



# Special Topic: The U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program

Interviewee: Eric Derleth  
In Warner, New Hampshire

Interviewer: Libby Herland  
In Pittsfield, Massachusetts

January 18, 2021 (interview conducted by phone)

# Oral History Cover Sheet

**Approximate years worked for in the U.S. Fish and Wildlife Service, Partners for Fish and Wildlife Program:** 29 (42 total FWS)

**Offices and Field Stations Worked, Positions Held:** Refuge biologist, Iroquois National Wildlife Refuge (NWR) in Basom, NY; Partners for Fish and Wildlife Coordinator for Vermont in Essex Junction, VT; Partners for Fish and Wildlife Coordinator for New Hampshire, Massachusetts, and Rhode Island in the New England Field Office in Concord, NH

**Most Important Projects:** Farmers Home Administration (FmHA) easements in New York; private lands wetland restoration in New York and Vermont; riparian and stream restoration; dam removal; saltmarsh restoration; cranberry bog restoration

**Colleagues and Mentors Mentioned in Interview:** Don Tiller, Gene Hocutt, Carl Schwartz, Tracy Gingrich, Bob Scheirer, Chris Smith, Ted Kendziora

**Brief Summary of Interview:** Eric begins by telling us how, as a biologist at the Iroquois National Wildlife Refuge, he started working on the Partners program, working on restoring wetlands in agricultural lands near the refuge and also identifying and then doing compliance checks on FmHA conservation easements. He was one of the first refuge biologists to work on private lands outside the refuge boundary in the Service's Northeast Region (Region 5). After four years, Eric was selected as the first Partners coordinator for Vermont when funding became available through the Lake Champlain Special Designation Act. Starting with traditional wetland restoration, the program evolved into riparian habitat restoration because of the amount of degraded habitat that existed on dairy farms in Vermont. That led to restoring streams and dam removal in Vermont in partnership with federal and state agencies and watershed associations. Eric describes riparian and stream restoration efforts in detail. When Eric became the New England Field Office Partners coordinator out of Concord, New Hampshire, he continued his efforts to restore aquatic connectivity through dam removal, culvert replacement, and other techniques. His projects got more and more complicated, working with even more federal, state, municipal and non-governmental organizations, leading to stream restoration, saltmarsh restoration, and wetland restoration in former cranberry bogs. These projects were multi-year planning and permitting projects. A later focus in his career were projects that aimed to provide habitat for at-risk species such as the New England cottontail and invertebrate species such as the frosted elfin and monarch butterfly. Lastly, Eric describes the schoolyard habitat program run in New England by one of his co-workers. The evolution of the habitat restoration program from simple ditch plugs to very complicated, large scale habitat restorations requiring innovative funding sources, such as Hurricane Sandy recovery money and American Recovery and Reinvestment Act money, and potentially future infrastructure money, is frankly remarkable.

# The Interview

LIBBY HERLAND: Hi. This is Libby Herland. I'm a member of the Fish and Wildlife Service Heritage Committee. Today, we are doing an interview with Eric Derleth who worked on the Partners for Fish and Wildlife program for 29 years in the northeast region of the United States. This interview is being conducted by phone. It is being conducted as part of a special initiative that the Fish and Wildlife Service Heritage Committee has, looking at the Partners for Fish and Wildlife program – how it started, how it evolved, how it was implemented in different states and different regions across the country. Today we are interviewing, we're talking with Eric Derleth who has a really interesting career in the Partners program as well as working in other parts of the Fish and Wildlife Service. We are really thrilled to be speaking with Eric today. So, Eric. Good morning.

ERIC DERLETH: Good morning.

LIBBY: All right. I know you started working in 1991 in the Partners program. Just start with what years you worked in the Partners program, where you worked, and what your job titles were, and then we'll start, we'll go back and talk in more detail about each of those different duty stations.

ERIC: Okay. Sure. I started working in the Partners program as a collateral duty, as a refuge biologist in western New York at the Iroquois National Wildlife Refuge. I was at Iroquois working mostly maybe half-time on the Partners program from 1991 to 1994. In 1994, I became the Partners for Fish and Wildlife state coordinator for Vermont – the very first one. I was there for 10, 11 years. From there, in late 2004, I lateraled to the New England Field Office and became the Partners coordinator for Massachusetts, New Hampshire and Rhode Island. I was there until my retirement in 2020.

LIBBY: Okay. That's great. One of the things that is really interesting about this interview with you, I think, is going to be that you worked at multiple states, multiple stations, and you had such a long career with the Partners program that you really saw, you were there fairly early near the beginning of the program, and you were there, you've seen a lot of changes. I know you worked on a lot of different projects. Well, start with your work at Iroquois and how you started getting involved as a collateral duty biologist on the Partners program.

ERIC: Well, as I remember it, we were asked by the northeast region, Region 5, whether or not Refuges could help Ecological Services deliver a private lands program - principally a wetlands restoration program that was similar to what was delivered in Region 3. There really was no staff for the program in Region 5, except for Carl Schwartz starting in New York. He was, I believe, the first New York state coordinator. The way it worked out is, there was outreach to Refuges - the National Wildlife Refuge System - on whether or not biologists at Iroquois National Wildlife Refuge and Montezuma National Wildlife Refuge could help put projects on the ground in areas in and around the refuge. That goes back to one of the priorities of the program which was to help the National Wildlife Refuge System and the habitat around that. We could work with private landowners in nearby areas.

LIBBY: Right.

ERIC: What we focused on initially was - this was on the lake plain of Lake Ontario - very flat, clay land but heavily ditched. So, there was a lot of degraded wetlands there. We started with ditch plugging in

former agricultural lands to restore hydrology to these areas. Did multiple projects. Most of it was Fish and Wildlife Service funded. We did work a little bit with NRCS [Natural Resources Conservation Service]. Also, we got into, at that time, Farmers Home Administration (FmHA) easements, where they would take easements and we would be the easement manager for those projects. These were collateral duties, so I was probably for three years, '91 to '94, spending about maybe 50% of my time on Partners projects and 50% of my time on the refuge itself. I will say that my project leader at the time, refuge manager, was very supportive of doing this.

LIBBY: Well, you know, you must have read my mind because I was just wondering who was the manager and I was wondering whether you had support, 'cause I know some managers clearly, I clearly remember, because I was the regional private lands coordinator at that time, I remember some managers were really happy to work beyond the borders of the refuge. They recognized the value.

ERIC: It was Don Tiller.

LIBBY: Don Tiller, that's right.

ERIC: He was the refuge manager. Grady, or "Gene" Hocutt, [was] at Montezuma National Wildlife Refuge. Don was extremely supportive of me leaving the refuge boundary and working in areas around the refuge.

LIBBY: Right.

ERIC: We had four western New York counties that we covered. Some were close to the refuge; some were a little bit more distant, but essentially in the same kind of habitat. The focus was wetland restoration. 100%. We were not into any diversity of projects at that time.

LIBBY: Were you using refuge equipment?

ERIC: We used refuge equipment a little bit. Maybe less so than others, but Carl and I – Carl mainly – set up contracts with private contractors in the area. We would work through different levels of contracting pretty much on an hourly basis. I would design the project. We'd have the heavy equipment go out there. I would oversee the project, doing the surveying and getting the elevations correct. But it was essentially, almost all of it was with private contractors.

LIBBY: How did the public respond to this, and did you find the opportunities? Did you find the landowners who were willing to have this work done on their property?

ERIC: That was mainly coordinated through the Ecological Services office in Cortland. There was a lot of outreach done. This is kind of pre-, before social media, before really digital media at all. So, there was lots of flyers and public announcements and press releases and things like that. We were able to secure quite a lot of interest from people who really did like wetlands. Private landowners who did like wetlands. Then a word-of-mouth kind of thing happened where a neighbor would talk to a neighbor and that kind of made the program catch and keep going. But it was really more of just an advertisement through the printed media. That's really what elicited the response. There were certainly – it was a heavy agricultural area still, even though some of it is not the greatest farmland. But there were still many, many active farms and some of those farmers were probably a little surprised that we would be turning ground back into wetlands. We never had anything negative about it. It was just a purely voluntary program so people that were interested would contact us.

LIBBY: Yeah. Almost every farm had that spot that was kind of hard to farm successfully year after year because it was actually kind of wet. Those were probably a lot of the projects that you did, were some of those spots where people didn't really lose that much money, I don't think, by having the wetland restored.

ERIC: Yes, that's essentially what [happened]. It was ground that was marginal at best.

LIBBY: Was Iroquois – some refuges are really supported by the community and others - there's maybe a little tension between the refuge and the private landowners. I don't know what it was like at Iroquois, then. So, did this help the image of the Fish and Wildlife Service to have this program?

ERIC: I think so. It was a relatively small program, so we were just a small part of what the refuge was seen as doing. We had a lot of outreach programs with the public. It's a huge migratory waterfowl stopover in the spring so we had lots of celebrations about that. But I would say the Partners program was kind of under the radar for a while. But the volunteers that worked there certainly knew what I was doing and talked about it with their friends and acquaintances. I can't say for sure, but we may have gotten some projects just based on that alone. I do know that we had people who were associated with the refuge that heard about the program that did come and sign up for projects. So, just their association and knowledge of the refuge brought projects into where I could work on them.

LIBBY: Right. So, what you did mostly was wetland restoration, but you also said you talked a little bit about the Farmers Home Administration easements. I know that the Cortland, New York Field Office in Cortland – working through Carl Schwartz – would get notification of these Farmers Home Administration loans that were on properties where there was the potential for some wetlands. They were being restructured. So, Carl, would he, he would contact you? Would you go out with him and look at some of these properties, or were you ...

ERIC: I'm trying to remember if we went together. But he certainly contacted me and gave me mapping information such that I could go out and review the project to see if it was, in my opinion, a valuable project that the Fish and Wildlife Service might want to take an interest in. And then, later on, it was also to make sure that the easement was being adhered to. Just a compliance kind of thing. That the activities were - agricultural activities - had ceased within the easement boundary.

LIBBY: Right. So, you did compliance checking as well.

ERIC: A minimal amount. There was difficulty there because Refuges might have been supportive of the project, of the overall program, but easement review and easement compliance takes a lot of time.

LIBBY: Yes.

ERIC: That was a potential issue or could have been a potential issue had we had a lot of them - about just the amount of time that you would have to take on that. I think the Service overall had an issue with that, too. I think this was more of a national, it was a national thing if my memory serves me correctly. But it was a way to protect, to identify and protect wetlands, and valuable in that regard.

LIBBY: I think the regions, like Region 3 and Region 6, that had a small wetlands program already - they had Wetland Production Areas – they may have been a lot more comfortable with managing these new kinds of easements, but we didn't have anything like that in Region 5. I don't think they had anything like that in Region 4 for example, in the southeast.

ERIC: I think you are correct.

LIBBY: I suspect you are correct too, about that. All right. So, you worked with Carl Schwartz and then you told me earlier that Tracy Gingrich at Montezuma did something very similar to what you did out in the Iroquois area. So, you were there for about four years and then you decided to move to Vermont?

ERIC: Well, there was, I actually was up in Canada on a waterfowl banding assignment and I became aware of a new position in Vermont. It would have been the first Vermont state Partners, state coordinator. The funding from this came through the Lake Champlain Special Designation Act. I think that was in – I can't remember the exact date – early '90's. That provided base funding to the Fish and Wildlife Service to start a Vermont Partners program specific initiative. Prior to that, it had been managed as a multi-state state office from the New England Field Office. That office had worked in several states. Trying to cover all of the states was a little difficult. But with the passage of the Act, there was a position created – the Vermont coordinator position – and some seed money to start projects on the ground. I was fortunate enough to interview and get the job and started in 1994. Again, it started as a wetland restoration program working in close concert with the Lake Champlain Basin program, which is an EPA [Environmental Protection Agency] funded program. There was an emphasis on restoring degraded wetlands that had been drained or ditched in previous agricultural endeavors. That's how the program started. I was tasked to look for projects in the Lake Champlain watershed of Vermont and the Lake Champlain watershed of New York. So, I continued to some degree, a loose association with Carl Schwartz after I had transferred over.

LIBBY: That's right, because obviously half the - well I don't if it's half, but the other side of the lake is New York State.

ERIC: Carl was very flexible. We both looked at it as who was the best person to get the job done. It was very easy to implement projects.

LIBBY: Yeah, you were working out of a Fisheries office.

ERIC: Yes, it was at the time called the Lake Champlain Fish and Wildlife Resources Office. To the best of my knowledge, it was the only office – fisheries office – that hosted a Partners program.

LIBBY: Right.

ERIC: It was that way, and still is that way, actually. Right now, there's a Partners program in Essex Junction, Vermont and there is a Vermont coordinator [Chris Smith] up there.

LIBBY: Right. Were you trying to focus specifically on trying to assist the fisheries resource or was it still just general habitat? I know you talked about wetlands, but did that help guide where you worked?

ERIC: Initially it was just wetland restoration, basically taking the program that was in western New York and to some degree in the Midwest and trying to mimic those activities in the northeast. While it could be done to some degree in the Lake Champlain valley of New York and Vermont - because it's very, both of those are very agricultural areas - the Vermont landscape doesn't lend itself well to just focusing on wetland restoration. It's got some pretty strong topography. Opportunities were there, but they were somewhat limited. The agricultural lands were in intensive use and to try to convince a farmer to give up even marginal land was quite difficult. So, we eventually started looking at what were the other degraded habitats there that the Partners program could support. One of those, because the dairy

industry is so strong, for New England, was riparian restoration through livestock fencing and riparian planting and basically separating the livestock cows from free-flowing streams and the wetlands that, the riparian wetlands, that were surrounding those. So that was kind of where we morphed into. It really did take off. We did probably over my tenure there, probably 30 to 40 miles of fencing. It continues today, and there's a lot of riparian planting going on. Just looking at the sensitive wetland areas and trying to figure out a strategy in concert with the agricultural landowner. What works for them? They would get essentially a brand-new fence that they could use and we would have protected area that would protect the wetlands or the stream course itself.

LIBBY: Did you install stream crossings also in some of these projects?

ERIC: It was a low emphasis on crossings. We did more alternate water sources where there would be livestock manipulated pumps that would pump from the stream. We would also have other kinds of water systems that we would integrate into a rotational grazing system and things like that. But every project was a little different – proximity to water and things like that. We tended to totally exclude, where possible, the livestock from the streams except where they had to cross the stream to get from one pasture to another.

LIBBY: So, you were the first full-time coordinator for the state of Vermont, but are you just focusing on the Lake Champlain watershed at this point or were you able, using either this money or other money that came from the Partners program, to extend your projects throughout the entire state?

ERIC: Yeah, that's a good question. We focused on the Lake Champlain watershed but as we got into the different kinds of projects - we had basically used up all the seed money that came from the special designation act other than the base funding that paid for my salary - we were able to diversify and increase the area that we would look at. So, eventually it became a statewide program. I would say that the Lake Champlain watershed was still the focus, but we did do projects statewide. After that, I got very interested in, because of the riparian fencing and the degraded stream systems, I got into stream restoration which was a brand-new kind of applied science practice. People would look at streams that were not functioning well and try to figure out how to put them back together. At the time, there was Dave Rosgen, of Wildland Hydrology, a retired Forest Service person, giving classes. I think many Partners people at the time took advantage of those classes. I developed a partnership with Vermont DEC [Department of Environmental Conservation] Rivers Program – two individuals there [Barry Cahoon and Mike Kline] – and U.S. Forest Service Green Mountain National Forest [Dan McKinley]. As a team, we went out and took these classes over three years and pretty much decided to implement stream restoration in specific watersheds after we got back, and we had some training. We spent a lot of time looking at stream function. Many streams in Vermont were channelized, straightened for agricultural purposes. It's a steep, narrow valley, steep slopes. Many of the streams were pushed over to the valley walls and therefore were straightened. Farmers were constantly battling that because a stream doesn't want to stay straight. So, what we tried to do was, what we knew about stream functioning, was try to put the streams back together as best we could, and working within an area that the landowner would allow.

LIBBY: So, what were some of the techniques? How did you do that?

ERIC: Well, again, there's a river assessment process where you look at what the dimension, pattern and profile of the river should be given its landscape setting. We looked at that. There's a bunch of science

about what should the sinuosity be, what should the width and depth be, what should the slope be? We tried to put that on the ground using a variety of construction methods that use both wood and rock. So, there's different kinds of structures, veins and tree revetments and various grade control structures that provided both habitat and provided some stability to a stream. Many of the streams were set in a 100 percent agricultural landscape with really no riparian habitat other than grasses or tilled ground on either side, so they were rapidly eroding streambanks. Big changes in pattern, especially after storms. We did this for 5, 6 years up until I left. We had big projects; many of them done in the White River watershed which headwaters are in the Green Mountain National Forest. They were working to let the Forest Service fisheries biologists [who] were able to work off the forest. We worked with the White River Partnership to put projects on the ground. There was a big project up in northern Vermont – the Trout River – where we sort of cut our teeth on a large-scale project. This was the Vermont DEC Rivers program and myself and some local watershed associations, working with us. It generally did involve both working in the stream and then working, restoring the riparian habitat as well, 'cause that was really what was going to give us the long-term equilibrium in the system if we could get riparian habitat to grow and provide that stability to the banks.

LIBBY: Right. Right. So, way more complicated than just filling a ditch plug (laughter).

ERIC: Yeah. Vermont was kind of unique. One is that we were working with the Vermont DEC Rivers program. It was actually a regulatory program and you do need a stream alteration permit in Vermont. But because we were working with the regulators who were reviewing projects that were like hard armoring and rip rap, those were very much still in use, we were able to design our own projects and implement our own projects in a fairly seamless way. Vermont was kind of unique. We did not need stamped engineering drawings to do these projects which is different – I can talk about it later. Other projects of similar types, if you worked outside of Vermont, you would need a much, it's a different kind of work environment. So, we were designing the projects ourselves and implementing the projects ourselves. I was supervising heavy equipment, placement of rock veins and cross veins and things like that, based on the design that we, as a team, put together.

LIBBY: So, I have a couple of questions. How did these projects get funded and did the landowners have, what kind of commitment did they have to these projects?

ERIC: Well, there's a diversity of ways to get them funded. We were getting funded from the Partners program. We were getting funded from the State of Vermont. We were getting funding on some of the forests where the projects were – working in concert with the Forest Service – we were getting some funding from them. We were certainly getting staff time from all of those entities as an in-kind contribution. A lot of the watershed associations would apply for grants either through the Lake Champlain Basin program or other grants, Five Star grants through EPA, and we were able to bring funding in that way. It was difficult to put the money together. The projects were, by our standard, fairly expensive. Equipment time, if you were running excavators, 8, 10 hours a day, it can add up.

LIBBY: It can.

ERIC: We'd get a lot of donations of materials if we could. If we were putting wood into the streams, an in-kind contribution of the wood, large wood material, was very important. We could get rocks or boulders, and again, that could be an in-kind contribution. The program didn't really suffer from lack of funding. It was more of how many projects can we handle, 'cause we were doing all the work ourselves



in the field. You could only really work on one, possibly two projects at a time. It was intensive work. Once you started, you had to work all the way through it and get it done.

LIBBY: Right. As we were talking earlier, some bean counters might look at this and say, “Oh, you’re not really doing that much”, compared to some other states or some other regions, but the nature of the projects were very different. This was complicated.

ERIC: It was complicated, and we made mistakes, because this was brand new for us. Some of the things worked, some of them didn’t work. Even the areas where we would say, maybe a structure failed or things like that, we had moved the agricultural land use back from the river such that, if an individual structure didn’t function as we had hoped, it really wouldn’t come at the expense of productive agricultural land. That was part of the deal - putting the river back together - is to have a riparian width that we could work in. And then, ultimately, the river really should work itself out if you give it enough room. Its natural processes should take over. It’s just really to put kind of an equilibrium in the system and start a trajectory for the stream to just be a stream.

LIBBY: So, how did you find the landowners who would be willing to have this work done on their property?

ERIC: Well, a lot of them were folks that had come through a regulatory environment, like I mentioned earlier. They had to go to Vermont DEC to get a riprap project or a bank stabilization project. At that time, there were alternatives presented to them. “Would you be interested in doing something different?” So that was one way. There was a lot of outreach, say through the White River Partnership. At the time, salmon were a very high focus for the White River, both from the Fish and Wildlife Service and the Forest Service. So, we had reaches off of the, outside of the Green Mountain National Forest, that were pretty heavily degraded and where we would like to get better salmonid habitat in that area. Part of this was just an outreach through specific watershed groups or the Forest Service itself. We did have a working relationship with USDA [U.S. Department of Agriculture] NRCS, to try to promote riparian and stream restoration as well. So, we got some projects through them. We didn’t necessarily work with them on the ground, putting stream restoration projects, but we did have the opportunity to identify potential projects that way.

LIBBY: I know salmon was a big focus from a fisheries point of view during that period of time. Now it seems like we are focusing a lot on just coldwater habitat for trout. Did you have other fish species that we were trying to target habitat for?

ERIC: Yes, we did. You’re right. Eastern brook trout were - and as the supporting entity of the Eastern Brook Trout Joint Venture - we were looking for areas where we could restore coldwater fisheries primarily for resident species. The upper Lake Champlain watershed, the tributaries to that, provided a big opportunity for that. The Trout River project, as an example, would have been one that would have benefited eastern brook trout and other coldwater fairly rare state species. So, the emphasis really at the time was to look at stream function and riparian habitat. To some degree, the sediment loading that was going into the streams was excessive, so we were trying to reduce that. There’s a lot of downstream impacts from excessive bank erosion that manifested themselves all the way into Lake Champlain, both in a water quality and a sediment loading kind of situation. Nutrient loading as well.

LIBBY: Nutrients, yeah.

ERIC: There was a big emphasis from EPA Lake Champlain Basin program to reduce nutrients into Lake Champlain, and still is actually.

LIBBY: I think just the last question I have – if there is a special project, another project or anything you want to tell me, we can talk about that. But did the landowners actually have some kind of a contract or an agreement with the Fish and Wildlife Service or with one of your other partner agencies?

ERIC: Yes. We had both an agreement through Vermont and we had an agreement through the Partners program.

LIBBY: Okay.

ERIC: Most of the landowners willingly signed these agreements. The standard, 10-year agreement. The hope was, obviously, that the practices would last much longer than 10 years. All of the riparian fencing that we did and much of the stream restoration that was done with the riparian planting had those landowner agreements.

LIBBY: Have you, by any chance, gone back to any of these projects or heard anything about them?

ERIC: My successor, Chris Smith, who is now the Vermont coordinator – has been since I left in 2004 – has been back and they've written several reports on projects that were done in that timeframe. He'd look at those and assess those with private partners. Absent this Covid thing that we're going through right now, I would have gone up there this past spring and summer and looked at projects. We had actually planned to do that but couldn't do that. It's still something that we would do next year if conditions permit.

LIBBY: Right. I don't know how much evaluation, monitoring and evaluation there's been in the Partners program. When I interviewed Carl, I wanted to talk to him about the project that we funded with Steve Brown. Do you remember him? He was a grad student; I think at Cornell at the time. Just to try to determine whether, how beneficial the wetland restorations were. Were they providing wetland functions and for how long? Because ...

ERIC: There were papers that were written on that. I can't remember the individuals' names. There was one that was focused in northern New York at the very earliest of the wetland restorations that were completed through Carl's efforts. I think, if my memory serves me correctly, that wetland function was largely achieved such that there were really no differences between the restored wetland function at various metrics and a natural kind of reference wetland, three to four years after they had been constructed. So, if they were done correctly, you got functioning within four years, for sure.

LIBBY: Right.

ERIC: I'm doing that from memory right now, but there were assessments of that. I know Chris Smith has been back and looked at some of our riparian plantings which now, some are over 20 years old, more than 20 years old. He's told me that I would just be amazed at the riparian habitat that has grown on the riverbanks.

LIBBY: Well, you definitely have to get out there and try to see if you can look at some of those projects. Maybe this summer you will be able to go out there.

ERIC: I hope so.

LIBBY: That is really rewarding. To look at that and to know, to think about the value of your contribution and the work that you did.

ERIC: Yeah, well, just for a plug for the program, I think that's why a lot of people entered the program and stay with it for as long as we do, because you do get a personal sense of accomplishment and you really do feel like you are making a difference to the landscape and the wildlife and fisheries that would benefit from the restored landscape. It's very gratifying. I certainly can attest to that. I stayed with the program the bulk of my career. I was definitely converted to that, and I know many of my peers stayed many, many years with the program.

LIBBY: That's true, that's true. Many of the people that we interviewed, or we will be interviewing, spent the bulk of their career, I believe, in the Partners program. Once they got into it, they didn't leave. Some did. Some moved up the hierarchy, but ...

ERIC: Well, I think a lot of it is that sense of accomplishment but also the diversity of the projects that you were exposed to. Every project was unique. And as the program diversified in the type of project that it would do, the challenges changed. That certainly happened in my tenure, where we started as wetland restoration, and we did way different things at the end of my career than I was doing at the beginning of my career.

LIBBY: Right. Right. So, I just have one other question about Vermont. Did you end up doing any of the farm, traditional Farm Bill work, with the folks from the New England Field Office, like looking at easements. I don't think there were that many in Vermont, but there might have been some FmHA easements or any of the Swampbuster or anything like that? You were not involved with any of that?

ERIC: No. The regulatory compliance part did not transfer over. The New England Field Office kept that part of it. So, I was singularly focused on the Partners program restoration. We did do Farmers Home easement review a little bit - probably less than 10 projects. But there were some that were in existence, had been reviewed prior to my arrival and I did some compliance checks on those, and there were a few new ones that came in. It was not a program that was strongly marketed in Vermont, and that may be one of the reasons there was not as much interest. USDA would be better to answer that. It was just not strongly promoted or, if it was, there was no interest.

LIBBY: Right, and you only had one refuge at the time. Missisquoi. At then at some point, the Nulhegan division of Conte was established, but I don't know. So, you didn't have a strong, as strong a refuge presence in Vermont as you did in obviously New York. Iroquois and Montezuma had been around for a long time and were very well known and important refuges. Not saying Missisquoi's not important (laughing) but it's different. They were different.

ERIC: Right. It was different. I just, there was a lot going on right then, and I wasn't seeking those projects, but I would certainly respond to any requests from Ecological Services if I could help in any way.

LIBBY: Bob Scheirer – he was the coordinator then for New England.

ERIC: He was the coordinator. That's right. Bob was there. I can't remember what year he retired. I think it was 2003. He and I would converse and try to coordinate as best we could. He was the previous Vermont coordinator but relinquished that with my arrival in Essex Junction.

LIBBY: He had a large, that was a large territory to cover, so it makes ...

ERIC: Yeah. He was already covering Massachusetts and New Hampshire and Rhode Island, so he had a plateful too.

LIBBY: Oh, so when Bob retired, you must have moved over into his position, or a form, a version of his position.

ERIC: Yeah. It was a personal choice. Before I left Vermont, we did get into dam removal. That's where it started.

LIBBY: Oh, yeah. Talk to me about that!

ERIC: Very low head dams. Really set in agricultural landscapes. It was a relatively simple process to remove the structure. We did maybe four to five of those before I left. That work has continued. I can speak more to that because when I did the job, the Partners coordinator at the New England Field Office was advertised, one of the things I brought to there was dam removal. I can talk about that at greater length.

LIBBY: Oh, yeah. Definitely.

ERIC: Dam removal for me started maybe 2003, 2004. It's continued with the Vermont Dam Restoration Task Force still – River Restoration Task Force, I think. I may have the wrong name for that, exactly.

LIBBY: That's alright.

ERIC: But, yes, there was a group that had both state and federal entities and non-profits that came together to identify dams, potential dams, for removal in Vermont, even in the early 2000's.

LIBBY: Wow. Is this something that had been happening in other states and people found out about it in Vermont and said, "Yeah, let's look into this"?

ERIC: That's a good question. I would say that it was; early 2000's was kind of the beginning of dam removal nationally.

LIBBY: Right.

ERIC: If my memory serves me correctly, Wisconsin was at the forefront. Pennsylvania through the Fish and Boat Commission was working early on. I think people recognized that this aging infrastructure which posed a human risk by leaving the structure in place and possibly having a catastrophic failure of a structure was something that could be addressed. At the same time, we would get valuable aquatic connectivity, fish passage and riverine restoration out of it. Can't really remember what was the impetus for Vermont, but it likely was the Vermont Rivers program becoming aware of a structure that was unsafe and a landowner that said, "I need to do something about this." That was part and parcel of a stream restoration initiative. We folded that in, in some instances, to our stream restoration activities.

LIBBY: Well, it's really interesting, just looking at this from a historical point of view because people weren't doing dam removal in the 1990's, really.

ERIC: Right. And we probably didn't start until the early 2000's, I don't think. I may be wrong on that. But yes, it was an opportunity that I think the Partners program nationally has availed itself of, has looked at

that as an opportunity to put voluntary habitat restoration on the ground. It's something that wasn't thought of back in the early '90's as really something that we were going to be doing, but is definitely something that I think is done fairly regularly now, at least in some states.

LIBBY: Yeah, and I know – I definitely want to talk to you more about dam removal – but I remember when the one in Maine, Edwards Dam, came out. That was a big dam.

ERIC: It was huge.

LIBBY: When I worked in the Regional Office in Newton Corner, I remember a lot of – Alex Hoar was my cubicle mate, and he worked on FERC projects - so I heard a lot about fish passage. But nobody was, of course, those were hydro projects where there was a dam involved, and so people weren't talking about taking out the dam, they were just trying to figure out how they were going to move the fish.

ERIC: Right.

LIBBY: But it's really interesting; at some point, the realization changed, came around, that these dams are impediments and they're not even functioning that well, or they're not, the benefits of the dam are [not] outweighing the negative aspects of the dam. So, to start talking about dam removal and to do it was significant. It was huge.

ERIC: Certainly, dams that are regulated by the Federal Energy Regulatory Commission (FERC) are, that's a type of dam, and they're supposed to be looking at the pros and cons. Basically, should that dam have - the cost and benefits are assessed every time the license is up for renewal. If my memory serves me right, Edwards Dam came out because the benefits of that dam were much, for removal, much greater than leaving it in place.

LIBBY: Right.

ERIC: That was one of the impetuses for the removal of it. That being said, most of the low head dams that are in New England, and I think there's like 10,000 of them, are not FERC regulated. So, they are a relic of the Industrial Revolution. They provided hydropower or electric power, and many have been abandoned in place and allowed to degrade to a condition where they could be, they could very well be a safety hazard. Reducing human risk is part of this. There's state dam safety bureaus that are supposed to inspect dams for condition and require landowners to either remove or maintain the dams. That is a very huge - it's a complicated job. They essentially don't have enough staff to be looking at dams, that number of dams, New England-wide. So, we've been able to look at this from both a human safety and ecological outcome part of this. When I went to the New England Field Office in 2004, it was one of the things that we partnered up with, with other agencies, and looked at the potential for dam removal with some idea of looking at priority watersheds that would address some of our trust resource responsibilities. That was a driving force for about 15 years for me. It was an emphasis when I got the Partners coordinator position at the New England Field Office. We had lots and lots of strong partners. A big, long list. We removed dams in Massachusetts, New Hampshire and Rhode Island. I probably say I worked on over 40 dam removals during my tenure there.

LIBBY: Wow.

ERIC: Some were very hands on. Some were providing technical assistance only. All of the projects – and this is where I talked earlier – all required stamped engineering design plans which is different than even

the low head dam removal in Vermont, which we didn't need those. But all of these, you're basically doing a complete hydrological assessment, hydraulic assessment and you've got to go through an environmental compliance and a regulatory permitting process that requires the use of engineers under a contractual basis. We did not use Service engineers for dam removals, mainly because the workload was so great that they didn't have the opportunity to provide hands-on support. We certainly did communicate with them and ask specific questions when they came up and they were very helpful, but they couldn't do the design work. We had to contract it all out.

LIBBY: And then, at some point, we didn't actually have Service engineers. In Region 5, anyway, they abolished that program whenever the Regional Engineer retired. I can't remember who the last one was, but it kind of went to the field.

ERIC: There are some now, and they do projects right now.

LIBBY: They do fish passage.

ERIC: They do fish passage projects, but they do coordinate with the folks that are doing river restoration. I would say right now they're doing; they have their technical fishway expertise, but they are also looking at natural channel bypasses and integrating stream restoration into some kind of naturalized system to get fish up and around dams that can't come out. They've got probably three or four people now that do this, still.

LIBBY: Okay.

ERIC: The structure of the, the organizational structure is somewhat different than what it used to be, 15 years ago.

LIBBY: Some of the expertise is still there though.

ERIC: The expertise is still there. All the people have changed from when you and I started. All those people have retired. Now there's different individuals there. I worked with them on some projects but not a lot.

LIBBY: Was contaminants a big concern for you on dam removal?

ERIC: Well, for dam removal, it's a huge can of worms when you get into this, especially in an urban landscape or something that was, say, the dam had been in existence since the Industrial Revolution. There are different things to assess before a dam can come out. This is one of the things that may, you had talked earlier about metrics of accomplishment. A short dam removal in New England is three years from the day that somebody walks in and says, "I have a great idea about removing this dam." I've worked on many that took 6 or 7 years to get out. Part of this is related to public acceptance of removing a very prominent piece of a structure that probably everybody, for their whole life, has always been there. It's been the center of the town or the community or always on the landscape. The other part of it is exactly what you talked about, which is - what are the environmental risks involved with removing the dam? Much of that is related to a contaminant, an assessment of sediments that might be impounded or held behind the dam. Not all projects have contaminated sediment, but some do. You have to go through a permitting process on how to address downstream flow of sediment or removal of the sediment from the stream. Some of it is just the volume of sediment that you might release. We went through and continue to go through a process of, is it okay to let the stream naturally take the

sediment away? That is obviously the cheapest way to do it, but you have to be cognizant of the ramifications of having that happen. That is normally where we would go if we could. We've had other places where we actually had to physically remove the sediment from the site and take it away. It had levels of contamination that would not have allowed it to go downstream.

LIBBY: Wow.

ERIC: The other part of a dam removal is the National Historic Preservation Act, section 106. Many of these projects are historic in their own right. They are certainly eligible for the National Historic Register. So, you have to go through a process with the SHPO, the State Historic Preservation Office, on the importance of the structure, its landscape setting, is it attached to the mill complex? Many of these were mill dams. We have to be cognizant of protecting our historical or cultural resources when we do a dam removal. We, in many instances, have had to do a Memorandum of Agreement with the SHPO that would have stipulations on how to memorialize the dam itself. Even though the dam came out, there were certain things that we still might have to do. We'd either have to leave a remnant of the dam, we'd have to create a public outreach effort through a kiosk or pamphlets to try to explain and let people know why this dam was here and actually why it was removed as well. And all those things take time. So, that all fits in to why it takes a long time to get a dam out, in many situations. Many of these are in urban environments too. That was the other part of it, is multiple landowners abutting the stream. We had to spend a lot of time in outreach. I will say that we were successful. In some instances, we focused on some rivers, I wrote some of these down. Town Brook in Plymouth, over 15 years we removed 6 dams. That's where the Pilgrims landed, so the outlet is right at Plymouth Rock. The last dam came out 2 years ago. There is one other dam that we're, that project partners are going to work on – a natural channel bypass – on a dam that can't come out, that was built in 1620 and it just has to stay there. But we also worked on the Mill River which is a tributary to the Taunton River, a Wild and Scenic River. In an urban landscape in Taunton, we took three dams out there. The Wood-Pawcatuck in Rhode Island, three dams on that, in western Rhode Island. And the Ashuelot River and Bellamy River in New Hampshire, tributaries to the Nashua and one to the Connecticut. Bellamy River into the Gulf of Maine. We tried to look at not just taking single dams out but looking at where we could restore aquatic connectivity through a long-term partnership. The one thing that was really different about this is the partnerships were different. We had, instead of working with USDA-NRCS, I worked more with the NOAA [National Oceanic and Atmospheric Administration] Restoration Center. They have a strong program, they have very, very competent people that do similar work to what the Partners program but with a focus on their trust resources which are essentially diadromous fish. We had a great working relationship with the Regional Office in Gloucester. And then, obviously the two state agencies that, especially in New Hampshire and Massachusetts, that we worked with in concert. The Massachusetts Division of Ecological Restoration is probably singly, they probably have 20 to 25 people that just focus on habitat restoration. I'm not sure that occurs anywhere else in the country. They were a very strong partner for the Partners program through the dam removal and actually other kinds of habitat restoration projects that we did.

LIBBY: Well one of the questions I have for you is – was dam restoration the most complicated project you would do? I know you also did saltmarsh restoration which we will discuss, maybe next, which had to be complicated. But with all the people that were involved, the agencies, the funding. This is expensive! Where did the funding come from?

ERIC: Well, that's a good question. They are very expensive. The only way this really could work is with a project team and multiple entities putting funding together. Many of these projects cost in the six figures. It was hundreds of thousands of dollars to take a dam out, and in some cases over a million. The funding came from ourselves through National Coastal Wetland Conservation (NAWCA) grants, and I can talk at greater length about funding sources within the Service. But during our tenure at the New England Field Office, we had the American Recovery and Reinvestment Act.

LIBBY: Oh, yeah.

ERIC: It was called ARRA. That provided funding for projects. I put in proposals for those and was fortunate to get funding for that. We had Hurricane Sandy funding that came in during my tenure. That kind of came in two chunks – some directly to the Fish and Wildlife Service were for projects that I promoted with my project partners. Then, as an ancillary to that, another – that was about 9.3 million dollars. Separately, Massachusetts Division of Ecological Restoration, which is a division of Mass Fish and Game applied to the National Fish and Wildlife Foundation for other Sandy funds. That was for a 10-dam removal package that I was working on with them. They got 3 and a half million dollars for that. So, over the course of a few years, because of Hurricane Sandy, we had up to 13, 14 million dollars.

LIBBY: That's amazing.

ERIC: All of that was used towards feasibility, design, permitting and actual construction. We just parsed it out as a multi-step process. Usually, we would start with dam removal very early on, on feasibility. What were the issues related to historic, sediment characterization and assessment. And then we would, if it was deemed feasible, and almost all of them were, we would move into design, preliminary design and final design and permitting, and then eventually implementation. Many of the dams were – I think it was a mix – privately owned. Several of them, again, legacy from some corporate or company or private enterprise. But many of them were municipally owned as well. We worked with several municipalities to take out dams that they recognized the liability of long-term ownership of this aging infrastructure. So, the towns were able to put money into it too in some instances.

LIBBY: Right. Did you ever use Natural Resource Damage Assessment (NRDA) money for these?

ERIC: Yes, we did. Limited. I know one of the projects that was out in western Massachusetts in Pittsfield, Massachusetts no less was taken over by Natural Resource Damage. That was one that the funding, that the seed money for funding, came from Sandy, but eventually the – I'm trying to remember the name of the dam right now and I'm blanking on it.

LIBBY: Is it Sackett Brook?

ERIC: No.

LIBBY: That was NRDA money. There's the Mill River, there was a dam that just came out – 'cause I live in Pittsfield – a dam that just came out on a little, I think they call it the Mill Street dam. It was in downtown Pittsfield.

ERIC: I just can't remember right now. But again, Natural Resource Damage program was looking at dam removals as well. My counterparts in that program at the New England Field Office, we'd converse a lot on how we could either identify dams or in some instances put funding in from both programs to work on those. Mainly I was working with NOAA which was a huge funding source. The Commonwealth of



Massachusetts was very well funded for ecological restoration and they were able to put money in. But we were also looking at grant programs as they became available on an annual basis and applying, making applications for specific projects as needed. We got quite a bit of funding that way. Natural Coastal Wetland Conservation grant funded, put money into several projects. That's a Fish and Wildlife Service program.

LIBBY: Right. Just applying for grants can be a tremendous amount of time. I have some experience, some involvement on a peripheral basis with dam removal near some of the refuges I managed, and I know it's just a huge amount of work. Wow.

ERIC: Well, fortunately I wasn't writing most of these. I was a reviewer of applications, trying to provide technical review. I wouldn't necessarily take lead authorship on an application, for exactly why you said – it takes a lot of time. Fortunately, we had other folks – that was their role. We've been successful. Over the years, been very successful.

LIBBY: Well, I'd really like to talk about your project in Wellfleet. I don't want to – there may be other things you want to talk about – so let's talk about that, but I know the project in Wellfleet is a huge project and one that is still ongoing in some ways, I think. What else would you like to talk about in terms of New England?

ERIC: I will say that when I came to the New England Field Office, that project – the Herring River restoration project – was just at the beginning phases of consideration. If completed, 'cause it's still not completed yet – we're in permitting now - it would be the largest tidal restoration project in the northeast. Almost 900 acres of former *Spartina* dominated saltmarsh. That being said, the Herring River is the largest example of a type of project that I worked on ever since I, when I started there. It was removal of tidal restrictions to restore saltmarsh habitat, principally in the Commonwealth of Massachusetts, though there were other kinds, working other states also. But this was dominated by Massachusetts. Many of the issues or the projects had been identified in the early 2000's by an atlas of tidal restrictions that was done on a county-wide basis. Most of the restrictions were put in because of transportation infrastructure. A road culvert that crossed a tidal stream that was too small, really, and restricted tidal flow. There's a cascading set of issues that result when you do a tidal restriction. Probably more complex than I have time to talk about. But it essentially changes *Spartina* dominated intertidal systems to something else that is less salty and does not have the tide range or the tide heights that, the mean high water. The intertidal conditions change dramatically when a structure is put across a stream. That can also affect both the vegetation but also affect the substrate. You have basically a collapse of the saltmarsh platform through decomposition and collapse of pore space. This causes the whole marsh surface to subside. So, you have loss of elevation and then you have changes in vegetation, changes in salinity, and you also have a restriction for diadromous fish. River herring and American eels and things like that. So, jumping back a little bit, a lot of our projects on dam removals were focused on diadromous fish. The program really had, under my tenure, had an emphasis on restoring alewife, access for alewife, blueback herring, American eel, to some degree sea lamprey. Tidal restoration projects have a similar kind of effect in a limited basis. They were essentially at the head of tide or below the old head of tide, 'cause they actually did convert saltmarsh to cranberry bogs in Massachusetts over a hundred years ago. But we worked, I don't know, I want to say, 30, 40 projects, ranging in size from just 2 to 3 acres up to a couple of hundred acres on restoring intertidal conditions and then allowing natural processes to take place. So many of these projects will take a long time for

natural processes to restore the habitat that was formerly there, because the system has changed so much. But it should provide, once it's all, it should provide greater resiliency to many of these coastal communities. It takes out infrastructure that may or may not be able to survive rising sea level and things like that. We do have the issue of sea level rise going on right now. That complicates how you might approach a restoration project in the intertidal zone right now. We were very successful and to some degree have - a product of our own success - we're running out of projects in Massachusetts. All the easy ones have been done. We've got things like the Herring River that are still out there. Really very, very complicated. It's taken a lot of time.

LIBBY: One of the things that I remember about the Herring River project was that there are obviously multiple landowners. You probably have that often, but in this case, there's a lot of landowners. You also had the National Park Service (NPS) with the Cape Cod National Seashore involved which is not a traditional - they don't own all the land that's within the Seashore boundary, and it's regulated by the Park Service. A lot of that is still private land. So, you have all these different levels of government and ownership. I just can't imagine what it's like (laughing).

ERIC: You're exactly right. Almost all of the projects in Massachusetts have a project team developed. We try to bring in all the level of stakeholders that we can, that would voice an interest in the project. The Herring River is an example of one that does have a lot of abutting landowners. Eighty percent of the 1,000-acre project area is within side the Seashore, the National Seashore, but 20 percent isn't. The structure that needs to be replaced is town-owned, by the Town of Wellfleet. It was a dike that was originally built across the Herring River. About a thousand-foot dike, 900-foot dike that was built in 1909 that took a 700-to-800-foot tidal channel and restricted it to an 18-foot opening on the outgoing tide and 6 feet on the incoming tide.

LIBBY: Wow.

ERIC: So, it dramatically changed almost a thousand acres of habitat. After that, they built a golf course within the former floodplain. There's a variety of infrastructure that was put in, low lying roads that were put in at an elevation that couldn't have been built prior to the restriction. All of this will become part of the project to either raise the roads, remediate the golf course, protect private property as we restore tides to that area. We won't get full tidal restoration, but we'll get 85, 90 percent of it. But again, very complicated. A lot of effort gone on by the Park Service because they are the lead federal agency on this project, but has support from NOAA, Fish and Wildlife Service, and state agencies, USDA-NRCS. There's actually a Herring River technical team that exists, that I used to be on, that has now got Fish and Wildlife Service representation on it that is trying to lead the project through to fruition. We are in the permitting process right now, or the project is in the permitting process right now. That technical team met monthly for 15 years.

LIBBY: Wow.

ERIC: We did a full-blown environmental impact statement (EIS) for the project, led by NRCS [correction: NPS]. That's a huge, huge document. There's a companion environmental impact report that has to be done for the State. We've had years and years of technical assessments on, if we let the tides back in, what will the salinities be? What will the tide elevations be? Because we have to be very, very careful about doing this. The idea right now, it's going to be incremental restoration, where we have a series of tide gates that will allow to be incrementally opened such that we can address some of the ecological

consequences of 110 years of tidal restriction. Just letting the tide back in, in one big event, is not tenable under this. We've done that many times where we have allowed just the tide to come back in by enlarging the culvert or taking out a culvert. But these were all small-scale projects. This one does not allow – you can't have that happen. So, the EIS which was produced in 2016 went through a huge alternative analysis. We've got a path forward and we have engineering designs for all the structures that need to be built. We'll eventually have it built. Right now, we are in fundraising mode. There's about 30 to 40 million dollars that are needed to build the project. Which is kind of outside the gamut of the Partners program.\*

LIBBY: Right!

ERIC: We don't usually do that! But we put very little money as an agency into this, so far. Some hydrological assessment through some modeling. But principally, the funding – they've spent 6 to 7 million dollars so far – has come from the Commonwealth, from NOAA and to some degree from the USDA-NRCS on their Cape Cod program. We're at a point now where we're starting to seek funding for implementation in which the Fish and Wildlife Service programs would be part of that.

LIBBY: Maybe NAWCA again would be part of it.

ERIC: Right. Right.

LIBBY: Isn't there some CEIP or something like that, money? Some coastal money?

ERIC: I don't know if there's anything, I don't know about that term. But we have talked to the NAWCA and Coastal Wetland Conservation grant leads in Hadley about availing ourselves of one or possibly two applications depending on how we structure the [project]. Because we have a Phase 1 and a Phase 2 of the project, we might be able to get multiple fundings.

LIBBY: I know we are really – the purpose of this whole special topic on looking at the Partners program – is to look at the history, but we can say that looking at the future, that possibly if we are able to get an infrastructure program passed by Congress in part, well we need to do something with our infrastructure and also because of climate change adaptation, then that might be a funding source.

ERIC: That's been much talked about. It's certainly all the federal agencies [are] aware of the potential for an infrastructure bill and we're all looking at working the project. The non-profit organization Friends of Herring River have been in contact with Congressional staff to talk about pretty much highlighting the project and the opportunities that present itself. While funding for infrastructure has certainly not happened yet, there are people that are promoting it or at least identifying the project as a potential thing.

LIBBY: I think this has good potential. It doesn't affect that many people but it's a good amount of land, so we'll see.

ERIC: One of the things, too, it starts to hit on some of the other things that we've, our recent emphasis – at risk species – which is now an emphasis for the Fish and Wildlife Service, especially in the northeast region. Saltmarsh sparrows being one of the species that could potentially benefit from this project. So, it has a nexus with some of the newer initiatives that we have ongoing right now. We'll just have to see how it plays out.

LIBBY: Right.

ERIC: I think we've done a tremendous job at looking at some of the aging infrastructure and some of the perturbations to the tidal wetlands that have gone on. Obviously, the timeline for when they reach a new equilibrium is a little uncertain right now. We have to wait and see what happens with sea level rise and what kind of natural processes can take place in the coastal arena. But largely successful over my first ten years there. There's still some legacy projects out there. There's probably three or four ongoing tidal restoration projects right now in addition to the Herring River that are being worked on.

LIBBY: Astonishing. You've had quite a career. Are there any other projects you want to talk about or anything?

ERIC: Well, the only thing I would say right now is the Partners program, I had an assistant, Ted Kendziora. He's still there. Kind of a lone ranger right now for the project, for the program. Ted has spent a lot of time working on at-risk species which is a fairly new emphasis for the agency. Maybe 4, 5 years. We started it with the New England cottontail which was petitioned to be listed.

LIBBY: Right.

ERIC: We put in kind of a full court press with six state agencies, NRCS, National Wildlife Refuge System, to start to put habitat on the ground that would benefit that species. Libby, you know some of that because some of that was done out on the refuge on Cape Cod.

LIBBY: Yes. Mashpee.

ERIC: We were able to integrate mowing, prescribed fire in pitch pine-scrub oak environment to try to enhance habitat for New England cottontail. We put, I don't know, several hundred thousands of dollars on the ground from all these different state and federal sources to deliver projects in a six-state area. That included Massachusetts, New Hampshire, Rhode Island, Connecticut, New York and Maine. That ended with a "Not Warranted" decision [for federal listing under the Endangered Species Act]. We were part of that – the Partners program was part of that process and the decision that the species did not need to be listed at this time.

LIBBY: Yep. I remember.

ERIC: It has morphed into other projects too. Other at-risk species have come up. More recently, frosted elfin, monarch butterfly, couple of species of northeast turtles. So, the Partners program is very actively engaged in putting habitat projects that would benefit these at-risk species in the northeast.

LIBBY: Yeah. So, one of the things about the New England cottontail – we're talking about - maybe we were restoring the habitat – but we're actually, a lot of this habitat needs to be managed in order for it to continue to benefit these at-risk species.

ERIC: Correct. Yep.

LIBBY: So again, that's another way that the program has evolved, as long as - before we would just plug a ditch and that was it. We'd walk away, basically. Now we're involved with, I'm sure you developed management plans or management plans have been developed for these properties where you've done these projects, and somebody is responsible, I assume, for continuing to manage it so that it continues to benefit these at-risk species.

ERIC: Well, that's true. We have got management plans and rotational cutting or mowing integrated into this. It's a little uncertain where the long-term funding will come from, but we do have cooperative agreements and landowner agreements that would perpetuate some level of management on this. The emphasis on the New England cottontail has somewhat waned across all the state and federal agencies because of the listing decision, but it is strictly on the forefront for other species like frosted elfins and things like that which are still – the decision to list those – is still outstanding. The receiver of the project, either the landowner or one of our partners, has been tasked with coming back to us and other project partners when the time comes up to manage the habitat again. Depending on the funding source, we can't continually just put Partners program money into the same project over and over again, but we can help other people find funds that might be able to achieve that second or third iteration of management. This is something that, you are exactly right - American woodcock, New England cottontail, a lot of these invertebrate species, monarch butterfly, frosted elfins – they all need management of a seral stage that is only temporary. If you let it go by, you are going to lose the habitat for that species. It's something that people need to think about. If we value these species on the landscape, you need to put that level of effort into it.

LIBBY: Well, if you want to keep them from becoming listed as a threatened or endangered species, it's what you have to do.

ERIC: Sure.

LIBBY: Even if they do become listed, like piping plover, you know piping plover are always going to need management efforts. It's the way it is. If you want to have piping plover, you're going to have to management. Wow.

ERIC: I could talk – I haven't gone through all the diversity of projects.

LIBBY: Yeah, what else do you have?

ERIC: How much more do you want?

LIBBY: I'd like to wrap it up in about 10 minutes or so. 10 or 15 minutes. Okay?

ERIC: Okay. New emphasis for us in Massachusetts - and maybe you're well aware of this is - the cranberry industry has passed its heyday in Massachusetts. Economically it's very difficult to produce cranberries at a cost that is competitive with other states like Wisconsin. So, a lot of these very early cranberry grounds were built in Atlantic white cedar swamps, red maple swamps. They have a heavy peat-based system. But many have been abandoned or are no longer economically viable. So, over the last ten years, we started to look as a partnership. These can be very much related to some of the tidal restorations, some of the dam removal projects. They all can overlap to some degree. But taking these peat-dominated wetland systems which are freshwater systems and trying to figure out how to restore them to a productive peat wetland, that is something that we have done successfully. The very first project in the northeast was the Eel River project. A 40-acre project in Plymouth [Massachusetts], done over 10 years ago now. It's grown to include several other projects. Some are completed, some are in permitting right now. It has become an emphasis of the Massachusetts Division of Ecological Restoration such that they have dedicated staff that are just looking at these potential projects. They have some unique biota. They don't necessarily always touch our trust resources, but some of them do, especially the stream systems that have diadromous fish going through them. But many of them have rare state-

listed or state-rare species. The trajectory once you've done a restoration is – the difference between a commercial cranberry bog and what you have in an outcome for a functioning wetland is just stunning. You see this within 2 to 3 years.

LIBBY: Really.

ERIC: It's just amazing. So anyway, that's still ongoing as we speak and is an emphasis. Could continue to be an emphasis in the Partners program, depending on staffing levels and expertise.

LIBBY: Is that mostly done through hydrological manipulation or is it including plantings and ...

ERIC: All of the above. It first starts out with – these are entirely very simplified systems. The cranberry bogs had sand berms going across the stream valley. These are usually broad valleys with sand glacial deposition on the uplands on either end. They basically built a berm with a water control structure and then channelized the stream. Everything was done to make it as efficient as possible to grow cranberries. It also involved putting sand on the former peat bog system to have the right substrate, the best substrate to grow cranberry plants. They would put 2 to 4 inches of sand on every year. So, you can look at this when you start a restoration, you can see a layer of 2 to 3 feet of sand over the former peat level. Then you've got to try to figure out how to restore the wetland. Some of it involves removing the sand overburden. Others are – well, maybe we can grow peat on top of the overburden. We've done both, where we've done this. Some of the projects are at head of tide, too. They were growing cranberries wherever they could. Especially with sea level rise, we'll have a coastal resiliency tidal restoration component to it, too. There's one out in Harwich right now, the Cold Brook project, that will probably have - part will be estuarine restoration and part of it will be a freshwater restoration.

LIBBY: Will Atlantic white cedars be planted in some of these restorations?

ERIC: We have planted those in two projects. The Eel River project and anybody who wants to go to Plymouth can now see Atlantic white cedars that are now probably 15 years old. It's fairly impressive how fast they grow.

LIBBY: That's great.

ERIC: We were experimenting with individual site conditions – what are the right hydrological conditions to grow Atlantic white cedar. We failed in some areas, but we were largely successful in other areas. Now we're just letting the cedars grow where they want to grow. Another similar one – a large 200-acre project out in Plymouth as well – which is I think the largest cranberry bog restoration that has been done. It's about 200 acres. We completed another project in Falmouth; the Coonamesset project that was funded partially by Sandy funds. It had many other partners which is again a former cranberry bog. Many of these are, the cranberry bogs were on the landscape for 100, 150 years and are part of the community, so you end up doing, just as many projects do, you have a lot of community outreach to do, to explain what the desired future condition is, or the trajectory might be over the next 10 to 20 years. So, there's a lot of outreach that's needed to have these small communities understand what is trying to be achieved. I guess the last thing I'll mention – it's not because it's the least important – but the Partners program has been, and still is – hugely integrated into schoolyard habitat.

LIBBY: Great.

ERIC: So, we've got an outreach program led by Ted Kendziora to the school systems. It's focus has been on pollinators and restoration of pollinator habitat. We've tried to engage the kids as best we could to show them what they can do locally. Been very successful. We've had outreach and done 30, 40, 50 projects across New Hampshire and Massachusetts with the kids.

LIBBY: Were those mostly elementary or did you go through middle and high school also?

ERIC: Mostly elementary and middle school, I would say. Again, this is one that Ted was leading. I was fortunate enough just to be peripherally involved and had a working knowledge of it, but he would be out there with the kids. If my memory serves me correctly, it was mostly the younger kids. Very successful. They were very interested in it. It usually takes a teacher or a school system to become interested in it and then the kids will just naturally follow. We've got some work in an urban environment to do that too. That's more at the beginning stages right now, I think.

LIBBY: I know there's a lot of work being done with kids in Lowell, Mass. Real urban area. The refuge staff at Great Meadows and Oxbow, Assabet – that Eastern Mass Complex – those folks are working with them.

ERIC: Well, wherever the Service can provide that level of expertise and be a catalyst to do that, it's going to serve us well.

LIBBY: Right. Absolutely. That's the next generation. We have to be opening the doors to nature to all these kids.

ERIC: Exactly. Well, I think I've touched just briefly on a lot of things but at the same time, if you have any other questions, I'd be happy to try to answer them.

LIBBY: Well, we really covered everything that I – it's just your career has been phenomenal in the Partners program. I just love how you showed us how you started off doing simple wetland restorations and how things changed. The work that you did at the end of your career – so different but it's all so much more complicated working with a lot more partners, and funding sources, the permitting. You really gave us a great illustration of how the program evolved, which is really what I wanted to hear about, and how you worked with all these partners.

ERIC: Well, I think the Partners program has been very good at allowing the program that's delivered at the state level to have the greatest amount of flexibility that they can. So, you look for opportunities, you look for partnerships, you look at the ecological projects that are out there. You can tailor – we have the ability to tailor the project to what is most pertinent to the geographic area we're in. I've been fortunate enough to have a lot of funding that came from outside the program. Not that Hurricane Sandy was something that everybody enjoyed having by any means – it was a huge disaster in many parts of New England. But at the same time, the consequences of that provided a lot of funds to kind of get ready for the next coastal storm or the next hurricane, and provided a huge amount of money to do projects that were not typical of the Partners program at all. Putting in two highway bridges on a state highway is something that I never thought I would ever do, but those are two of the big projects that were part of Sandy. Muddy Creek and Parker's River. They cost 4 to 5 million bucks apiece.

LIBBY: Right.

ERIC: That's not something that you normally think about as a Partners project. But being part of a project team that helped put that on the ground and then helping manage the Sandy funds through a very circuitous process - I think the program allowed that to happen. I'll always be grateful for that just because it provided that diversity of opportunity.

LIBBY: Right. Even the name of the program – Partners for Fish and Wildlife – that really does say it all. It could be Partners for Fish and Wildlife Restoration but it's really, really gratifying to see where this, how this program has evolved and is sustaining itself. I know that the money comes from a lot of other entities – it's not just Partners money. In fact, very little Partners money goes into these projects. It pays for the staff but there's not much Partners money so the fact that the Fish and Wildlife Service has been at the center of so many amazing projects that have such long-term benefit for fish and wildlife and people is very rewarding.

ERIC: Yep, it is. It was rewarding to me both personally and professionally to make that happen.

LIBBY: Absolutely.

ERIC: I can't speak highly enough for the partners that I've been able to work with over the years. Incredible people, incredibly dedicated through all different levels of government and non-profits. We couldn't do anything, and this is probably true nationally, but we couldn't do anything without the partners. That "partners" part of Partners for Fish and Wildlife is perhaps the most important component.

LIBBY: Right. Right. Awesome. Well, Eric, I'm going to turn off the recorder so stay on the line for a minute. Thank you so, so much.

ERIC: Good talking to you!

\*As of February 2023, when the transcript of this interview was completed, the Herring River Restoration Project is fully funded at approximately \$67 million with the bulk of the funds being provided by the USDA-NRCS, Commonwealth of Massachusetts and NOAA. The FWS has provided \$2 million through the National Wetlands Conservation Act. The National Park Service is also contributing funding and providing significant in-kind contributions. Project construction is set to begin in March 2023 and will last approximately 2 years.

**Key words:** agriculture, aquatic environments, coastal restoration, contaminants, cultural resources, dams, endangered species, estuarine environments, farms and farming, grasslands, habitat restoration, partnerships, rare species, restoration, rivers and streams, wetland restoration