MEETING NOTES
Stevens Creek Hydroelectric Project (FERC No. 2535)

Dominion Energy South Carolina, Inc.
Fish Passage Technical Working Committee

September 19, 2024

Draft JAG 9/27/24

ATTENDEES[1]*:*

Amy Bresnahan – DESC
Caleb Gaston – DESC
Marc McKenna – DESC
Audrey Bauhan – Dominion Energy
Fritz Hoogakker – Dominion Energy
Paul Vidonic – Dominion Energy
Taylor Allen – Dominion Energy
Alison Jakupca – Kleinschmidt
Jenn Güt – Kleinschmidt
Jesse Waldrip – Kleinschmidt
Will Pruitt – Kleinschmidt
Andy Herndon[a] – NMFS
Bjorn Lake[a] – NMFS
Fritz Rohde[a] – NMFS
Kevin Mack – NMFS
Pace Wilber – NMFS
Eric Bauer[a] – USFWS
Melanie Olds – USFWS
Aaron Gray – GAWRD
Bryant Bowen[a] – GAWRD
Bill Post – SCDNR
Elizabeth Miller – SCDNR
Ellen Waldrop[a] – SCDNR
Jason Bettinger[a] – SCDNR
Paula Marcinek[a,b]

[a] attended virtually
[b] outside expert as outlined in the FPTWC Rules of Operation

Not in Attendance: USFS

These notes are a summary of the major points presented during the meeting and are not intended to be a transcript or analysis of the meeting.

The purpose of the meeting was to review the process and planning/siting study development of fish passage for the Stevens Creek Hydroelectric Project (Project).

Alison, Kleinschmidt, welcomed the meeting attendees and led introductions of the Fish Passage Technical Working Committee (FPTWC, group, or committee). Amy, DESC, provided relevant information about the meeting building to in-person attendees. She then led a

[1] Acronyms: DESC = Dominion Energy South Carolina; NMFS = National Marine Fisheries Service; GAWRD = Georgia Wildlife Resources Division; SCDNR = South Carolina Department of Natural Resources; USFS = United States Forest Service; USFWS = United States Fish and Wildlife Service

safety moment about the hurricane season and to familiarize yourself with storm surge and inland flooding and to plan accordingly.

Alison informed the FPTWC, if they were not already aware, that FERC[2] issued Scoping Document 2 for the Project, which included an updated processing schedule that moved the issuance of FERC's Ready for Environmental Analysis (REA) Notice to February 2025; the REA Notice was originally scheduled to be issued in August 2024 in Scoping Document 1. The delay of the REA Notice provides more time for the FPTWC to consult on the Project's fish passage prescription (Rx) and Fish Passage Adaptive Management Plan (AMP) before the agencies (NMFS and USFWS) are prompted to provide the Project fish passage Rx with the issuance of the REA Notice.

The group discussed several aspects of fish passage at the Project throughout the meeting. The discussion summary below is presented by topic and not necessarily the sequence in which discussions took place.

NSBLD/ADD Update

Pace, NMFS, provided an updated on the fish passage Rx for the Augusta Diversion Dam (ADD)/Augusta Canal Project. The City of Augusta (the City) filed a request for a trial-type hearing. The initial hearing with the Administrative Law Judge was scheduled to occur the week of September 23, 2024, with an initial order coming by that Wednesday. Depending on the outcome of the initial order, there are various schedules for November and December, with the process concluded by mid-December 2024.[3] The Environmental Assessment (EA) for the Augusta Canal Project is more than ten years old, and FERC may be re-writing the EA; if that is the case, there will be a public comment period, and it may be some time before a license is issued for the Augusta Canal Project. For context, the license for the Santee-Cooper Hydroelectric Project was not issued until almost two years after NMFS issued the Biological Opinion.

There are no new updates as of the June 2024 meeting on fish passage at the New Savannah Bluff Lock and Dam (NSBLD). Paula asked NMFS if they had any information about the Water Resources Development Act (WRDA) amendment as it relates to the Savannah Harbor Expansion Project (SHEP) and fish passage at NSBLD. Pace supplied what information he knew of the WRDA amendment, which is a bill currently in the United States Senate (and potentially House of Representatives). One version of the WRDA amendment authorizes USACE[4] to conduct a feasibility study for deepening the harbor a second time. Pace added that there was a report published that strongly criticized USACE for delinquency, particularly

[2] FERC = Federal Energy Regulatory Commission

[3] Pace Wilber, NMFS, provided an update regarding the City's trial-type hearing via email dated September 27, 2024. In summary, the Administrative Law Judge dismissed all issues raised by the City and denied the City's motion to stay the proceeding.

[4] USACE = United States Army Corps of Engineers

in implementing measures associated with the SHEP (i.e., fish passage at NSBLD). A tracking system was mandated to be developed to track USACE's compliance with obligations.

American Eel Passage

Caleb, DESC, presented information to the FPTWC regarding an additional preliminary American Eel survey conducted by DESC biologists in August 2024. In summary, two observers searched the entire face of the dam from a boat at the toe of the dam between 2050 hours and 2150 hours. One eel was observed climbing on the face of the dam approximately 200 feet east of the navigation lock. The eel was approximately the same size as the ones collected during the April 2024 preliminary survey (between 134 to 260 millimeters). The water temperature was approximately 23ºC and generation slightly less than the previous survey. Caleb added that he would likely not be able to visually discern if eel were further than approximately 8 to 10 feet above the water line. Kevin, NMFS, asked how the leakage in the dam may compare to flow needed for an eel way or trap. Caleb responded that while he did not know the exact flow, it was enough to be an attractant. Caleb reviewed drawings to determine the angle of the dam/spillway slope, which was believed to be between 58 to 60 degrees; this is more than the 45 degrees prescribed for an eel ladder. Jenn, Kleinschmidt, reviewed the Project's recently filed Exhibit F, and the spillway slope is listed as "12:8".

Potential eel data that GAWRD and/or SCDNR may possess was discussed at the previous FPTWC meeting. Will, Kleinschmidt, provided an update on his ability to obtain relevant data. Data provided by GAWRD indicated that there are some eels above the Project dam and even some above the Thurmond Dam, although it is not a large population. SCDNR has collected less than ten eels above the Project dam in electrofishing efforts. Kevin, NMFS, asked if these surveys were specifically for eel. No, they were community sampling efforts. Will added that there is the potential to obtain University or hobbyist data, but there is a concern with reliability.

Amy asked if there was a particular season that eel surveys should be conducted. Bill, SCDNR, replied that spring is best (peak is between March and April), although there is also a fall pulse at the Roanoke Rapids Hydroelectric Project (Roanoke Rapids). Kevin added that it is a fairly large pulse of eel they think is associated with high flows.

Paula stated that she believes the FPTWC needed to concentrate on thinking about what is needed for the fish passage Rx and for the Project license, which could include filling in data gaps within other portions or relicensing such as water quality. Paula went on to add that she believes that DESC needs to expend effort in determining the flow coming over the Project dam and what is going on hydrologically between the Project dam and ADD. She noted several requests for more gaging downstream of the Project dam but understands it is a complex area to gage. However, Paula believes temporary gages are needed to look at

flow and thinks this is useful for determining passage location as well. Amy responded that DESC has consulted, and continues to consult with, USGS[5] regarding gaging downstream of the dam, but they still do not have the technology to accurately gage flow in that area. Paula asked if DESC requested one gage or a system. DESC only discussed a single gage with USGS. Paula believes multiple gages are needed to collect data on both sides of Stallings Island and could tie flow together to data downstream of the island. Fritz H., Dominion Energy, commented that in terms of an eel siting study, he does not believe that flow data would be beneficial; it is a matter of where fish actually are for siting studies, not where one thinks they will be. There was apparent agreement to this statement within the meeting room.

Based on the discussion thus far, Alison stated that it appeared that there was flexibility to develop siting and other studies under the Fish Passage AMP. She asked the group if they were open to Dominion Energy outlining some next steps for studies and present that at the next meeting for the committee to consider. Caleb noted that biologists recommended surveying in the spring and inquired if the temperature of the water released from Thurmond Dam could delay the peak eel migration; SCDNR believes that scenario is a possibility. Kevin responded that he believes a study plan under the AMP would be useful and suggested doing something similar to the April 2024 electrofishing effort and potentially target moonless nights.

Alison commented that some next steps in the fish passage process included determining which studies could and should be done pre-license issuance and post-license issuance. Paul, Dominion Energy, noted that one thing the group could start thinking about is what a temporary eel trap/ramp design would look like for the Project. It was suggested that a possibility is to also construct a mock-up of the dam with same aggregate and slope and observe how eels traverse the structure. Jesse, Kleinschmidt, added that eels are very adept at moving on all kinds of substrate. Fritz H. added that it was more a concern of slope than dam surface. Will, Kleinschmidt, spoke of his experience regarding surveying for eel at the Lloyd Shoals Hydroelectric Project; eels tend to hunker down during the day, and the survey team yielded more eels during their nighttime surveying effort than during the day. Fritz H. asked if there was any downstream monitoring that could provide a heads-up when a group of eels are headed upstream. No, there is not consistent downstream monitoring to inform such a case, but it was suggested to attempt to time the surveys after a high flow event. The group discussed potential sampling techniques, including energizing the face of the dam with parallel wires and utilizing an electrified net.

Melanie, USFWS, asked the group to consider the usefulness of investigating the Project dam as a means of eel passage. She does not believe that any study will prove that passage just over the dam itself is sufficient; she is leaning towards additional passage being warranted despite the ability of eel to traverse the Project dam. Fritz H. replied that knowing the baseline passage rates may influence what is prescribed at the Project.

[5] USGS = United States Geological Survey

Audrey, Dominion Energy, asked what the purpose of investigating passage at the Project dam is if data is showing there are not many eels above the dam. It was discussed that the upstream collection of eels was opportunistic data as they were not targeting eels. Taylor, Dominion Energy, added that it is notoriously difficult to catch eels in reservoirs. For example, Dominion Energy knows they passed two million eels at Roanoke Rapids but still had to deploy traps to find them. Elizabeth, SCDNR, suggested that a fyke net deployed upstream of the Project dam may be helpful, depending on where the net is located. Melanie stated that another thing to consider is that it is difficult to confirm numbers of fish, but with traps you can do that. Taylor added that there is the possibility of a scenario where 90 percent of the eel are passing via the Project dam, and they build a trap for only passing 10 percent of the eels.

Caleb asked the FPTWC what kind of information/data would be helpful in informing the agencies regarding developing the fish passage Rx for the Project. Kevin indicated that a spring sampling effort would be helpful to identify the locations of eel congregation. It was also suggested that a population study above and below the Project dam would be nice, but it is not a priority. Melanie is concerned with the timeline for a spring survey, with the potential date of February 2025 for the issuance of the REA Notice. Pace commented that there will be an opportunity to revise the Rx after FERC issues the Project EA. Fritz H. asked if there was enough flexibility in the Fish Passage AMP to pursue that route. Melanie commented that the USFWS's first Rx would include whether fish passage will be prescribed or not and an outline; the agency is going to be as flexible as they can be.

Caleb inquired of the committee that if Dominion Energy is catching and handling eels during these studies, if they wanted the eels to remain below the Project dam or be passed above the dam. Bill suggested that pit tags or coded wire could be inserted into the eels and then a trap study conducted above the Project dam in the headpond to see if any of the tagged fish make it above the dam. A pit array was not deemed necessary at this stage.

Jesse asked NMFS and USFWS if there was any consideration for a phased approach for the Rx since there is currently no passage at NSBLD or ADD. Kevin responded that the phased approach is the plan for Alosines but there is no such plan for eel passage. Jesse stated that the number of eels necessary for a robust siting study may not currently be below the Project dam and suggested the FPTWC could consider a certain level of effort and then do more as passage is implemented at downstream dams.

Elizabeth noted that there was previous discussion that there would not be a joint Rx between NMFS and USFWS and requested an update. The two agencies commented that they are in different timeframes, and they cannot seem to reconcile the different internal processes; however, they will do their best to coordinate internally.

The group continued their discussions on potential studies that could be conducted in the Project reservoir. Amy commented that USACE has no obligation for spawning or water level considerations below Thurmond Dam and it would likely be difficult to coordinate sampling with USACE. Fritz suggested conducting electrofishing when flows are optimal. There was some discussion about placing eel pots in Stevens Creek, but that circles back to needing a pit array, which could be lost in Stevens Creek within the spring high flows. Will wondered if a pit array on the crest of the dam would be a good option; it appeared to be a possibility worth exploring among the committee. Bill added that if Dominion Energy used coded wire to tag eels, they would not necessarily need to sample in spring but just when flows are down enough.

The discussion on American Eel concluded with the action item for Dominion Energy to begin to develop a concept/plan for an eel study in the spring of 2025. NMFS requested that they assist Dominion Energy with the eel study plan development.

Alosine Passage

Fritz H. gave an overview of his understanding of Alosine habitat in the Project area. He commented that the FPTWC is data poor in terms of habitat and fish community in the Stevens Creek system where agencies are stating is the ideal location for Alosines. Fritz H. reviewed the Agency Technical Draft of the Diadromous Fish Restoration Plan for the Middle Savannah River: Strategy and Implementation Schedule (2005) which NMFS and USFWS are using as evidence that good Alosine habitat exists in Stevens Creek, and believes the document is exploratory in nature. Fritz H. recognized that there are some issues in the system including water quality as well as additional barriers (i.e., mill dams), which may be causing sedimentation issues; we already know there is a dissolved oxygen (DO) issue in the creek. While Fritz H. acknowledges that Alosines will likely travel up Stevens Creek and try to spawn, a serious question remains if the eggs and juveniles will survive.

Fritz H. thinks it is also important to recognize the Flathead Catfish issue in the Savannah River. Flathead Catfish are a non-native species that have wreaked havoc on the Satilla River system, altering the ecological system. Fritz H. stated that Flatheads have been documented in the Savannah River downstream of the Project dam, and by implementing fish passage at the Project, that potentially opens the Stevens Creek system to be invaded by the species. In a follow-up comment via the Microsoft Teams chat, Bryant, GAWRD, stated that Flathead Catfish are already in the lower portion of the Savannah River and are not causing too many noticeable problems once they reach sinuosity; Flatheads are also in Clarks Hill/Thurmond Reservoir. Jason, SCDNR, expressed concern regarding the re-shuffling of communities because of Flathead Catfish. He is not certain of their presence in Stevens Creek but if they are passed upstream, they could negatively affect the native Bullhead Catfish which is a species of special conservation concern in SC[6].

[6] SC = South Carolina

Caleb raised the question about what information does the FPTWC not know that they need to know to develop an informed Rx. He added that Dominion Energy believes there is a habitat data gap, and they would like to perform an assessment to determine suitability for Alosines by performing habitat transects throughout the Stevens Creek basin. What data exists is outdated and not complete and they think the FPTWC needs to determine that it would in fact be a benefit to the fish to be able to pass over the Project dam. Bill noted that at Roanoke Rapids, fish passage was prescribed but determined as a group that fish passage was not needed; he asked what factors lead to that decision. The factors that lead to this decision were a high hatchery contribution coinciding with a decline in Roanoke River American Shad catch-per-unit-effort which created genetic diversity concerns for the population in the Roanoke River. The NCWRC[7] suspended stocking in 2018. The ASWG[8], a subgroup of the DFTRAC[9], decided to suspend trap and transport until it is determined that passage is warranted. Fritz H. replied that the determination was based on a study out of the Hightower lab that dealt with genetics. Fritz H. added that at least for now, there will still be slugs of low DO water from Thurmond Dam.

Fritz H. asked if Smallmouth Bass and/or Alabama Bass were present in the Savannah River system. Yes, below the Augusta Shoals. Fritz H. responded that the group may also need to consider the passage of Alabama Bass, in particular, as this species could negatively impact Bartram's Bass, which are located farther up Stevens Creek. Bill commented that if it was a matter of being able to identify the species and have the ability to prevent them from passing, there is technology (Fishheart) that has been recently shown successful in doing that. The technology has a low footprint and can be programmed to work automatically with staff in the facility area to ensure it remains operational.

Dominion Energy asked the FPTWC their opinion on a habitat suitability study. Kevin stated that NMFS is being informed by a document from 2005 (see above) and understands the desire for it to be updated. Kevin does not read the document as being speculative and NMFS is of the position that Stevens Creek is the target area for Alosines. There was some discussion on the type of data used to determine the habitat suitability of Stevens Creek (i.e., field or desktop analysis), but it was unknown. Kevin noted the Aquatic Habitat Whitepaper that was developed for the Project relicensing only focused on the Project boundary and not above it. Fritz H. stated that there is the scenario that the habitat is great in the upstream area but there is also a concern regarding sedimentation because of the mill dams. Kevin agreed that sedimentation was a concern. Eric, USFWS, provided a comment on the Microsoft Teams chat seconding Kevin and noting the effort in Stevens Creek for the 2005 Diadromous Restoration Plan was going on right after USFWS defined what suitable habit was for Robust Redhorse, but agrees that it would be great to have more information on

[7] NCWRC = North Carolina Wildlife Resources Commission
[8] ASWG = American Shad Working Group
[9] DFRTAC = Diadromous Fish Restoration Technical Advisory Committee

how much suitable spawning habitat for Robust Redhorse might be there. Eric added another comment on the Teams chat that he did not believe the determinations for Robust Redhorse habitat were based on anything above a mill dam. One of the mill dams is currently protecting Bartram's Bass and he is not sure that USFWS would want to remove that one; it is a complex problem that would need further study. In a follow up Teams comment, Eric noted that Price Mill Dam is the lowest mill dam on Stevens Creek, and Bartram's Bass have been collected between it and the next dam upstream; however, it appears that the most recent collections in the watershed were in 1999.

Will commented that there were a lot of mussel habitat studies conducted in the Turkey Creek sub-basin. Through discussions it was determined that the committee could talk with Keith Whalen with the USFS who is a member of the FPTWC but could not attend the meeting. Jason, SCDNR, commented that Mark Scott with SCDNR should have physical habitat data he could send; Jason was not sure what parameters were collected. Fritz H. noted that it appeared that a habitat suitability study would be useful and inform the Rx. Bryant provided a comment on the Teams chat stating that there are successfully reproducing populations of Alosines (land-locked Blueback Herring and Hickory Shad) in all three reservoirs above Thurmond Dam. Kevin asked what a habitat suitability study would entail. Fritz H. responded that they would collect habitat data across transects using the most up-do-date methodology.

Pace stated that NMFS filed comments on the FERC docket that identified Project operations as impacting water quality, and one thing NMFS wants the FPTWC to consider is how water quality conditions may change if operations changed. Fritz H. noted that it will be interesting and challenging to walk the line between operational changes and the Project's re-regulation function. Kevin commented that NMFS understands that the re-regulation function is essential for downstream resources.

Alison asked if the FPTWC felt that the USGS gage at Stevens Creek River Mile 4.5 where the DO is the lowest would be beneficial data for the committee. She believes that with fish passage many years ahead, it will be important for both the Water Quality Technical Working Committee and FPTWC to keep up to date on the data. Alison noted that there is the potential for the habitat in Stevens Creek to improve in the period between the Rx and implementation depending on other measures within the basin – USACE could improve water quality in Thurmond Reservoir upstream of the Project, nutrient input could be reduced, etc.

Bryant asked a question via the Teams chat about the availability of bathymetry data; GAWRD only has bathymetry downstream of NSBLD. USACE may have bathymetry data below Thurmond Dam, but it would be of the mainstem Savannah River. It does not appear that there is any bathymetry data of Stevens Creek itself or the area between the Project dam and ADD.

Fish Passage Options

Jesse provided a presentation on the upstream fish passage options at the Project. Based on the Project, he discussed there being three traditional options of fish passage for Alosines as well as potential experimental options. A nature-like fishway is a possibility using a natural channel. As for technical fishways, a vertical slot (pool-type) and lift are also options. The two experimental designs Jesse discussed were Fishheart and Whooshh.

Jesse presented some pictures of nature-like fishways and explained some advantages and disadvantages. Some advantages of a nature-like fishway are that it passes most species and life stages, provides both up- and downstream passage, and is a more natural solution. Some disadvantages are that a nature-like fishway has a large footprint and there are increased operations and maintenance (O&M) costs and effort; the O&M costs are very site-specific. Jesse noted a fishway that Kleinschmidt worked on in Maine, but there have not been many studies conducted yet to determine its effectiveness. Bill is interested in reviewing this data once it is collected and becomes available.

Jesse then provided some photographs of vertical slot fishways. Some advantages of a vertical slot fishway are that it passes multiple species well, is good for relatively week swimmers, the size can be adapted to accommodate large design populations, and there is less O&M effort/cost compared to other fishway types. Some disadvantages a vertical slot fishway have are that it requires more turbulent and higher velocity flow than other fishway types, has a large footprint, and is not effective for higher head sites. The head of the Project dam is 27 feet; a pool every 9 inches as is the current guidance would equate to a large footprint (approximately 36 pools).

Jesse discussed that fish lifts have several advantages including being good for skittish fish and large schools and passing multiple species well. Fish lifts have a small footprint, allow for sort and transport, and are adaptable to many sites and locations. Fish lifts currently have a proven record of effectiveness for passing American Shad on the East Coast. A couple of disadvantages of a fish lift is that it is mechanically complex and requires increased O&M effort and cost.

Pace asked if trap and transport was investigated as an option. Caleb replied that based on previous FPTWC meetings, the understanding was that volitional passage was the agencies' preference. However, current discussions indicate that connectivity may not be the best option. GAWRD's preference is that the FPTWC should be looking at volitional passage; GAWRD is not in favor of fishways that require constant O&M. NMFS requested that in addition to trap and transport, experimental passage be investigated as a possibility at the Project. Pace noted that the FPTWC should compare and contrast and ensure that the group does not exclude an option that may be relevant ten years from now, which is likely the

soonest that passage would be implemented at the Project. Fritz H. added that on the same note, it is also important to remain open to the possibility that a fish passage structure is not the right thing for the system.

Jesse discussed potential locations of fish passage facilities at the Project. Along the GA[10] side of the river, there is room along the shoreline for a fish passage facility of some sort, but likely only a fish lift; there is likely not room for a large nature-like fishway or vertical slot (actual feasibility calculations have not been done yet). Paul asked if the Fishheart system would fit along the GA side. Yes, as it is a floating system. Fishheart includes a submerged pipe with water coming out as attraction flow. Fish swim in the pipe, and if the system identifies the fish as one to be passed, the gates close, and the system flushes the fish out using water. If a species comes in the pipe the system has not identified to pass, it flushes the fish out the back side of the pipe. Jesse explained that Fishheart is not a proven technology, but they do have proof of concept. Whoosshh is a similar design as Fishheart but uses air to flush fish rather than water. The technology could still be considered but it did not do a great job of proving concept at its most recent demonstration. Neither experimental passage (Fishheart or Whooshh) or trap and transport is considered volitional according to NMFS; Fishheart and Whooshh also do not address downstream passage.

Jesse explained that there are unused bays in the Project powerhouse that could be considered for a fishway, although likely not a nature-like fishway in that location. There is probably room for a vertical slot in the area of unused bays and definitely room for a fish lift. The concern with a fishway in this location is that if fish are passed volitionally, they will be put right back into the headpond right in front of the forebay so they could go back over the Project dam if it is spilling or through the turbines.

The Project navigation lock is a potential location for a fishway, but similar to the unused bays, the navigation lock would likely not work for a nature-like fishway. There is room for a fish lift or a vertical slot, but it would be difficult to make the entrance to the fishway since the navigation lock extends downstream. However, there is the option to extend the entrance from the lock and go around.

The corner of the navigation lock is also a potential location for a fish passage structure, but not a nature-like fishway, with the caveats of challenges with access, debris, and spill capacity. There is room for all four types of fishways on the SC side of the Project dam; however, of significant note is property and access issues. Access to DESC's property on the SC side of the Project dam is through private property. DESC does have permission to traverse the private property for dam maintenance, but for the large anchoring project recently undertaken, everything was accessed via water. Jesse concluded that the O&M cost for a fishway on the SC side of the Project dam would be an enormous challenge.

[10] GA = Georgia

Melanie suggested that the FPTWC also consider the life of a fishway; for example, fish lifts have a much shorter life span and must be over-hauled sooner compared to a nature-like fishway.

Bill commented that the SC side of the Project dam is probably the least desirable location for passage because of the flow coming out of the turbines and the channel depth on the west side of Stallings Island; he suggested focusing on the GA side of the Project. It was noted that the Project tailrace is a hydraulically dynamic area.

Alosine Studies

The FPTWC discussed potential studies to inform Alosine fish passage at the Project. The group discussed that while eel studies could likely be conducted soon, Alosine studies will likely wait until post-issuance of the Project license.

Jesse noted that by assessing spawning habitat, the committee could also the answer the question of what the design population is for any proposed fishway. He agreed it is important to gather information on upstream habitat, but that one of the first things in a conceptual stage of a fishway is to figure out the design population, which will directly influence how big the pools are to be in the case of a vertical slot and how big the entrance should be. Jesse also commented that in any fishway the design must also consider that non-target fish will enter it, and if those non-target fish include large populations, they can clog up the fishway; so, non-target species are also to be considered in the design population of a fishway.

Paul noted that the FPTWC could divide the studies into two categories: 1) studies before passage is implemented downstream; and 2) studies after passage downstream is implemented. Characterizing the spawning habitat both up- and downstream of the Project dam could be done sooner before passage is implemented at NSBLD and ADD.

Tracking studies are more geared towards after passage is implemented at ADD. The group could consider collecting fish downstream below NSBLD and bringing them up, but American Shad are notoriously finicky fish to tag and often change behavior, with lots of fall back and mortality. Jesse wondered if there was a pseudo species to use in place of American Shad. Fritz R., NMFS, stated that a similar tracking study as what was done at Roanoke Rapids may work for the Project. The fish could be collected, held in pens overnight to acclimate, and released at the proposed fishway at ADD. It was suggested that only collecting male shad would not hurt the population. However, a consideration is operational changes, which NMFS appears to be considering. If flows are adjusted and results are obtained before that, then the effort was for nothing.

Bill believes that the habitat question is the most important; if there is not suitable habitat, there is no point in passing fish. Caleb inquired if downstream habitat characterization should be something that the City should be doing since that area is in the ADD FERC boundary. Kevin responded that the concentration of habitat suitability should be upstream of the Project dam; there is only one mile of habitat between the Project and ADD and not the priority habitat. Caleb believed that a habitat suitability assessment would involve investigating the habitat in the Augusta Shoals to determine if the habitat in Stevens Creek is any better. Caleb asked NMFS if the City will be required to survey the habitat upstream of ADD. NMFS replied that the requirement was not in their Rx. There will not be a condition in the Project's Rx to survey habitat outside of the Project boundary. Caleb believes the perceived value in assessing the Augusta Shoals area is to be able to compare it to habitat in Stevens Creek to ensure the committee is not doing Alosines a disservice by passing them upstream. Kevin believes that the group will have more clarity on the City's actions related to fish passage once the trial-type hearing is concluded. Kevin again emphasized that he believes habitat upstream of the Project dam is more important to assess.

The group discussed headpond bathymetry and ADCP[11] studies. Headbond bathymetry is associated with tracking and where the fish are going. Bathymetry data is also useful for fishway design once the location of the fishway has been determined. Jesse explained that in his experience as a consultant, he is often brought in after a Rx is issued and the client has not always had the opportunity to conduct tracking studies. A feasibility study could be done right now to determine location of a fishway based on construction, access, etc., but if fish are not showing up there, it was a waste of a study. Bjorn, NMFS, commented that we will soon have clarity with the City but NMFS is not in control of the REA Notice and they do not want to waste time. Bjorn agreed that collecting data before the fishway design will protect DESC's investment; the FPTWC can get the needed information and decide on a fishway that will actually work. Bjorn agreed that it is key to know the fish's behavior as they approach the Project dam. Alison summarized that a key piece of vital information needed to help determine studies is the outcome of the City's trial-type hearing, which should be finalized within 2024.

The FPTWC decided to hold off discussion on Rx timing.

New Information Clause

Will provided a draft of a new information clause that was developed using recent fish passage Rx in the area as a guide; however, the presented clause was determined to be hard to follow and not ideal. Melanie and the USFWS are attempting to write a Rx to be as flexible as possible and are open to adding language regarding new information; they may be the ones to develop it. USFWS has attempted to exercise their reservation of authority to Rx a fish passage in the past without much success. The group discussed that the Rx would be

[11] ADCP = Acoustic Doppler Current Profiler

issued with the Project license but if something in the future determines a different approach is needed, DESC could pursue a non-capacity license amendment. There is a risk with a non-capacity amendment as there will be an opportunity for public comment. FERC is usually good about sticking to the issue within non-capacity amendments (fish passage, in this case). The group could review the comments that come in regarding the fish passage Rx and DESC could decide at that time if they are comfortable with the non-capacity amendment approach.

The next FPTWC meeting was scheduled for Wednesday, December 4, 2024 at the Dominion Energy facility in North Charleston, SC.

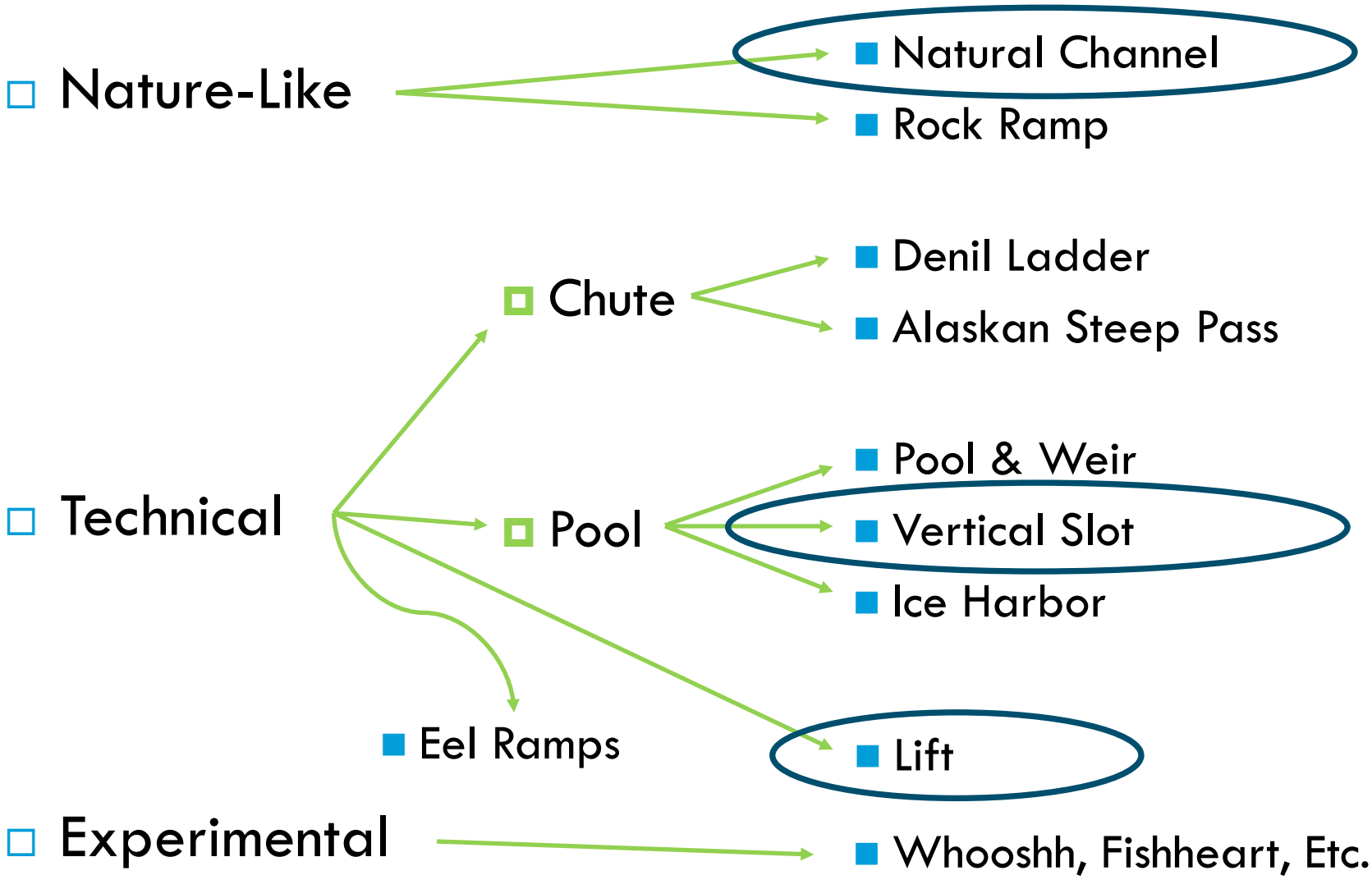
ACTION ITEMS:

- DESC to develop American Eel study plan in consultation with NMFS. The study effort will be conducted in spring 2025 and could potentially include tagging eel with coded wire and/or concurrent sampling in the headpond to see if eels pass.
- DESC to further investigate Alosine habitat suitability in Stevens Creek, including contacting SCDNR for data.

STEVENS CREEK FISH PASSAGE TWC MEETING

September 19, 2024

Upstream Passage Family Tree



Nature-Like Fishway

Nature-Like Fishway

Shikellamy

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Aerial image courtesy of KC Construction

100 ft

North

Nature-Like Fishway

Advantages

- Passes most all species and life stages
- Provides upstream and downstream passage
- More natural solution

Disadvantages

- Large footprint
- Increased O&M effort/cost?

Vertical Slot Fishway

Vertical Slot Fishway

Advantages

- Passes multiple species well
- Good for relatively weak swimmers
- Size can be adapted to accommodate large design populations
- Less O&M effort/cost than other fishway types

Disadvantages

- More turbulent and higher velocity flow than other fishway types
- Large Footprint
- Not effective for higher head sites

Fish Lift

Fish Lift

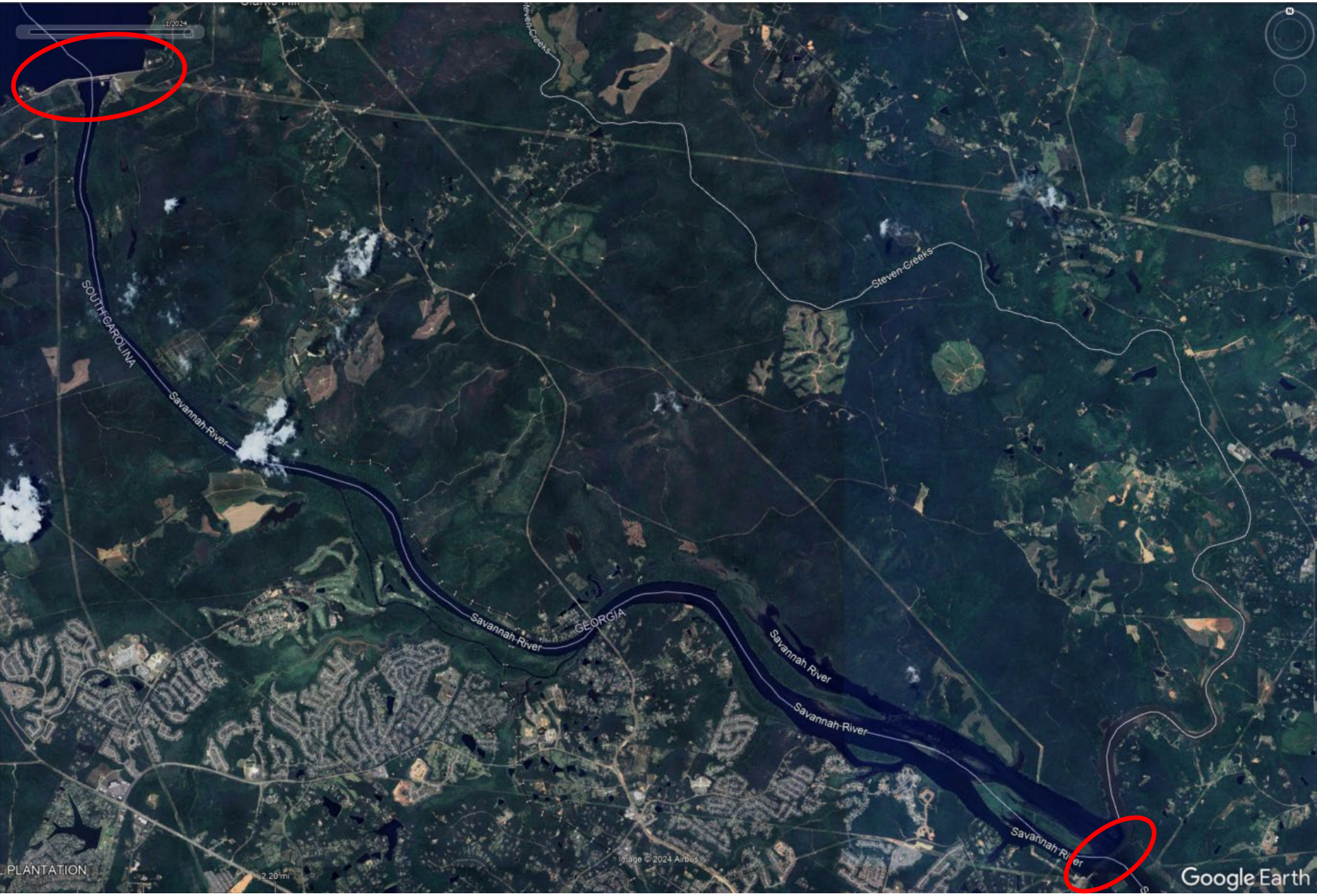
Advantages

- Large flumes with low velocity and low turbulence
- Good for weak swimmers, skittish fish, and large schools
- Passes multiple species well
- Small footprint
- Allows for sort and transport
- Adaptable to many sites and locations
- Currently has proven record for effective American shad passage on the East Coast

Disadvantages

- Mechanically complex
- Increased O&M effort/cost

Stevens Creek


SOUTH CAROLINA
Savannah River
Savannah River
GEORGIA
Savannah River
Savannah River
Savannah River
Steven Creeks
Steven Creeks
PLANTATION
Image © 2024 Airbus
Google Earth

Stevens Creek

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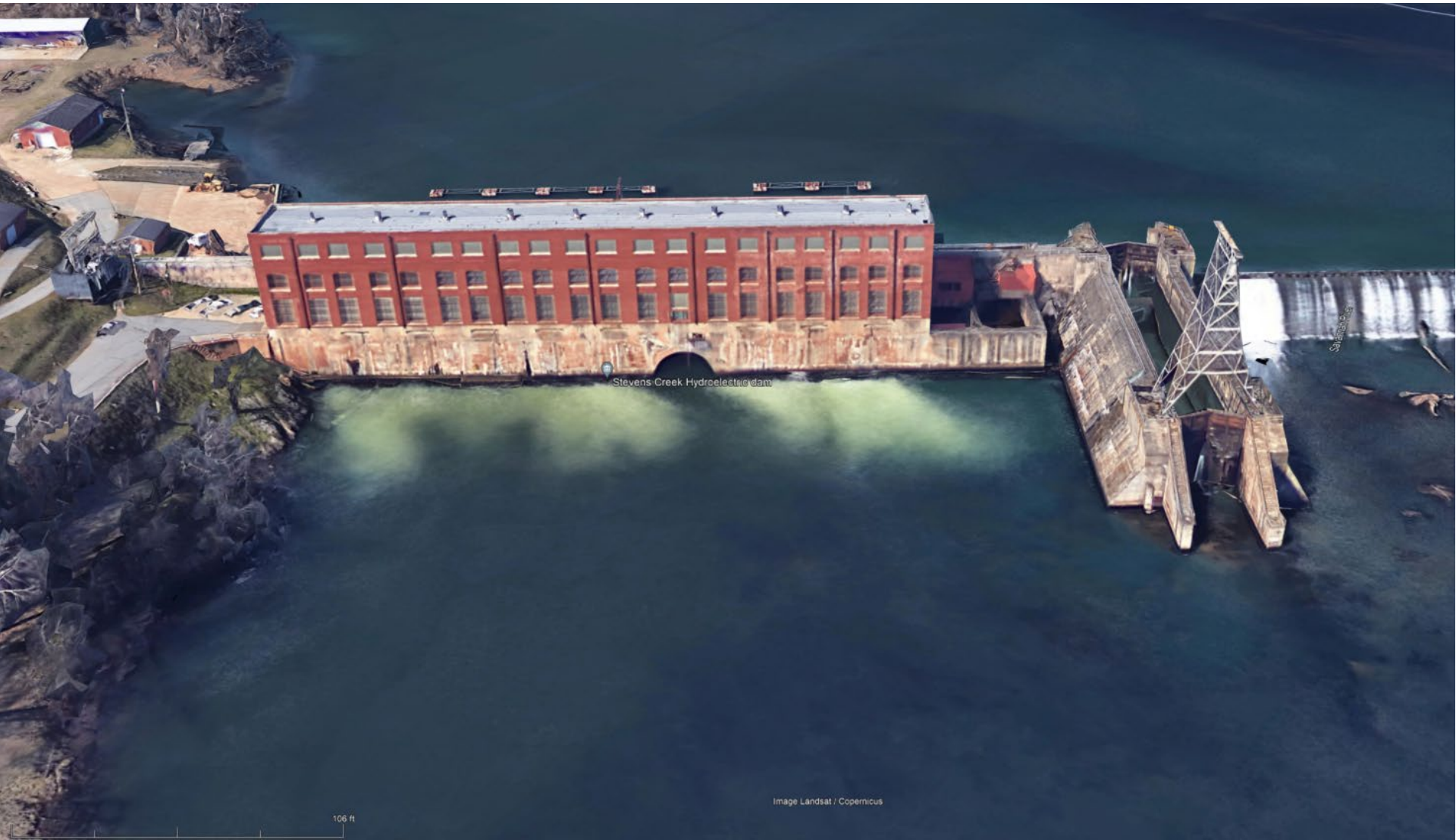

Stevens Creek

Stevens Creek

Alosine Studies

Post-Implementation of Fish Passage at NSBL&D and Augusta Diversion

- Spawning habitat survey and characterization of the Savannah River downstream from Stevens Creek Dam
  - This would be helpful in assessing the design population for any proposed fishways.
- Spawning habitat survey and characterization of the Savannah River and Stevens Creek upstream from Stevens Creek Dam
  - This would be helpful in assessing the design population for any proposed fishways.
- Fish tracking study in the tailrace of Stevens Creek Dam
- Fish tracking study in the headpond of Stevens Creek Dam
- Baseline population monitoring study of American shad and blueback herring
  - This would be helpful in assessing the design population for any proposed fishways.
  - Should this also include robust redhorse?
  - Should we also include other resident species? (to estimate expected "bycatch" in any proposed fishways)
- Tailwater Bathymetry Study (to collect data for any proposed hydraulic modeling)
- Tailwater ADCP Flow Study (for calibrating any proposed hydraulic models)
- Topographic Surveys of potential fishway sites
  - Property survey
- Headpond Bathymetry Study (to collect data for consideration of routes of passage for upstream migrants)
- Upstream Fish Passage Feasibility Study

Eel Studies

- American Eel Survey
  - Siting and Population Study
  - Nighttime observations
  - Assessment of current passage efficiency
- Upstream Eel Passage Feasibility Study