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Brown, Russell ~ Oral History Interview

Joshua Wrigley

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Voices from the Fisheries
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Woods Hole, MA 02543

Interview with Russell Brown by Joshua Wrigley

Summary Sheet and Transcript

Interviewee

Brown, Russell

Interviewer

Wrigley, Joshua

Date

September 27, 2016

Place

Northeast Fisheries Science Center
Falmouth, MA

ID Number

VFF_WH_RB_001

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Biographical Note

Dr. Russell Brown was born in Farmingdale, New York and grew up in Silver Spring, Maryland. He earned his Bachelor's in Fisheries and Wildlife from Cornell University and his Master's degree and Ph.D. from Michigan State University. In 1994, Dr. Brown began working at the Northeast Fisheries Science Center on groundfish surveys. He also was involved with Atlantic salmon and was the Chief Scientific Advisor to the U.S. delegation to NASCO. As of this interview in 2016, he is the Population Dynamics Branch Chief at the Northeast Fisheries Science Center.

Scope and Content Note

Interview contains discussion of: Great Lakes fisheries, haddock repopulation on Georges Bank, Atlantic salmon populations, socioeconomic impacts of Atlantic salmon conservation, Trawlgate, transitioning from the *Albatross IV* to the *Henry Bigelow*, optimizing research vessel time, process of collecting samples aboard research vessels, collaboration between NOAA and the clam industry, natural fish mortality versus fishing mortality, community outreach education programs at the Northeast Fisheries Science Center, communication between NOAA and fishermen, NOAA's reaction to the Deep Water Horizon oil spill.

In this interview Dr. Russell Brown gives a detailed description of the beginning of his career, and his time thus far working at the Northeast Fisheries Science Center. In particular, he discusses the work he did with Atlantic salmon, transitioning from the *Albatross IV* research vessel in Woods Hole to the *Henry Bigelow*, and acting as the Chief Scientist for NOAA's research cruise in the Gulf of Mexico following the Deep Water Horizon oil spill.

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Transcript –RB_001

Joshua Wrigley (JW): This interview is being conducted as part of the Voices from the Science Centers project funded by the Northeast Fisheries Science Center. It's also a part of the Voices from the Fisheries project, supported by the National Marine Fishery Service Office of Science and Technology. I'm Josh Wrigley, Project Manager of Voices from the Fisheries, and today I'm speaking with Russell Brown at 15 Carlson Lane, which is where the Social Sciences Branch of the Northeast Fisheries Science Center is located. The time right now is about 9:30, probably a little after, and the date is September 27, 2016. Um, and, uh, Russ Brown is head of the Population Dynamics Branch right now and has served in many other capacities as well that we'll get into throughout the interview here. So, um, I guess we'll start off by just asking, uh, when and where were you born?

Russell Brown (RB): Sure, I was, I was actually born in Farmingdale, New York, um, which is actually on Long Island. I didn't live there very long; my family moved to Maryland very quickly, so I actually spent most of my childhood growing up in Silver Spring, Maryland, which happens to be the headquarters for NOAA Fisheries and NOAA, but nobody in my family ever worked for NOAA.

JW: And yet you find yourself here.

RB: Exactly.

JW: A linear trajectory.

RB: Kind of, kind of full circle. I actually did a detail down in Silver Spring recently which was wonderful because it got me close to my parents again. They're still in Silver Spring, so.

JW: That's great. So, um, where did you, where did you wind up doing your undergrad?

RB: Well, I, I was always interested in fisheries, um, I actually grew up, I, I liked to recreationally, recreational fish, and so those opportunities in Maryland are sort of limited. You fish in reservoirs and ponds and things like that, and I caught trout that were stocked by

the Maryland Department of Natural Resources. So they would put them in one day and you'd catch them the same day or the next day or the next week, okay, so it was a really artificial fishery, but I always loved fish and fishing. I pretty much decided by the time I was a sophomore in, in high school that I was going to do some sort of natural resources field. I kind of flipped back and forth between forestry and fisheries, but, uh, ultimately I decided on fisheries. Looked for a really good fisheries program. I ended up going to Cornell University in the Department of Natural Resources for my undergraduate and I majored in fisheries and wildlife. From there, I actually spent a year working in the Adirondack Mountains of New York working on trout fisheries up there, and so I was basically the manager of a small field station in the Adirondacks.

JW: Wow. Whereabouts in the Adirondacks?

RB: That would be near Old Forge, New York. And so Cornell University actually has a, um, has a fifty year relationship with a club called the Adirondack League Club which has been in existence since the 1800s, since before there were roads. People would take railroads, basically, up to, to the Adirondacks. Um, but this club has thousands of, of acres of land up there. They have twenty-three lakes and ponds, about eight miles on the Moose River, and in exchange for Cornell University sort of managing that property for trophy brook trout and brook trout fishing, the University gets exclusive use of those lakes and ponds for research. And so as a result it's a very controlled sort of situation where you pretty much have a record of every fish that's caught and released, or caught and kept, out of every one of those ponds. And so, um, it's been a very sort of rich research relationship between Cornell University and the Adirondack League Club.

JW: Now were you working on acidification issues up there? Because I know the Adirondacks have been a, uh, a real...

RB: That is one of the, one of the issues that I did work on. And so we would do things, um, like, we were liming ponds up there, which was sort of a Band-Aid approach to trying to mitigate for acidic conditions. Um, and so basically what we would do is basically lime on the ice in the winter, and that way um, the episodic acidic events for most of these systems was during the spring runoff, and that's exactly when the ice melts, and so, um, the lime would basically work its way through the ice, um, and basically hit the pond at the exact right time of the year, which was a time of the year that is really hard to access these ponds any other way. Can't get a float plane in, you can't get...

JW: Right, right.

RB: ...a lot of roads are, are basically closed because they're mud.

JW: So you could get sort of an even distribution over the surface of the lake by doing that.

RB: Exactly. So you would apply the lime heavier in, over the deeper portions of the lake and, and, you know, at lower densities in the shallower areas so it was very effective.

JW: Interesting.

RB: Yeah.

JW: So was Ed Raney, by any chance, still at Cornell when you were there, or--

RB: Um, Ed had--

JW: --had he retired by then?

RB: --Ed had left by then.

JW: Okay.

RB: Okay, so I was, actually the primary person I worked for up in the Adirondacks was Dwight Webster. And Dwight was the preeminent brook trout biologist for, basically in the country, relative to his knowledge of brook trout. Unfortunately, he actually died while I was working up there.

JW: Oh, I'm sorry.

RB: And so I ended up having to sort of take over the program as a freshly minted Bachelor of Science degree and sort of hold things together until they could get new leadership up there. Um, but the program's still going strong, I was actually up there this spring, actually in June, there was a reunion of researchers that had worked at the Adirondack League Club, so I got to see a lot of old friends, and it was very refreshing to see that the research program was still going very strong. So from there I, I moved on to Michigan State University. I worked with a professor, my major professor there was Dr. William Taylor. I chose Michigan State because I was very interested in fisheries population dynamics. And so I looked at a number of programs, actually was, I had fellowship and scholarships and uh, and uh assistantship offers from about six different programs. I chose Michigan State because I was really intrigued by the Great Lakes. I was, it was sort of an up and coming fisheries program at that time. It really kind of blossomed while I was there, the program itself. Bill actually became President of the American Fishery Society while I was, while I was one of his graduate students. But I basically did my Master's and research work on the Great Lakes. I worked on lake white fish, which is a very important commercial fishery...

JW: White fish salad?

RB: Yup, and basically in the, in the upper Great Lakes, and so looked at the relationship between environmental conditions and reproduction and recruitment of lake white fish. And one of the relationships up there is actually when you get early ice cover on the lakes, um, basically the white fish spawn and their eggs aren't, um, you know, disrupted by winter storms and everything, so there's a strong correlation between sort of early ice cover and successful lake white fish recruitment. So that's something that I looked at, and I actually worked in conjunction with a scientist from NOS [National Ocean Service] from the Great Lakes Environmental Research Lab, Ray Assel, and Ray's specialty was he was a Great Lakes ice cover expert. He was *the* Great Lakes ice cover expert. And so Ray and I sort of coordinated and, and really used some of his ice cover modeling to take a look and basically relate it to something biological. And that turned out to be a very, very successful, you know, reproduct-, research endeavor. So, um, from there I went on and worked on a Ph.D. I actually worked on rainbow smelt, um, reproduction and recruitment, sort of early life history, spawning and early life history. Rainbow smelt is an important forage fish species in the Great Lakes. It's also an exotic; it's not native to the Great Lakes.

JW: When were they introduced?

RB: They were actually, they invaded, um, through the Wayland Canal. So when the Wayland Canal was established, they came up through the St. Lawrence River, gradually invaded Lake Erie and then moved their way up through all the other four Great Lakes. So they had always been native to Lake Ontario, but they basically moved into Erie and the upper Great Lakes through the Wayland Canal. So, finished up my Ph.D. at Michigan State, um, I actually came straight out here to the Northeast Fisheries Science Center, um, and I was hired by Steve Murawski who at that time was the Branch Chief of the Population Dynamics Branch. Steve had hired, uh, I would guess I was the third person from my laboratory at Michigan State that Steve had hired and he brought me in to basically work on New England groundfish. And so Steve actually went on eventually to be the Head of Science and Technology, and ultimately to be the Chief Scientist for NOAA Fisheries for a period of time. So, but that's how I came to the Northeast Fisheries Science Center.

When I first got here, we had just released a special advisory relative to the three, three principle groundfish stock on, on Georges Bank: cod, haddock and yellowtail flounder. And that special advisory said that the stocks were in very poor shape, and that, that management needed to take significant action. And so...

JW: And this was in 1994?

RB: This was in 1994. And if you really take a look back, historically, at where management really pivoted, it was, it was 1994, 1995, okay? So in December of that year, Andy Rosenberg who at the time was the Regional Administrator for NOAA, or for the, um, for uh, the Northeast Regional Office at that time, GARFO [Greater Atlantic Regional Fisheries Office] now, established the three closed areas; Closed Area I and Closed Area II on Georges Bank, and then the Nantucket Lightship area in southern New England. And that was a direct response to that special advisory.

JW: And those were groundfish mortality closures?

RB: Exactly. And they were, they were short term when they were established. I mean, people need to remember that those were, you know, 90, a 120 day emergency closures. Um, and to be honest with you, they were based on old, the Georges Bank closures were based on old closures that were seasonal closures that were established to protect spawning haddock.

So when I first came into the Northeast Fisheries Science Center, we were fishing cod and trying to avoid haddock. And when we did the first, um, when I did my first stock assessment it was on Georges Bank haddock. I teamed with Loretta O'Brien, who's still with the Northeast Fisheries Science Center, and she sort of mentored me, and we went through the Georges Bank haddock assessment. And at that time the haddock stock was actually at an all-time low, okay? And so, I believe the estimate that we generated from the stock assessment was it had, it had declined to 10,000 metric tons. And so when we went into the stock assessment meeting, and this was a stock that's, that's jointly managed with the Canadians, and so we did have a joint assessment process at that point, it was, it was before we established the Trans-Boundary Resource Assessment Process. But during that stock assessment, the management rebuilding target for George's Bank haddock was actually 80,000 metric tons, and so the stock was basically at one eighth of the level that the managers wanted to, to rebuild the stock to. Um, and a very prominent stock assessment biologist who

was, was on the review panel at the time, basically stated that we'll never, there's been a regime shift and we'll never rebuild the haddock stock to 80,000 metric tons. And I remember my response being, "well, we'll never know unless we reduce fishing mortality." So, um, I wasn't sure that the stock could rebuild either, but I knew that it would never rebuild if, if...

JW: That the outlook was pretty grim at that time?

RB: Yeah. Yeah. So, um, to sort of put things in perspective now, Georges Bank haddock is, has recently been at all-time record highs; 80,000 metric tons was the rebuilding target at that time. It has been three to four times that level in terms of spawning stock biomass in recent years. So, um, it's sort of an example of, you know, these stocks are resilient, they can rebuild. You have to provide them with the environmental condition, or you have to provide them with the management conditions, in order to set them up we obviously don't control the management, or the environmental conditions and that's, that's key. I always said, you know, we need to position these stocks to take advantage of environmental, you know, favorable environmental conditions and then pray that we get them.

JW: Yeah, yeah.

RB: So in the case of haddock we, we got those environmental conditions in 2003, again in 2008, and several times since then, and so we've had some very large year classes that have basically produced, you know, very high levels of haddock.

JW: When had the, the rolling closures that you mentioned before, been used prior to the, prior to 1994 when, when they, um, when they closed...

RB: Well, I think rolling closures are a feature that's been used more in the, in the Gulf of Maine than it has on Georges Bank.

JW: Okay.

RB: And basically the, um, the intent there, is that I think there's a pretty clear understanding among fishermen and among scientists that there's sort of a progression or a migration of cod, particularly the offshore stocks, up through the area. And so, um, you know, in, in early April they'll be in one area. They'll basically move, move to the north and the west and sort of swing around the Gulf of Maine. And the idea of rolling closures was to, um, to basically protect the fish as they move through the area. One of the, one of the probably unintended drawbacks to rolling closures is you close an area, say for 30 days, and then you reopen it. One of the things that happens is that fish actually aggregate and it actually makes it easier to catch them when an area opens back up. And I think that's something that people perhaps underestimated. The fishing activity actually breaks up these schools and, and makes the distribution of fish less dense and therefore fishing on a, on a tow basis or an hour towing basis, you know, less productive, so.

JW: So when you, when you arrived here at the Center, had you worked at all on New England groundfish prior to that, or was it a completely new transition to--

RB: No, I mean, for me--

JW: --to come to the--

RB: --it was, it was a completely new--

JW: --salt water

RB: --transition. Um, and, you know, I was fortunate in the sense that I worked on the Great Lakes, which is the closest freshwater equivalent to the oceans, okay? And so variable recruitment, you know, commercial fisheries, recreational and commercial fisheries competing for fish, were all features that, you know, I was used to in the Great Lakes. I think the difference in New England was, coming in, was sort of the scale and, and the importance of things. So, you know, a lot of times when you work in inland fisheries, you might be working on a recreational fishery and, and your impact on people's lives might be, you know, you know, Billy Bob gets to keep, you know, four trout instead of six in this particular pond in this year. When I came out here, you know, it's interesting I, you know, we set the radio in the morning and, and it comes on to WMVY which is our local Martha's Vineyard station--

JW: Yup.

RB: --here on Cape Cod. And I remember one morning, you know, the lead story was our groundfish stock assessments, you know. And it was, you know it was a real eye opener for me, you know. It was basically a recognition of, you know what? You're not in Kansas anymore; I mean, this stuff really matters.

JW: The politicization of the stock assessment promises.

RB: Yeah. That you would see your work, you know, portrayed in the paper. That, um, you know, that you would see people's criticism of your work, you know, very publicly on the radio and in the paper. That was, that was very new to me.

JW: Um, and now, now you also worked on Atlantic salmon populations as well after that, right?

RB: I did, I did...

JW: Is that correct?

RB: And, um, basically I worked on groundfish for about six or seven years. I also worked on the Georges Bank winter flounder assessment. But there came an opportunity where they needed an additional person to come in and work on international aspects of Atlantic salmon. And so I actually had a background in terms of working with salmonids from my work in the Great Lakes, and it was primarily coordinating with colleagues and things like that. So one of my colleagues from the Great Lakes was Dr. John Kocik, and John was actually the other salmon biologist here at the Northeast Fisheries Science Center...

JW: Right, up at the Orono field station?

RB: Right, and actually when, when I first moved to salmon, John and I were still here in Woods Hole.

JW: Oh really? Okay.

RB: Okay, so we actually, I was, I was working on ground fish and he was working on salmon but we actually shared an office. So it was a pretty easy transition, um, you know. John had a certain role. His role was really more the domestic research side of things. My role was more the international, the national and international stock assessment side of things. And then I had some, some research components in terms of trying to look at Atlantic salmon as they migrated out of the rivers and into the estuaries and into the ocean. And so, you know, my role, my primary international role was I was one of three U.S. representatives on the, um, International Council for the Exploration of the Sea - ICES - Atlantic salmon working group. And that's a group that basically puts together the international stock assessment for Atlantic salmon. And that stock assessment basically is utilized by an organization called the North Atlantic Salmon Conservation Organization - NASCO. And NASCO is the international organization that basically manages Atlantic salmon, primarily at sea. So it's equivalent to, say, the International Whaling Commission for whales, okay?

So my role there was to participate in the stock assessment within the ICES arena to put together that stock assessment. I would bring it back and basically present it and explain it to both the U.S. delegation to NASCO and to scientists, Atlantic salmon scientists, here in the United States. In addition to that, I was the Chief Scientific Advisor for the U.S. delegation to NASCO. So I would go to the NASCO meetings, um, internationally, and I would advise our, our delegates to NASCO in terms of how they, you know, what the science was and perhaps how they should negotiate.

JW: How, how different were the perspectives on an international basis when it came to Atlantic salmon, since I know in the United States a lot of runs have, you know, pretty much gone extinct, and, you know, in the, in New England here, um...

RB: It's interesting. Atlantic salmon populations in the United States are just a shadow of, of what they were, I mean, they're, they're at extraordinarily low levels. They absolutely should be listed under the Endangered Species Act and they are. Salmon populations to the north are more robust; in a lot of the Canadian rivers, particularly as you go north to Newfoundland and Labrador, in those areas. And then when you come around to some of the European countries, still have very healthy runs of Atlantic salmon.

Atlantic salmon are interesting in the sense that they, they mean different things to different people. The lobby here in the United States is very strong relative to, you know, recreational fishing and things like that. And there are some people, very wealthy people, that really believe in, in the restoration of Atlantic salmon. So, um, you know, one of, one of the things that I had the opportunity to do was to go down and give a scientific presentation to an Atlantic Salmon Federation fundraiser in New York City. And I actually had to get a bunch of clearances from NOAA General Council, relative to, because you know, for instance the, the cost of the banquet ticket that I was speaking at was \$250, which is a little more than, than the \$20 that we're allowed to accept as a gift. They put me up at the, uh, at some university club in New York City, um, when I walked in, in the best suit that I owned and the best tie that I owned, and in my London Fog jacket, I was immediately intercepted by the doorman who said, can I help you? But what he really meant was do you belong here? And I looked around, and everybody else is wearing, you know, \$2,000 suits and things like that. I mean, that's the kind of, that's the kind of, you know, interest that people in the United States have, and certainly people in Scotland and people in Norway and things like that...

JW: Yeah, I guess Atlantic salmon does have a very specific socioeconomic...

RB: But then you compare that to subsistence fishermen in Greenland who, um, you know, commercially and, and subsistence fishes for Atlantic salmon in August and September and October. And that's a very important fishery for that person fishing in and out, you know, in an aluminum skiff with an outboard motor. And he may come in with, from a day of fishing with, you know, with 10 or 12 Atlantic salmon and two seals that he shot or caught in the net or whatever, and, um, you know, the fish is very important to him too, or, you know, commercial fishermen in the Faroe Islands.

And so one of the things that always struck me about Atlantic salmon was sort of the stark contrast of interest of the stakeholders that cared about that resource. And that's what you sort of had to navigate with, you know, through NASCO, was trying to negotiate for, you know, on behalf of all of those parties. So you would have, you know, you would have the environmental groups that wanted to basically see fishery closures and things like that, and realizing that on a, on a sociological, from a sociological standpoint you really weren't going to be able to negotiate that completely with Greenland and the Faroes. Even if, even if you came with a, you know, pocket full of money and said we'll buy you out, they don't want to be bought out, you know. So that's, that was really sort of fascinating about Atlantic salmon.

On the research side of Atlantic salmon, um, one of the, the challenges that I tried to tackle was to figure out what Atlantic salmon were doing once they reached the ocean. And so I had, I had sort of picked up on some, on some work that had been done in Norway to try and capture Atlantic salmon smolts at sea. And previously in the United States, I think people had tried to do this before and I think they captured a grand total of like three Atlantic salmon smolts, you know, out in the bays and out in the ocean and things like that. And so we really didn't know a lot about their distribution or, or habits or whatever. One of the things that I learned from the Norwegian work was that they are very surface-oriented, and so really what you need to do to sample them is to sample them on, you know, at or near the surface of the water. And so that's difficult to do considering, you know, mid-water trawls are difficult to...

JW: Right, yeah I was going to say, what's the method for doing that?

RB: Well, and, and actually it's a little bit unorthodox, I mean, number one, um, it's difficult to motor over Atlantic salmon and then capture them in a net if they're on the surface, you just scare them away from the surface. And so what we did was we employed a pair trawl approach where we basically used two trawlers to tow a net between them. So that there, the net was basically fishing in clean water. The other thing that we had to do with the net was to figure out basically how to have the float line splashing on the surface. And what we realized was almost that we had to fish a mid-water trawl upside down, to be honest with you, when you got down to the net design. So we had a float line that was basically splashing on the water, scaring the fish down and then, you know, having an eight or ten, you know, meter, you know, spread in the net to capture the fish.

And so we were very fortunate in the sense that Atlantic salmon research was well-funded at that time. We were able to find a couple of commercial fishing trawlers that were willing to try and tackle this, to pair trawl. We designed a special cod end to capture the Atlantic salmon smolts live and so they actually went into an aluminum box which we called the coffin, but, you know, the point was to keep the, keep the fish alive, and so they would actually, they would actually slide into this thing and get out of the turbulence of the net and

things like that. And so we, we rigged this all up and I think the, I think the established, you know, Atlantic salmon biologists in New England and especially up in Maine were sort of snickering and going, okay, go out and try that. We, we actually caught, on the first...

JW: Did they think the salmon wouldn't survive the--

RB: They didn't think we would find them.

JW: --the experience? Oh, okay.

RB: They didn't think we'd find them. And we actually went out the first day in Penobscot Bay and, and we caught 512 Atlantic smolts. And we actually had to step, that shocked everybody, and we became concerned about mortality and so we actually had to back off and redesign our sampling design to be less efficient, to be honest with you.

JW: Yeah.

RB: Okay? We, we sort of honed in on the area where we really thought they would be at high densities. We were right, they were at high densities and it was a, you know, from there we basically moved out further into the estuary and further into the ocean where they were at lower densities, but where they had been in the estuary longer.

JW: Now were those Penobscot fish, or were they also mixed in with Atlantic salmon from other--

RB: They were.

JW: --runs and...

RB: Yeah, they were primarily Penobscot origin fish...

JW: Okay.

RB: And so there's, there's a mix of hatchery smolts that are basically stocked into the system in the spring and pretty much emigrate out of the river system very quickly. There are also, um, what we call naturally reared smolts, and so they are either fry stocked up further up in the estuary, or further up in the river system, or in some cases perhaps, you know, naturally reproduced, so they, you know, they're actually originating from spawned fish. And so, you know, one of the points in that project, and Tim Sheehan is one of my colleagues that sort of continued that work, is to try and sort out the proportion of sort of hatchery reared smolts versus naturally reared fish and, and to try and get at, you know, what those relative contributions are.

JW: Um, so at, at what point then did you transfer from working on salmon to ecosystem surveys?

RB: Well, it's interesting. Actually, the person who hired me, Steve Murawski, came to me and said, you know, we've got a retirement coming up for the leadership of, uh, the Ecosystem Surveys Branch and that's the branch that conducts our multi-species bottom trawl surveys. It's the branch that does our scallop surveys, our clam dredge surveys, our Gulf of

Maine bottom trawl survey for northern shrimp and a number of cooperative research surveys. And the thing that attracted me about that position was I, I knew that we were going to transition from, uh, our current research vessel that that time, the *Albatross IV*, to the *Henry Bigelow*. And so I knew that that was an extraordinarily important transition and I wanted to be sort of integrally involved in the planning and execution of that transition so that we would sort of minimally impact the stock assessment process and all the other processes that depended on those bottom trawl survey results. So that was, uh, that was a very sort of significant challenge. What I didn't anticipate was that we would have a controversy that would crop up, uh, literally three months into my tenure in that position, called Trawlgate. And the issue there was, we, and I say we, the collective we, NOAA Fisheries, OAMO - the Office of Aviation and Marine Operations, weren't paying enough attention to how we handled trawl warps, and trawl, you'd think a piece of wire would, would stay the same, um, in fact they stretch, they, you know, they do different things. And...

JW: And this was on the *Albatross IV*?

RB: This was on the *Albatross IV*. And so ironically, um, the commercial fishery stakeholder that was, that was most concerned about our handling of trawl wire was the same individual that I worked at, on the pair trawling with for Atlantic salmon; his name was Matt Stommel. And Matt and I talked about this, you know, a fair amount while I was working on Atlantic salmon with him. Um, it's interesting, because when I took the job as the Branch Chief for Ecosystem Surveys, I was actually at sea working on Atlantic salmon. And when I got back I immediately flew to someplace in Europe for the NASCO meeting. And so I was gone for about three weeks after I took the Ecosystem Surveys job. I drove, my first day back to the office, I drove in about 6:30 in the morning, um, parked my car and as I was getting out a pickup truck pulled up and, uh, and it was actually Matt Stommel. And Matt said, "I heard you got a new job." I said, "yes." And he said, "congratulations, he said, are you going to check those trawl warps?" I said "yes," I said, "I will, I will have them checked before the next trawl survey". And that check of that trawl warps actually triggered the whole Trawlgate, um, controversy.

So, um, we had to work through that. It was actually very productive in the sense that we started to engage in some very meaningful conversations with commercial fishery stakeholders that resulted in the establishment of a trawl survey advisory process, the one that precedes the one that we have now. And that process went on from spring of 2003 until approximately 2008, where a number of meetings and a number of experiments were conducted. And it resulted in basically the design of the fishing system that we use on the *Bigelow*, on the *Henry Bigelow* now. So industry was very involved in designing the net, the trawl warps, the protocols that are used on, on the *Henry Bigelow*. What we had originally envisioned was that we would get multiple net manufacturers to sort of come up with competitive designs and then we would use, we would use our industry stakeholders to help evaluate sort of the performance of those designs. What actually happened was three of the industry net builders in the region, the three major ones, basically got together and worked collaboratively to design the fishing gear and the net.

JW: Where were those net builders based?

RB: Um, Reidar's Manufacturing is in New Bedford. Trawlworks is over in Rhode Island, um, and then John Knight, I'll think of the name, I forgot the name of his company, but he's actually in Point Judith, Rhode Island, okay, and so those three trawl manufacturers probably

generate 70, you know, 70% of the bottom trawl and smaller mid-water trawl gear that's used in the Northeast, say from Long Island up through Maine. There's some other smaller net builders, there are some large mid-water trawl net builders primarily based in Glo-, I'm sorry, yeah, in Gloucester, um, but these were the three that basically provide most of the bottom trawl gear in the industry.

JW: So by having them as active participants then you could sort of be assured that industry would play a prominent in vetting and seeing how these, uh, how these things play out?

RB: Sure. So, um, you know, that process got a little bit dicey in 2008, um, for a couple of reasons. One, we, we ran out of time and we had to make a decision on sort of the final design and the final, uh, sort of thing. One of the things that was playing in the background, and I think I can say this now that everybody involved is retired, um, we were told at the end of 200-, we had requested three years of overlap between the *Albatross IV* and the *Delaware*, and the, um, *Bigelow*, to fully calibrate the bottom trawl surveys. And so, um, what actually happened was we had some overlap in the fall of 2007. Unfortunately the *Henry Bigelow* was not operating at full capacity and the work that we did ended up not being usable. But the NOAA Fisheries leadership, at the end of 2007, told us that we would not be getting three years of overlap, that we would be getting one year of overlap, and that overlap would be 2008. Um, but, um, we were, we were not, uh, at liberty to share that with the industry. So the industry was operating on sort of one model that, you know, you've got plenty of time to do this, and we were operating on a model that, uh, we knew that the *Albatross IV* was going to be decommissioned in November of 2008. So that made things difficult. But, um, in any case, we came up with a very effective trawling system for the *Henry Bigelow* that increased the catchability significantly for a number of species. There were a number of species that we were concerned about, things like monkfish, which are very tight to the bottom. Our catchability for monkfish increased by over 500%. You know, for a lot of the flat fish species, you know, it increased 2 to 300%. So that--

JW: What aspects of the net changed? Or, of, uh--

RB: We, we basically--

JW: --of the process of dragging--

RB: --generated a more efficient sweep and the sweep is basically, uh, the rubber disks that are in contact with the bottom. And that allowed us to, um, get fish off the bottom in a more efficient manner. The net itself had a gradation of, of meshes that resulted in greater capture efficiency, less fish basically able to charge the meshes and get through the meshes themselves. We slowed down the speed of the survey from 3.8 knots to 3 knots; that allowed for better bottom contact, um, it did result in small changes in catchability for some of the faster swimming species, primarily things like mackerel and pollock. But for the most part, the changes that we made resulted in higher catchabilities for a lot of commercial and recreational important species.

JW: Um, what other challenges were there in sort of going from the, the infrastructure that you had on the *Albatross IV* to, to the *Bigelow*--

RB: Well it's, it's interesting...

JW: --in terms of technology?

RB: Yeah, I mean, we, we really tried to incorporate a lot of, of technology on the *Bigelow*. We have very sophisticated net mensionation systems that, um, you know, are constantly evaluating the performance of the nets as they're in the water, and so we, actually at the end of every tow now, generate a report card that basically shows the net performance and shows, um, if, if the net's within the specs that we've established or not. So we have certain thresholds, um, if those thresholds are not met, in terms of the performance, in other words the wingspread or, you know, the bottom contact or whatever, we won't use that tow for abundance and biomass estimates, because it's not a representative tow. So it's, it's a, it gave us a chance to really take a look at all of the quality control aspects of how we do surveys. So that was, you know, we got very sophisticated in terms of evaluating, you know, the performance of the gear. We also designed, uh, what, what I still think is probably a state-of-the-art system in terms of the ability to process fish and in, invertebrates and organisms once they get on, on to the deck of the, of the boat.

JW: That was going to be my next question.

RB: And they, you know, we established a very sophisticated conveying system to convey fish to allow us to sort them efficiently, to allow us to weigh and measure them. We were really very cognizant of, um, ergonomics, in terms of the safety of our scientists and things like that. It's interesting, we got a sorting station and I had, I had people on my staff that were six foot six inches tall, had a couple of young women who were on the order of five foot tall. And we were trying to figure out how to sort of deal with that in terms of making the sorting thing at the right level. And what we figured out is we can just elevate people. And so we had these adjustable stands and, you know, based on your height, you would adjust the stand differently. So that six foot six person might be actually standing on the deck of the ship, whereas that five foot, you know, zero person, um, would be, you know, elevated, you know, up on a stand a little bit. And to model this, we actually built a cardboard replica of the, um, of the fish processing laboratory. And so we built mocks of basically the conveyor belt, built mocks of tables and things like that. And worked on it as a group within Ecosystem Surveys. And so, um, it was really sort of fascinating, the branch and group and it wasn't just the branch there were other people from other branches, kind of broke up into factions. And some people thought that we should do it this way, and some people thought that we would do it that way. So we would let a certain faction go up to the, we had this open warehouse and the would take all the cardboard and they would rearrange it and everything, and you'd come in and the whole group would come in the next day and they would say, okay, you know, explain to us what the strengths and weaknesses, and people would be asking the questions and sort of leveling criticisms. And then another faction would sort of take over and you'd come back the next day and everything would be different, you know, everything would be completely different. Um...

JW: Did they finally come to a consensus, I guess, as to what...

RB: Well we did, you know, I wouldn't say it was a complete consensus but I can tell you this, it saved, it saved the agency hundreds and hundreds of thousands of dollars in mods that we would've had to make, you know, after the fact. And I'm not saying it was perfect; it was not perfect. However, the mods that we made were really minor relative to what we would've done if we'd just kind of drawn it out on paper. But I, the concept, you know, a vessel like the *Henry Bigelow* is extraordinarily expensive to operate and so people, people focus on, um,

you know, how much does it cost per day to operate the ship. And what I tell people to shock them a little bit is I don't care. Okay, what I care about is how much are we paying per data point. That's everybody's labor, cost of operating the ship, okay, how do we maximize, or minimize basically, the cost per, per data point. Or maximize the amount of data we're getting per sea day. And so that's, that's sort of the, um, that's sort of the notion that I really try to instill within the staff. I said, if we, if we have an hour delay, you know, because, because we needed a widget that we didn't have on board and, you know, somebody's got to run to Home Depot or whatever, that's a thousand dollars. That's a \$1,000 of ship time. So figure out what it is in terms of spares and things like that and make sure that we are fully prepared so that we are never the cause for a ship delay, okay? And then the sort of the same thing is as we're bringing a catch from an individual trawl across the deck, how can we maximize the value of what we're collecting? How can we make sure that we appropriately sample without oversampling? Because if you're oversampling for one species, you've missed an opportunity to sample for another one, okay?

So that's the kind of optimization that we try to instill within the operation. And it's, it's largely been successful, I mean we've got metrics and it's, it's actually easy within our electronic data capture system to, to pull the metrics out and say, this is, this is what we did on this particular tow and, um, and this is why we oversampled this species. Okay, we need to change the protocol. So literally, as you pull, as you pull a fish out of the sink and put it onto a measuring board, um, as soon as you identify the species and the length, it's going to tell you what to do with that fish. It's going to tell you, I need a weight. It's going to tell you, I need or I don't need you to cut that fish open and do a diet composition. I might not need you to do that, because we already did three fish of that length, you know, in this area. Um, you know, uh, researcher X from X university needs a sample frozen, okay, so we put all of our special sample requests from all of our external samplers within this computer system so if you have a fish on the board, it's going to tell you that, you know, investigator from, you know, University of Massachusetts Amherst needs this fish for this, you know, you need to freeze it, or you need to freeze five in a bag, or you need to preserve it in alcohol; whatever the, whatever the protocol is. So the, the concept there is, you know, we're spending taxpayer dollars on, on research vessel time. And we need to maximize data coming out, you know, whether it's for us or whether it's for other investigators, um, to, you know, really sort of optimize the, the operation.

JW: So how did the *Albatross IV* differ then in terms of its sampling processes, I mean, I guess they weren't as automated and as, you know, advanced here. What, what was sort of the standard process and the equipment that went on there?

RB: Well, on the *Albatross IV* you would, you would get a net, you know, you would get the cod end back on the deck, you would dump it into a checker which was out in the middle of the deck. The crew would go out in the weather and sort those fish into baskets and buckets. They would drag or carry those baskets or buckets back to a scale, um, you know, we would weigh the collective catch for each species. Back when I first started that was all written on paper, okay?

JW: Must've been difficult out in the, uh, in the elements.

RB: It was, it is, you know. And you use waterproof paper and things, but the, the operation was also prone to error and things like that. You would bring the, you would bring the catch over. There were three sampling tables. When I first started, there were conventional

measuring boards, not electronic measuring boards, um, you know, there were scales that you would weigh the fish and things like that, but it was, it was a very sort of inefficient operation for, you know, for what we were trying to collect. So, um, it was labor intensive, we had a lot of, from an ergonomic standpoint we had a lot of, um, you know, lifting and back injuries and things like that. Um, the deck of the *Albatross* was unstable. I can remember being out there one early morning at 3:00 in the morning and we got hit by a rogue wave that, you know, usually, usually when the, um, you know when the person who's up on the, you know, when the person is up, captain of the ship sees it, you usually get a call saying secure for rogue wave. Um, they missed it, they didn't see it. And so all I saw was a wall of green water coming, you know, through the back deck, and I mean literally a wall. Um, five of the six of us got knocked down, the entire catch got washed over the side. We lost most of our sampling gear, went over the side. I can remember, I saw it first and I yelled rogue wave, and what I did was sat down, because that's a, you don't want to be high when the wave hits, that's when you end up over the side. Um, and so, um, you know, we had situations like that.

On the *Bigelow*, you're primarily processing the catch inside. We are dumping the cod end into a checker. We do have one person outside moving the fish from that checker into a conveyor belt which comes into the laboratory which is inside. And then the rest of the processing is, is done inside. So baskets and buckets are basically moved around, there's not a lot of lifting of fish at all. So it's interesting, I mean, you try to be perfect on the ergonomic standpoint, we traded all of our back and lifting injuries for shoulder injuries from pushing baskets, believe it or not. So, you know, rotator cuff injuries and things like that, so, um, didn't see that one coming. But, um, you know, now we're working on, on trying to refine the way that we operate to minimize or eliminate those.

JW: Now with the, uh, the surf clam survey, that wound up, um, transitioning to industry vessels, right? Is that, so what, what was sort of the story behind that?

RB: Well, it's interesting, you know, early in my career the surf clam, or the, the clam industry in general, surf clams and ocean quahogs, uh, that industry was at loggerheads with, with the Center. And actually, um, there was a lot of active litigation and things like that. That's a situation that, uh, during the course of my career, has turned around completely in the sense that, uh, this is one of the industries that we work very closely with. This is an industry who funds research that we need. Um, it's an industry that provides us with vessel time at times when we need to do research.

We had a need to basically re-platform the surf clam and ocean quahog, uh, survey because it was previously done on the *Delaware II*, okay, and so we had designed a whole dredge and ramp assembly that was very specific to the *Delaware II* and really couldn't be moved to other platforms easily at all. The equipment and, uh, technology required to dredge clams is, is very sophisticated. And so when the *Delaware II* went offline, we, you know, we made the decision that we would move to an industry-based platform. And so we worked closely with industry to platform, uh, the, the survey on the *ESS Pursuit*, which is a large, um, you know, clam dredge vessel. And basically what happens now is that the *ESS Pursuit* surveys approximately one third of the resource each year and then after three years a stock assessment is conducted. One of the things that's a real advantage about the *ESS Pursuit* is the, you know, she can fish two dredges at once, um, and so we have a, you know, we can, we can fish two different kinds of dredges in a single dredge tow.

One of the aspects that we worked with on industry was to redesign the clam dredge to give us better information. And what we were really, you know, when we're using dredges on the *ESS Pursuit*, they're basically commercial dredges so they're designed to catch, you know, commercially harvestable clams. But as scientists and stock assessment biologists, we're interested in the smaller clams and the pre-recruits, you know, how many clams are going to come into the fishery next year or the year after. Um, and we had previously done that in a very ad-hoc way. We would take a commercial dredge and we would basically line it with chicken wire to increase the retention of, of small clams; it also increased the retention of just about everything else that's on the bottom. And so you could only fish these chicken wire covered dredges for, for, you know, a few minutes before they became completely clogged with material and they were hard to handle.

So what we did, um, is actually we worked with a couple of, of commercial fishery stakeholders. And one of, one of the individuals, Tom Dammarind, became very interested and he said, I can design you a dredge that will get you what you want. And he actually made it with sort of removable bars so, and dredges it's basically the bar spacing is what retains the clams. And so he made the dredge in such a way that it would catch those pre-recruits. It would not retain as much of the other material as, uh, that we were not interested in. And it was adjustable in the sense that you could pull all those bars, you know, basically, pull them out and replace them with larger spaced bars. So, um, it was, it was actually a really beautiful thing. And to be honest with you, the industry paid to build it because they were interested in the science.

So, that's probably, you know, that's an example of sort of one of the more rewarding things in my career where you, where you start out with an industry that is at loggerheads with the government, with the agency, um, that, you know, we're, we're at the point where, you know, litigation is the only answer, coming around to a situation where we're working very closely together, where they're asking, they're asking very legitimate questions about, you know, what do you need and is this a shortcoming of, but not just, uh, not just criticizing, you know, sort of standing shoulder to shoulder and saying, okay, we're going to help you find a solution to this. So, um, that aspect of things has been very good. You never hear about that in, in the press, to be honest with you. I always joke--

JW: Positive news.

RB: --well, I always joke, you know, the bad news is always on the front page of the paper and if they choose to publish the good news, it's back in the business section. You know so if we, if we show, if we have a survey that shows a large recruitment, or we have a positive stock assessment, it shows up in the business section, because it's a business opportunity, so.

JW: How has the stock assessment process continued to evolve since 1994 when you came on?

RB: Well it's interesting, it's, uh, these days it's a much more inclusive process than it was back then. It was primarily stock assessment biologists and maybe a few people from the Regional Office or Council staff sort of sitting around the table and working through the process. And we've tried to open up the process and be more inclusive, um, to try and, uh, try and get greater engagement from the folks who are really impacted by the assessment, whether they be recreational or commercial fishermen, or, or, um, you know, environmental organizations and things like that. When you open up the process, it takes a little bit longer to

navigate through. Less efficient is perhaps too harsh of a term, but it just takes longer to include--

JW: To incorporate all of this--

RB: To incorporate more--

JW: --stakeholders.

RB: --more input and things like that, so, um, you know, that's been interesting because the demand for science is just increasing, increasing, increasing; and the demand for, um, meaningful involvement is also increasing. And so we're constantly sort of working through that trade-off of saying, okay, do you want a lot of stock assessments, do you want more involved stock assessments, do you want more, uh, meaningful, you know, meaningful interaction with our stakeholders as we're going through these stock assessments; there's tradeoffs, you know, between that triangle. And that's one of the things that we're really trying to navigate at this point.

I think the other, the other aspect of things that's been recent is, is greater incorporation of sort of, of sort of environmental variables and environmental conditions. And they've always been incorporated in the stock assessments, but they're being incorporated in more meaningful, um, in clearer ways now. So we're working a lot more with oceanographers, with ecosystem folks, taking, you know, and it's really become sort of incumbent on us because the environmental conditions out there are not stable and they are effecting, you know, the performance of these stocks. And so we do have to take it into account. So we have species that are shifting distributions. We have species that are increasing in productivity, we have species that are decreasing in productivity, that are, and those increases and decreases in productivity are independent of fishing; they really are dependent on, you know, sort of--

JW: Changes in--

RB: --shifting...

JW: --natural mortality?

RB: Exactly, exactly. So, um, that's been, that's been a pretty significant change. Back when I first started working on stock assessments, back in, you know, in the mid 1990s, the fishing mortality rate on a lot of the groundfish stocks anyway was so high that it masked any other sort of environmental variability. It was the dominant source of mortality for these stocks. As management sort of caught up and we have sort of effective management now that has reduced these fishing mortality rates down to low levels, a lot of these fishing mortality rates are down at approximately the level of natural mortality. So if you have sort of a lot of variability or fluctuations in natural mortality, it creates a lot of uncertainty in, especially in your fishing mortality results, or estimates, and things like that. So that's one of the concepts that you're seeing now. You know, there's a perception that stock assessments are, uh, you know, perhaps less stable or even less accurate than they were previously. I think what you're seeing now is that environmental variability sort of expressing itself in, in being able to sort of see that. So that's, that's an interesting change for a lot of these stocks. So a lot of these models previously, and we have a terrible time estimating natural mortality; it's an extraordinarily difficult thing to estimate.

JW: Right.

RB: Okay, but if, if natural mortality, and so therefore in the past, we've sort of assumed that natural mortality is constant, okay? We know it's not, okay? So let's say, you know, natural mortality is .2, but maybe natural mortality fluctuates between .12 and .32, you know? That's very significant when you're fishing mortality is at a low rate because you're rebuilding. So that's one of the real changes and it's a struggle and a challenge for us to, to sort of communicate.

I think the other thing that's been really critical is, is better communication and outreach and education with our stakeholders. So one of the things that I've been involved with for quite awhile is the Marine Resource Education Program. And that's a program that was actually established by commercial fishery stakeholders back, you know, probably 14 or 15 years ago now. Um, and they worked initially and got some funding through, uh, through various sources, but ultimately we're now supporting that program through our cooperative research program. And there's several different aspects to that program now. We have a base program called the MREP 100 program which basically has three days of, of sort of information on how the science is generated, okay? It's sort of classroom stuff. And we bring the stakeholders...

JW: Where fishermen come here to Woods Hole?

RB: Yeah, uh, commercial fishermen, recreational fishermen, NGOs [non-governmental organizations], uh, Council staffers, Council members, uh, Congressional, uh, Congressional staff, I mean, it's, it's pretty much anybody who has an interest in fisheries has the potential to participate. So they spend three days working on the science and then a few days later they spend a few days working on management, you know, how, how is the science translated into management? So it walks them through, you know, the entire Council process and things like that. And one of my goals is to actually go over and take that management because, because there, there's still a couple of gaps--

JW: Where you get into the weeds?

RB: --an truths where we're, where they get into the weeds and I, I can potentially learn something. So that's sort of the MREP 100 Session. And literally, I believe we've put through probably close to 500 people through, through those sessions. What we determined a few years ago was that people were really, really interested in the science and they wanted to take a deeper dive. And so we came up with an MREP 200 Session, and that basically, um, focuses, exclusively on the science, it's a couple of days in length, and one of the things that we make sure that we do is that we get them onto the research vessel, we walk them through the research vessel, we really talk about what happens on the research vessel. Because our research vessels are basically a black box to most of our stakeholders.

JW: Now is this while at sea, or when it's docked?

RB: We, when, when we're docked.

JW: Okay.

RB: But we have demonstrations and things like that, so we'll show them exactly, you know, what we do and things like that. So, um, that's been a, a real popular program. Actually, um, initially we put it together, um, Meredith Mendelson was a staffer at the Gulf of Maine Research Institute at the time, um, and Meredith and I put that together originally. Meredith actually went off and she was a staffer for Olympia Snow for a little bit. Um, now she's the Deputy for the Commissioner for the Maine Department of Natural Resources, or Marine Resources, so, um, she's still in the game but in different roles. But now we work with Alexa Dayton primarily from the Gulf of Maine Research Institute. And so we put those sessions together; we have one coming up at the end of October so we're, we'll have the *Bigelow*, actually here in Woods Hole, I believe, I think she'll be at the, at the WHOI [Woods Hole Oceanographic Institute] dock. Um, and so that's, that's an opportunity. We've put together some special sessions for recreational fishermen; we kind of realized that a lot of the material that we'd put together was sort of more, you know, commercial fisheries, New England, and, and Mid Atlantic Council sort of focus and things like that, so we put together some special sessions for recreational fishermen. We put one together that talked about ecosystem-based fisheries management and we actually ran that out of our Sandy Hook laboratory. That was really popular and we're actually going to run that again this, this--

JW: Interesting.

RB: --in 2017. And so, um, and we've also, originally this program was strictly based in New England; we've expanded to the Mid Atlantic, um, we've had a number of sessions down with Mid Atlantic stakeholders now. So that's, that's a way of basically improving everybody's literacy, including ours, you know, and, and that's really important, so that we can have meaningful conversations about, about the issues that we're trying to address. Um, and so, um, it's really surprising some of the, some of the most important conversations that happened at those MREP things are over dinner or after dinner or whatever, sort of in the margins. And so, um, that's been extraordinarily rewarding for me, um, you know, I get to meet stakeholders, we have a binder and I say, you know what, I say, if you have questions in the future, you have my phone number. And I said, you know what, if I have questions in the future, I have your phone number. And, and it'd be amazing, I, you know, there've been situations where you hear about something happening in, in, uh, in Point Judith, or you hear about something happening in Cape May, and you're like, what's going on, you know? And you just, you've got the, you've got the phone numbers for two or three stakeholders, you can call them up and you can say, what's going on? Well, you know, you guys put this regulation in effect and this is how we're responding to it. Or--

JW: Yup.

RB: --you know what, the market over in Europe just collapsed and we got, we got nothing to, you know, we've got nowhere to go with this product, so we basically told our harvesters to, that we're not buying it, you know? So, um, that's been really important for sort of understanding, because it's, it's not just what's happening out there in the environment, it's what's happening in the ports, it's what's happening in the markets, and, you know, I mean, folks in this building know that implicitly, okay? But, but as an agency we need to get more and more on top of that, that it's a whole system--

JW: Yeah.

RB: --trying to generate benefits for the nation.

JW: Um, one of the last things I wanted to ask you about was just your, your experience on the, the first, I guess, cruise after the Deep Horizon, Deep, Deepwater Horizon oil spill.

RB: Well, you did your homework, didn't you?

JW: Yeah. And, you know, what, any of that, if you can speak about that, what you experienced, um, you know.

RB: Well, you know, it's interesting. You know, Deepwater Horizon happened and, and to be honest with you, for two or three weeks the, the agency seemed paralyzed, in a sense, about what to do. I think everybody thought that, you know, that the well would get capped off within a matter of days--

JW: Yeah.

RB: --and obviously that didn't happen. Um, ultimately, you know, we, you know, we decided to launch a series of research cruises to go out and to, to start to take some baseline information to try and map out where, um, where oil was going, etcetera. So, uh...

JW: How did you wind up on those cruises?

RB: Well, it's interesting. My, uh, I took Friday afternoon off, I was at my house, um, phone rang, um, and it was Steve Murawski. Remember Steve was the guy who hired me, Steve was the guy who was the Chief Scientist at the time, Steve was the guy who was basically briefing the President, you know, along with Kathy Sullivan. Um, and Steve said, "you know, we need, we need your help on Deepwater Horizon." And I said, "sure, anything, I said, you know, we've been sitting here grinding our teeth for, for three or four weeks now, in terms of, I said what do you need me to do?" And he said, "well, I need you to be the Chief Scientist on the first research crew that's going out there." And, uh, I said, I sort of stopped, and I paused, and I said, uh, "I said, there's a, there's a lot of good people in the agency, I said, uh, why me?" And he said, "well, a couple of reasons." He said, uh, he said, "we know you're really good at sort of coordinating, you know, field operations and things like that. And he said, uh, he said, uh, and, and I trust you to handle the press, you know, he said that's going to be a really important aspect of this." Um, and so I said, "sure, I said, uh, when do you need me down there?" And he said, "can you catch a flight in the morning?" And so, I think I left in the afternoon on Saturday, I had to basically put my life on hold for three weeks and cancel everything; I was a Boy Scout leader at the time, I had to get somebody to cover my Boy Scout camping trip for me, etcetera, but, you know, I went down there and, and basically, you know, my job was sort of, put that cruise together on the fly. Um, it was extraordinarily challenging in the sense that we had groups coming in from all over the country. We had a twenty-two foot AUV [autonomous underwater vehicle] that was coming from MBARI [Monterey Bay Aquarium Research Institute] over on the West Coast, uh, along with a team. So equipment was being flown in from everywhere. We, we had to basically, you know, my job was to try and coordinate all of that, get all of that together. Um, working with the ship's crew, um, and, and that was, uh, you know, they were, uh...

JW: Where was the ship based out of?

RB: It was actually based out of Pascagoula, Mississippi.

JW: Okay.

RB: Okay, so...

JW: The Pascagoula lab?

RB: Yeah, so I basically flew into Gulfport, um, was, was living on the ship, um, you know, had a, had a rental car, you know, trying to, you know, zip back and forth between the Pascagoula lab and the ship was actually docked on the other side of the Bay, so I kept having to go over the bridge and down the, down the causeway and things like that, but, um, and we, we kept, there were several issues. I was getting bombarded by calls, with calls from people who, from various agencies who had to be on this cruise, you know, and, um, you know, it was literally the heads of agencies going I need to put this person on the cruise, and I'm like, I've got 16 berths, you know? And, you know, I'm required to take somebody who's a representative of BP Oil to observe, I'm required to take this, I'm required to take that, you know--

JW: Right, space is limited.

RB: --etcetera. And space is limited. And so there was all that challenge. I, I kept having to call, um, Steve and saying, "you know, can you authorize me for \$10,000 to get this flown in and etcetera." And finally he said, he said, "this is really important. He said, stop calling me. Just get what you need, you know?" So we put it together, I mean, one of the big challenges was, uh, ships, uh, in order to have potable water ,they make water while they're at sea, so they use the heat from the engines to basically make water, which is normally a--

JW: Is it a desalinization process?

RB: Desalinization, right. But the problem is, you can't make, you can't make water when you're in an oil spill. So we had to figure out how to, and we put, uh, approximately 20,000 gallons of water in, in a water bladder on the deck of the ship. And so we had the ship's crew working, and they got this thing over there and it turned out the first thing they opened up, it was an open pool, you know. It wasn't, it wasn't a bladder.

JW: What did that do to the ship's stability?

RB: Well, and that's the other thing, I mean, we had to go through the whole ship stability thing. And so, um, what was, you know, it was, it was really important to work together with the crew and things like that. We, you know, we, we had to do press interviews every day. We managed to put together the cruise. We got off the dock, um, we were very successful in using the AUV and a lot of our oceanographic equipment to map, sort of, a plume of oil that was down, you know twelve or thirteen hundred meters down in the water. And you could tell that from, uh, from the oceanography, you know, we would, we would do these vertical sort of samples. And one of the unique things about the, the Gulf of Mexico is there is all these microbial that have evolved to basically eat oil. And people don't realize, but oil leeches into the Gulf of Mexico from--

JW: Just natural--

RB: --a thousand non-point--

JW: --leaks?

RB: Yeah. Non point, both, both natural and unnatural, you know, abandoned, abandoned wells and things like that. But there's all of these microbes that basically eat this oil. Well when they're doing that, they basically are utilizing oxygen also. And so you see these oxygen profiles that come down and they decline sharply for--

JW: Oh, so you...

RB: --for a hundred meters and then they go right back up to the same level

JW: Anoxic zone there?

RB: Yeah. There's sort of an anoxic zone where basically these things are chewing through the oil. So, um...

JW: Interesting.

RB: You know, there was, there was a lot of important biological sampling that went on, on that survey. It was important to sort of coordinate sort of the wire time for the various groups that wanted to do things. Um, you know, we had to do a lot of, of press briefings, you know, on the phone and things like that. When we got back, Kathy Sullivan who was the head of NOAA was waiting for us on the dock. So, um, it was very, very sort of high profile, high pressure situation. Um, very rewarding, you know, I, I probably worked, you know, 19, 21 hours a day, you know, um, but, um, it was, it was sort of a very rewarding endeavor.

I can remember early on, um, we were trying to, we were trying to get the boat off the dock and we had this reporter come in from the local, uh, TV station in Biloxi, and she showed up and she was wearing heels. And, you know, she was having to go across the gangplanks onto the ship because we wanted to film, you know, up on the, in the, you know, on the deck of the ship and things like that. So, you know, I carried her camera across, okay, and we did the interview and stuff like that, and, uh, I was carrying the camera back across the gangplank and I hear a tink, something hit the gangplank and splash, something go in the water. So something fell off the camera. And the officer, the vessel officer behind me heard it too, and he's like, "something fell off that camera and it's, it's in the water." And the reporter goes, "oh no, she goes, I hung my car keys on the camera." I'm like, really? [laughs] So, so, you know, we're sort of, I, it was just sort of really bad, you know. And so we got the camera across and stuff, and uh, so I came back on the ship and, and these guys from MBARI were, you know, hot shot scientists, and they were sort of, they were sort of trying to measure me up relative to my capabilities as Chief Scientist, you know, just sort of being an agency survey guy, and, and things. And they were like, "well, what are you going to do?" I said, "well, I'm going to get the keys back." They're like, "no, you're not." I said, "yeah, I am." So drove over, I called over to the gear shed at Pascagoula lab and I said, "do you guys have a floor magnet?" Said, "yeah." I said, I said, "you got about twenty feet of rope you can lend to me?" So I'm out there with the floor magnet and the rope, and I'm, you know, fishing across there, and the guys from MBARI are like, "you're not going to", so the second time I pulled it up, I had the keys. So I just walked in and I just did this, just jingled the keys. And the chief guy from MBARI looked at me, he goes, "you're going to be a good Chief Scientist."

So, um, you know, those were, uh, you know, it was important work that we did. I think we were able to dispel a lot of -ness; there was a lot of hyperbole at the time relative to what was going on out there. I think the thing--

JW: About the magnitude of the spill?

RB: About the impact, yeah...

JW: Or the impact?

RB: And I'm not saying that it, it had a very significant impact. But the reality is, it was in an ecosystem that regularly, sort of, gets much smaller impacts of oil, okay? When oil gets up into the estuary, it's devastating, okay? And where it did get into the estuary, it was devastating. But a lot of the oil that was out in the ecosystem itself, basically got, you know, sort of naturally dealt with in ways that we probably didn't understand previous to this particular oil spill.

JW: So those microbes are pretty unique to the Gulf environment then? Or would they be found in any other, sort of, forms--

RB: I don't know.

JW: --in other, other locations.

RB: You know, I've got to be honest with you, you know, you, you wonder if, you know, off of Saudi Arabia or wherever, you know, that you would see--

JW: Yeah.

RB: --similarly sort of evolved ecosystems. And, you know, I don't know the answer to that, I just, it was striking to me how less sensitive the Gulf of Mexico was, at least from my perception, than, say, Prince William Sound--

JW: Yeah.

RB: --where, I mean, those impacts are still there, so. Um, no, it was, it was a very rewarding sort of mission to get involved with. It sort of capitalized on a different set of skills than I normally get to use, so, um, I mean, I learned a great deal from the experience. And it's certainly, certainly something that I'm glad I was able to participate in, in my career, so.

JW: Well, I think that covers just about everything that I had on my list. Are there any final thoughts that you want to share, or...

RB: Well, you know, it's interesting. I'm actually hopeful, um, about sort of our relationship and the directions that we're going with our stakeholders. I think the communication's better. I think the knowledge-base with, among our stakeholders, um, is significantly higher. And I'm not saying that the stakeholders were, were naive or ignorant previously; they certainly had and still have a, a set of, sort of field knowledge that we may never have, that we're constantly trying to understand. Um, but I think the communication in general is, is much,

has improved quite a bit over the course of my 22 year career. It's not perfect, um, there are instances where, um, people are playing roles, where they say things in public that they might not say to you privately, um, because they feel like they have a responsibility to advocate or take a position. Um, you know, as scientists, we try not to advocate. I mean, we probably advocate for our own science, but not, you know, we shouldn't be advocating so much for policy decisions, at least, you know, within the Science Center and things. So I'm, I'm hopeful in that regard, that, um, you know, that we're making progress.

I think we need to understand, and it's a real, I think one of the big challenges for us is understanding sort of the net benefits to the nation. Um, and, and being able to tackle that, and being able to try and help the entire system optimize that, under changing environmental conditions, under changing economic conditions. You know, the, the world's a different place, you know. I, I bought cod this weekend to make cod cakes; it was, it was frozen Alaskan, Alaskan cod, you know, Pacific cod. And it's really good, works great in cod cakes. I wish, I wish I was buying our own cod, but you know, it's not available, or if it is available it's out of my price range. So, if we all focus on that, I think we can continue to make progress.

So I've encountered colleagues, you know, who are sort of beaten down at this point in their career. I'm actually pretty optimistic in terms of, of the direction that we're going and, and frankly, for the potential that we can, we can make. So, um, you know, it's incumbent on somebody like me to really think about what the next generation of scientists coming up within our organization and get them thinking in a way that, that helps us move forward, and to working with our next generation of stakeholders to really think about, you know, we don't, we don't have to be where we were in the 1990s, in the 1980s, you know. This is, this is 20 years later. We have made progress and we can make more progress. Um, but we just all need to sort of focus on understanding each other's perspectives, and then moving forward in a way that's, that's effective, so.

JW: Great. Well, thank you very much for talking with me today.

RB: You bet. All right