

**Dominion Energy, Diadromous Fish Restoration Technical Advisory Committee (DFRTAC)  
American Eel Working Group  
5 May 2020**

Conference Call Scheduled from 0900-1100

**Present (Conference Call Attendees):** Taylor Allen (Dominion Energy), Corey Chamberlain (Dominion Energy), Twyla Cheatwood (NMFS), John Ellis (USFWS), Caleb Gaston (Dominion Energy), Bob Graham (Dominion Energy, retired), Justin Krebs (AKRF), Wilson Laney (USFWS retired and NCSU), Kevin Mack (NMFS), Chris Manhard (AKRF), Jeremy McCargo (NCWRC), Dan Michaelson (VADGIF), Doug Newcomb (USFWS), Fritz Rohde (NMFS), Scott Smith (VADGIF), Peter Sturke (Dominion Energy), John Swenarton (Dominion Energy), Carlos Lozano (AKRF)

**9:08 a.m.** Peter convened the call and named all of those on the call. Twyla thought we were going to be on Skype but there were some technical issues, so we are just using the phone.

Pete reviewed the agenda. He noted that for the spring meeting, we usually have an eelway tour, but we can't do that right now due to social distancing requirements. He noted that we can perhaps complete our business during this morning session and cancel the afternoon one. He noted that he had sent the study plans out for review, so perhaps we can spend some time on those at the end of the call. He asked if anyone had any objections to trying to finish and then completing the study plan reviews via e-mail. Wilson and other DFRTAC members liked that idea.

Peter indicated we would try to squeeze the agenda into the two morning hours today. He thanked Taylor for putting together the effectiveness plan.

Wilson noted that he is still working on the American Eel Climate Vulnerability Assessment (CVA) for the National Marine Fisheries Service (NMFS), SE Fishery Science Center (SEFSC), and also the Habitat Areas of Particular Concern (HAPC; now know as Fish Habitats of Concern or FHOCS) document for the Atlantic States Marine Fisheries Commission (ASMFC).

**Downstream Passage – Eel Population and Movement Study**

It is hard to believe it has been almost a year since this work began. We reviewed the presentation provided with Justin providing the commentary. These data will also be provided via a report in June.

Monthly trap sampling was conducted October 2019 through April 2020. May sampling is scheduled soon. The goal of the monthly trap survey is twofold: determine spatial patterns of distribution and habitat use by eels; and collect data to develop an independent estimate of eel size structure and population abundance. The pot/trap sampling is stratified by habitat types. The hope is to capture and tag eels to generate a population estimate. The second component of the study is acoustic tagging and telemetry. They have deployed five receivers thus far, and there are six receivers downstream of Roanoke Rapids Dam bringing the total to 11 receivers for the study. They tagged thirteen eels and released them into Johnson Pond. They hope to get some insight on what the migration cues are, from these released eels.

The monthly eel trap survey was reviewed. They had low catches during the first three months. They reevaluated the design. They expanded the sampling into the shallow submerged aquatic vegetation (SAV) areas of the reservoir, and also into the Gaston Channel Zone (see map provided). They increased the number of samples. They only captured nine eels. They saw none in Nov-Dec. They got one in February. They got five in April and are optimistic that as the water warms, trap catches will increase over the next couple of months. The red dots are where eels were captured. They have collected other

species as well. They noted dips in abundance during the cold months. The number of other fish species has increased.

Wilson asked if trap predation is a concern. They don't think it is. Most of the fish captured are centrarchids, or small catfish. The trap mesh size is a half-inch. So, consensus is that we don't think predation by other fishes on American Eels, within the traps, is an issue.

Peter noted that the mesh size in the traps is designed to capture yellow or silver eels only. Bob noted that the traps they used below the dam were three-eighths inch, so smaller mesh.

Bob was asked if he thought the half-inch mesh was sufficient to allow smaller eels to escape. Yes, he does.

Wilson noted that it sounds as though there is no concern, since any small eels that were likely most subject to trap predation will be able to escape.

John Swenarton felt that keeping track of the bycatch is important. They do a lobster survey at Millstone, and they do keep track of the bycatch. He felt if eel numbers do increase, then bycatch could be a factor.

We discussed whether or not to try to document the bycatch. It was noted that it takes a good bit of time to work up the entire catch of the other non-target species. Wilson suggested that perhaps doing species counts and measuring only the minimum and maximum size of the other species encountered, would provide the information desired with a minimum of effort. Bob noted that the effort required to fully document the bycatch is time-consuming. He thought that bait quantity and quality is a far more important variable.

John Swenarton noted that their soak times for their lobster sampling were up to four days. Bob suggested that they do some limited sampling.

Peter thought that the bullheads or catfish would be the most likely predators.

John liked that idea.

Peter suggested that we just measure some of the bullheads, before they throw them back in the water.

Bob suggested that we also might want to know what the smallest eel is that can pass through the mesh. That would give us some idea of what the retention size of eels for the traps is.

Wilson noted that we will know the eel length-frequency anyway, from the trap catches.

Peter noted that the mesh size is based on the NCWRC recommendations for letting smaller eels escape.

The red dot traps caught at least one eel. There were two in the Deep Creek trap. One of the other ones also had two. There were several traps in the central portion of the lake that all caught eels. Most of the traps that caught eels are close to the shoreline. Only one offshore trap in the deeper stratum caught an eel. They caught eels in three of the seven months, in the central area.

Peter noted that we had talked about the eel releases at Fifth Street and whether they made it to the north side of the lake. The answer is yes, they are, given the captures on that side of the lake. Justin noted that they appear to be pretty well-distributed throughout the lake. They collected eels in rip-rap habitat, and in the SAV area. Dense vegetation did inhibit sampling using traps.

They tagged 13 eels initially and released all of those back in Johnson Pond. They were released in mid-October. One receiver was put in Johnson Pond, two at the mouth of Deep Creek, and two in the reservoir. These are RKE 1-6 and supplement the ones downstream. Three more will be deployed later this summer. The receiver in Johnson Pond is intended to detect when eels leave the pond. Eels could still be in the pond, behind a corner and/or behind a stump, and not be detected. They therefore could be missed, but the hope is that if an animal is not heard for a long period of time, it has left the lake. Placement of Deep Creek 1 and 2 receivers is such that they don't overlap in terms of detection radius. They have detected eels leaving at either 1, or 2, or both of them. They feel good about the placement of those. They haven't had many detections on the Roanoke Rapids West Receivers, which is to be expected if eels are moving out. They have 17 tags to deploy this coming September.

Pete noted that when the lake got pretty nautical, they lost a buoy from one of the receivers. The receivers have an internal tag, so they should be able to locate it and download the data. Pete noted that the batteries should last until December, so they should be able to take advantage of shallower lake conditions. Justin noted it has a horizontal line on it, so they should be able to grapple it successfully.

#### *American Eel Movement*

Justin noted that ten of the eels have moved out of the pond. He noted that three of them left fairly shortly after being tagged, which might have been a tagging response. One of the three moved out of the lake and downstream of the Roanoke Rapids Dam. Two left about a month later, November 22 and 24. They were later detected in Deep Creek, along with a third eel which had left November 14. All three of those were later detected downstream of the dam. Things seemed to speed up in December and January. Some eels were detected at the mouth of Deep Creek. Two of them left Johnson Pond, were detected at the mouth of Deep Creek, then later were detected downstream of the dam. Wilson asked if we could say with certainty say that the eels that are being detected downstream are still alive and well? Justin indicated that the ones detected were detected at the two most downstream receivers. There is a lot of turbulence, so that is why the eels may not have been detected further upstream below the dam. Peter noted another factor is that all of the water was going through the bypass at the time, so that makes it noisier, but also opens up a migratory pathway for the eels. Also, RKE 5 and 6 are anchored on opposite sides of the river, to form a "gate" and increase the likelihood of detection.

Bob asked, if there was an outage during the entire period, we wouldn't expect them to be picked up at the receivers in the tailrace, since no water was being released via the turbines. Pete noted that is correct. Bob noted that RKE 4 only covers one channel of the Bypass Reach. Bob noted that it isn't surprising to him that the eels were only detected at receivers 5 and 6 downstream.

Wilson asked if there was any indication of "silvering" at all on the eels they trapped. Pete noted that it was hard to tell. Some of the eels did appear to have larger eyes, but otherwise were not showing other obvious signs of silvering.

Pete noted that all of the downstream detections were in a uni-directional mode. None were detected at 6 and then 5. All were detected at 5 then 6.

Justin asked about the data downloads from the downstream receivers. Jeremy was not sure what the NCDMF download schedule was. He noted that there are no new tagged American Shad out there. There may be some tagged sturgeon out there.

Pete noted that the NCDMF receiver below Weldon would be the first one downstream.

Wilson noted that the permit for the Atlantic Sturgeon work was issued. Jeremy noted that they did get the Section 6 funding for the sturgeon work, and will be working in the Roanoke, Chowan and Cape Fear rivers, starting this fall.

Justin noted that ten of the thirteen eels tagged, moved out of Johnson Pond. Six of them moved out of the study area. Four of them are still in the lake, and have the shorter duration tags, so we may not detect them this fall. One had a long duration tag. Three of the eels are still in Johnson Pond as far as we know. Three of them were detected in early to mid-March. The one named "Justin" was ironically last detected on the day of release, in October. The other two had long-duration tags and should be detectable during migration.

Pete noted that the longer duration tags should last until April 2022. The shorter ones have 12.5-month duration. So, unless it is an early migration, we may miss it.

Justin noted that we should check any captured eels for existing tags. Pete noted that all of them got a PIT tag as well, so we should be able to detect those.

Justin noted we do have a good sample size, in comparison to other studies done. If we put out the rest of the tags, we should have a really good sample size. They modeled the eel movement, using GLM, and looked at environmental covariates. He reviewed the variables they used. Movement was more likely to occur at night, from Johnson Pond. Justin explained the model results in the table on the slide. Rainfall, day/night, and lunar phase were significant factors for movement from Johnson Pond. From Deep Creek into the lake, the same factors were significant. Looking at movement from the lake through the dam, there were no significant covariates, but the intercept was significant. They think the eels' movements were triggered between the two detections above and below the dam. Once they get the three additional receivers out this year, we should know better when they leave the lake. Justin noted that is the summary from the past year. He asked if there was anything else we need to discuss.

Wilson noted that was a good report.

Pete noted he will be really excited to get those east receivers out; hopefully we will be fortunate and get more eels out there this year. He asked Taylor to get his surgeon face on again.

Justin noted that Chris had pointed out that even though we have only ten eels, the effects are significant enough that we should expect that to continue. Also, day/night, and precipitation and lunar phase, all have been shown as significant in other studies as well, so that is encouraging.

Pete said if anyone has an "aha" moment later to please chime in.

He noted that Tom and Carl aren't on the call, but thanks to them for handling the eel pot sampling. Pete noted that they are collecting depth data during deployment, and surface and bottom DO data. Doug Newcomb has those data, and they are working to get the lake level during those days as well. Doug noted that the depth data he has now in his model, come from the quadrangle sheets. So, what he is getting from Dominion is as good or better than what he is getting from the quad sheets. Pete noted that they should be able to give Doug depth data within a foot of actual.

Bob noted he would like to second the good work by AKRF and also the Dominion guys who are doing all the field work.

Taylor noted that he and Pete did this for the first few months and checking all of those pots is a lot of work.

Pete noted that he appreciates the walk-through of the statistical analysis. Justin noted that Chris did all of that work.

#### **Downstream Passage - Fish Friendly Turbine Update**

Pete covered the fish-friendly turbine update. They are working with EPRI, doing a market analysis, to see what sort of turbines are available. They need one that would work at Roanoke Rapids Dam, and also would meet the biological performance necessary at the project. EPRI is working with R2 to look at the screening criteria. They have talked to Alden about their turbine, but they are staying as unbiased as they can, with EPRI, so as not to influence the results. Pete noted that Alden had previously done the desktop turbine mortality review. They used eel lengths ranging from 400-1000 mm in the work that has been done so far, with the eel pots and electrofishing, they wanted to make sure that 400-1000 was an appropriate length range. So far, it has been rare to get an eel above 600 mm. He suggested that keeping it at 400-1000mm was more conservative.

Wilson asked if it was possible to do a "sensitivity" run, with both ranges, and see what that does to the model results?

Pete thinks that may be feasible. He noted that Paul Jacobsen of EPRI had noted that we are in the early stages of upstream passage, so the system may not yet have the capacity to produce eels of a larger size. Wilson agreed that was a good approach. In the meantime, they could do the sensitivity runs to see what happens to the model results.

Pete noted that if they do eliminate the 1000-mm lengths, the survival estimates increase. He wondered if NCDMF has any length-frequency data for any of the commercial fishery. Fritz said that NCDMF does not have any length-frequency data. Wilson noted that we can look at the Hightower study of the White Oak River [Hightower and Nesnow, 2006, Southeastern Naturalist], and also the Paul Rudershausen study [Rudershausen et al. 2019, Transactions of the American Fisheries Society]. Wilson noted that we can also ask ASMFC for the length-frequency data they have that were used in the most recent stock assessment.

Pete noted that the EPRI study is ongoing. The other portion of the analysis is that they have Alden working closely with Voith, to look at detailed engineering drawings to determine whether the Alden turbine specifically, is feasible. A second ask would be to determine the power generating efficiency. They don't want to replace the generators at the station, they just want to replace the runners. Pete asked for questions.

Wilson noted that update sounds great. He asked if Dominion needed the NMFS and USFWS fishway engineers to provide any input. If so, staff of those agencies could seek review by their engineers.

Pete noted that they will let NMFS and USFWS know when a fishway engineer review would be appropriate at some point. Pete noted if they figure out that a fish-friendly turbine is feasible, they will definitely work with the fishway engineers to determine how a solution will fit. Pete noted the USDOE is also looking into fish-friendly passage.

Wilson asked if the turbines are more friendly for all species of fish, and not just eels? He noted that in the future, should the agencies decided that upstream passage becomes appropriate and feasible, we may want to be discussing safe downstream passage of American Shad as well. Pete agreed that was the case. Wilson noted that the state agencies (both NC and VA) would no doubt also be interested in the passage of other species as well.

Pete asked if anyone needed a break. No one did, so we kept going.

### **Upstream passage at Rapids and Gaston**

Pete gave us a status update on the Roanoke Rapids eelways (Figures 1 and 2). The Roanoke Rapids Dam North Eelway was damaged early in 2020. They finally got access to the area to repair it, but that is when the coronavirus hit, and the contractor couldn't repair it due to social distancing rules in place at the time. Since then, restrictions have loosened, and the contractors were able to finish the repair last Wednesday. They put a cage around the access ladder and repaired the attraction flow piping. So those have been up and going since last Wednesday. They caught four eels initially, but then yesterday got 30-40. The South Eelway has been functional. They have gotten 590 thus far for the year, which is low, but they anticipate an increase in the next few weeks. Another complicating factor is that for the South Eelway, the Skimmer Gate is broken and in need of repair. It is not functional so hasn't been releasing water through that gate, and that provides a lot of flow, so that may be why the south catches are down a bit. They are working to repair it. The station is stuck in skeleton crew mode, due to the coronavirus need for social distancing.

Corey noted that the skimmer gate is original to the dam. There have been several failures of the gearing system that raises and lowers the gate. They have determined that they need to totally rebuild the structure, because the gearing there is not able to handle the need for frequent flow adjustments. The stresses on the gear system are more than the original design, so they are going to redesign the system. They decided to do the redesign rather than spend money on temporary repairs, so the gate is non-functional at this point.

Pete thanked Corey for providing the Skimmer Gate details. He noted that the water temperature at the eelways is 17 C right now, so that is usually when the catches begin to increase. He hoped that Twyla and Kevin were finding similar levels as significant in their analysis of the eel capture data. Pete thought that the largest catches were around 19 C.

Pete moved to Gaston upstream passage and noted that we may be moving toward the McCargo projection of 2,700 eels (Jeremy's predictions with respect to the number passed). There was an issue with the pump early on. So far, they have captured 486 eels. The PIT tagging machine had broken down, so the manufacturer provided a loaner machine. They have had no mortalities. They also got approval to use AQUI-S 20E to sedate the eels again this year. Pete noted that the graph he provided is just for the Gaston South Trap, since the Gaston North Trap is not there.

### **Gaston Eelways and Construction and Design Schedule**

With respect to the Gaston permanent Eelways construction, Pete noted that there were a lot of internal discussions due to the coronavirus, about which capital projects would move forward as priorities. He explained that Dominion borrows funds for construction, and the eelways were on the chopping block for being delayed, and they relayed the information to management about the regulatory requirement, so everything is moving forward with an October 1 target date for operation. They are working on permitting for the construction, since they need a roadway on the north side, for access. There is a minimal wetland impact on that road, so they are working with the Corps of Engineers on that permit. He asked Corey if he wanted to provide any other details.

Corey noted they were hoping that their Shoreline Manager, Will Miller, could authorize the activity, but the wetland impact caused it to exceed his authority. They have to deal with two different Corps of Engineers representatives, one for Halifax County and another for Northhampton. Their environmental folks are working on getting the Corps field staff out to the site.

Pete noted that Kleinschmidt is working on an operational manual for all the Dominion eelways at Gaston-Roanoke. FERC accepted all the plans for the new eelways. Submittal of the final drawings will happen within 30 days of completion of the facilities.

Pete asked for any questions. There were no questions.

### **Effectiveness Studies; Dr. Nick Walker Request for DFRTAC Membership**

Pete noted that the only other things we were going to discuss were the effectiveness studies and those need to be submitted to FERC in June so they can begin the studies in October. They will have to address the duration. The other thing he had sent was Nick Walker's request for participation in the eel working group. Everyone can look at that, at their leisure.

We will target the next meeting for the September/October time frame. Pete noted that he would like for that to be in-person, but we will cross that bridge when we get there, depending on the status of the coronavirus and the need to maintain social distancing. Some people have expressed an interest in attending the next eel tagging event in the fall, so they should be able to accommodate that participation. They are shooting for August 31 through September 4 as the tagging window. Bob asked if they would get the additional eels from Johnson Pond. Pete indicated that is the plan. He shared the schedule. He thought that perhaps two surgeries could be done concurrently, to speed things up. Matt Fisher and Taylor Allen hopefully would both be available. They need to be active with the sutures for the eels pretty quickly, since they recover quickly.

Bob noted that Justin could speak to this, but they appeared to have very good success with the eel surgeries, with no dropped tags, or mortalities. Justin confirmed that was the case.

Pete noted that the first year had worked really well.

Justin noted that there were a lot of empty traps. Wilson noted that zeros are valid data as well, in terms of providing good habitat distribution data. We need to know where the eels aren't, as well as where they are.

Wilson noted that based on his last conversation with Kirby Rootes-Murdy, the ASMFC does still have an interest in hosting a workshop on American Eels, for the entire range of the species, so we should keep

that in mind. Also, work on American Eels continues in PR and Gus Engman and Tom Kwak are working on a book on PR fishes, which will include American Eels.

Carlos mentioned that Eeltown.org is hosting a meeting this coming Saturday.

Pete noted that EPRI has expanded their group to include European Eel investigators as well, and a lot of their rivers and drainages that are smaller than ours. They are having issues with BREXIT, because of eels being moved from the UK into EU countries. They are working on a lot of this over there, and since European Eels are critically endangered, they are really pushing hard to develop solutions. Dominion is still a member of that group so they should be getting a newsletter soon.

Carlos from AKRF noted that they were able to attend another EPRI webinar, on passage technologies, and did get to see some new technologies. They saw a floating upstream collection device. They also saw a presentation on a zigzag bypass design.

Pete hopes that Alden will include that design as part of their study.

Pete noted that Bob and Twyla had both mentioned involvement with the American Fisheries Society Southern Division meeting next year, so there may be a session on eels at that meeting. Bob noted that meeting will be held in Northern Virginia, so he is working on that session. Twyla noted that she and Kevin would like to be involved in that one. That will be in 2021. Wilson noted that Dr. Tom Kwak (NCSU, USGS Cooperative Fish and Wildlife Research Unit Leader) is now the President of the AFS Southern Division. We hope that things will be freed up enough by then so that we can all attend. Wilson wondered about having a DFRTAC face mask design created for future use.

Pete noted that was all that he had in the way of an agenda.

Action Items:

- AEWG members provide feedback on the study plans that were sent out for review via e-mail. The two reports are for Upstream Passage at Gaston Dam. 1) Upstream Effectiveness and 2) Upstream Distribution.

Pete indicated he would pester us as needed for provision of comments.

We will meet tomorrow morning at 9:00 a.m. for the American Shad Work Group meeting. The meeting adjourned at 11:00 a.m.