many years, a lot of congressional briefings with various higher-ups in NOAA, from the AA [assistant administrator] for NOS [National Ocean Service] or the director of NCCOS, going as the subject matter expert. We would go in to talk about our HAB programs and what they were doing. Then that would give Congress – the staffers – a chance to ask us, "Well, what do you need to do that?" I found that to be really fun to do. I discovered that I had a gift of – I think, and people told me that I had a gift, so I guess I do – people are talking about what they're concerned about and being able to come up with something that addresses their concern that we, NOAA, are doing that will help to convince them that it is worth funding these programs. I think that's why I ended up going to a lot of these briefings. It was always a real interesting thing to do to be able to see how things work, how the sausage was made. So, HABHRCA got reauthorized, and they requested five reports, four on HABs and one on hypoxia. Besides doing what I call my day job, which was running ECOHAB and then eventually PCMHAB. I was also in charge of writing these reports, and I had a couple of contractors working with me to do that. One of the reports laid out in some detail what the PCM program should look like – the linkage between these two tracks. It took us a couple of years to get all those reports written. Since then, we have every time they ask, we say, "No more reports. Please minimize the reports." So, what am I doing right now? I'm writing up a report, a South Florida report for Congress that nobody wants. But anyway, that's further on. There was something else I was going to say that I can't remember about the two tracks. It'll come back to me if I do remember it. I'm trying to remember. The next time that HABHRCA came up for reauthorization, I was asked if – they again reauthorized it, and they had a bunch of reports in it. But I had had it with report writing. So, I bowed out of that, and fortunately, my supervisor above me backed me up in that. My role with regard to report writing decreased a lot for a number of years. But in the meantime – so, all this time, I'm still running ECOHAB. Oh, I know. I didn't tell you about the event response program. The other programs – MERHAB, ECOHAB, and PCMHAB – are all competitive research programs; we get a pot of money through a competition, people get funded, and then we manage those projects. And managing those projects means going out, doing site visits, keeping in touch with them, [and] making sure they're doing what they need to be doing. So there's what now is a fourth program – actually, we've got a fifth program in the works, too. But that's another part of the story – is event response. The problem is when a harmful algal bloom occurs, you want to get out there and study it when it's happening. If you get funded through all the other programs, there may or may not be a HAB going on or occur at all during your project. There's a joke in the community that the best way to get rid of a HAB is to get funded because as soon as it does, the blooms all stop. It's happened so many times. It's funny. Anyway, we have event response. NOAA doesn't move money fast at all. So, what we have done is we have put a pot of money at a cooperative institute, which is the US HAB National Office, which also has an informational website (https://hab.whoi.edu/). The HAB National Office does a lot of things for us that we can't do directly. It has a website that we control entirely. It's an informational website, and I

can send you the link if you're interested. I can't remember if I did early on because it's a great way to learn about HABs. And if you are, I'll write myself a note.

MG: [10:22] Yes, please.

QD: [10:25] It's a living document. The person who is currently the assistant director of the National Office, Mindy Richlen, who's really the person who does all the work, and I work on this website all the time – add new things to it. Our programs have so little control over the NOAA websites that we have found that it's easier just to have our own there that we can control. We don't do anything wild that we shouldn't be doing. It's just they're there, and we can put information on them that we want. Oh, I was talking about event response. So we put a pot of money there at the US HAB National Office, not a huge pot of money. People submit to us little proposals by email, little being like two pages. If we think it's an event that is worthy of a response, we say, "Sure." "We" is all the program managers in my office. And then the US HAB National Office provides them with the funding for whatever it was they asked for, which is often things like ship time, toxin test kits, or things like that. We just did an analysis, and the average size award is eleven thousand. The amount ranges from about three thousand to something on the order of sixty thousand. Because if it gets into much more than that, we have to go find the money somewhere else. And we have on occasion. Those are little events, but they're often very interesting to be involved in them. And sometimes, Marc and I – Marc is the MERHAB program manager, Marc Suddleson. He and I have worked closely together for years now because he was the only HAB person there most of the time. When I first got there, Sue Banahan, the person who recruited me, was still there. She and I worked on ECOHAB, and then she left, so it was Marc and me. But Marc and I were the ones who worked on the event response for the most part. And some of them don't take much direction, but some of them, they'll call you up, and they say, "I have no idea what to do. The water is bright red, and everybody's upset, and there's lots of dead fish. What do I do?" So, one of us will take the lead in sort of pulling together people to help them, getting them in touch with who they need. Sometimes, it becomes all-consuming. So, there was a red tide in 2005 that actually started involving OR&R [Office of Response and Restoration], and we were doing SITREPs [situation reports]. It turned into a big deal. For that one, across – it came out of our budgets. We came up with $540,000 to pay for ship time because ship time is very expensive, so they could actually figure out where the bloom was because it was spreading. The one off of Maine, which was then moving down Massachusetts and was going to move on further down the coast, is quite lethal. So that one consumed all of Marc's and my time and several other people's as well for months because it just didn't end. And then we had another recent one when they opened the Bonnet Carré Spillway in Lake Pontchartrain in Louisiana because it was flooding The Mississippi River. The freshwater plume went into Lake Pontchartrain, and then it went across to Mississippi, and then it went across to Alabama. That had never happened before. There were cyanobacteria blooms all over the place. There were questions about the health of using beaches [and] the health of seafood, and they had no idea what to do and how to message what should be done to the public. I, Maggie Broadwater (my replacement as ECOHAB Program Manager, and Mary Kate Rogener (the Event Response Coordinator), spent a lot of time – it ended up – we went on for three months with weekly calls, coordinating calls, because the state of Mississippi was suing the Mississippi River Commission and the Army Corps of Engineers about opening the Bonnet Carré Spillway, so they weren't talking to people in Louisiana. They weren't allowed



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to pick up the phone and call them and ask them what they were doing. So, our coordinating calls were the only way that they could communicate legally. That was another one. But they're always really interesting. You learn a lot while you're doing these things. You feel as if you're being useful. That's why the event response program, both in terms of the publicity we get for our programs and our office – it's really high bang for the buck, but also, it's personally very rewarding to work on. And I'm still doing it.

MG: [15:36] When you say pull-together teams, who makes up the teams? Are they all NOAA folks, or are they people who are on the ground and in that area already?

QD: [15:43] It's sometimes whoever you can find has the capabilities that you need. There are not many places that can do toxin analysis. For example, the Charleston lab in NOAA has a lab that can do all kinds of HAB toxins, so we often ask them to get involved. They're part of NCCOS, but they don't have a budget for these things right now, so their ability to do that is limited, and we can't pay them directly from the event response pot. There are indirect ways we can do it, but we can't pay for labor or anything. That's a real problem. But there are other people in the community that can. So, they charge so much – somebody charges so much per sample for analyzing for cyanobacterial toxins. One time, it was, I think, a Labor Day Weekend, and somebody I knew in NOAA heard that people in – I can't remember if it's Marion County or Martin County in Florida, where the St. Lucie River is, and they were having huge cyanobacteria blooms, and all the marinas and everything were just a stinking slime. They wanted to know how toxic it was and how they should be messaging it. So, there I was, on a holiday weekend, talking to them and trying to reassure them and find people they could ship samples to on a holiday weekend. So, it's sort of whoever you can twist their arms to do something, sometimes for free. But sometimes, all they need is information. Once they've got the information, then they can run with it on their own. And sometimes, they don't need information; they just need the money. Each one is different, which is what keeps it interesting. You just never know when you answer the phone what you're going to be doing. Now, it's become a little more – I won't say ad hoc because it's still ad hoc, but we actually have an event response coordinator. So, all of us who are the HAB people in our office still participate in deciding what's going to be done. Sarah Pease is the one who fields all the calls and does all the phone – helping them out, trying to figure out – and she will call one of us in if we have particular expertise. We've always worked it that way; whoever knows the area or the particular problem is the one who takes it. Anyway, there's the four programs on the one side, and then there's the – I don't know if I would call it – it's the planning side, I guess, but it is policy that we're trying to influence. So, after giving up writing the reports, I still kept doing congressional briefings, and now we have a bunch of people who do that, and I don't. I sometimes am brought in to help give advice, but I don't – well, I have done one or two this last year, but I generally don't do those anymore. But what I am working on is the National HAB Observing Network [NHABON], which started out [with] two of us at a meeting about HAB forecasting saying, "Well, you can't have HAB forecasting without HAB observing. What are we doing about HAB observing?" That led down a long path of multiple documents to convince NOAA and the community that we were ready because the thing is that our programs and others – I won't say just us – have developed all these amazing ways of measuring HABs and HAB toxins, and they can be put out in the water, operate remotely, and send the data back if that's how you want to do it. Sometimes, that's the hard way to do it, and it's better to put it on a dock or bring samples into



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your lab. But there are devices now that can do this. Wouldn't it be wonderful if we had a network of all of these devices and that everybody agreed to work together, but that it met the regional needs? So, that's what has led to the – now NOAA has taken it on, and Congress – so, we wrote what we called a framework, which lays out the basic idea. And then IOOS [Integrated Ocean Observing System] Association became interested in it. So that's affiliated with IOOS, but it's outside of NOAA. They became interested in this problem, so they wrote an implementation – what's the word we use? It's not a plan yet – strategy. That got to Congress before it was actually finished, but that really got Congress interested. So, Congress has started putting in money for pilot programs, and the money goes to IOOS, but the wording in the appropriations legislation is that IOOS will give the money to the regional associations but that it will do it on the advice of the HAB experts in NCCOS. And that has forced IOOS and NCCOS to start collaborating in ways that it never did before. And so now, we work together pretty seamlessly on anything having to do with HAB observing and, to some extent, HAB forecasting because now some HAB forecasting is being done by the regional associations. So, on the research side, I no longer manage programs. When I retired, I kept a few legacy ones because it was just easier to let me finish them out. But I don't take on any new projects, and I don't run ECOHAB and PCMHAB anymore. I still am involved in event response. But I haven't been the lead on one for quite a while because we've had an event response coordinator. So, my main effort until recently had been in HABON, and then the plan was that I would – so, there was an implementation plan written – oh, I skipped a step with NHABON. After Congress gave us money, they also said in appropriations language that, "We want an implementation plan with a five-year projection of what it would cost to fully implement it." And that was just a gift because it's rare the Congress really wants you to give them the dollars, so you can tell them, "This is what you need to appropriate if you want to do this." We did have some champions in Congress, staffers for both the House and the Senate Appropriations Committee. With the changes in administration – well, not so much that as the House and Senate – they have both moved on, so we don't have the champions anymore. I don't know what's going to happen. I think had they stayed, it was a good chance that it would have continued to increase. I don't know. But the trouble is the time is right to form this National HAB Observing System as HABs keep getting worse. It's not a partisan issue. There are many Republicans who are as interested in this as there are Democrats. So, I hold out some hope that it will happen, [but] not as big as we have put in this implementation plan, which is going through NOAA approval right now. It's a winding route. In the meantime, with NHABON, the person who was the director of the IOOS Association, Josie Quintrell, has retired, but she has kept doing the HAB stuff as the one thing she wants to continue in her retirement, which has just been great. We have developed a community of practice for NHABON, and there's a steering committee for it. These are people who are pushing to move NHABON forward, but we also hold quarterly webinars. I am a co-chair of the NHABON Steering Committee. So that's one of the things that takes up a lot of my time these days is moving this forward

MG: [25:03] What went into your decision to semi-retire?

QD: [25:11] Age and not having quite as much energy as I had and wanting to do some other things, although I haven't quite gotten around to any of them. It needs to be more time than halftime for my leisure activities, I think. But I'm going to be seventy-five this fall. I'm not sure how much longer I will do this. I mean, I'm enjoying everything, although this South Florida



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report that I volunteered to do because I am an expert; I serve on the Florida HAB Task Force, so I have a great deal of expertise in South Florida, but it has turned into – it's a congressional report. That's all I can say. It's just a pain to write. I really would rather not be doing it, but I am doing it. The plan was that the person who took over for me for ECOHAB and I would put together a special issue of a journal that would celebrate the 30th anniversary of ECOHAB because ECOHAB is really what has led to enormous expansion of our understanding of HABs. And you can't manage them if you don't understand them. So, I hope that my energy will continue through that process. We'll see.

MG: [26:39] It sounds like it would make a good oral history project to document its institutional history.

QD: [26:45] Yeah, it would. Because what's interesting is what I know, and what a few other people know, is how the building blocks have been put together. Maybe it doesn't matter for it to be remembered. The point of the special issue is going to be that it takes research over a long period of time, that you can't understand something really quickly, and that to do it right, you have to do it over a long period of time and in a number of different approaches.

MG: [27:27] Well, that was what I was going to ask you about next is how the HAB research has evolved over time. What were breakthroughs, advances in our learning, and trends in the research?

QD: [27:43] I would say that the whole field of molecular biology has just revolutionized how we do the biological part of oceanography. Maybe there have been similar advances in, say, modeling and physical oceanography. But I don't know what the big breakthroughs were there. I know what we use. It seems like we're still using many of the same things. For example, with modeling whether data ingestion into models in real-time, is that such a breakthrough? Or is AI [artificial intelligence] a major breakthrough for modeling that has upped the game enormously? I can't judge that. I can judge the biological part. I would say all the advances, and it's a wide range of things that seem to, to me, made a difference. But when I talk about – well, one of the centers is not reliant on that, I will admit. That's interesting. That's another oral history project that I was just telling somebody about the other day that's about to be lost. Many years ago, when I was at Bigelow, I worked with a scientist who was using a flow cytometer, which was this mammoth instrument that had two lasers and it had different wavelengths. You could count and then sort organisms using – so, the organisms would flow through a tiny aperture in a stream of liquid. It would separate them so they go past a light source one at a time. You would have something that would measure on the other side of the light source, the characteristics of the cells. If you had two light sources, you could get two different sets of measurements. You could distinguish the organisms by these results. This was pretty crude back then. It was being used in medical science way before that. This was adapting it for oceanography. So I was there and actually participated in a workshop at the Bermuda Biological Station that did the first work on marine organisms that was published. Anyway, that has led, in terms of optics, to all these different kinds of instruments that take advantage of that thin stream of water and using a light source of different kinds to measure the organisms. Now, the one we use a lot in oceanography senses chlorophyll. When it senses chlorophyll passing a lens, it will take a picture. The pictures are good enough that they have machine learning algorithms that can identify the



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organisms, and then they can count them. This first started in Texas. A manager can get a warning that's totally automated, saying the HAB in your area has gone above a threshold level, and you need to start testing toxins in shellfish. These things can be deployed on docks; they can be deployed in the water, and they have been, but that's a lot harder. California is trying to put together a whole network of these, and I think they have twelve of them right now. Some are on docks, and some are out in the water, providing data in real-time about HABs all up and down the California coast. And so that's one breakthrough. And that's optical, that's not really – optical, and also developing the capability of doing the flow well enoug,h and being able to do it for long periods of tim,e operating them remotely. A whole series of things had to happen. And, of course, the internet comes into all the capabilities with the internet and ability to send data rapid-stream because these are huge datasets that are the data that identifies the organisms. But I would say that HAB detection is the really big change because back when that organism I was telling you about that started ECOHAB, they couldn't tell what it was – they couldn't count it because it looked like everything out there. There are a lot of little, tiny things that all look just alike. They couldn't really count it when it was present or not. They needed a stain or dye that could identify it. They did that using the molecular tools, something that would specifically bind to *Pfiesteria*. And then they could count when blooms were due to *Pfiesteria* or not. It turned out it was something else that was causing the problem. So, those molecular methods have continued in various ways beyond my ability to actually understand how some of them even work because I don't have the training in this, but it just absolutely astonishes me that we are now able to do.

MG: [33:28] Something I wanted to mention was that a number of years ago, my brother was working as a surf instructor on Long Island, and part of his work was informed by an app he had on his phone that told him where the toxic areas were in the water and where to avoid. Is that a tool that relies on these datasets and instrumentation, or am I completely off?

QD: [33:50] That's interesting. So, that must have been the work of Chris Gobler. He makes maps available to people. I think that even the TV weather people sometimes put the HAB data out around Long Island. In Florida, with the Florida red tide, one of the projects that we've been working on is to develop these cheap – take these cheap microscopes, put a sample underneath it, and attach a cell phone to it. They can take a picture, and that can be sent somewhere else for identification. It's done in such a way that it can identify the HAB. So, they're using that now. The idea is every beach every day. Having that available to people along with models for – it depends on which way the wind blows, if there's *Karenia brevis*, the Florida red tide, that produces toxic aerosols at the beach. If it's blowing offshore, you're not going to have a problem with it. Blowing onshore, you're going to have a problem. I mean, that's a little simplistic. And then where are the blooms likely to move to? So, right now, they're actually doing it where they can. It's not yet every beach every day, but twice a day on some beaches because it can change from morning to evening. So now they're trying to tell you, "Well, it's bad this morning, but it'll be fine this afternoon." So you can pick a beach instead of having to go beach and find out, "This is awful. Let me go try this other beach." So yes, that is one of the goals for the public.

MG: [35:35] I have in my notes that in 2015 – and I'm going to mispronounce this – Provasoli-Guillard National Center for Marine Algae and Microbiota was formed, and they're

developing a training program for future scientists. I didn't know if you were engaged in that work at all.

QD: [35:59] Yes. So, originally MERHAB, which is managed by my colleague, did not include training. I benefited from several training courses because I did some identification of HABs years ago in Louisiana. I argued that we should do that. Finally, I convinced him to put it in a call for proposals. Bigelow put in a proposal and got funded. They're the logical ones to be doing it because of the culture collection there. The culture collection has actually been there – it was there when I was there. It was started by Bob Guillard. So, they had funding from us. They managed to make it last for four years. And now they do it, I think, almost every year, if not every year. They have now expanded to other things as HABs have grown. And it's funny; I was just on a call with the person who manages the training course, plus a couple of other people who are doing some HAB work. But they are expanding. I mean, there's almost always been somebody there who worked on HABs. So Clarice Yentsch, who was there years ago – the person I described who has been forgotten as the originator of all of these optical instruments that rely on basically that original device – and I had gone to a talk. No, I was at a demonstration by somebody who's selling one of those instruments, FlowCam, who's from Maine and knew both Charlie and Clarice Yentsch. He said it was Charlie Yentsch who started it, and it was not Charlie Yentsch because I was there when it began. I [inaudible] up the paper[1] and sent it to him and said, "From now on, you need to give credit where credit is due. It was Clarice Yentsch who started it." Anyway, she was a well-known HAB expert back then– although I didn't work on HABs there much at Bigelow, and I didn't for a while, even when I went to Louisiana. I learned a lot from her, and it stayed with me and helped me later. So there's always been this tie starting back from my origins of Bigelow.

MG: [38:48] That's interesting. It's also interesting how it always seems to be the women who get left out of the historical record.

QD: [38:53] Yes. That was why I came down so hard on him to make sure that the record got corrected.

MG: [39:00] Good. Speaking of training, I was curious – you mentioned, I think, in your survey about how you love working with younger scientists, and I was curious to hear more about that experience and what that's been like for you.

QD: [39:14] Well, obviously, I did a lot of teaching. Until I came to NOAA, I'd done a lot of teaching everywhere. I was a teaching assistant at the University of Washington. And then my Ph.D. advisor, after I'd graduated – I was there doing a postdoc – he was going on sabbatical and needed somebody to teach his courses. So I actually was an acting assistant professor at the University of Washington. Then, when I went to Bigelow, I didn't teach there, but then later, when I went to Louisiana, we didn't have a student body there because we were way down – three hours from LSU [Louisiana State University] and an hour and a half from Nicholls, which

[1] Yentsch, Clarice M.; Horan, Paul K.; Muirhead, Katharine; Dortch, Quay; Haugen, Elin; Legendre, Louis; Murphy, Lynda S.; Perry, Mary Jane; Phinney, David A.; Pomponi, Shirley A.; Spinrad, Richard W. (1983). "Flow cytometry and cell sorting: A technique for analysis and sorting of aquatic particles1". *Limnology and Oceanography*. **28** (6): 1275–1280

was the nearest University. I taught summer courses at LUMCON always, usually Introduction to Marine Science. And I taught part of Biological Oceanography up at LSU. And then, I took student interns, undergraduates, and graduate students from a number of universities, any student who wanted to do something in marine science. I always had students of various kinds in the lab, which I always enjoyed; that's where the new ideas come from. And then, I also had a few international people who came and spent time in my lab, which was always a really interesting experience that they were recommended. For some reason, Spain had, at the time, a really generous program for sending postdocs to other places. So, I had a number from Spain that came and stayed with me, Antonio Bode and Elisa Berdalet. At LUMCON [Louisiana Universities Marine Consortium], it was lucky that there was a place for people to live, so they'd just live at the lab. But then, LUMCON was in the early, early stages of remote teaching. They built a room for that purpose. It was totally different now than you and me sitting here with Zoom. This was me at the front of a classroom with slides and then cameras that would transmit it to other locations. I would teach up to three locations at once. I did things like – Our Changing Coastal Ocean was one that we did at LUMCON quite a lot. But I did several specialty courses for LSU and also for what's now known as ULL [University of Louisiana at Lafayette]. But I've always enjoyed teaching and having students around. One of my former graduate students and post-docs, Mike Parsons, continues to work on HABs in Florida, so I see him professionally now and then. So now, in NOAA, there have been periods when we had Knauss Fellows and young contractors. So when I was doing those five reports, I had a couple of young contractors, Cary Lopez and Libby Jewett, that worked – they didn't technically work for me, but they were working with me. They both have gone on to nice careers elsewhere. It's good to run into your students and see them doing well or your former colleagues. So, now we have a whole bunch of new young people in office. Anyway, part of my job description is mentoring. I make a point, particularly with this Zoom – I really feel sort of sorry for the new ones that come in. I mean, getting the business done works fine, but they lack the ability to network with people. I try to make a point for the ones that I work closely with, one that I'm currently working closely with; we have weekly discussions that usually start out about whatever it is we're working on – right now, the South Florida report, but then it ends up just talking about whatever. Yesterday, talking with Bridget Weimer, it was about career ladders in NOAA, what her choices might be down the road, and what did she want to do, and me talking some about what I had enjoyed doing. It started out talking about why we enjoyed working at NOAA. So, I tried to make a point of spending time talking to the various young people that I'm working with on things.

MG: [44:07] That sounds rewarding. I've been thinking about how there's so much utility and value in this interview with you. I hope that when the HABs programs onboard new employees, they share your interview so they understand your career path, decisions, and just how your career in this field has evolved. I think that will be useful.

QD: [44:29] Yeah, I never thought about it. One of the things I did was, because we had so many new people coming in with regard to HABs, I put together and then I asked a couple of my other colleagues to add to it, a HABs 101 kind of syllabus, partially web pages where you can go to get information kinds of things, but then I sort of walk them through it. "Here are some of the things that you're going to need to know and where you can get more information about them." I hope that's been useful to them.



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MG: [45:05] I'm sure it is. It sounds like a great place to start. I also wanted to ask you, speaking of the remote environment, in what ways, if any – and I'm sure there are some – were you, your office, and your work impacted by the COVID pandemic?

QD: [45:25] I actually am surprised by how little we were impacted. I think the office was in a pretty good place at that point. A number of people already worked remotely. So, Maggie is in Charleston. Felix Martinez, who took over from me as the PCMHAB (Prevention, Control, and Mitigation of HABs) Program Manager, is in the NOAA Great Lakes Environmental Research Lab. We had Mary Kate, who was located at her home in Georgia somewhere. And then Marc and I, who were in Washington. We were actually doing most of our business by remote work anyway. I had been doing a lot of remote work over the years because something that hasn't really come up – I'm quite mobility-limited. I've had multiple hip surgeries, and there have been long periods of time when I didn't get around very well, so I've worked from home. It has worked surprisingly well over the years. It was even before we had Zoom or Hangouts that somehow we made it work. I can't even remember now how we did it before, maybe just by the phone.

MG: [46:56] Have you encountered any challenges or barriers in terms of finding accommodation?

QD: [47:02] Well, there have been lots of discussions about – for example, we talked about expert panels. We did switch to doing them online. We concluded that while it worked okay for the bigger ones, it really was not sufficient because one of the reasons people come to panels is not just about the science; it's about meeting other people. That's how many people develop collaborations. Unlike big meetings, you're sitting with these people for three or four days, and you get to know them and find out what they do. So, lots of collaborations come from panels, and that wasn't happening. So, we really felt that it would be better to do the panels in person. There were a few things like that that we really had to think through. We've done a number of workshops. We had a whole bunch of workshops scheduled right at the time that COVID hit, and a lot of agonizing learning how to use – we didn't want to use either Zoom or Google Hangouts because they just didn't have the capabilities for breakout rooms and all those kinds of things. So, there was a learning curve, certainly, with many of these things. But some things may never go back. So, our office is still largely people calling in remotely. I went in the other day. Marc and I had gone in for a meeting; we were the only ones there.

MG: [48:49] Yeah, must feel so strange, like a ghost town a bit.

QD: [48:54] Yeah, it is. But we're getting ready for the restack. So everybody is trying – we've all gotten moved around anyway. Now, I no longer even have an office. It's not the same as it used to be. I'm trying to figure out – I want to have a – I don't know what you want to call it. Not a fire sale because I'm not going to sell anything. I've got all these books I'm getting rid of and a whole bunch of HAB memorabilia. I've taken what I want to keep. I don't know if anybody wants any of it, but I'm going to have one day, when everybody's in the office if I can think of a day and put it all out and say, "Grab what you want. It's going away."



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MG: [49:43] You might want to consider reaching out to the NOAA Central Library or NOAA Heritage in terms of any literature or assets that can be included in their collections.

QD: [49:52] Well, they've told us – because we have – anything older than ten years they don't want.

MG: [49:58] It's funny, I'd be more interested in the older items and materials.

QD: [50:01] Yeah, isn't that odd? Well, a lot of stuff is available online. But of course, you have to know what it is if you want to find it online. So I'm telling that the younger people – so there's lots – the founding reports for ECOHAB, for example. They're going to throw those all away. So if you want a paper copy of that, you better get it.

MG: [50:29] I'd hate to lose that provenance.

QD: [50:36] Yeah, me too. In part of my research, I worked with a group that would use old records of various kinds – I mean, amazing what we sometimes came up with – to look at past fertilizer use, but other things as well that are markers of eutrophication to try and understand the change in the Mississippi River over time.

MG: [51:10] Well, that sounds like historically valuable data.

QD: [51:13] Yeah, that would be, and I actually don't know where the data came from because who keeps fertilizer use data? I think it was state by state that they kept it. And some of it was in, as I understand it, state libraries and things like that from agencies like ag [agriculture] agencies.

MG: [51:34] Perhaps that's something that NCEI [National Centers for Environmental Information] is interested in adding to their data collection.

QD: [51:41] Yeah, I don't have that data. Somebody else does. We don't keep any data at our office.

MG: [51:51] Dr. Dortch, do you have a few more minutes to keep going? We're just about done.

QD: [51:53] Yeah, yeah.

MG: [51:56] You included in your notes some additional experiences to include in this interview, such as visiting Antarctica in 1994. I can't remember if we talked about that or not. I'm wondering if you can say a little bit about what you were doing there.

QD: [52:10] I was going down on down for a site visit for NSF [National Science Foundation] for their Polar Programs. They had picked me because I've never worked in the Arctic or the Antarctic. Because I was a biological oceanographer, I understood the processes, but I wasn't conflicted with anybody – the whole issue of conflicts. That was one of the amazing experiences of my life, as you could well imagine. What they did is flew us down to Punta Arenas, Chile,



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which is where you can get a commercial flight. Then the US Air National Guard met us there; they had a plane, [and] they do practice runs for Antarctica. When the weather cleared, and this is a big issue with Antarctica, they flew us to St. George Island, which has a gravel landing strip, no lights, only daytime. So, the first time we went, they couldn't land because it wasn't clear enough. The second time, they made – so, I'm sitting there; you're wearing all your polar garb in case there's a crash landing or something. So you're wearing all your polar garb, including these great big boots. You've gone to a warehouse in Punta Arenas and gotten completely outfitted with all this stuff. My feet are propped up on a lettuce crate because they're providing supplies to the lab that we're headed to on the Palmer Peninsula. So we're going to Palmer Station. They tried once, and they just couldn't see the landing strip, and it was getting close to dusk. They came around, and they tried again. They could see the lights of the ship that was anchored just offshore. They used those lights to land. I am glad I didn't know that because it was scary. Then we were met by Jeeps, and they drove us down to the shore. There was nothing on the shore but a bunch of rubber zodiacs and ice chunks. We had to wade out. So here I am; I'm probably about forty-five years old at this point, maybe fifty, and get into the zodiacs with our suitcase. And then the zodiac took us out through the ice to – was it the *Polar Duke*. You pull up to the side of the boat, and they drop a ladder down, one of these ladders with wooden steps that's about this wide (3 in). Well, my boots are about this big (12 in), and my feet are about this far back from the end of the boot. It turned out I was in the front of the zodiac. I was the first one to go up the ladder, and the boat and the zodiac are separating like this, and you have to do this jump. You don't have to carry your suitcase; they pulled the suitcase up separately. But I made it, obviously. [It was] one of the scariest things I've done. And it turns out that – it was a couple of days steam, but it's through – there was one short stretch through open water, and it was not bad weather, so it wasn't too bad. The rest of the way is through a passage that was solid ice walls on both sides. Just amazing to look at. It's gray and gloomy. We really didn't have much sunlight when we were down there. And then you get to the only dock, it turns out, in Antarctica; I didn't realize that. The ship can pull up to the dock, and you can just walk off, which was really nice. I didn't have to go through the whole leap off and on the dock. Then, we went and did the site visit. While we were there at the site visit, we got to take the zodiac out and go to an island that had a penguin colony. Penguins are cute, but they smell to high heaven. It was raining, and the shore was running with pink-orange penguin poop and water. By the time we came back to the boat, we were just covered and just smelled terrible. They had a special room for us to wash off in. Anyway, we spent the day walking around, and while they were doing some research, seeing what it took to do the research on the penguins, which was really interesting. But we also got to walk around this little island. We could hear these weird noises. We came around this corner of rocks, saw steam rising, and didn't know what it was. It turned out that there were a bunch of – oh, what are the great big seals? Not sea lions. It'll come back in a minute. They're huge, and they were molting, which means I guess they lose all their fur. They were belching and farting and wallowing in this mud, all together, a whole bunch of them, maybe ten of them. Elephant Seals. But we saw fur seals, we saw leopard seals, which are the ones that go after the young penguins. They apparently also go after zodiacs as well. Yeah, they're a little nasty. And then we got to go out another day while they were doing the actual oceanographic research and look and see how they took samples from zodiacs and stuff. Another afternoon, we got to hike up the glacier behind the station. It was really interesting being there. Then we came back the same way – got on the boat, went through the channel, and then had to wait for the plane. So we would every day get off the boat, take the zodiacs to the

station that was on St. George Island, and wait for the plane to land or not land. And it didn't land a couple of times. So, I got lots of practice getting on and off the boat with a ladder. I got pretty good at it. Anyway, it was just an experience.

MG: [58:50] Yeah, sounds like such an adventure.

QD: [58:52] Yeah, it really was.

MG: [58:55] The other two trips you mentioned were a French oceanographic cruise in the Mediterranean and an island off of Naples. What were you doing there?

QD: [59:06] The French oceanographic cruise – my then-husband and I were given the opportunity to go on this ship. It was more his research than mine, but it was stuff that I knew how to do. His former M.S. advisor was at Bigelow – this is Bigelow Lab. This is when we went to Bigelow Lab. Ted Packard was there, and he had done the first leg of the cruise, and then he'd given it to John and me because we'd just gotten married, and it's sort of a honeymoon. We spent three weeks on the *Jean Charcot*, which I think is no longer a French ship; it's, I think, gone somewhere else. It was really interesting seeing how a foreign country organizes cruises – the French – and it was remarkably similar to the way it's done in the US. It would have to be. But it didn't cross my mind how standardized it had to be. The food was amazing. Apparently, the way they would get people to go on cruises – because cruises are often pretty hard work – they had incredible chefs and this waitstaff that was like any fine restaurant. The entire ship just shut down during lunch. If you were in the middle of a cast, it just stopped. I guess it stopped. Many of them were timed so that it would work for lunch anyway. Lunch and dinner were just incredible meals the entire time. It was an interesting experience to be out working in the Mediterranean. I'd never done deep oceanography like that before because we were doing some work on respiration rates in the deep ocean, which – I work on phytoplankton in the surface water, so I had not had the experience of seeing how deep oceanography is done. I suspect it's a little different now. Anyway, that was that one. So, the island off of Naples, Ischia, was one of these training courses in phytoplankton with an emphasis on HABS. It was three weeks, and it was chosen to be at the end of the tourist season for this resort area on this island, which tended to attract German tourists for some reason. But the tourists were all gone. So, we had the entire hotel, and there were about fifteen of us in the class. And it was international. So it was quite an interesting group. One of the teachers was a person by the name of Karen Steidinger, who is one of the mothers of HAB science. She just died last week. I gave sort of a memorial for her at our last NHABON webinar because she had just died the day before. Anyway, we had lots of fun. The island itself was really interesting. The people who were there were really interesting. We'd work really hard all day, learning about really serious taxonomy of mostly HABs. But then eating all this, again, interesting food. Since they catered to such a diverse clientele, it was all the different parts of Italy. They would tell you what part of Italy the food was, or if it was German – because they did some German foods. It was always great food. And then Ben came to join me at the end, and we stayed a couple more days on that island. Then we went and traveled around Italy for another couple of weeks. I was probably gone for five or six weeks. But it was just a fun opportunity.



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MG: [1:03:26] Yeah, that sounds lovely. And it's so nice when you can visit these places that maybe you wouldn't have the chance to go to without work supporting you.

QD: [1:03:34] And staying for a long period of time so that you can get to know it a little bit, which is how I prefer to go places.

MG: [1:03:43] Yeah. Well, now tell me a little bit about your life outside of work and the things you would do if you had more time to do it. I think in your survey, you mentioned gardening, cooking, and reading. I know we're both in book clubs that read *Lessons in Chemistry.*

QD: [1:03:57] Yeah. Actually, I don't know if I told you that I live in co-housing.

MG: [1:04:03] Tell me what that means.

QD: [1:04:06] It's an intentional urban community, multi-generational. There are people here from – there have been several newborns while I've been here – up to people in their late eighties. It is a quite diverse people. So the idea is that you have a small house that's yours. You have a kitchen, dining room, everything. But then there's a common house where there are living rooms; there are guest rooms that you can rent out. There's an exercise room. There's a workshop, and it's a huge workshop. So you don't have to have your own things. I mean, everybody has their own kitchen, but you don't have to have your own workshop. It's a different mindset about how you do things, too. You do a lot of things together so you don't pay somebody to clean the place. We have workdays, and everybody participates in workdays, which is the inside and the outside maintenance. Instead of having a property manager, you have teams that take care of various aspects of managing here. So there's a facilities team that my partner is on. He's involved with everything from replacing sump pumps, which he does himself, to managing a contract for replacing the outside fire stairs, which was many thousands of dollars. I'm on the admin team, administrative team, which is budgets, insurance – of course, I'm not thinking of all the things I'm involved [in]. Right now, I'm involved in a discussion about what we should have in the way of waivers of liability signs. It can get down into the minutiae, let's put it that way. So that's one thing I do, and I'm the point person on that team, which means I sort of keep it organized. Then I'm also on the gardening pod, and I'm the point person for the pea pod, which oversees there – it's a U-shaped building, and the common house is at the base of the U. Everybody lives in the arms in either apartments or things that are like townhouses that come out in the arms. In the inner part of the U are multiple levels of breezeways. On the outside of the breezeways are planter boxes. Those all have plants in them, obviously. Most of those are maintained by whoever lives in front of the planter box. But the ones in the stairwells are all herbs for the community to eat, except the ones that face the street, which are flowers. Then, there are also raised beds in the back where people can plant vegetables or whatever they want to plant in raised beds. So I manage both that and the raised beds and the boxes. Mostly, the work is the stairwells, keeping herbs in those. I send out, every couple of weeks, an herb report that says what kind of herbs you can – because there are a couple of other places where we have herbs in the community – where you can find herbs, how to pick them, and what to use them for. If you're going to keep them growing, you might as well have people using them.



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MG: [1:07:57] What appealed to you and Ben about this co-housing situation, and how long have you lived there?

QD: [1:08:04] We moved in right at the beginning of COVID. We had both lived in our earlier days with lots of people. Then we lived in our own house for many, many years, all the places we lived. When we moved to Washington, we eventually moved into a townhouse that we lived in for quite a few years. I served on the board and was very active with the landscaping on the board [and] managed that part of it. Ben felt as if he was not as connected to his neighbors as he would like to be. I was more connected. He wanted to live in a place where there was more connection. And I liked the idea of – I mean, besides the working together, there is just – tonight, for example, is what's called *Viernes sociale*. The people who live at the very end of one of the U-arms, in the summertime, every Friday night, everybody congregates there. We put out lawn chairs because we have a green there, and everybody sits around, and they have drinks. Nobody drinks a whole lot. But sit around and socialize and chat. It starts at 6:30. There's a cooler outside for drinks for the kids. Parents and kids come early, and other people come at different times. It sometimes lasts until midnight or, I gather, later, but I'm usually gone by them. It's a great way to see your neighbors [and] socialize with everybody. Everybody misses it the rest of the year. It's just a really nice thing. We just wanted more interaction with people. I mean, because we live so close to each other, and there is the expectation that we will be – so yesterday afternoon, somebody called me up and said, "Can you get me some tomato cages?" And then I went over and helped her put her tomatoes in the tomato cages, which are not things that we would have just done in our other community. As I said, Ben is the community handyman and fixes the stopped-up toilets and the sump pumps that don't work and all the things like that. It's a level of interaction with people that you just don't have elsewhere. We were much less isolated. Even though we weren't going into people's houses or even using the common house much during COVID, we still were seeing people and getting to know them.

MG: [1:10:51] I think that's so important. Social disconnection is so pervasive. It's great to have a community of people right there.

QD: [1:10:58] Yeah. My office looks down on a tree that all the kids in the community climb. Our front porch, as it turns out, is right across from somebody who just had a baby. They asked us did we mind if we put the sand boxes in front of our house. So we got the sandboxes in front of our house. And now we have a baby swing in front of our house. All the parents come and sit in the shade of the tree that the kids climb. It's where everybody gathers now, and not necessarily when we're there; everybody just sits in our rocking chairs and stuff. It is not our space; it is the community space. We love having the kids out there. It's funny when I see them waving to me while I'm sitting there working.

MG: [1:11:52] Yeah, that's a lovely model. I wonder if more of those kinds of communities will be created in the future.

QD: [1:11:58] They are expanding. There are two right near each other, one within easy walking distance of NOAA.



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MG: [1:12:04] Oh, great. Well, my last question is if there's anything else you want to say about your career with NOAA, the work you've done in HABs or anything else that we haven't covered.

QD: [1:12:21] In reflecting about NOAA, I realize that I have really enjoyed the time working at NOAA, which is part of why I have had trouble with the idea of retiring. Many of the stresses that occurred in the other locations, I don't know if it's because times have changed – and I know it occurs elsewhere, but there has been so much less stress. It has been so much less difficult to just get what you want to do despite it being a bureaucracy and everything else. I have felt much more respected than I did when I was in the academic community. I don't know if it's because times have changed or what, but it has been a really good experience for me.

MG: [1:23:23] Good. That's really evident in our conversations. It just seemed like you fell into a flow in a place that really supported you and allowed you to do such cool and interesting things.

QD: [1:13:36] Yeah, I have absolutely no regrets about coming to NOAA.

MG: [1:13:42] Good. Well, I'm going to miss these conversations. This has been so fun for me. I was intimidated by interviewing you because I knew nothing about HABs, but you really made this understandable and enjoyable for me.

QD: [1:13:55] Well, good. I'm glad because it could be boring listening to somebody drone on.

MG: [1:14:00] No, no, not at all. Well, let me turn off the recording, and I can talk to you about the next steps.

QD: [1:14:05] Yeah.

----------END OF INTERVIEW----------

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