# Attachment 2
# Comments and Responses on the Draft Erosion and Sedimentation Report

| Commenting Entity | Date of Comment & FERC Accession Number | Comment – Erosion and Sedimentation | Alabama Power Response |
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| **Federal Energy Regulatory Commission (FERC)**<br><br>Note: footnotes included in the original letter have been omitted from this table | 6/10/2020<br><br>20200610-3059 | The Erosion and Sedimentation Study in the approved study plan states that Alabama Power would analyze its existing lake photography and Light Detection and Ranging (LIDAR) data using a geographic information system (GIS) to identify elevation or contour changes around the reservoir from historic conditions and quantify changes in lake surface area to estimate sedimentation areas for nuisance aquatic vegetation. According to the study schedule, Alabama Power will prepare the GIS overlay and maps from June through July 2019 and conduct field verification from fall 2019 through winter 2020.<br><br>The Draft Erosion and Sedimentation Study Report does not include a comparison of reservoir contour changes from past conditions or the results of nuisance aquatic vegetation surveys. The report states that limited aerial imagery of the lake during winter draw down and historic LIDAR data for the reservoir did not allow for comparison to historic conditions and that Alabama Power will conduct nuisance aquatic vegetation surveys during the 2020 growing season.<br><br>It is unclear why the existing aerial imagery and Alabama Power's LIDAR data did not allow for comparison with past conditions or why the nuisance aquatic vegetation surveys will be conducted during the 2020 growing season instead of during the approved field verifications from fall 2019 to winter 2020. As part of your response to stakeholder comments on the ISR, please clarify what existing aerial imagery and LIDAR data was used and why it was not suitable for comparison with past conditions. Also, please explain the change in timing for conducting the nuisance aquatic vegetation surveys. | Light Detection and Ranging (LiDAR) data collected in 2007 and 2015 were used to develop a comparison as discussed in Section 2.2.2 of the Final Erosion and Sedimentation Study Report.<br><br>Regarding the nuisance aquatic vegetation component of the Erosion and Sedimentation study, the growing season is late spring into summer, which did not correspond with the fall 2019 to winter 2020 schedule included in the FERC-approved study plan. Therefore, Alabama Power conducted the nuisance aquatic vegetation survey in summer 2020. The results are included as Appendix F of the Final Erosion and Sedimentation Study Report. |
| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | Is it possible to provide aerial images showing the areas of active erosion in relation to the project boundary as part of the final study report? | Larger scale aerial images for all study sites are provided in Appendix G to the Final Erosion and Sedimentation Study Report and include depictions of the project boundary, summer, and winter pool contours. |
| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | Appendix D photos…it would be helpful in the captions for the photos included better location descriptors (e.g., Harris Reservoir, Harris embayment, Harris Reservoir-??. River Arm, Tallapoosa River, etc.). For the Harris Reservoir sites, it would be helpful if the contours within which peaking operations occur (lake fluctuation zone) could be identified. | Each photo includes a site number which can be cross-referenced with the maps provided in Section 2.1 (Methods) of the Final Report. Because Harris is a storage reservoir, there are no daily fluctuations in reservoir level, only seasonal fluctuations in accordance with the operating curve. |

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| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | On page 24, in section 3.2, the report includes the following statement: "A total of 20 sites, rather than 15 sites, were provided for the left bank segments as many segments were tied with a score of (slightly impaired)."<br>Please explain what is meant by many of the streambank segments being "tied with a score of slightly impaired" and clarify the relationship between the number of streambank segments/sites and the bank condition score. | Alabama Power edited the text to make this section clearer. All assessed streambank segments (each 0.1 mi of the study reach) were sorted based on their condition score, from lowest to highest. Sites with the 15 worst scores (i.e., ranked 1 through 15) were presented in Table 3-2. Since 14 of the left bank segments in the list had the same score for condition (3.0), they were included in the list. |
| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | Q6 - On page 25, in Table 3-2, shouldn't the heading/label of the first column of the table be "Site Number" instead of "Rank" given that the rank options are only 1 through 5 (according to Table 3-1) and there appear to be 20 sites. | Revised Table 3-2 in Final Erosion and Sedimentation Study Report. |
| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | In Figure 18 of the Tallapoosa River High Definition Stream Survey Final Report, there appears to be a missing ranking at river mile 37 for the right streambank. Could you explain this gap in the ranking? | Included in Final Erosion and Sedimentation Study Report |
| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | In Figures 13 and 16 of the Tallapoosa River High Definition Stream Survey Final Report, the scale is small and so it appears that most of the riverbanks are unmodified and the modified banks identified on the individual site surveys are not visible. It would be helpful if the figures in the report showed labeled points for the erosion/sedimentation sites that are identified in the report. | Included in Final Erosion and Sedimentation Study Report. |
| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | Q9 - Page 20 of Tallapoosa River High Definition Stream Survey Final Report states that a confidence rating was used to indicate the clarity of the streambanks in the video and figures 14 and 17 of that report show areas where the video clarity was impaired and therefore the confidence in the accuracy of the streambank conditions/classifications is lower. As stated above, it would be helpful if the figures in the report showed labeled points for the erosion/sedimentation sites that are identified in the report. Do any of the areas with impaired video clarity coincide with areas that stakeholders identified as erosion/sedimentation sites or other sites that Alabama Power identified as part of this study? Do you intend to take any steps to deal with the impaired clarity data? Is so, how? | Alabama Power reviewed the Trutta study and determined that all areas of low confidence did receive a score. Additional photos were taken at low confidence areas to allow for confirmation of bank scores.<br><br>Also, these areas do not coincide with the two downstream erosion sites identified as part of the study. |
| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | For Figures 20 through 23 of the Tallapoosa River High Definition Stream Survey Final Report, please label the river mile ranges on the maps to help reviewers understand the starting and ending points of the study area and which segments of river are included.<br><br>In Figure 26 of the Tallapoosa River High Definition Stream Survey Final Report, please move the scale bar and sources so that they are not covering the river segment and bank conditions at the bottom of the map | Revised figures are provided in the Tallapoosa River High Definition Stream Survey Final Report (updated December 17, 2020). |

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| **FERC** | Questions submitted in advance of 4/28/20 ISR Meeting | Can you identify where peaking pulses are attenuated downstream from Harris Dam under the current operating regime and volume of typical downstream releases? If so, are there any patterns in the downstream streambank conditions and observed levels of erosion along the segments of streambanks within the attenuation zone? Where are the identified erosion sites in relation to the length of the attenuation zone? | Included in Section 3.2 of the Final Erosion and Sedimentation Study Report. |
| **Alabama Department of Conservation and Natural Resources (ADCNR)**<br><br>Note: footnotes included in the original letter have been omitted from this table | 6/11/2020<br><br>20200611-5152 | Throughout the Erosion and Sedimentation Study when referencing "cause of erosion" change to "potential cause(s) of erosion/sedimentation." On page 2, section 2.0 Goals and Objectives in the Erosion and Sedimentation Study Plan it states, "The goals of this study are to identify any problematic erosion sites and sedimentation areas and determine the likely causes." "Once areas are identified, Alabama Power will perform assessments and collect additional information, as necessary, to describe and categorize each area according to its severity and potential cause(s)." | Revised in Final Erosion and Sedimentation Study Report. |
| **ADCNR** | | On page 6, section 2.0 Lake Harris, 2.1 Methods in the Erosion and Sedimentation Study, replace, "determine the cause of erosion:" with "determine areas of erosion and potential cause(s):" For the potential cause(s) categories considered, provide a definition of each and additional details into the methods utilized to characterize how each cause was determined and differentiated. The methods described appear to detail how areas of erosion were identified but do not detail how potential cause(s) were determined. A reference to the Erosion and Sedimentation Study Plan Study Plan methods or inclusion of section 4.1 study plan methods should be provided. | Revised in the Final Erosion and Sedimentation Study Report. |
| **ADCNR** | | On page 12, section 2.2 Results, 2.2.1 Erosion Survey in the Erosion and Sedimentation Study insert "potential cause(s)" into "Each site was photographed and examined to determine the cause of erosion." | Revised in the Final Erosion and Sedimentation Study Report. |
| **ADCNR** | | On page 20, section, of the Erosion and Sedimentation Study, verify and confirm accuracy that Table 2-3 indicates a net loss of Hay/Pasture in the Little Tallapoosa River Basin of -8,815.1 acres from 2001 to 2016. Text indicates a "Twenty-five percent of the Little Tallapoosa River basin has been converted to hay/pasture fields (MRLC 2019)" These two statements appear to be contradictory. | Revised in the Final Erosion and Sedimentation Study Report. |
| **ADCNR** | | On page 24, section 3.2 Results of the Erosion and Sedimentation Study, change "primarily caused" to "potentially caused". Remove "natural riverine processes" and replace with "regulated riverine processes" or define how natural riverine processes are defined in this context and occur below a controlled and regulated tailrace. | Revised in the Final Erosion and Sedimentation Study Report. |

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| **ADCNR** | | On page 25, Table 3-2 of the Erosion and Sedimentation Study, add score ranges (minimum and maximum scores) in addition to the means. If previous sites E22 and E23 are included in this Table, provide an asterisk and footnote specifying which ones they are. Include in discussion section how this scoring method compared to the method used at sites E22 and E23. | Minimum and maximum scores were not available in the Trutta data. |
| **ADCNR** | | On page 26, Figure 3-1 of the Erosion and Sedimentation Study, include site numbers from Table 3-2 into this map or provide incremental river mile markers. | The legend for Figure 3-1 in the Final Erosion and Sedimentation Study Report has been updated to indicate that the labels provided on the map correspond with river miles below Harris Dam. |
| **ADCNR** | | On page, Table 4-1 of the Erosion and Sedimentation Study indicates a 592.1 acreage increase in deciduous forest. Deciduous forest stream buffers have been shown to reduce nitrogen, phosphorous and sedimentation from surface water runoff into streams, lakes and estuaries. This could be included in the discussion section as a positive observed land use trend in the area (Klapproth and Johnson 2009; Roy et al. 2006). | Comment noted. |
| **ADCNR** | | On page 31, Section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, provide additional information on definitions and methodology in how cause(s) were determined before the conclusion that erosion was a result of anthropogenic and/or natural processes independent of project operations. As is, the use of the word "potential" should be included. Provide the current definition of “project operations” for this study and include it prior to other document “project operations” statements. If referring to “fluctuations” from project operations, this should be clearly stated throughout Erosion and Sedimentation Study. Among Study plans there appears to be variations in the provided definition of “Project operations” and “project related impacts”. For example, on page 4 the Erosion and Sedimentation Study Plan states “Project operations” as “(i.e., water level fluctuations or construction/maintenance activities on/at Project facilities or lands)”, but on page 2 of the Threatened and Endangered Species Study Plan it states “project related impacts” as “(i.e., lake fluctuations, downstream flows, recreation and shoreline management activities, timber management, etc.)”. Providing consistency of these definitions among studies would be beneficial during the relicensing evaluation process. In addition, including “etc.” which indicates that “further, similar items are included” after using “i.e.” or “that is” is a contradictory use of the terms. | Comment noted. |
| **ADCNR** | | On page 31, section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, replace “extremely small” with “relatively small”. | Revised in the Final Erosion and Sedimentation Study Report. |

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| **ADCNR** | | On page 31, section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, insert “potentially” prior to “clear-cut”. Reword sentence to read: “The observed erosion at these sites is the potential result of adjacent land use and clearing of riparian plant cover destabilizing soils along the affected banks, although erosion at these sites may have been initially caused or exacerbated as result of altered flow releases from Harris Dam.” | Comment noted. If project operations were the initial cause of bank destabilization at these sites, one would expect to see similar instances along the length of the study area. However, the vast majority of the study area had functional streambanks. |
| **ADCNR** | | On page 31, section 5.0 Discussion and Conclusions of the Erosion and Sedimentation Study, insert “in the reservoir” after decrease in “Sedimentation in Lake Harris is most pronounced in the Little Tallapoosa River arm where sediment transported from upstream settles out of the water column as water velocities decrease” statement. | Revised in the Final Erosion and Sedimentation Study Report. |
| **ADCNR** | | In Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study, include periodic river mile markers and corresponding segment numbers in figures of the study. | Revised in the Final Erosion and Sedimentation Study Report. Figures including river mile markers for the river downstream have been added to the report. |
| **ADCNR** | | On page 33, Figure 21 of Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study, a red section in downstream of No Business Creek within the 3.5-5 range appears present. In results or discussion explain how this area is not included as a second impaired site. | It is identified as an impaired site and shown in figure 3-1. Figure 3-2 highlights the “most” impaired areas in the downstream reach. This particular reach is only slightly impaired, with a condition score less than 4. |
| **ADCNR** | | On page 34, Table 3 of Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study, if available, include ranges (minimum and maximum scores) with segment data. | Minimum and maximum scores were not available in the Trutta data. |
| **ADCNR** | | On page 43, Conclusions section of Appendix E Downstream Bank Stability Study Report of the Erosion and Sedimentation Study include a definition and discussion about the potential for head cutting in tributaries due to main river channel operations. Head cutting is a process by which the upstream portion of a stream channel becomes destabilized and erodes progressively in an upstream direction. Accelerated velocities can lead to an increase in head cutting upstream from affected areas (Annear et al. 2002). | Comment noted. |
| **ADCNR** | | Erosion and Sedimentation Study discussion. ADCNR recommends including the APC response statement “Most of the erosion issues downstream are not due exclusively to operations. For example, areas where trees and vegetation are being cleared are not due exclusively to operations, but water fluctuations could exacerbate erosion.” into the discussion section of the study. | Comment noted. |

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| **Alabama Rivers Alliance (ARA)**<br><br>Note: footnotes included in the original letter have been omitted from this table | Questions submitted in advance of 4/25/20 ISR Meeting | Table 3-2 shows streambank scored for the 15 most impaired areas downstream of Harris Dam. How was the Average Combination Bank Condition score (final column) computed? It does not appear to be an average of the “Average Left Bank Condition” and “Average Right Bank Condition” scores, which would yield a lower average scored. The averages showing for the left and right banks are mostly 3.0 or higher while the average combined bank condition scores are mostly below 3.0. | This table was modified in the Final Erosion and Sedimentation Study Report to address confusion, including eliminating combined bank condition. The revised tables include the 15 areas regardless of bank. Condition score was calculated by averaging point bank condition scores into 0.1 mi segments to facilitate identifying problem areas. |
| **ARA** | 6/11/2020<br><br>20200611-5114 | Article 20 of the existing license states that Licensee “is responsible for and must take reasonable measures to prevent erosion and sedimentation.”43 Such measures and responsibility must be comprehensive in light of hydropeaking’s amplifying effects on other potential sources of erosion both upstream and downstream of Harris. The High Definition Stream Survey (HDSS) completed as part of the Erosion and Sedimentation Study Report describes opportunities to “support targeted restoration, habitat improvement,” and identified at least one area that “would be an excellent area to focus streambank rehabilitation efforts.”44 The HDSS states that it documents baseline conditions and that future surveys could be directly compared to it in order to understand ongoing shifts in river conditions.45 ARA supports the collection of future surveys for this purpose. | Comment noted. |
| **ARA** | | As part of its environmental analysis, ARA encourages FERC to consider all historical evidence available when assessing how geology and soils may be impacted over another 30- to 50-year license term, including any evidence submitted by stakeholders in the form of photographs, maps, and personal accounts. If the Green Plan, or a similar pulsing flow regime is to be continued as part of a renewed license, a suspended solids sampling conducted pre-pulse, during generation, and post-pulse would better identify how and when sediment transport is occurring in the river, enabling an identification of project operations’ impact apart from natural river processes and other potential sources of erosion. | Comment noted. |

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| **Wayne Cotney in letter filed by Carol Knight** (highlighted portion of letter pertains to this study) | 6/11/2020<br><br>20200611-5148 | Wayne Cotney is another lifelong river who has fished from the Wadley bridge to the head of the backwater since 1954. He has especially enjoyed fishing around Horseshoe Bend and the Frogeye/Bibby's Ferry areas. He tells me that it breaks his heart to know how the river used to be and to see it now and how much it has changed just during his lifetime.<br>When he was a boy, he and his grandfather Bishop, neither of whom could swim, would use fish baskets. There were always trees to hold on to, and trees that were small when he was a boy are now large trees, and some have even washed away. He remembers fishing around Capp's Island, so named for Capp Hodnett, a local farmer. All that's left are a few trees and a pile of rocks.<br>He remembers when the bridge was built at Horseshoe Bend and when folks kept boats tied to the banks up and down the river. Fishing was a way of life—and a way of feeding one's family—during those days. Those days are long gone, for several reasons, including but not limited to erosion and "fast water" that comes from up the river.<br>Wayne knows and uses the 800 number to check the generation schedule. However, he finds the information he obtains from the number to be quite inadequate, even downright incorrect. For instance, he was fishing June 2 and 3, 2020, near Horseshoe Bend. Checking the generation schedule, he learned the turbine would run from the morning of June 2 to 8 PM. According to Wayne, you seldom see big surges at Horseshoe Bend like the ones you see in Wadley, and if you do, it takes about 10 hours to reach the bend. On June 2, the rushing water ran him and his companions out of the water. They are experienced fishermen, and this water seemed to be more than what would have been released through generation.<br>He has noticed during the past week (June 1-9) that the river banks are washing away, with water at flood stage for several days. It appears that 25-50 feet of bank have eroded since last fall.<br>There was a sandbar below the Horseshoe Bend bridge that has all but disappeared, but for the past few months, it seems to be reappearing! That is the enigma of the Tallapoosa River and its path. This is just one person's experiences with a river that has almost mythical significance to folks around here. | Comment noted. |

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| **Mike Smith in letter filed by Carol Knight** (highlighted portion of letter pertains to this study) | 6/11/2020<br><br>20200611-5148 | Mike Smith, a resident of Wadley in his early 70s, has been raised and has lived on the river all of his life. He inherited the property that his parents owned on the banks of the Tallapoosa just below the Wadley bridge, and he, too, has seen the banks of the river gradually erode over the years, leaving trees uprooted or barely hanging onto the soil at the edge of the water that alternately rushes and meanders on its way to Horseshoe Bend. He says that his biggest concern is the erosion that is eating away at the bank. He lives within sight of Hutton Creek, which crosses Highway 22 just inside the Wadley city limits. He has watched that creek fill with trees and silt to the point that it no longer flows as freely as it did when he was a boy.<br>His father, Charles Smith, was a fisherman who caught baskets of fish that were plentiful in the river during the 1950s and 60s. According to Mike, his dad "caught lots of fish. We gave them away, sold them, ate them, froze them. There were always plenty of fish!"<br>Although Mike never fished as his father did, others were allowed to "put in" at their place for years. However, no one does that anymore, just highlighting the issues that come with the fishing on the river these days. It is not the relaxing activity that it once was. | Comment noted. |

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| **David Bishop** (highlighted portion of letter pertains to this study) | 6/11/2020<br><br>20200611-5005 | I have spent much time fishing the Tallapoosa River from Wadley to Horseshoe Bend. I have been following the re-licensing for the past couple of years and have listened in on one call.<br><br>I began fishing on the Tallapoosa River near Wadley with my family in 1962. Both my grandfathers before me fished on the river since they were children in the early 1900's. As an adult I fish often (35-40 days) every year. As a kid I probably fished 100 times a year.I grew up less than a mile from Lake Harris but have only fished it a handful of times. I have no problem with the lake. But I do have a problem with its operation regarding downstream releases.<br><br>As recently as last week (June 2-3, 2020), actual release was at least 3 times more volume than scheduled. Currently, I live 2 hours away from where I fish, so I always call the dial-up line before leaving the house. It said only one turbine would be generating. This information was wrong. Not only was it an inconvenience, but a real endangerment to those of us who rely on the phone schedule for release information. In this case, at Horseshoe Bend, the water rose at least 5 feet in a 45 minute span. This has happened numerous times and presents a real danger to small craft. We were run off the river for about 10 hours while the water was too high and fast to fish. I do my best to pick good, safe times to fish. I check with the power company ahead of time. I know that water from the dam takes 10 hours to reach Horseshoe Bend. In spite of all I know, I don't know what the Power Company doesn't share. They could send real time alerts to my phone. This would go a long way toward protecting the lives of Alabama citizens.<br><br>We have noticed a large amount of bank erosion and tree loss in the years since the dam was built. A corresponding widening and shallowing of the stream with warmer water resulting in fewer fish has been noted by many who fish the river. I feel that responsible and constant release would mimic the pre-dam flow and allow the river to recover to its natural state. I am also concerned that raising the winter pool of the lake will result in more flooding, erosion, loss of property and life downstream. Also, public access is limited to only two points above Lake Martin and below Wadley. This needs to be remedied so that more people may enjoy the river. FERC can take the lead and make sure that those of us downstream can enjoy our river as before. | Comment noted. |
| **Chuck Denman** | 6/11/2020<br><br>20200611-5174 | Flushing effects from high water flow scours river bank while sediment deposited from low flow in center of channel enabling vegetation to block center of channel causing greater flows along bank. | Comment noted. |

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| **Chuck Denman** (highlighted portion of letter pertains to this study) | | A general review of historical materials i.e., newspapers, and other records dealing with the proposals for constructing the Dam. Including comments and conditions provided in initial permitting. With the goal being to determine if the dam has achieved the original benefits expected. Perhaps a score card.<br><br>A pre vs post Dam analysis of downstream impacts. Including flooding, erosion and habitat changes to flora and fauna.<br><br>1. Flood: storm runoff model comparing 25, 50, and 100 year 24 hour storm events.<br>2. Erosion: utilizing available remote sensing materials to compare river channel and islands size and shape today and pre dam.<br>3. Plants: utilize remote sensing materials to map flag grass and invasive plant communities to compare changes from pre Dam.<br>4. Fisheries: review available materials from locals in the community, fish and game and other resources to determine what effect the dam has had on downstream fish types and numbers. | Alabama Power provided a response to this additional study request in its July 10, 2020 Response to Initial Study Report (ISR) Disputes or Requests for Modifications of Study Plan (Accession No. 20200710-5122). |
| **Joe Meigs in site evaluation form filed by Donna Matthews** | 6/11/2020<br><br>20200611-5169 | I have a lot of washed out area on my bank and lost about 10 to 12 feet of bank.<br><br>Too much water for width of river. | Comment noted. |
| **David Royster in site evaluation form filed by Donna Matthews** | 6/11/2020<br><br>20200611-5169 | Large washed out areas.<br><br>Water rises too much and is too swift for the width of river. Someone needs to look at the erosion with the water down.<br><br>Water is way too swift. | Comment noted. |

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| **Donna Matthews** | 6/12/2020<br><br>20200612-5018 | Submitted separately are landowner forms reproduced from the study report and completed by landowning downstream stakeholders. They are reporting on erosion at their property sites. They represent lay attempts to recognize and monitor riverfront erosion. Whether or not each geo-located individual completed and submitted a form, each has taken their time to attend at least one meeting to express their grievance with downstream management over the life of the dam.<br><br>Also submitted is a screen shot of pinned landowner locations. Additionally, submitted is a page from the Trutta report locating erosion sites. There are correlations with landowner reported erosion and the study map. The Trutta float-the-river erosion survey is baseline information. It is a current day 'snapshot'. It may provide useful data for prospective study. Not being conversant in reading sonar / lidar data, I seek reassurance that riverbank video taken when the river channel is full does not dampen / downplay the classification of erosion sites. The river's edges evaluated – as landowners experience it – when the water is low may expose more severe erosion than shown on the Trutta video.<br><br>Notable is the omission from the report of log/lat data for the sites identified in Figure 3-1 and Table 3-2. (Long/lat data was provided in Table 2-1 Summary of Lake Harris Erosion & Sedimentation)<br><br>**#1 Request for long/data for Figure 3-1 and Table 3-2 of the Trutta Report and Request greater resolution image of Figure 3-1**<br><br>Of major concern to all Harris Project Stakeholders is the Erosion Issue. Foundational to taking steps going forward is looking back to what has been. The University of Alabama maintains an aerial photographic library including images of the Harris Project area beginning in 1942. In existence are digitized prints for 1942, 1950, 1954, 1964, 1973. These are housed at www.alabamamaps.ua.edu. Attached is a mosaic of a portion of the project area as it appeared in 1942. The full sized map is rendered and georeferenced. | Alabama Power followed the study methods approved by FERC on 04/12/2019 (Accession No. 20190412-3000).<br><br>Table 3-2 was revised in the Final Report to include latitude/longitude data. Alabama Power did not edit the Figure 3-1 as it would be illegible. However, the impaired locations were added to the Harris Erosion and Sedimentation Sites Google Map on the relicensing website (www.harrisrelicensing.com) to facilitate stakeholder review.<br><br>The Trutta survey was conducted during normal Harris Project operations via inflatable boat. It would not be practical to conduct this type of survey during low or no-flow conditions, as the surveyors would not have been able to boat the length of the river. Furthermore, it is not necessary for the river to be at low flow in order to assess bank stability and erosion. |
| **Donna Matthews** (only the portion of the letter that to this study has been included in this table) | | **#2 Proposed: A New Study of the downstream river using historic images overlaid onto current imagery**<br><br>18 CFR 5.15 (e)<br>1. Erosion is a significant and persistent concern. Erosion is problematic for landowners and flora & fauna in and around the river.<br>2. To my knowledge, this type of GIS comparison | Alabama Power provided a response to this additional study request in its July 10, 2020 Response to Initial Study Report (ISR) Disputes or Requests for Modifications of Study Plan (Accession No. 20200710-5122).<br><br>Alabama Power filed the images provided by Ms. Matthews with FERC on August 4, 2020 (Accession No. 20200804-5252) |

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| | | using historic data to impact effects of release effects downriver have not been done.<br>3. At the initial licensing there was no post dam data to compare to compare to the historic data.<br>4. This is a simple and inexpensive study, using readily available data<br><br>18 CFR 5.0(b)<br>1. The study should look at and provide change analysis for:<br>a. Analysis of the river bank contour along its length through time. Free flowing rivers are elastic, moving silt and sedimentation from side to side and down its length. A river serving as a channel should show deviations from historic patterns.<br>b. Any changes in river bank elevation<br>c. Provide image overlays of historic data onto current imagery with the intent to discover what the data show about the effects of a dam on the downstream river and can be a tool to evaluate effect of future changes made to flow patterns.<br>d. Begin construction of a detailed GIS map with information relating fish populations, (and a whole host of other parameters) in 3D. That is, not only presence/absence of species along the river length, but presence (where data are available) of species during different decades in time. There are numerous possibilities.<br>e. APC can gather additional, (say scaled to 1:6000 or the highest resolution feasible) imagery to overlay on the historic public images available at 1:20000. This would provide a baseline for future studies. At our fingertips are 80 years of data.<br><br>2. This GIS modeling tool can also be applied to provide opportunity for interagency contribution towards building the most accurate picture of aquatic and other life of the Tallapoosa.<br>3. Creating the realization of and expounding upon the treasures of the Tallapoosa River is something all parties (APC and stakeholders above/below the dam) can rightly be proud of. | |

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|---|---|---|---|
| **Albert Eiland** | 6/11/2020<br><br>20200611-5170 | The daily constant changes of water levels as well as the soaking of the ground, allows trees to easily uproot, which causes the banks to wash away.<br><br>The constant flushing of water that causes the rise and fall of the water levels cause erosion, which then exposes tree roots which eventually lead to tree loss. | Comment noted. |

| Commenting Entity | Date of Comment & FERC Accession Number | Comment – Erosion and Sedimentation | Alabama Power Response |
|---|---|---|---|
| **Michele Waters** | 6/11/2020<br><br>20200611-5049 | Our property is located on the Tallapoosa River, in Tallapoosa County, between Bibby's Ferry and Germany's Ferry. Over the past 20+ years the banks have drastically eroded and it has gotten even worse in the past 4 years. When the dam is let off the water level gets so high, to the top of the banks. There have been numerous trees along the bank that have fallen into the river. In one area alone the bank has eroded so much that 2 trees have already fallen and a 3rd tree is on the verge of falling. These trees were not "side by side" along the river bank. The 3rd tree that is on the verge of falling was several feet behind the other 2 trees that fell.<br>There is an island on the property as well. This use to be 1 acre – now it's much less than that. Several trees on that island have also fallen. There is a slue that goes between the riverbank and the island. The water in the slue is normally anywhere from ankle high to knee high. However, when the dam is let off the water is up to the top of the bank – well over 7 feet deep. This has caused several trees along the slue to fall and block the water flow in the slue. When the water is down there is very little water, or no water, going down the slue. When the water is up the slue looks like a river.<br>The falling trees worry me, but what worries me the most is where the banks have not only washed away but caused "caves". In the past we had a small fence several feet from the bank to keep kids from running and falling in the river. A lot of the fence posts have now fallen down the banks and there are huge drop off's that the fence no longer protects the kids from falling down. Approximately 10 years ago we noticed a huge hole, like a cave, in the bank that is close to our picnic area and it is getting larger every year and closer to our picnic area. We are afraid the picnic area will eventually cave in unless something is done about this. Please note this picnic area was not even close to the bank when it was built. Now there are huge drop off's close to the picnic area.<br>Just this year we noticed a big cave in on the bank of the slue. The only time the water is high enough in the slue to reach the top of the bank is when the water is let off. The cave in is now approx. 2 feet into the bank and getting close to the road we use.<br>We have repeatedly asked for help from various sources for ideas or help to keep the banks from eroding. So far we have received no help or ideas. I'm afraid we will be enjoying a day on the river and a bank will cave in and cause harm or even death to someone. I have pictures from 2016 as well as pictures from 2020 that will show the erosion. | Comment noted. |

| Commenting Entity | Date of Comment & FERC Accession Number | Comment – Erosion and Sedimentation | Alabama Power Response |
|---|---|---|---|
| **Sharon K Holland** | 20200611-5076 | I am writing in regard to FERC project number P-2628-065 as it pertains to our property on the Tallapoosa River, in Tallapoosa County, between Bibby's Ferry and Germany's Ferry.<br>My grandmother farmed this property as a youth and it has been a part of our lives over the past 50 plus years growing up. Over the years, I have seen the drastic changes to the beautiful river and our land that borders its banks. I know there are natural changes to a river's edge, but there has to be ways to preserve the land so that it doesn't just completely erode away become part of the river and no more a place where we can fish, camp and play.<br>Over the past four years it has become increasingly worse and we are losing more and more trees in addition to the soil that keeps them a root! When the water is released from the dam the water level quickly tops our banks gushing and washing away our land and our trees.<br>We have an island on the property as well that use to be one acre and it continues to erode away along with its vegetation. We use to be able to walk the slue that's between the riverbank and the island, but the fast moving high waters have taken down so many trees it is almost completely closed off.<br>The banks of the river are becoming dangerous as the water erodes them away taking our land and the beauty they retain. There is a responsibility that comes with those who regulate the dam that causes these changes. We have repeatedly asked for help from various sources for ideas or help to keep the banks from eroding. Please let us know what can be done to preserve our beautiful river land so that our children and our children's children can enjoy for years to come. | Comment noted. |

# Attachment 3
# Final Erosion and Sedimentation Report

# Erosion and Sedimentation Study Report

## R.L. Harris Hydroelectric Project

FERC No. 2628

HARRIS DAM RELICENSING

Prepared for:

**Alabama Power Company**

Prepared by:

**Kleinschmidt Associates**

April 2021

Alabama Power

Kleinschmidt

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# 1.0 INTRODUCTION

Alabama Power Company (Alabama Power) owns and operates the R.L. Harris Project (FERC Project No. 2628) (Harris Project), licensed by the Federal Energy Regulatory Commission (FERC or Commission). Alabama Power Company (Alabama Power) is relicensing the 135-megawatt (MW) Harris Project, and the existing license expires in 2023. The Harris Project consists of a dam, spillway, powerhouse, and those lands and waters necessary for the operation of the hydroelectric project and enhancement and protection of environmental resources. These structures, lands, and water are enclosed within the FERC Project Boundary. Under the existing Harris Project license, the FERC Project Boundary encloses two distinct geographic areas, described below.


Harris Reservoir is the 9,870-acre reservoir (Harris Reservoir) created by the R.L. Harris Dam (Harris Dam). Harris Reservoir is located on the Tallapoosa River, near Lineville, Alabama. The lands adjoining the reservoir total approximately 7,392 acres and are included in the FERC Project Boundary (Figure 1-1). This includes land to 795 feet mean sea level (msl)[1], as well as natural undeveloped areas, hunting lands, prohibited access areas, recreational areas, and all islands.

The Harris Project also contains 15,063 acres of land within the James D. Martin-Skyline Wildlife Management Area (Skyline WMA) located in Jackson County, Alabama (Figure 1-2). These lands are located approximately 110 miles north of Harris Reservoir and were acquired and incorporated into the FERC Project Boundary as part of the FERC-approved Harris Project Wildlife Mitigative Plan and Wildlife Management Plan. These lands are leased to, and managed by, the State of Alabama for wildlife management and public hunting and are part of the Skyline WMA (ADCNR 2016b).

For the purposes of this study, "Lake Harris" refers to the 9,870-acre reservoir, adjacent 7,392 acres of Project land, and the dam, spillway, and powerhouse. "Skyline" refers to the 15,063 acres of Project land within the Skyline WMA in Jackson County. "Harris Project" refers to all the lands, waters, and structures enclosed within the FERC Project Boundary,

[1] Also includes a scenic easement (to 800 feet msl or 50 horizontal feet from 793 feet msl, whichever is less, but never less than 795 feet msl).

which includes both Lake Harris and Skyline. Harris Reservoir refers to the 9,870-acre reservoir only; Harris Dam refers to the dam, spillway, and powerhouse. The Project Area refers to the land and water in the Project Boundary and immediate geographic area adjacent to the Project Boundary (Alabama Power Company 2018).

Lake Harris and Skyline are located within two river basins: the Tallapoosa and Tennessee River Basins, respectively. The only waterbody managed by Alabama Power as part of their FERC license for the Harris Project is the Harris Reservoir.

Commonly used acronyms that may appear in this report are included in Appendix A.

## 1.1 STUDY BACKGROUND

During the October 19, 2017 issue identification workshop, several stakeholders noted the location of possible erosion and sedimentation areas at the Harris Project and suggested causes. On November 13, 2018, Alabama Power filed ten proposed study plans for the Harris Project, including a study plan for erosion and sedimentation that included the stakeholder noted locations. FERC issued a Study Plan Determination on April 12, 2019, which included FERC staff recommendations. Alabama Power incorporated FERC's recommendations and filed the Final Study Plans with FERC on May 13, 2019[2].

Alabama Power formed the Harris Action Team (HAT) 2 to address erosion and sedimentation issues at Skyline, Lake Harris, and in the Tallapoosa River downstream of Harris Dam that are due to Project operations and/or other causes. Alabama Power distributed an email to HAT 2 participants on May 1, 2019, providing maps of erosion and sedimentation areas identified for evaluation and requesting identification of locations of additional areas of erosion and sedimentation concerns. Alabama Power held a HAT 2 meeting on September 11, 2019, where it presented Geographic Information System (GIS) overlays and maps of the erosion and sedimentation sites that would be included in the field assessment. Following the September 11, 2019 HAT 2 meeting, a stakeholder requested, and Alabama Power agreed, to include one additional erosion site in the field assessment.

Although no existing information regarding sedimentation rates or amounts has been identified, Alabama Power has Light Detection and Ranging (LIDAR[3]) data and aerial photography for Lake Harris to assist in evaluating sedimentation issues. In addition,

[2] Accession No. 20190513-5093

[3] Light Detection and Ranging or LIDAR uses an airborne laser scanner to collect 3-dimensional data and can be used to construct highly detailed terrain maps.

Alabama Power has an Aquatic Vegetation Control group that periodically inspects Lake Harris for nuisance aquatic vegetation. Nuisance aquatic vegetation may occur in areas where excessive sedimentation occurs.

Little Coon Creek, which flows through portions of the Project Boundary at Skyline, is currently included in Alabama's 303(d) impaired waters list due to siltation. The sources of this impairment include non-irrigated crop production and pasture grazing (ADEM 2018).

The goals of this study were to identify any problematic erosion sites and sedimentation areas and determine the likely causes.

Alabama Power prepared and filed a Draft Erosion and Sedimentation Report with FERC on April 10, 2020[4]. Concurrently, Alabama Power distributed the draft report to the Harris Action Team (HAT) 2 (Water Quality and Water Use) participants. Stakeholders provided comments on the Draft Erosion and Sedimentation Report and this Final Erosion and Sedimentation Report addresses the comments received.

[4] Accession No. 20200410-5091

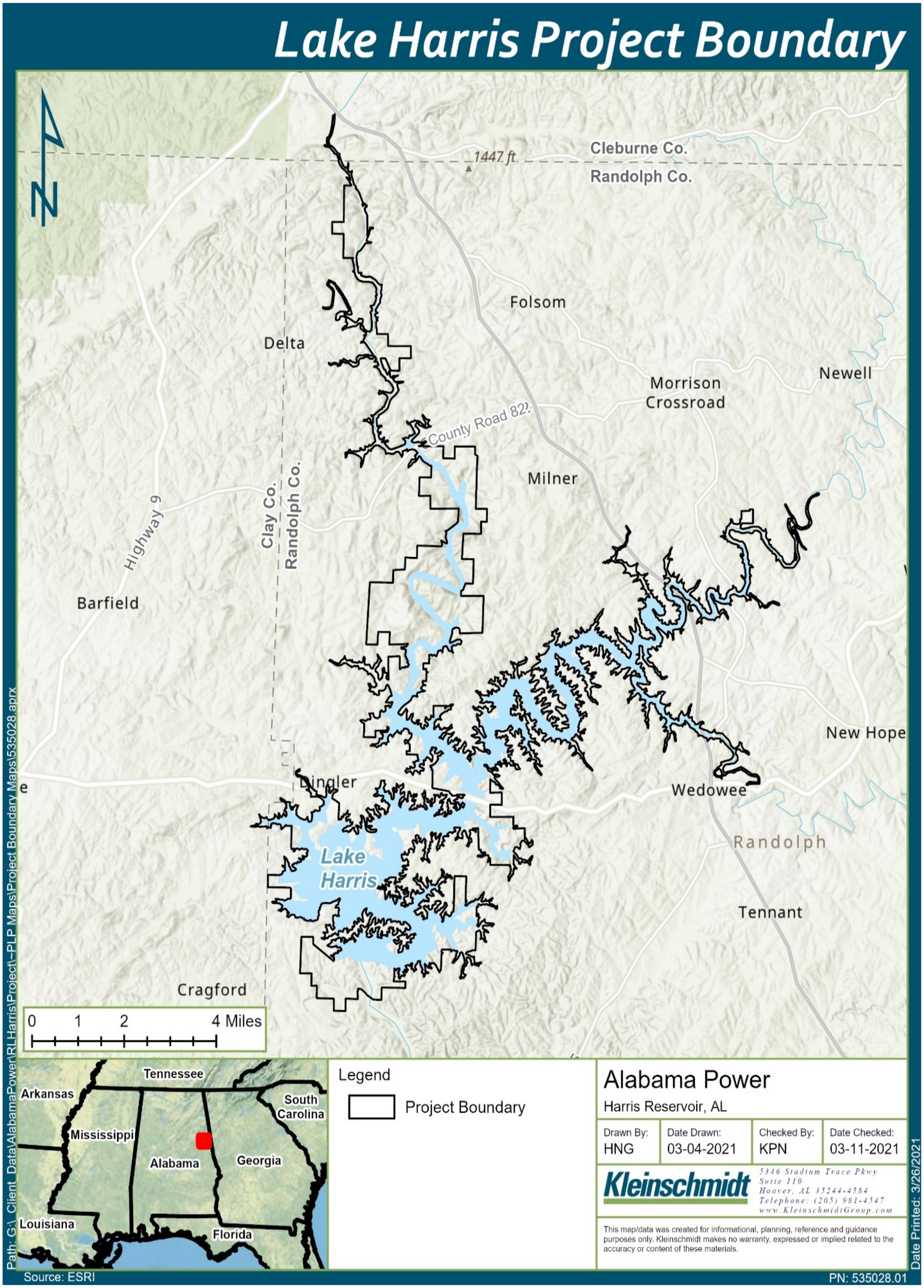



**FIGURE 1-1 LAKE HARRIS PROJECT BOUNDARY**

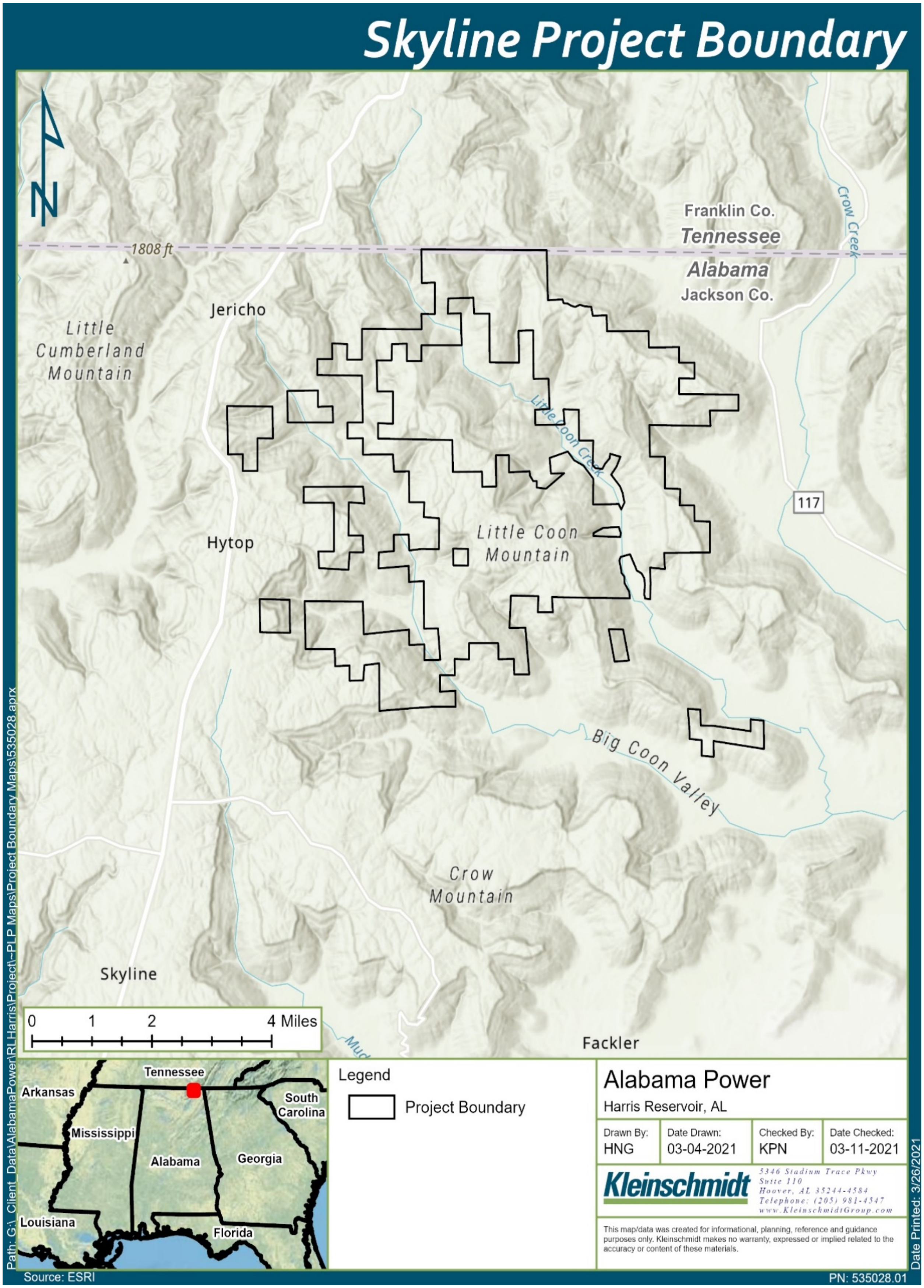



**FIGURE 1-2 SKYLINE PROJECT BOUNDARY**

# 2.0 LAKE HARRIS

## 2.1 METHODS

Erosion and sedimentation sites identified by stakeholders were investigated in December 2019 (Figures 2-1 to 2-5). Lake water surface elevation during the survey was 784.86 feet. Each site was photographed, georeferenced, and examined, either in the field or via aerial imagery analysis, to determine areas of erosion and potential cause(s): Harris Project operations, land disturbance (development), or natural processes. Erosion site assessments were completed under the direction of a qualified Erosion and Sediment Control Professional. A soil scientist also provided a Quality Assurance/Quality Control (QA/QC) during the erosion site inventory. Credentials for individuals who performed the assessments are presented in Appendix B. A site evaluation form, as approved by HAT 2 and subsequently provided as an appendix to the FERC-approved study plan, was used to perform and document the assessments and included the following components.

- Location: Each assessed site was assigned a unique identification number along with Global Positioning System (GPS) coordinates.
- Position in Landscape: the general position of the site relative to dominant landscape features.
- Physical Properties: the length, width, shape, and slope of the site.
- Erosion Process: the mode of erosion.
- Adjacent Land Use and Vegetative Cover: classification of the predominant adjacent land use and type/extent of vegetation.
- Hydrologic Impact information: classification of when/if the erosion occurs during extreme flooding, above normal water levels, or within the range of normal water levels.
- Description of the exposed soils.
- General comments about the erosion site.
- Potential cause(s) of erosion/sedimentation.
    - Project Operations (water level fluctuations, maintenance/construction activities)
    - Natural Factors (e.g., seasonal flooding, riverine processes, etc.)
    - Land Use (e.g., farming, ranching, mining, development, etc.)
    - Anthropogenic (foot/bike paths, vehicle traffic, boat waves, etc.)
    - Other noted causes identified during survey

Potential causes of erosion were assessed visually by the inspection team. To determine potential causes, the project team considered the geographic and geomorphic location of the identified location area and compared the area to surrounding banks. For example, exposed main lake areas and high boat traffic zones were analyzed to see if erosion patterns consistent with wave action were exhibited in the identified areas. While erosion from reservoir fluctuation and wave action can be difficult to discern, lake location can be the biggest indicator in differentiating between fluctuation and wave induced erosion. In addition, shape and depth of the erosion feature were assessed to help discern potential Project induced or wave action induced erosion. Erosion areas in upper portions of the reservoir were analyzed to see if predominant erosion patterns were consistent with natural processes observed in those areas, especially during high flow events when the area can experience flow conditions not seen during stable winter or summer pool conditions. Geomorphic location and adjacent bank condition are the biggest indicators of potential erosion causes in these areas.

Sedimentation areas were identified by stakeholders and by examining available satellite imagery/aerial photography and LIDAR data. The LIDAR and historical satellite/aerial imagery data were analyzed using GIS to identify elevation or contour changes around the reservoir to identify areas of sediment accumulation. To assess potential causes for sediment introduction to the system, land use classifications were analyzed for the Little Tallapoosa River basin in 2001 and compared to 2016. The GIS analysis was supported by field observations to verify sedimentation areas. Each of these areas were surveyed for nuisance aquatic vegetation during the 2020 growing season (Alabama Power 2021).

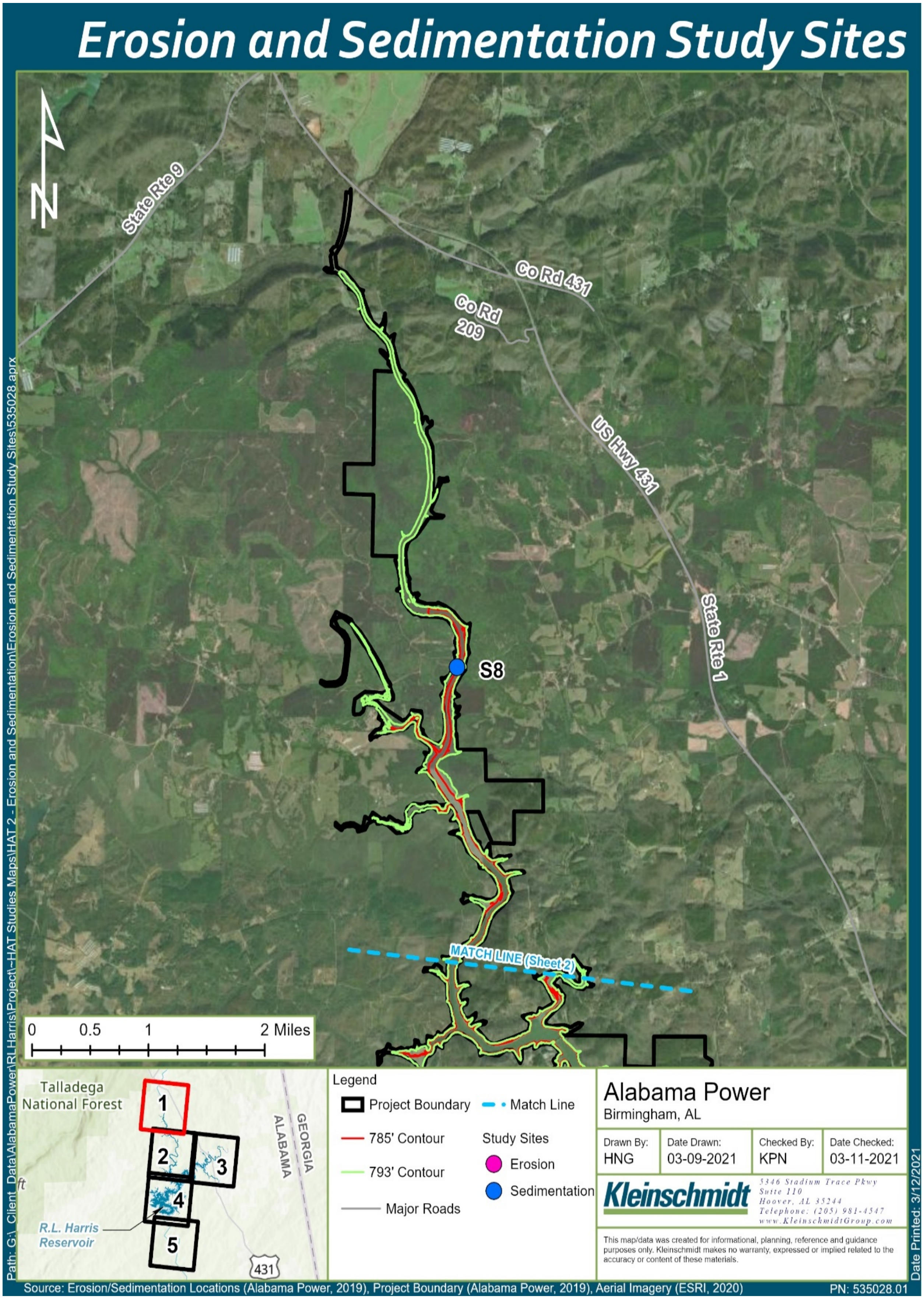



**FIGURE 2-1 LAKE HARRIS EROSION AND SEDIMENTATION SITES**

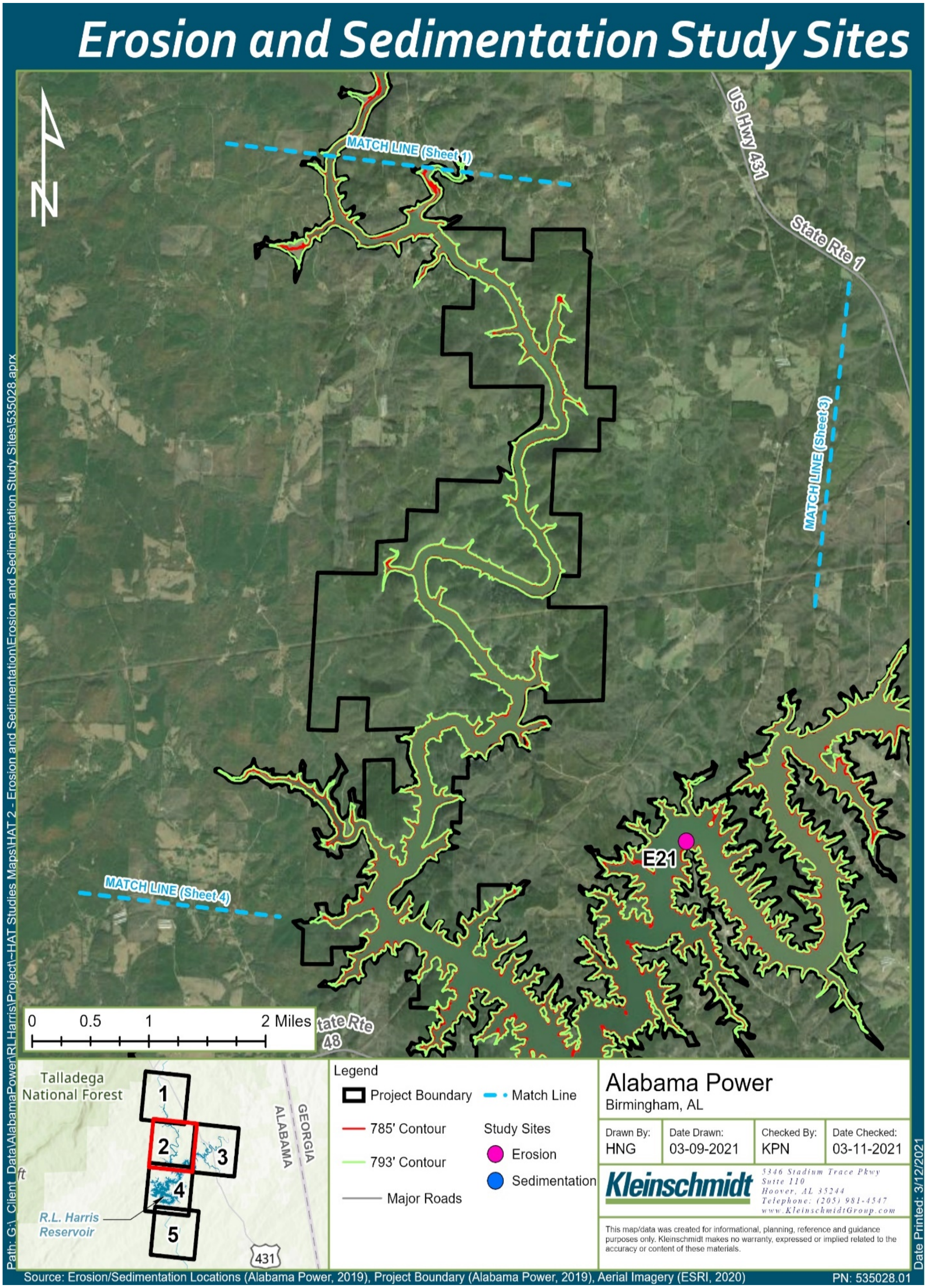



**FIGURE 2-2 LAKE HARRIS EROSION AND SEDIMENTATION SITES**

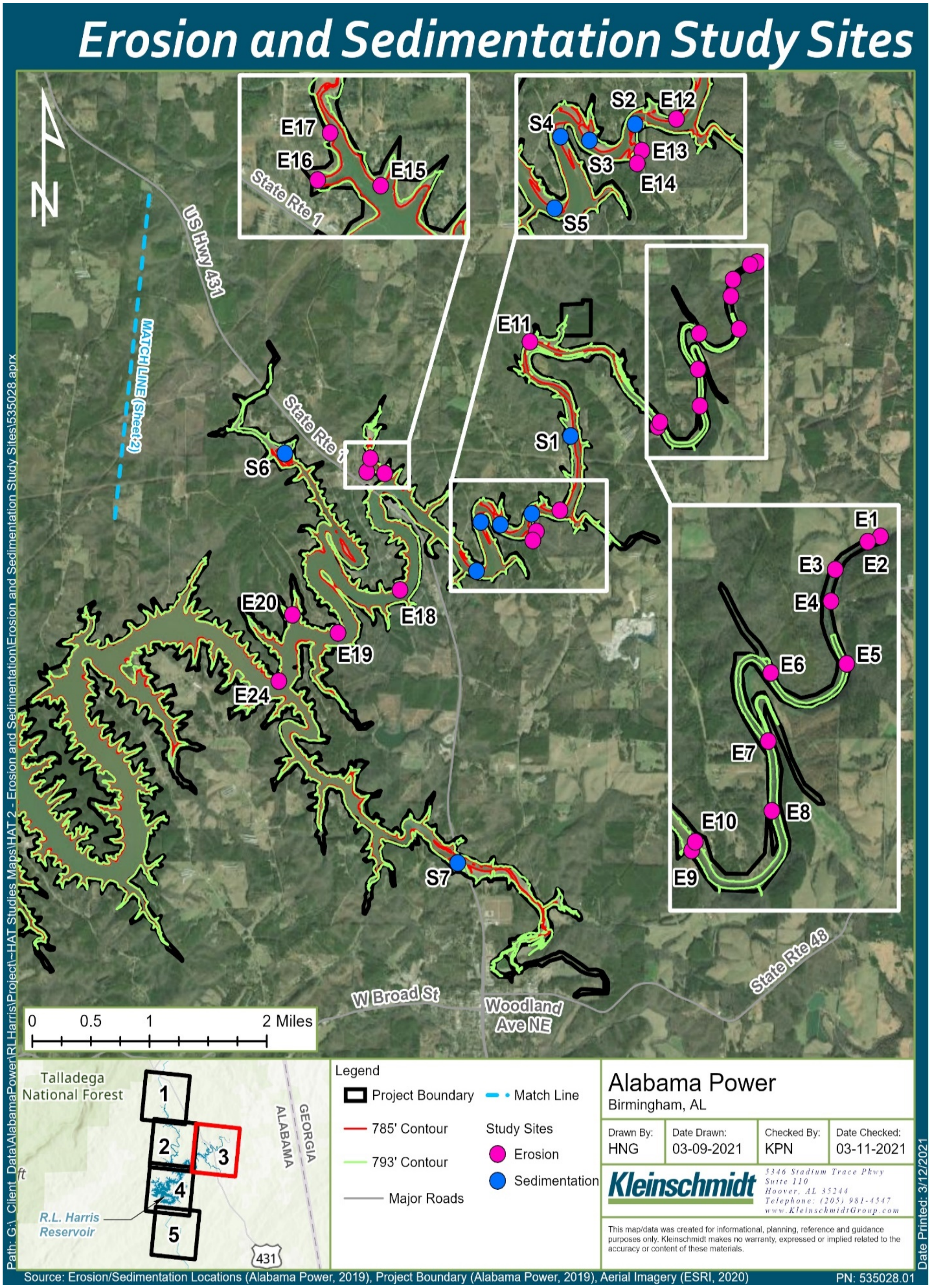



**FIGURE 2-3 LAKE HARRIS EROSION AND SEDIMENTATION SITES**

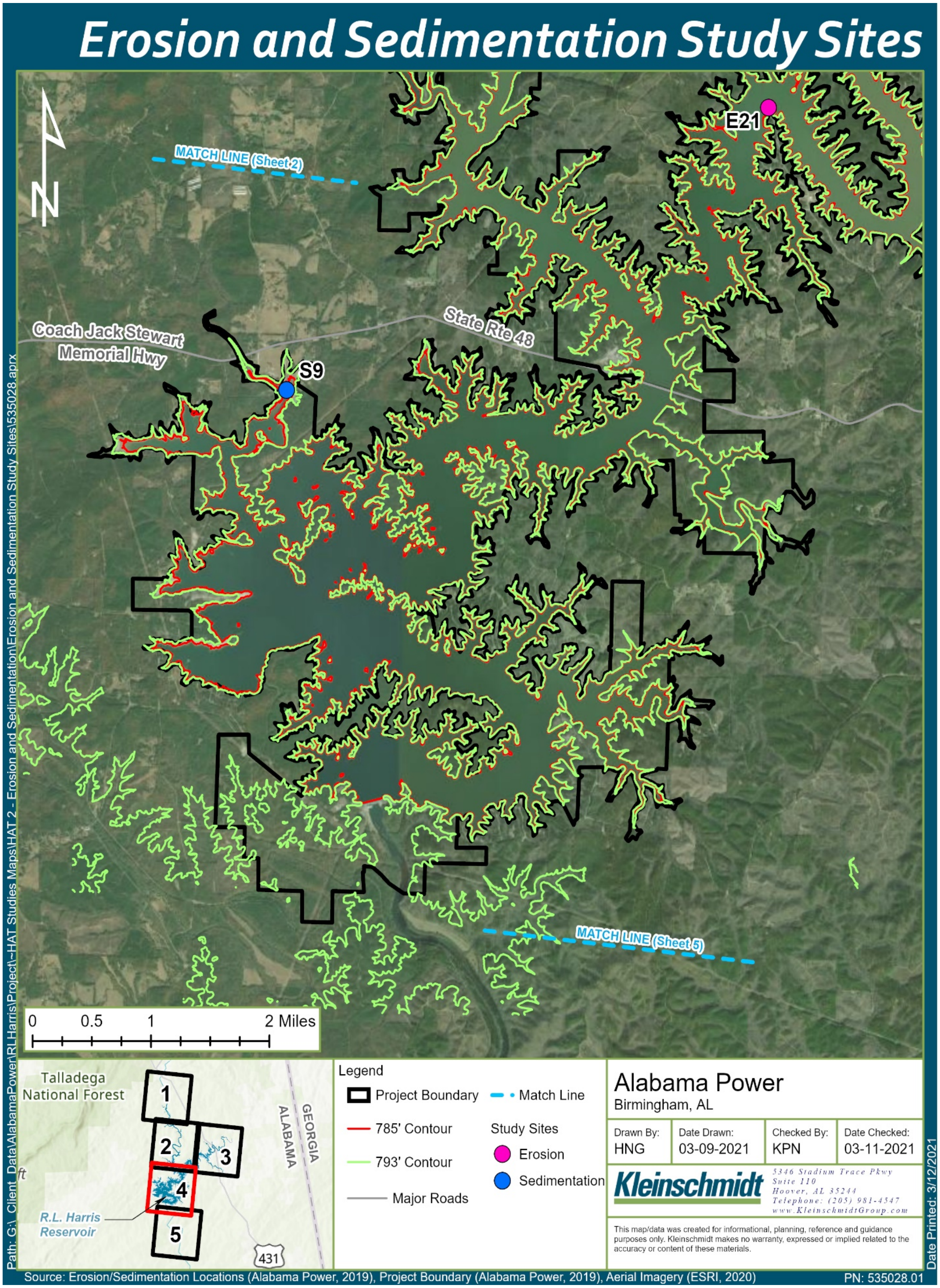



**FIGURE 2-4 LAKE HARRIS EROSION AND SEDIMENTATION SITES**

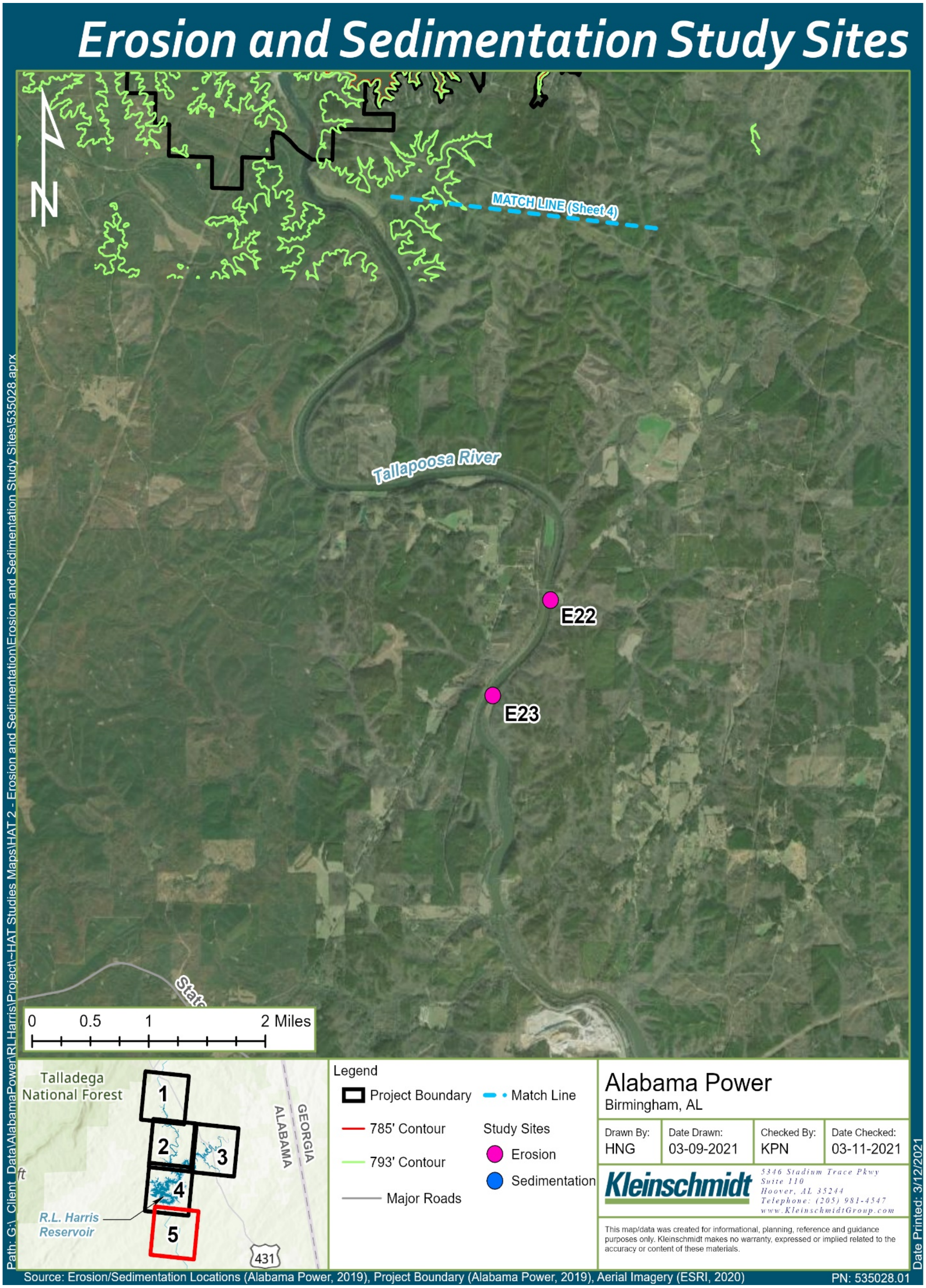



**FIGURE 2-5 TALLAPOOSA RIVER EROSION SITES**

## 2.2 RESULTS

### 2.2.1 EROSION SURVEY

Twenty-four erosion sites were identified for field assessment, and field assessments were conducted in December 2019. Each site was photographed and examined to determine the potential cause(s) of erosion. Table 2-1 summarizes the findings. No significant signs of active erosion were present at eight of the twenty-four sites (E6, E11, E12, E13, E15, E16, E17, and E20). Copies of the completed site evaluation forms are provided in Appendix C. Photographs of each erosion site are included in Appendix D. Large Scale aerial maps of each site, including the project boundary, winter, and summer pool elevation contours are provided in Appendix G.

## TABLE 2-1 SUMMARY OF LAKE HARRIS EROSION SITE ASSESSMENT

| Erosion Site | Latitude | Longitude | Potential Cause(s) of Erosion/ Sedimentation | Length (ft) | Width (ft) | Description of Exposed Soils | Adjacent Land Use |
|---|---|---|---|---|---|---|---|
| E1 | 33.39649 | -85.44412 | Natural Factor Independent of Operations, Land Use | 100 | 20 | Oc, Ochlockonee fine sandy loam | Agricultural, Exposed Roots or Root Undercutting, Leaning or Fallen Trees |
| E2 | 33.39618 | -85.44512 | Natural Factor Independent of Operations, Land Use | 150 | 20 | Oc, Ochlockonee fine sandy loam | Agricultural |
| E3 | 33.39448 | -85.44763 | Land Use | 50 | 30 | Oc, Ochlockonee fine sandy loam | Agricultural |
| E4 | 33.39253 | -85.44797 | Land Use | varying | N/A | Oc, Ochlockonee fine sandy loam | Early Successional Vegetation, Developed, Residential |
| E5 | 33.38870 | -85.44677 | Anthropogenic | 100 | 10 | Oc, Ochlockonee fine sandy loam | Unvegetated, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential |
| E6 | 33.38817 | -85.45264 | No active erosion | N/A | N/A | Oc, Ochlockonee fine sandy loam | N/A |
| E7 | 33.38399 | -85.45285 | Natural Factor Independent of Operations, Land Use | 75 | 5 | Bu, Buncombe loamy sand | Undeveloped Wooded, Exposed Roots or Root Undercutting, Leaning or Fallen Trees |
| E8 | 33.37972 | -85.45260 | Natural Factor Independent of Operations, Land Use | 100 | 10 | Bu, Buncombe loamy sand | Undeveloped Grassy |
| E9 | 33.37732 | -85.45879 | Natural Factor Independent of Operations, Land Use | 450 | 5 | LtE, Louisa stony sandy loam | Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential |
| E10 | 33.37785 | -85.45851 | Natural Factor Independent of Operations, Land Use | 150 | 5 | Oc, Ochlockonee fine sandy loam | Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees, Residential |
| E11 | 33.38727 | -85.47761 | No active erosion | N/A | N/A | Mantachie fine sandy loam | N/A |

| Erosion Site | Latitude | Longitude | Potential Cause(s) of Erosion/ Sedimentation | Length (ft) | Width (ft) | Description of Exposed Soils | Adjacent Land Use |
|---|---|---|---|---|---|---|---|
| E12 | 33.36759 | -85.47331 | No active erosion | N/A | N/A | Oc, Ochlockonee fine sandy loam | Developed |
| E13 | 33.36509 | -85.47680 | No active erosion | N/A | N/A | MaD3, Madison gravelly clay loam | Undeveloped Grassy, Roadway Embankment |
| E14 | 33.36407 | -85.47728 | Natural Factor Independent of Operations, Anthropogenic | N/A | N/A | Oc, Ochlockonee fine sandy loam | Undeveloped Wooded, Roadway Embankment |
| E15 | 33.37197 | -85.49914 | No active erosion | N/A | N/A | LgE, Louisa gravelly sandy loam | Developed, Wooded and Grassy, Residential |
| E16 | 33.37216 | -85.50173 | No active erosion | N/A | N/A | LtE, Louisa stony sandy loam | Undeveloped Grassy |
| E17 | 33.37371 | -85.50122 | No active erosion | N/A | N/A | Mt, Mantachie fine sandy loam | Undeveloped Grassy, Exposed Roots or Root Undercutting, Power Line Crossing |
| E18 | 33.35833 | -85.49693 | Land Use, Anthropogenic | 300 | 5 | LtE, Louisa stony sandy loam | Developed, Grassy |
| E19 | 33.35334 | -85.50611 | Land Use, Anthropogenic | 150 | 3 | LtE, Louisa stony sandy loam | Early Successional Vegetation, Exposed Roots or Root Undercutting, Developed Grassy |
| E20 | 33.35544 | -85.51280 | No active erosion | | | LtE, Louisa stony sandy loam | Undeveloped Grassy |
| E21 | 33.33941 | -85.55814 | Anthropogenic | 100 | 2 | MdC2, Madison gravelly fine sandy loam | Exposed Roots or Root Undercutting, Residential Grass Cutting |
| E22 | 33.19603 | -85.57649 | Natural Factor Independent of Operations, Land Use | 30 | 4 | Oc, Ochlockonee fine sandy loam | Developed, Grassy, Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees |
| E23 | 33.18490 | -85.58503 | Land Use | 400 | 10 | Oc, Ochlockonee fine sandy loam | Agricultural, Grassy, Early Successional Vegetation, Exposed Roots or Root Undercutting, Leaning or Fallen Trees |

| Erosion Site | Latitude | Longitude | Potential Cause(s) of Erosion/ Sedimentation | Length (ft) | Width (ft) | Description of Exposed Soils | Adjacent Land Use |
|---|---|---|---|---|---|---|---|
| E24 | 33.34779 | -85.51483 | Anthropogenic | 30 | 5 | DaD3, Davidson gravelly clay loam | Undeveloped Wooded, Exposed Roots or Root Undercutting, Leaning or Fallen Trees |

### 2.2.2 SEDIMENTATION SURVEY

Nine sedimentation areas were identified by stakeholders and by examining available satellite imagery/aerial photography and LIDAR data using GIS (Figure 2-6 to Figure 2-9) (Table 2-2). The identified sedimentation areas were limited to areas exposed during the winter pool draw-down due to limitations of LIDAR in measuring below water surfaces, therefore, approximate surface area for each of the identified sedimentation area were measured using contours 793 feet and 785 feet established in a 2015 LIDAR survey of the lake during the winter draw down. On December 4, 2019, Alabama Power visited all sedimentation areas that were accessible via boat to conduct field verification. These areas were surveyed for nuisance aquatic vegetation during the 2020 growing season (Appendix F). This visit coincided with the erosion survey effort. Site evaluation sheets and photos can be found in Appendices C and D, respectively.

**TABLE 2-2 SEDIMENTATION AREAS AND APPROXIMATE SIZE (ELEVATION 793 FT-785 FT)**

| Name | Latitude | Longitude | Acreage |
|---|---|---|---|
| S1 | 33.37625 | -85.4717 | 23.83 |
| S2 | 33.3672 | -85.4775 | 4.96 |
| S3 | 33.3659 | -85.4821 | 10.51 |
| S4 | 33.36622 | -85.485 | 5.49 |
| S5 | 33.36051 | -85.4856 | 6.68 |
| S6 | 33.37432 | -85.5138 | 13.55 |
| S7 | 33.32641 | -85.4885 | 26.14 |
| S8 | 33.45383 | -85.6098 | 10.59 |
| S9 | 33.30647 | -85.6286 | 18.25 |

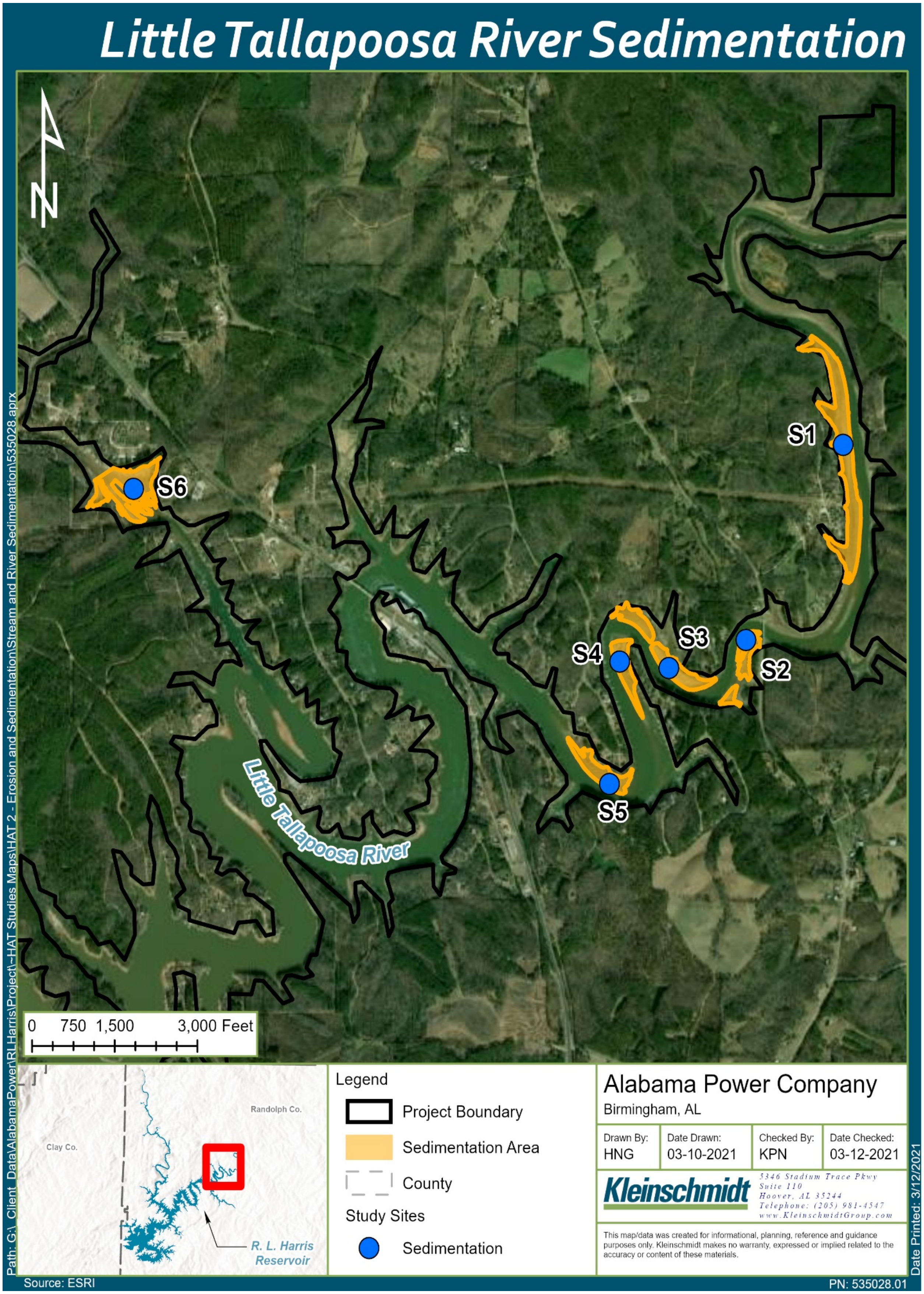



**FIGURE 2-6 LITTLE TALLAPOOSA RIVER ARM SEDIMENTATION AREAS**

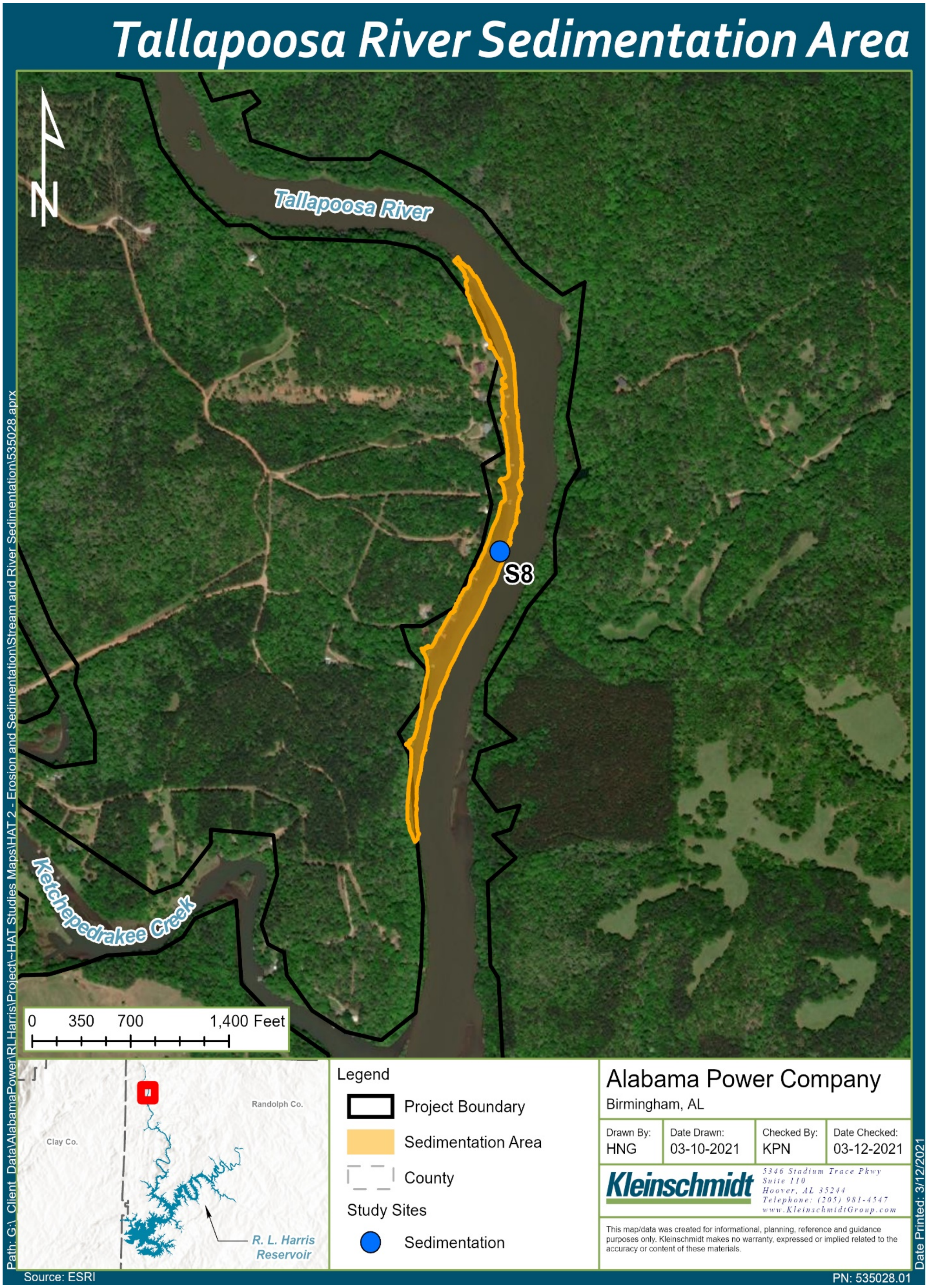



**FIGURE 2-7 TALLAPOOSA RIVER ARM SEDIMENTATION AREAS**

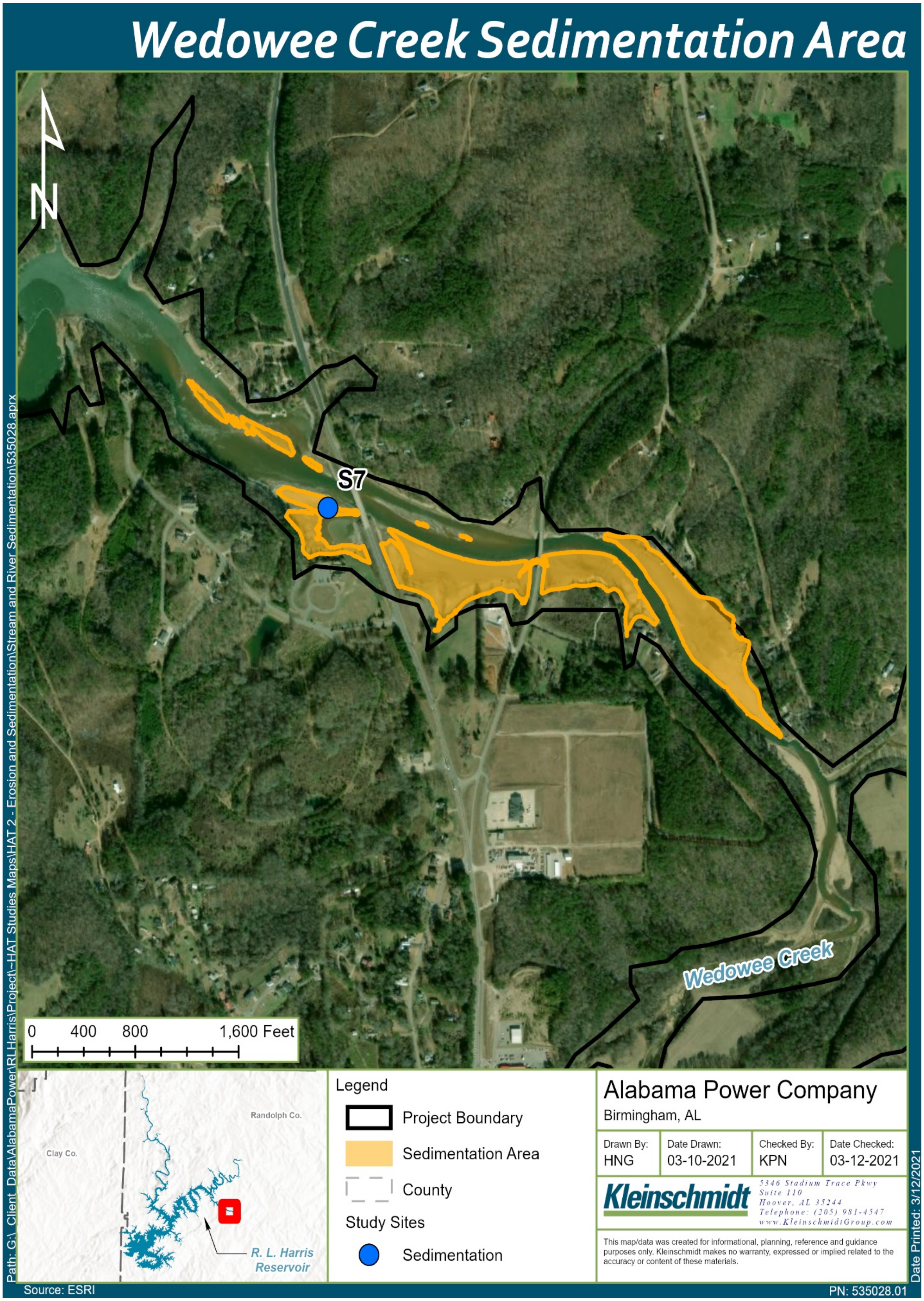



**FIGURE 2-8 WEDOWEE CREEK ARM SEDIMENTATION AREAS**

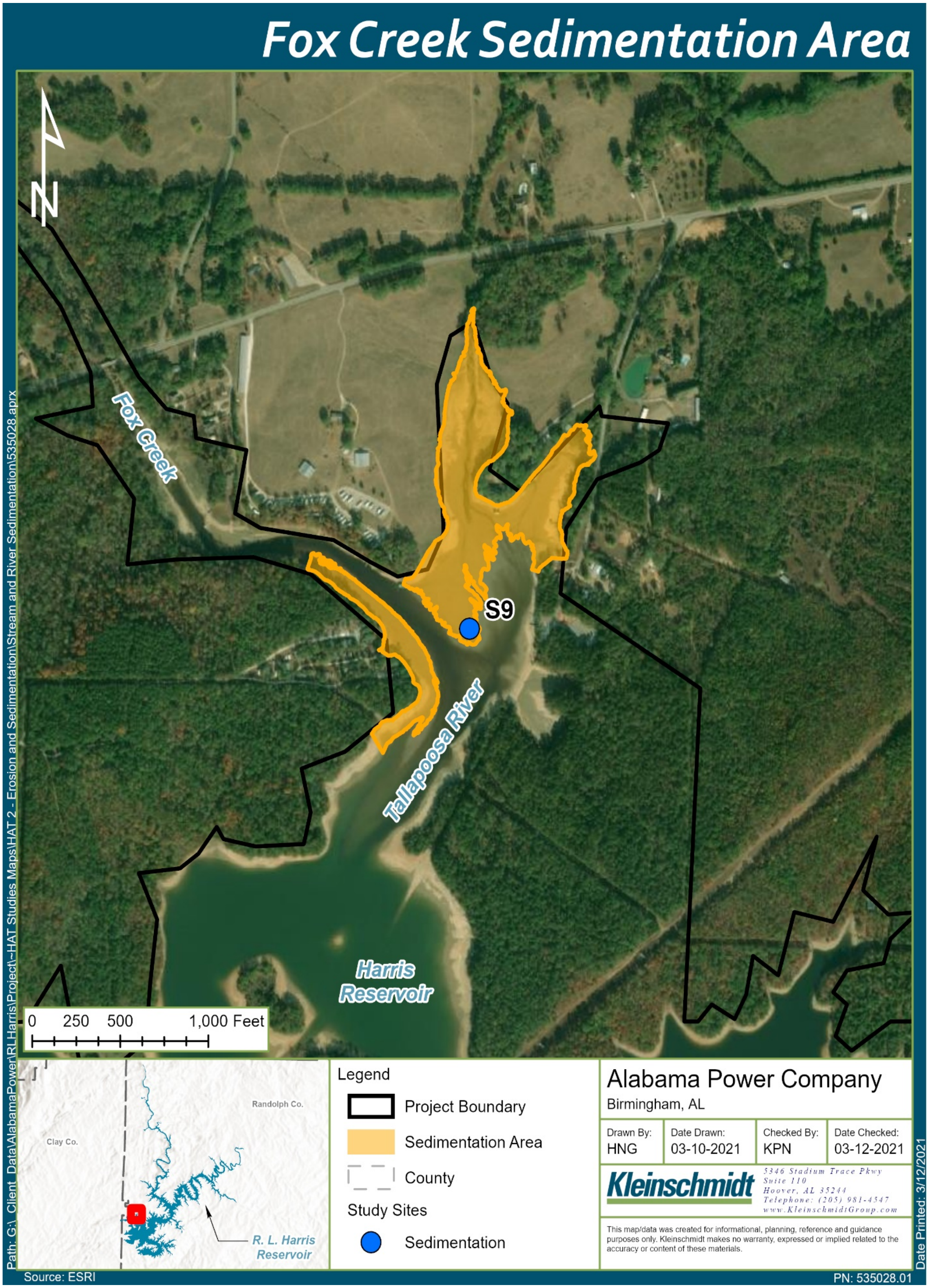



**FIGURE 2-9 FOX CREEK ARM SEDIMENTATION AREAS**

To assess the change in the sedimentation areas over time, LIDAR data collected during 2007 was compared to more recent LIDAR data collected in 2015 (Table 2-3). Surface areas, in acres, were calculated for the regions between the 786 ft and 793 ft elevation contours. Because the 785 ft elevation contour was not available from the 2007 dataset, sedimentation surface area from 2015 was calculated again using the 786 ft and 793 ft contours to allow for a like comparison. All but one of the lake sedimentation sites were larger in 2015 compared to 2007. Maps depicting the sedimentation areas analyzed at each site for the 2007 and 2015 datasets are provided in Figure 2-10 to Figure 2-18.

**TABLE 2-3 HARRIS SEDIMENTATION AREA CHANGE ANALYSIS**

| Name | 2007 Acreage | 2015 Acreage | Change (acres) | Change (%) |
|---|---|---|---|---|
| S1 | 19.28 | 19.86 | 0.58 | 3 |
| S2 | 1.29 | 1.65 | 0.36 | 28 |
| S3 | 5.40 | 6.09 | 0.69 | 13 |
| S4 | 2.47 | 3.99 | 1.51 | 61 |
| S5 | 1.51 | 4.11 | 2.60 | 172 |
| S6 | 5.55 | 6.12 | 0.57 | 10 |
| S7 | 16.47 | 17.70 | 1.23 | 7 |
| S8 | 10.08 | 9.65 | -0.42 | -4 |
| S9 | 11.44 | 11.69 | 0.26 | 2 |


**FIGURE 2-10 SEDIMENTATION AREA S1**

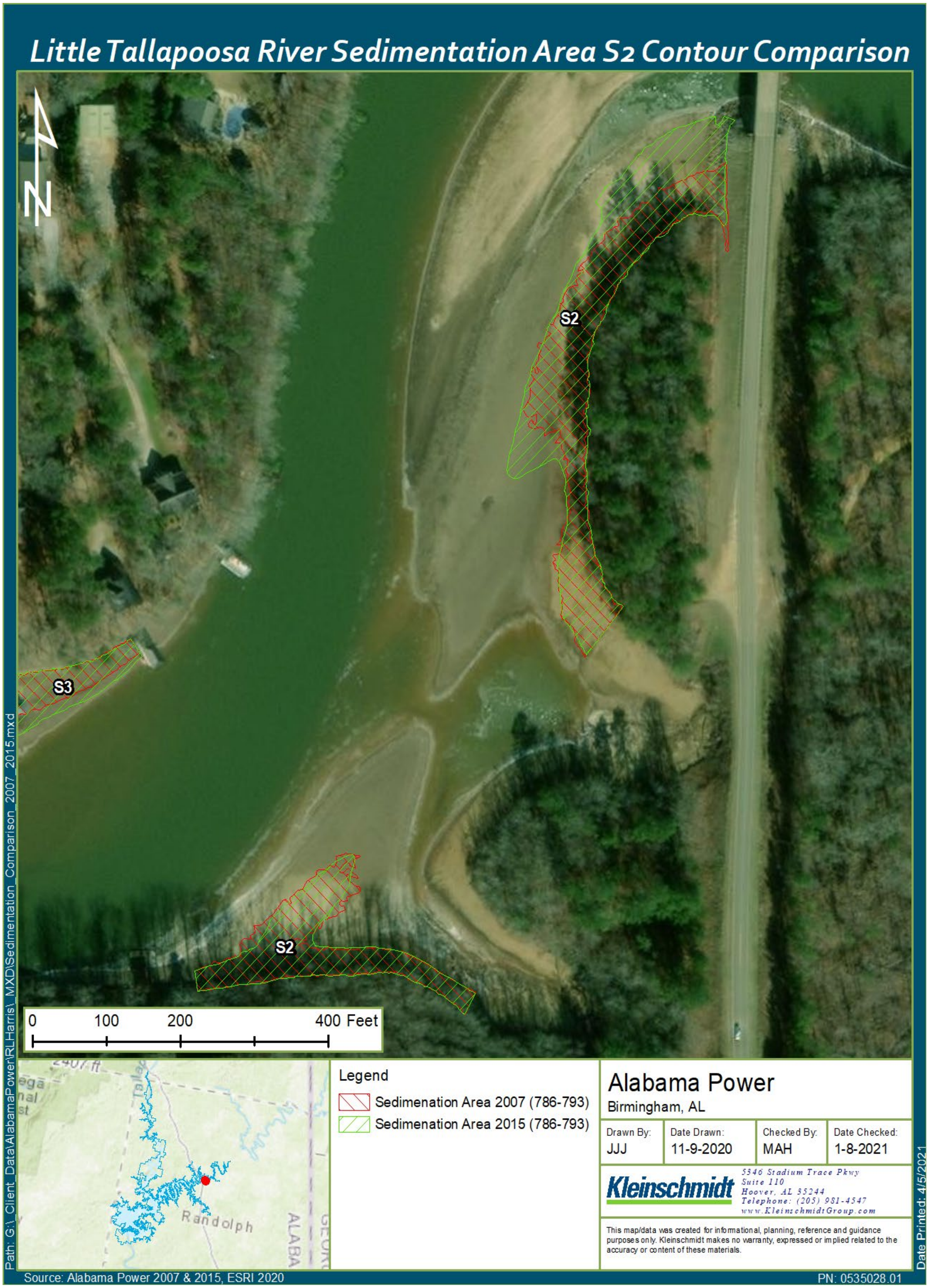



**FIGURE 2-11 SEDIMENTATION AREA S2**


**FIGURE 2-12 SEDIMENTATION AREA S3**


**FIGURE 2-13 SEDIMENTATION AREA S4**


**FIGURE 2-14 SEDIMENTATION AREA S5**

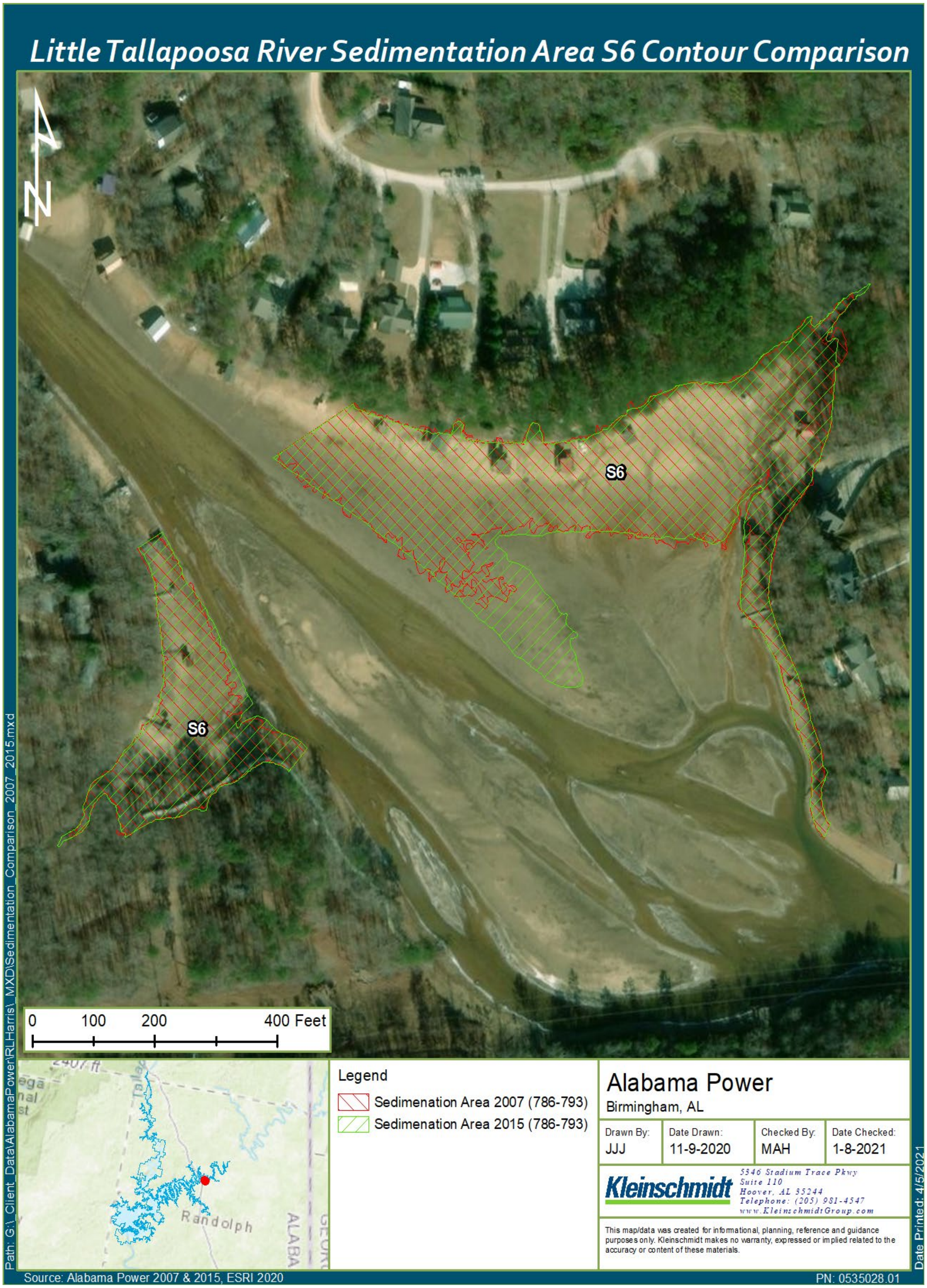



**FIGURE 2-15 SEDIMENTATION AREA S6**


**FIGURE 2-16 SEDIMENTATION AREA S7**


**FIGURE 2-17 SEDIMENTATION AREA S8**

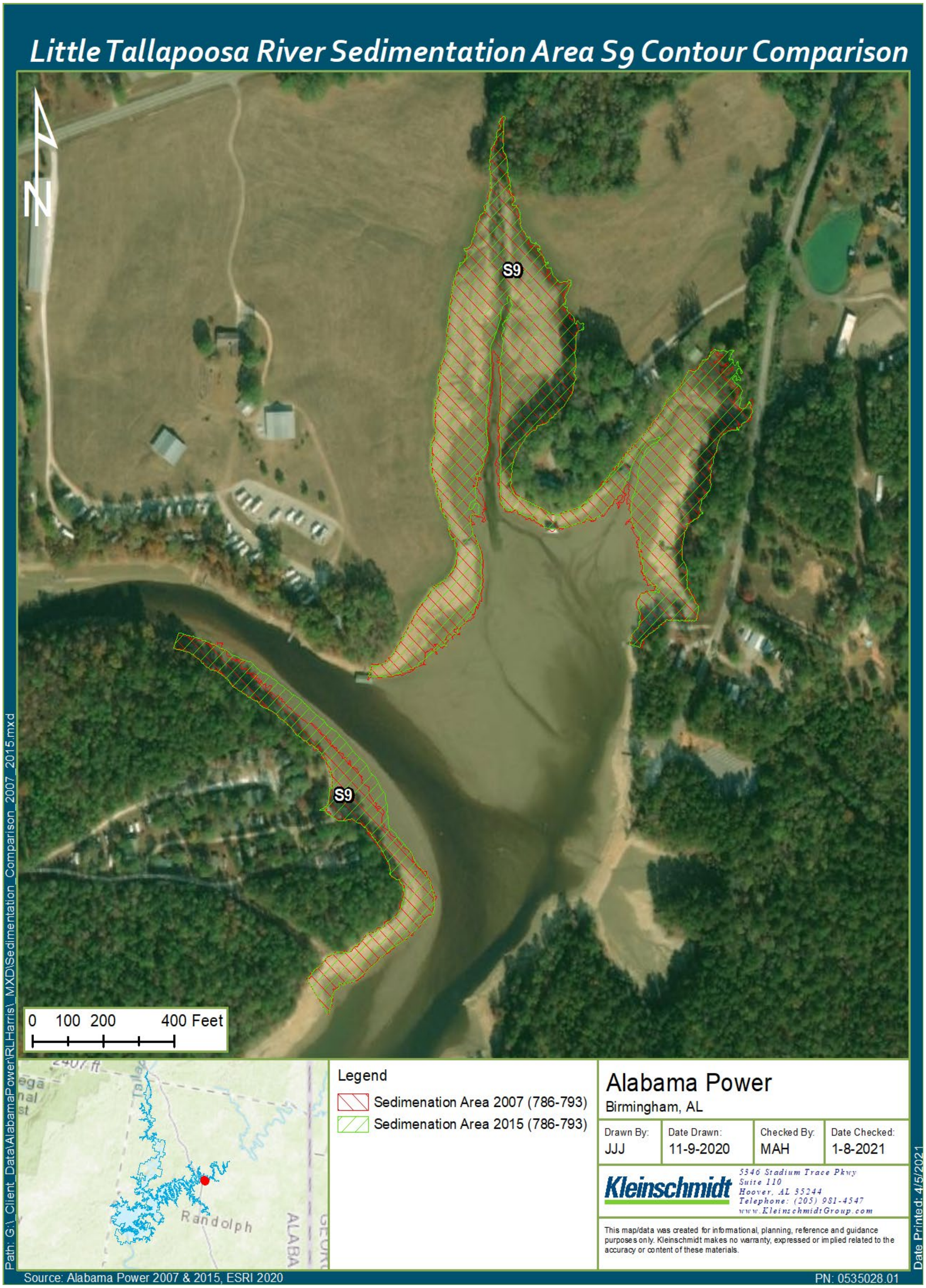



**FIGURE 2-18 SEDIMENTATION AREA S9**

Sedimentation areas on Lake Harris are primarily concentrated in the Little Tallapoosa arm, specifically where riverine flows enter the impoundment zone created by Lake Harris. To assess potential sources for sediment introduction to the system, land use classifications were analyzed for the Little Tallapoosa River basin in 2001 and compared to 2016 (Table 2-4; Figure 2-19 and Figure 2-20). Twenty-five percent of the Little Tallapoosa River basin's land use is classified as hay/pasture fields (MRLC 2019). Although this is a slight decrease from 2001, the basin has seen a loss of more than 6,000 acres of deciduous forest during the same time frame. Land clearing and conversion to agricultural fields and/or developed areas is a significant contributing factor to sedimentation in the Little Tallapoosa arm of Lake Harris. A USGS model of total phosphorus, total nitrogen, suspended sediment, and streamflow for the southeastern U.S. supports this conclusion, indicating high sediment yield for the Little Tallapoosa River basin (Hoos and Roland 2019).

**TABLE 2-4 LITTLE TALLAPOOSA RIVER BASIN NATIONAL LAND COVER DATABASE (NLCD) LAND USE CLASSIFICATIONS**

| NLCD Landcover Classification | 2001 Acreage | 2001 % | 2016 Acreage | 2016 % | 2001 to 2016 Change in Acreage |
|---|---|---|---|---|---|
| Barren Land | 1,775.6 | 0.46% | 680.4 | 0.18% | -1,095.2 |
| Cultivated Crops | 78.4 | 0.02% | 55.8 | 0.01% | -22.6 |
| Deciduous Forest | 123,507.5 | 32.16% | 117,241.3 | 30.53% | -6,266.2 |
| Developed, High Intensity | 1,224.9 | 0.32% | 1,613.5 | 0.42% | 388.6 |
| Developed, Low Intensity | 12,076.8 | 3.14% | 13,544.9 | 3.53% | 1,468.1 |
| Developed, Medium Intensity | 2,577.3 | 0.67% | 3,382.5 | 0.88% | 805.2 |
| Developed, Open Space | 20,734.5 | 5.40% | 22,599.1 | 5.89% | 1,864.6 |
| Emergent Herbaceous Wetlands | 0.0 | 0.00% | 266.6 | 0.07% | 266.6 |
| Evergreen Forest | 70,452.0 | 18.35% | 62,627.8 | 16.31% | -7,824.2 |
| Hay/Pasture | 106,940.6 | 27.85% | 98,125.5 | 25.55% | -8,815.1 |
| Herbaceous | 20,811.2 | 5.42% | 16,410.1 | 4.27% | -4,401.1 |
| Mixed Forest | 1,995.2 | 0.52% | 24,769.8 | 6.45% | 22,774.6 |
| Open Water | 6,217.0 | 1.62% | 6,244.0 | 1.63% | 27.0 |
| Shrub/Scrub | 8,341.6 | 2.17% | 10,098.5 | 2.63% | 1,756.9 |
| Woody Wetlands | 7,277.3 | 1.90% | 6,351.2 | 1.65% | -926.1 |
| **Total** | **384009.9** | **100%** | **384010.8** | **100%** | |

Source: MRLC, 2019

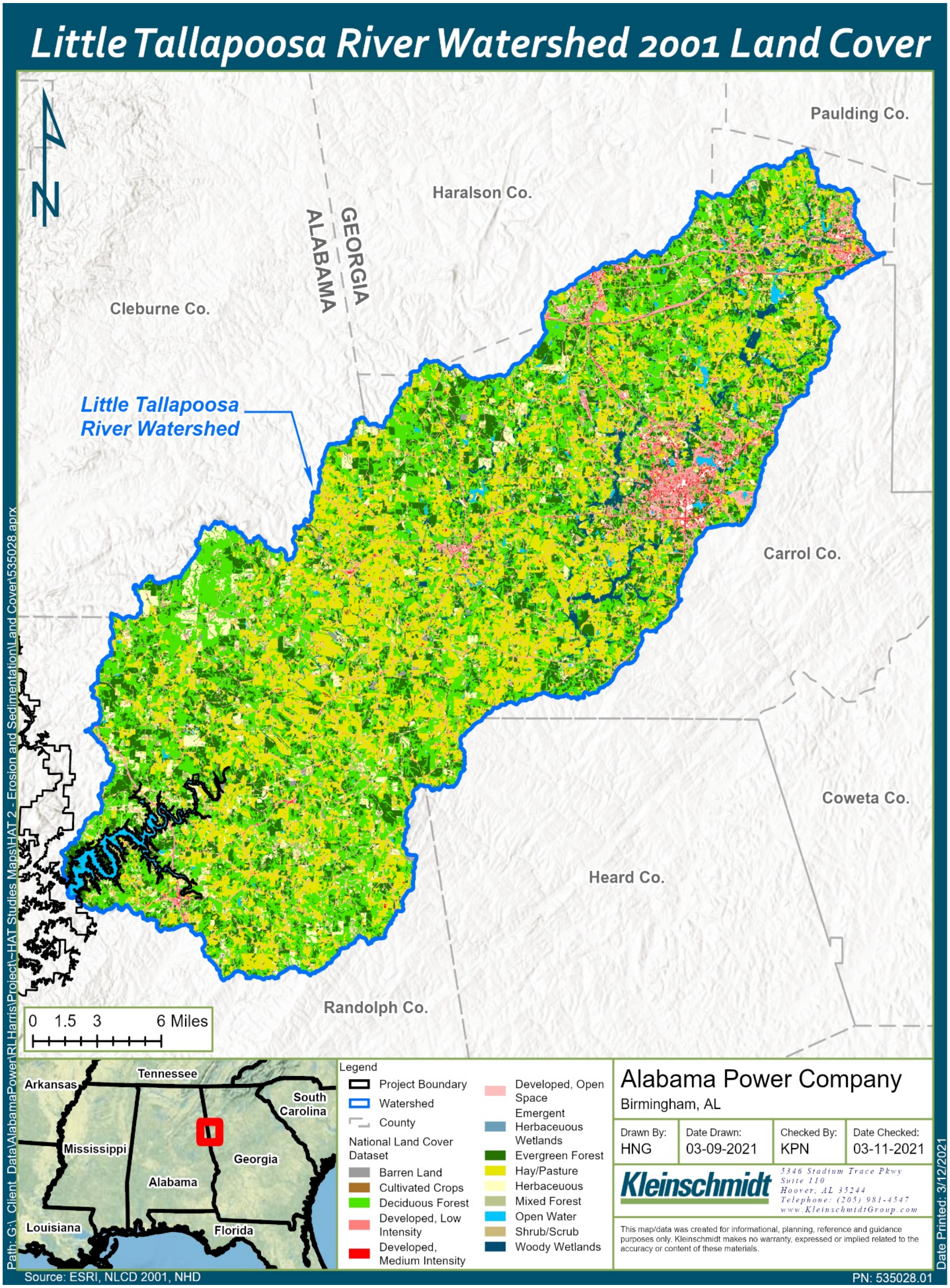



**FIGURE 2-19 LITTLE TALLAPOOSA RIVER BASIN LAND USE CLASSIFICATIONS 2001**

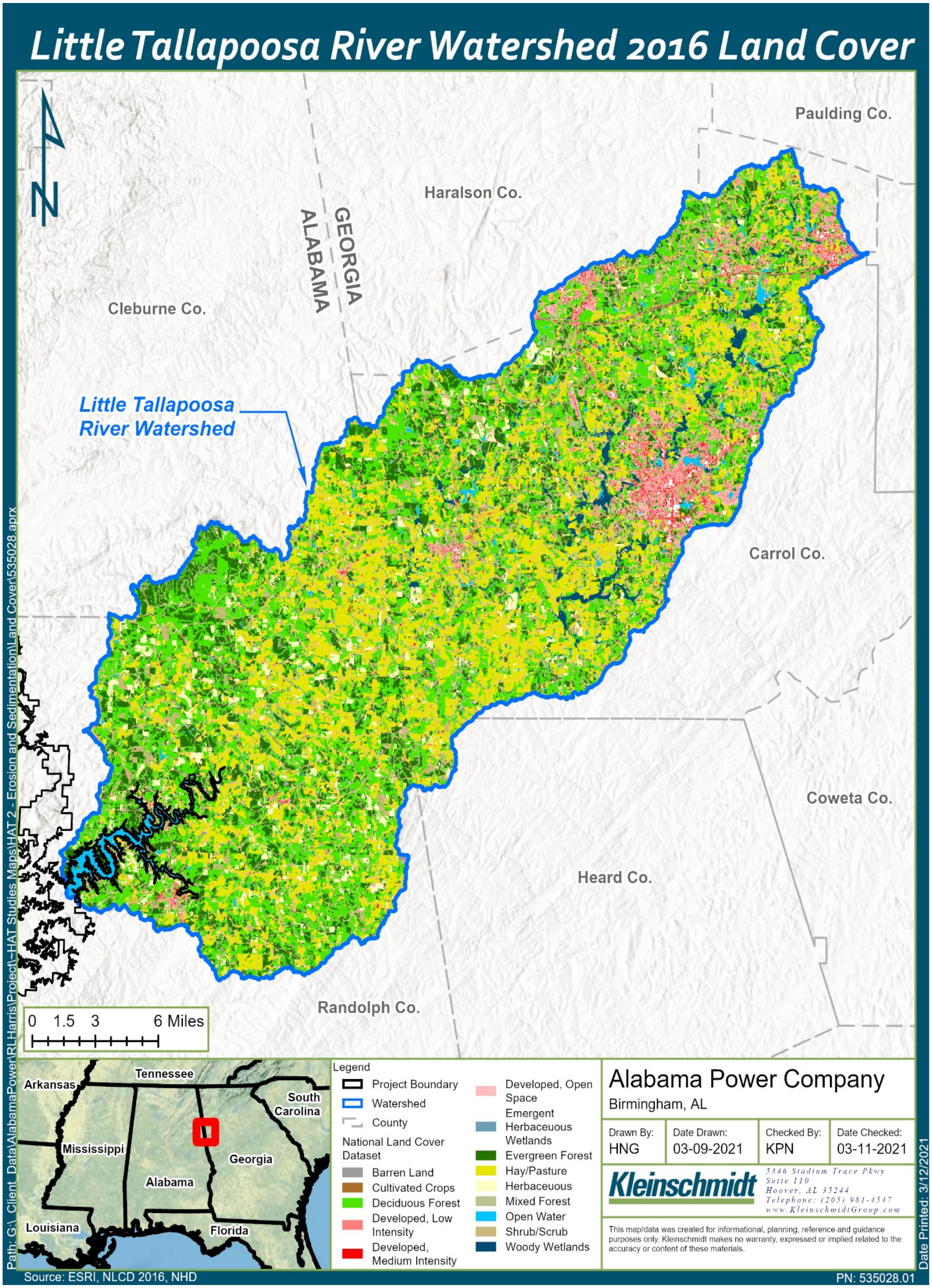



**FIGURE 2-20 LITTLE TALLAPOOSA RIVER BASIN LAND USE CLASSIFICATIONS 2016**

# 3.0 TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM

## 3.1 METHODS

Trutta Environmental Solutions (Trutta) used two boat High Definition Stream Survey (HDSS) systems to collect geo-referenced video (forward, left, and right), water depth, side-scan sonar, and high-resolution GPS information on forty-four miles of the Tallapoosa River between Harris Dam and Peters Island. The boats travelled downstream in roughly parallel tracks, with one boat closer to the left (east) bank and one closer to the right (west) bank. The dual tracklog approach was used due to the width of the river and provided high-quality imagery of instream and streambank conditions. The downstream survey results were also used to assess conditions for the two erosion sites identified by stakeholders (E22 and E23) shown in Figure 2-5.

All data were collected, organized, and classified for analysis by creating aquatic habitat GIS layers for depth and left and right streambank condition. The GPS time, location, and depth information were linked to each second of the left and right tracklogs. Therefore, video was referenced to a common location and time. The individual files were assembled to form a continuous stream-view tracklog of the Tallapoosa River[5]. The video was classified using HDSS video coder software which allowed an appropriate assessment score to be applied to each second of the video and associated GPS location. To standardize the results from the dual track surveys, the data were mapped onto a centerline so that the data collected from the separate boats along the same area of the river could be compared.

Left and right bank condition was visually assessed using the high definition video. Each streambank was viewed independently during the classification process. To avoid error due to different observers, scoring of Bank Condition was performed by a single experienced classifier from Trutta. The Bank Condition score consisted of five bank condition levels ranging from Fully Functional (1) to Non-functional (5) and were continuously assessed for the entire sampling area (Table 3-1).

Trutta also added a classification confidence to the streambank classification score. The confidence rating reflected the clarity of the streambank in the HDSS field video. The Tallapoosa River had extensive rocky shoals and in several places these shoals forced the boat operator away from the streambank resulting in decreased streambank visibility.

[5] In the Tallapoosa River from Harris Dam downstream to Peters Island.

Streambank visibility was categorized into three classifications – Good Visibility, Impaired visibility and no visibility. Most of the survey was in the Good Visibility class. Further details describing the Bank Condition scoring system can be found in the Tallapoosa River High Definition Stream Survey Final Report (Appendix E) (Trutta 2020).

**TABLE 3-1 BANK CONDITION SCORE**

| Bank Condition Score | Bank Condition Class | Description | Erosion Potential | Human Impact |
|---|---|---|---|---|
| 1 | Fully Functional | Banks with low erosion potential, such as, bedrock outcroppings, heavily wooded areas with low slopes and good access to flood plain. | Low to High | Low to High |
| 2 | Functional | Banks in good condition with minor impacts present, such as, forested with moderate bank angles and adequate access to flood plains. | | |
| 3 | Slightly Impaired | Banks showing moderate erosion impact or some impact from human development. | | |
| 4 | Impaired | Surrounding area consists of more than 50% exposed soil with low riparian diversity or surface protection. Obvious impacts from cattle, agriculture, industry, and poorly protected streambanks | | |
| 5 | Non-functional | Surrounding area consists of short grass or bare soil and steep bank angles. Evidence of active bank failure with very little stabilization from vegetation. Contribution of sediment likely to be very high in these areas. | | |

## 3.2 RESULTS

Streambank condition point data collected during the Trutta survey was averaged into 0.1-mile (161 m) segments to help facilitate the assessment of bank stability and erosion susceptibility. Using this data, Trutta developed a ranking system to understand specific areas of failing streambanks on the Tallapoosa River (Table 3-2 and Figure 3-1). Of the 875 0.1-mile segments downstream of Harris Dam, only fifteen sites (1.7%) had bank condition scores greater than three, i.e., slightly impaired or worse. Notably, only one area scored as impaired to non-functional. This area was located on the right bank at river mile

16.7 (Figure 3-2). This area also included several segments that scored slightly impaired to impaired. Trutta's report is provided in Appendix E.

The downstream survey results included conditions for erosion sites 22 and 23 shown in Figure 2-5. These sites were also assessed using the same criteria as the erosion sites located within Lake Harris (Appendix C). Both sites were confirmed to have areas of erosion potentially caused by adjacent land use/clearing and riverine processes (Figure 3-3 and Figure 3-4). The streambank condition class for both areas was "slightly impaired," and confidence (i.e., clarity of the areas in the HDSS video used to assess streambank condition) was classified as "Good Visibility."

Based on water level monitoring data gathered during the Downstream Aquatic Habitat Study (Kleinschmidt 2021), water levels fluctuate, on average, between three and five feet daily within the first 14 river miles downstream of Harris. These fluctuations attenuate with increasing distance below Harris Dam, averaging between one and two feet daily near Horseshoe Bend (43 river miles downstream). Importantly, there does not appear to be a correlation between impaired streambank areas identified in the Trutta survey and amount of water level fluctuation experienced within those areas.

**TABLE 3-2 TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM: 15 MOST IMPAIRED STREAMBANK AREAS**

| Bank | River Mile Downstream of Harris Dam | Condition Score[6] | Latitude | Longitude |
|---|---|---|---|---|
| Right Bank | 7.7 | 3.57 | 33.1919 | -85.5791 |
| Left Bank | 10 | 3.22 | 33.1625 | -85.5843 |
| Right Bank | 16.3 | 3.35 | 33.0859 | -85.5483 |
| Right Bank | 16.4 | 3.18 | 33.0848 | -85.5486 |
| Right Bank | 16.5 | 3.55 | 33.084 | -85.5494 |
| Right Bank | 16.6 | 3.96 | 33.0836 | -85.5509 |
| Right Bank | 16.7 | 4.45 | 33.0833 | -85.5526 |
| Right Bank | 16.9 | 3.2 | 33.0826 | -85.5561 |
| Left Bank | 17.9 | 3.09 | 33.0707 | -85.5648 |
| Left Bank | 19.2 | 3.11 | 33.0612 | -85.5551 |
| Left Bank | 20.6 | 3.05 | 33.0503 | -85.5547 |
| Right Bank | 34.4 | 3.07 | 32.9716 | -85.6631 |
| Left Bank | 36.5 | 3.05 | 32.9568 | -85.6914 |
| Left Bank | 36.6 | 3.04 | 32.956 | -85.6928 |
| Right Bank | 43.8 | 3.17 | 32.9845 | -85.7515 |

Source: Trutta 2020

[6] Bank Condition Scores: 1-Fully Functional, 2-Functional, 3-Slightly Impaired, 4-Impaired, 5-Non-Functional. (Trutta 2019).

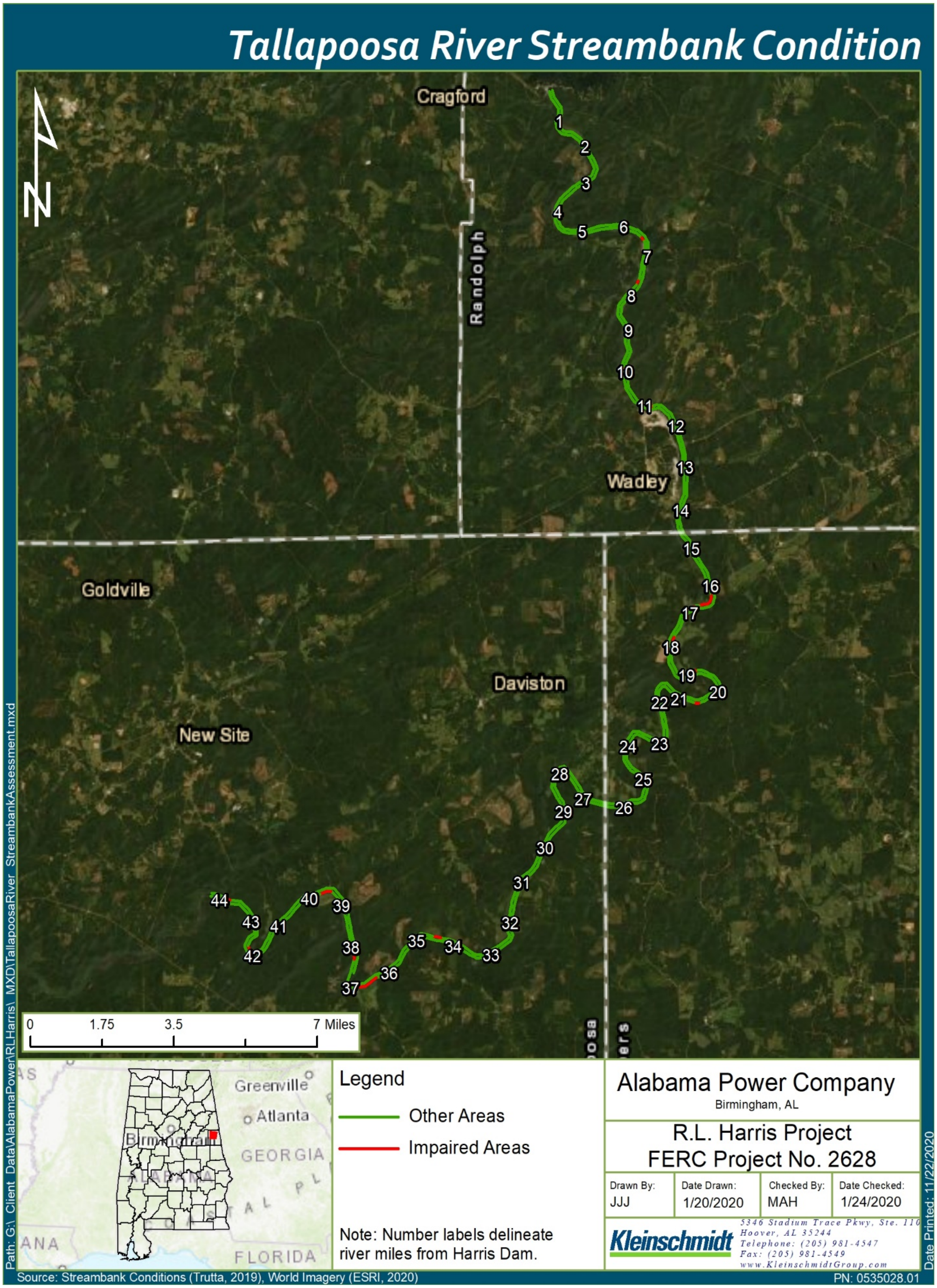



**FIGURE 3-1 TALLAPOOSA IMPAIRED STREAMBANK CONDITION AREAS**

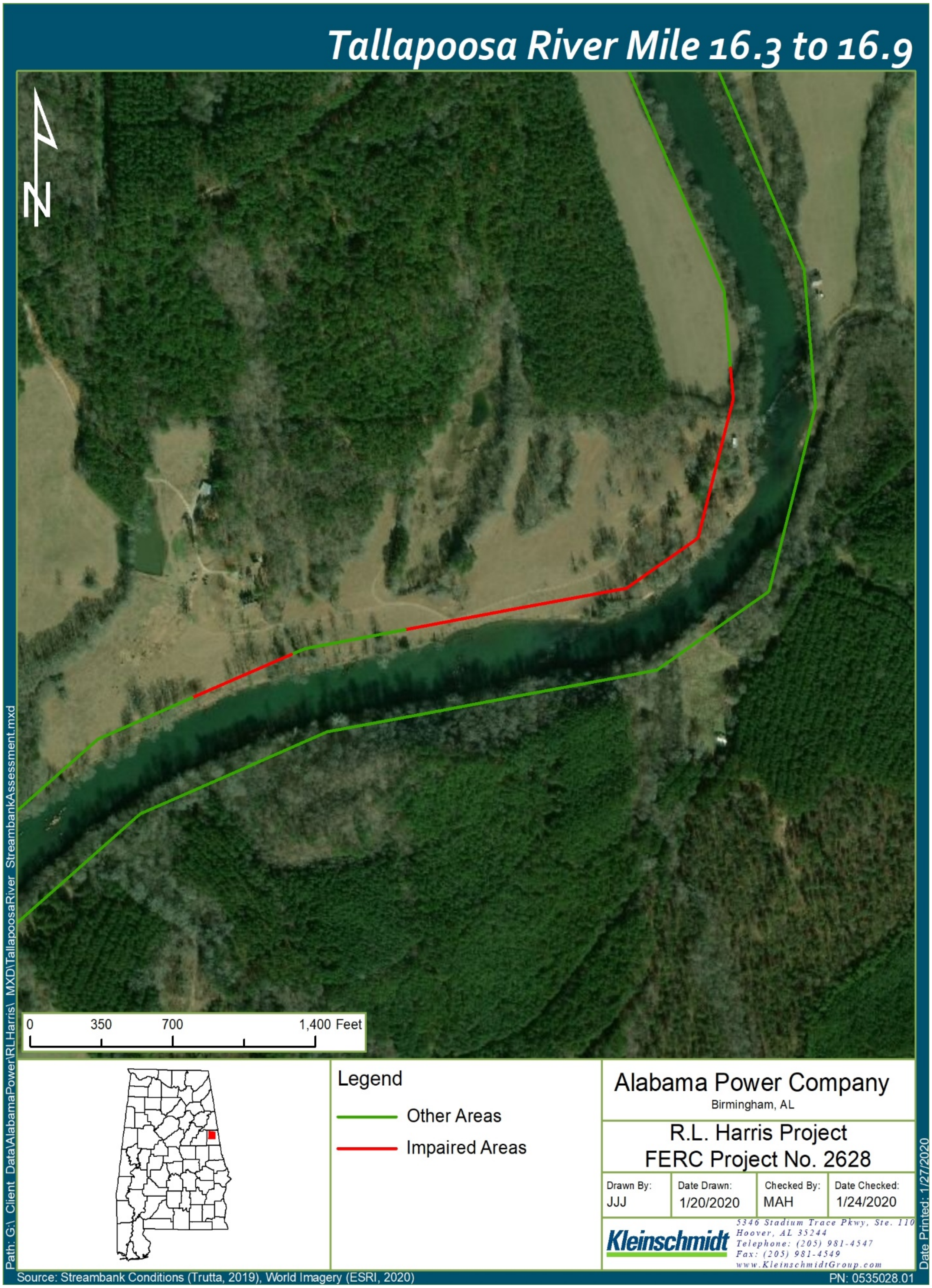



**FIGURE 3-2 TALLAPOOSA WORST STREAMBANK CONDITION AREA**

FIGURE 3-3 EROSION SITE 22 – IMAGE CAPTURE FROM HDSS SURVEY VIDEO

FIGURE 3-4 EROSION SITE 23 – IMAGE CAPTURE FROM HDSS SURVEY VIDEO

# 4.0 SKYLINE

## 4.1 METHODS

Little Coon Creek, which flows through portions of the Project Boundary at Skyline, is currently listed as impaired due to siltation. The sources of this impairment include non-irrigated crop production and pasture grazing (ADEM 2018). A GIS analysis of land use classifications within the Project Boundary at Skyline was conducted to assess the impact of agriculture on Little Coon Creek. Land use data is provided by the multi-resolution land characteristics (MRLC) consortium. The MRLC is a group of federal agencies who coordinate and generate consistent and relevant land cover information at the national scale for a wide variety of environmental, land management, and modeling applications.

## 4.2 RESULTS

A GIS analysis of land use classifications was used to assess the impact of agriculture on Little Coon Creek. A comparison of land use within the watershed boundary of Little Coon Creek was conducted using the earliest available MRLC landcover dataset (2001) and the most recent (2016) for this analysis. A summary of land use classification within the Little Coon Creek watershed in Table 4-1. This analysis shows 8.8% of land within the watershed is used for agriculture (i.e., cultivated crops and hay/pasture), a 0.8% increase from 2001 to 2016. These areas are predominately located adjacent to Little Coon Creek (Figure 4-1). The proximity of these areas to Little Coon Creek more easily allows for soils loosened due to tilling or other agricultural practices to be washed into the Creek, resulting in sedimentation of the creek bottom.

### TABLE 4-1 LITTLE COON CREEK WATERSHED LAND USE CLASSIFICATION CHANGE

| NLCD Landcover Classification | 2001 Acreage | % | 2016 Acreage | % | 2001 to 2016 Change in Acreage |
|---|---|---|---|---|---|
| Barren Land | 8.1 | 0.0% | 9.6 | 0.0% | 1.5 |
| Cultivated Crops | 257.6 | 1.3% | 394.0 | 2.0% | 136.4 |
| Deciduous Forest | 15,426.6 | 79.4% | 16,018.7 | 82.4% | 592.1 |
| Developed, Low Intensity | 22.6 | 0.1% | 22.7 | 0.1% | 0.1 |
| Developed, Medium Intensity | N/A | 0.0% | 0.2 | 0.0% | 0.2 |
| Developed, Open Space | 191.4 | 1.0% | 231.7 | 1.2% | 40.3 |
| Emergent Herbaceous Wetlands | 3.0 | 0.0% | 29.1 | 0.1% | 26.1 |
| Evergreen Forest | 273.2 | 1.4% | 188.7 | 1.0% | -84.5 |
| Hay/Pasture | 1,301.6 | 6.7% | 1,316.7 | 6.8% | 15.1 |
| Herbaceous | 261.0 | 1.3% | 32.5 | 0.2% | -228.5 |
| Mixed Forest | 874.3 | 4.5% | 783.6 | 4.0% | -90.7 |
| Open Water | 7.5 | 0.0% | 9.2 | 0.0% | 1.7 |
| Shrub/Scrub | 704.9 | 3.6% | 262.2 | 1.3% | -442.7 |
| Woody Wetlands | 102.8 | 0.5% | 141.9 | 0.7% | 39.1 |
| **Total** | **19434.6** | **100%** | **19440.7** | **100%** | |

Source: MRLC 2019

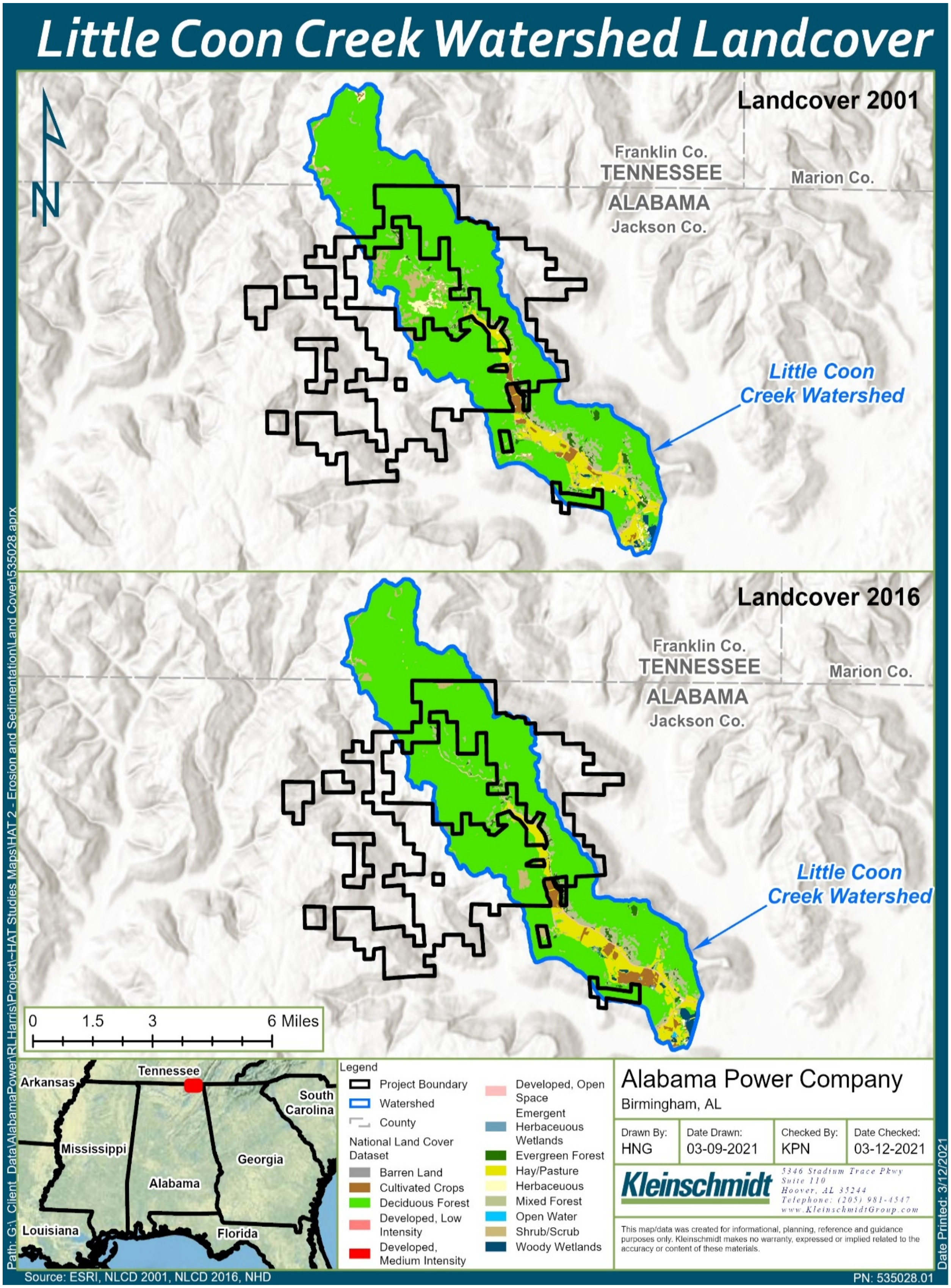



**FIGURE 4-1 LITTLE COON CREEK LAND COVER CLASSIFICATIONS**

# 5.0 DISCUSSION AND CONCLUSIONS

## 5.1 LAKE HARRIS

Of the twenty-two erosion sites identified on Lake Harris, eight sites were found to have no significant signs of active erosion. The remaining fourteen sites did show signs of active erosion; however, the erosion at these sites is occurring at or above normal reservoir elevation and were likely the result of anthropogenic and/or natural processes independent of existing project operations. Examples of anthropogenic effects include wave action due to boating activity, land clearing and landscaping, and other construction activities affecting runoff towards the reservoir (MSU 2020). Natural erosion processes observed included wind and boat generated wave action and bank scour due to channelized flows at the toe of banks. These processes would occur independently of any project operations. None of the erosion sites surveyed were likely the result of fluctuations due to project operations.

The 2,155 ft (0.4 mi) of total shoreline affected by erosion on Lake Harris represents a small percentage of the 367 miles of shoreline exposed to potential effects of project operations. The erosion that does occur is generally in areas affected by adjacent land use and local soil conditions, i.e., finer grain or sandy soils that are more susceptible to erosion. The Lake Harris shorelines are predominantly well armored due to exposed bedrock, shoreline erosion Best Management Practices (BMPs) such as rip-rap or seawalls, or undisturbed riparian habitat such as areas protected by the scenic easement enforced at Harris.

Sedimentation in Lake Harris is most pronounced in the Little Tallapoosa River arm where sediment transported from upstream settles out of the water column as water velocities decrease upon entering the reservoir. Land uses in the basin upstream of Lake Harris and adjacent to the river contribute sediment load to the upper reaches of Lake Harris. This is illustrated in the growth of all but one of the sedimentation areas identified on Lake Harris. Additional reconnaissance at identified sedimentation sites on Lake Harris during full (summer) pool conditions on August 26, 2020 determined no nuisance submerged aquatic vegetation is present. A survey report describing the methods and results of the nuisance aquatic vegetation survey is provided in Appendix F.

## 5.2 TALLAPOOSA RIVER DOWNSTREAM OF HARRIS DAM

The HDSS was performed to provide a baseline characterization of bank stability and erosion susceptibility downstream of Harris Dam. Undisturbed riparian habitat along much of the Tallapoosa River downstream of Harris Dam provides good bank stability for much of the reach. Trutta noted that many other Southeastern U.S. rivers have much more extensive bank erosion issues (Trutta 2019). The only segment of streambank scored as impaired to non-functional was found approximately 16 miles downstream of Harris Dam. This segment was adjacent to clear-cut areas with trees cleared to the bank/waterline. The observed erosion at the erosion sites identified by stakeholders (E22 and E23) is likely the result of adjacent land use and clearing of riparian plant cover destabilizing soils along the affected banks. While the erosion at these sites may be exacerbated by the frequency of fluctuations associated with regulated flow releases from Harris Dam. However, the flood control provided by Harris Dam as reduced the magnitude and frequency of large erosive events.

Whether areas of erosion are the result of project operations, flood flows, adjacent land use/anthropogenic affects, or some combination thereof can be difficult to ascertain. It is likely that some of the slightly impaired areas are being affected by river level fluctuations associated with Harris Dam operations. However, based on results of the HDSS, of the 875 0.1-mile bank segments assessed downstream of the dam, only one segment was scored greater than 4, or impaired. Only fifteen (1.7%) of the segments had bank scores greater than 3, or slightly impaired to impaired. Nineteen (2.2%) segments received a score of exactly 3, or slightly impaired. This translates to 84.1 miles (96%) of functional to fully functional streambank downstream of Harris Dam.

## 5.3 SKYLINE

At Skyline, the conversion of vegetated land to cultivated crops and hay/pastureland use adjacent to Little Coon Creek may explain the impairment noted by the Alabama Department of Environmental Management (ADEM 2018). The increase in deciduous forest within the Little Coon Creek watershed could be a positive sign going forward. Deciduous forest stream buffers have been shown to reduce nitrogen, phosphorous and sedimentation from surface water runoff into streams, lakes and estuaries (Klapproth and Johnson 2009).

# 6.0 REFERENCES

Alabama Department of Environmental Management (ADEM). 2018. 2018 Alabama §303(d) List. [Online] URL: http://adem.state.al.us/programs/water/wquality/2018AL303dList.pdf. Accessed January 20, 2020.

Alabama Power. 2018. R.L. Harris Hydroelectric Project Pre-Application Document FERC No. 2628. Alabama Power Company, Birmingham, AL.

Alabama Power and Kleinschmidt. 2021. Nuisance Aquatic Vegetation Survey Report. R.L. Harris Project. FERC No. 2628. Alabama Power Company, Birmingham, Alabama.

Hoos, A.B., and Roland, V.L. II, 2019, Spatially referenced models of streamflow and nitrogen, phosphorus, and suspended-sediment loads in the Southeastern United States: U.S. Geological Survey Scientific Investigations Report 2019–5135, 91 pp., https://doi.org/10.3133/sir20195135.

Klapproth, J.C., & Johnson, J.E. 2009. Understanding the Science Behind Riparian Forest Buffers: Factors Influencing Adoption.

Kleinschmidt Associates (Kleinschmidt). 2021. Downstream Aquatic Habitat Study Report. R.L. Harris Project, FERC No. 2628. Kleinschmidt Associates, Hoover, AL.

Michigan State University (MSU). 2020. Shoreline Erosion. [Online] URL: http://www.shoreline.msu.edu/shorelinemgt/erosion/. Accessed February 9, 2020.

Multi-Resolution Land Characteristics Consortium (MRLC). 2019. NLCD 2016 Land Cover Conterminous United States. Available: https://www.mrlc.gov/data. Accessed December 8, 2019.

Trutta Environmental Solutions (Trutta). 2019. Tallapoosa River High Definition Stream Survey Final Report. December 2019.

# APPENDIX A

# ACRONYMS AND ABBREVIATIONS

## ACRONYMS AND ABBREVIATIONS

### *A*

| | |
|---|---|
| A&I | Agricultural and Industrial |
| ACFWRU | Alabama Cooperative Fish and Wildlife Research Unit |
| ACF | Apalachicola-Chattahoochee-Flint (River Basin) |
| ACT | Alabama-Coosa-Tallapoosa (River Basin) |
| ADCNR | Alabama Department of Conservation and Natural Resources |
| ADECA | Alabama Department of Economic and Community Affairs |
| ADEM | Alabama Department of Environmental Management |
| ADROP | Alabama-ACT Drought Response Operations Plan |
| AHC | Alabama Historical Commission |
| Alabama Power | Alabama Power Company |
| AMP | Adaptive Management Plan |
| ALNHP | Alabama Natural Heritage Program |
| APE | Area of Potential Effects |
| ARA | Alabama Rivers Alliance |
| ASSF | Alabama State Site File |
| ATV | All-Terrain Vehicle |
| AWIC | Alabama Water Improvement Commission |
| AWW | Alabama Water Watch |

### *B*

| | |
|---|---|
| BA | Biological Assessment |
| B.A.S.S. | Bass Anglers Sportsmen Society |
| BCC | Birds of Conservation Concern |
| BLM | U.S. Bureau of Land Management |
| BOD | Biological Oxygen Demand |

### *C*

| | |
|---|---|
| °C | Degrees Celsius or Centrigrade |
| CEII | Critical Energy Infrastructure Information |
| CFR | Code of Federal Regulation |
| cfs | Cubic Feet per Second |
| cfu | Colony Forming Unit |
| CLEAR | Community Livability for the East Alabama Region |
| CPUE | Catch-per-unit-effort |
| CWA | Clean Water Act |

### *D*

| | |
|---|---|
| DEM | Digital Elevation Model |
| DIL | Drought Intensity Level |
| DO | Dissolved Oxygen |
| dsf | day-second-feet |

### *E*

| | |
|---|---|
| EAP | Emergency Action Plan |
| ECOS | Environmental Conservation Online System |
| EFDC | Environmental Fluid Dynamics Code |
| EFH | Essential Fish Habitat |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |

### *F*

| | |
|---|---|
| °F | Degrees Fahrenheit |
| ft | Feet |
| F&W | Fish and Wildlife |
| FEMA | Federal Emergency Management Agency |
| FERC | Federal Energy Regulatory Commission |
| FNU | Formazin Nephelometric Unit |
| FOIA | Freedom of Information Act |
| FPA | Federal Power Act |

### *G*

| | |
|---|---|
| GCN | Greatest Conservation Need |
| GIS | Geographic Information System |
| GNSS | Global Navigation Satellite System |
| GPS | Global Positioning Systems |
| GSA | Geological Survey of Alabama |

### *H*

| | |
|---|---|
| Harris Project | R.L. Harris Hydroelectric Project |
| HAT | Harris Action Team |
| HEC | Hydrologic Engineering Center |
| HEC-DSSVue | HEC-Data Storage System and Viewer |
| HEC-FFA | HEC-Flood Frequency Analysis |
| HEC-RAS | HEC-River Analysis System |
| HEC-ResSim | HEC-Reservoir System Simulation Model |
| HEC-SSP | HEC-Statistical Software Package |

| | |
|---|---|
| HDSS | High Definition Stream Survey |
| hp | Horsepower |
| HPMP | Historic Properties Management Plan |
| HPUE | Harvest-per-unit-effort |
| HSB | Horseshoe Bend National Military Park |

***I***

| | |
|---|---|
| IBI | Index of Biological Integrity |
| IDP | Inadvertent Discovery Plan |
| IIC | Intercompany Interchange Contract |
| IVM | Integrated Vegetation Management |
| ILP | Integrated Licensing Process |
| IPaC | Information Planning and Conservation |
| ISR | Initial Study Report |

***J***

| | |
|---|---|
| JTU | Jackson Turbidity Units |

***K***

| | |
|---|---|
| kV | Kilovolt |
| kva | Kilovolt-amp |
| kHz | Kilohertz |

***L***

| | |
|---|---|
| LIDAR | Light Detection and Ranging |
| LWF | Limited Warm-water Fishery |
| LWPOA | Lake Wedowee Property Owners' Association |

***M***

| | |
|---|---|
| m | Meter |
| $m^3$ | Cubic Meter |
| M&I | Municipal and Industrial |
| mg/L | Milligrams per liter |
| ml | Milliliter |
| mgd | Million Gallons per Day |
| µg/L | Microgram per liter |
| µs/cm | Microsiemens per centimeter |
| $mi^2$ | Square Miles |
| MOU | Memorandum of Understanding |

| | |
|---|---|
| MPN | Most Probable Number |
| MRLC | Multi-Resolution Land Characteristics |
| msl | Mean Sea Level |
| MW | Megawatt |
| MWh | Megawatt Hour |

***N***

| | |
|---|---|
| n | Number of Samples |
| NEPA | National Environmental Policy Act |
| NGO | Non-governmental Organization |
| NHPA | National Historic Preservation Act |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanographic and Atmospheric Administration |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NTU | Nephelometric Turbidity Unit |
| NWI | National Wetlands Inventory |

***O***

| | |
|---|---|
| OAR | Office of Archaeological Resources |
| OAW | Outstanding Alabama Water |
| ORV | Off-road Vehicle |
| OWR | Office of Water Resources |

***P***

| | |
|---|---|
| PA | Programmatic Agreement |
| PAD | Pre-Application Document |
| PDF | Portable Document Format |
| pH | Potential of Hydrogen |
| PID | Preliminary Information Document |
| PLP | Preliminary Licensing Proposal |
| Project | R.L. Harris Hydroelectric Project |
| PUB | Palustrine Unconsolidated Bottom |
| PURPA | Public Utility Regulatory Policies Act |
| PWC | Personal Watercraft |
| PWS | Public Water Supply |

***Q***

| | |
|---|---|
| QA/QC | Quality Assurance/Quality Control |

***R***

| | |
|---|---|
| RM | River Mile |
| RTE | Rare, Threatened and Endangered |
| RV | Recreational Vehicle |

***S***

| | |
|---|---|
| S | Swimming |
| SCORP | State Comprehensive Outdoor Recreation Plan |
| SCP | Shoreline Compliance Program |
| SD1 | Scoping Document 1 |
| SH | Shellfish Harvesting |
| SHPO | State Historic Preservation Office |
| Skyline WMA | James D. Martin-Skyline Wildlife Management Area |
| SMP | Shoreline Management Plan |
| SU | Standard Units |

***T***

| | |
|---|---|
| T&E | Threatened and Endangered |
| TCP | Traditional Cultural Properties |
| TMDL | Total Maximum Daily Load |
| TNC | The Nature Conservancy |
| TRB | Tallapoosa River Basin |
| TSI | Trophic State Index |
| TSS | Total Suspended Soils |
| TVA | Tennessee Valley Authority |

***U***

| | |
|---|---|
| USDA | U.S. Department of Agriculture |
| USGS | U.S. Geological Survey |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |

***W***

| | |
|---|---|
| WCM | Water Control Manual |
| WMA | Wildlife Management Area |
| WMP | Wildlife Management Plan |
| WQC | Water Quality Certification |

# APPENDIX B

# ASSESSOR CREDENTIALS

EnviroCert International, Inc.®

certifies that

**Trey Scott Stevens**

Subscribes to the Code of Ethics and Professional Conduct and has met the requirements established for the CPESC® Program as a

**Certified Professional in Erosion and Sediment Control®**

CPESC® Number: 8812

Certificate Date: August 23, 2017

Alan Black, Director, Technical Committee Chair

Robert Anderson, EnviroCert Board President

*The CPESC® Certification was established in 1983*

South Carolina

Department of Health and Environmental Control

Certifies that:

CEPSCI

**Jordan Johnson**

Successfully Completed Certification Requirements for:

**Erosion Prevention & Sediment Control Inspector**

**REG. NO.**
**13254**

**EXPIRATION**
**6/30/2023**

# APPENDIX C

# SITE EVALUATION SHEETS

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris      Date: 12-4-19

Field Personnel: [signatures]      Photo No.: 1

1. Erosion Area Location:
   ID: 1   Lat: ______   Long: ______   Time: 2:58

2. Position in Landscape:
   - ☒ Levee/Embankment
   - ☒ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 100 ft
   Width: 20ft
   Shape: ______
   Slope:
   - ☒ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☒ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☒ Other: Cows trampling bank down to river

5. Adjacent Land Use / Vegetative Cover:
   - ☒ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☒ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☒ Extreme Floods
   - ☒ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Sands

8. General Comments:
   Cows primary cause for erosion

   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☒ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris      Date: 12-4-19

Field Personnel: [signatures]      Photo No.: 2

1. Erosion Area Location:
   ID: 2   Lat: ______   Long: ______   Time: 305

2. Position in Landscape:
   - [x] Levee/Embankment
   - [x] Steep bank
   - [ ] Floodplain Terrace
   - [ ] Main Channel/Main Body of Lake
   - [ ] Cove
   - [ ] Other: ______

3. Physical Properties:
   Length: 150 ft
   Width: 90ft
   Shape: ______
   Slope:
   - [ ] Steep (> 20%)
   - [ ] Moderate (8% to 20%)
   - [ ] Gentle (< 8%)

4. Erosion Processes:
   - [x] Direct scour from river or tributary flows
   - [ ] Piping
   - [x] Slumping due to scoured toe of bank
   - [ ] Gully or rill erosion from overland flows towards lake
   - [ ] Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - [x] Agricultural
   - [ ] Undeveloped, Grassy
   - [ ] Undeveloped, Wooded
   - [ ] Road Crossing/Bridge
   - [ ] Roadway, Gravel
   - [ ] Roadway, Paved
   - [ ] Park
   - [ ] Unvegetated
   - [ ] Early successional vegetation
   - [ ] Exposed roots or root undercutting
   - [ ] Leaning or fallen trees
   - [ ] Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - [x] Extreme Floods
   - [x] Above normal high-water level
   - [ ] Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   sand

8. General Comments:
   Cows entering river eroding bank. High flows scouring bank disturbed bank.
   Riparian Zone Width: 20' (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - [ ] Project operations (water level fluctuations; maintenance/construction activities)
   - [x] Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - [x] Land use (e.g., farming, ranching, mining, development, etc.)
   - [ ] Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - [ ] Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris    Date: 12-4-19

Field Personnel: [signatures]    Photo No.: 3

1. Erosion Area Location:
   ID: 3    Lat: ______    Long: ______    Time: 3:15

2. Position in Landscape:
   - ☒ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 50 ft
   Width: 30 ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☒ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☒ Gully or rill erosion from overland flows towards lake
   - ☒ Other: Cows entering river

5. Adjacent Land Use / Vegetative Cover:
   - ☒ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☒ Extreme Floods
   - ☒ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   sands, silts

8. General Comments:
   Cows entering river, trampling bank vegetation

   Riparian Zone Width: 20 ft    (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-17-19

Field Personnel: [illegible] Photo No.: Site 4

1. Erosion Area Location:
   ID: 4 Lat: 33.392527 Long: -85.447967 Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: intermittent minor localized erosion
   Width: ______
   Shape: ______
   Slope:
   - ☒ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☒ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☒ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: Developed, residential

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☒ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Sand - clay

8. General Comments:
   Survey via drone. Bank stable despite tree clearing. Minor scour at toe of bank. Bank stabilized w/ early successional vegetation.
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations, maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: Some small areas of scour at top of bank from overland flow towards river.

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-17-19

Field Personnel: [signatures] Photo No.: Site 5

1. Erosion Area Location:
   ID: 5 Lat: 33.388696 Long: -85.446767 Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 100 ft
   Width: 10 ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☒ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☒ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☒ Unvegetated
   - ☐ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☒ Leaning or fallen trees
   - ☒ Other: residential/private property, clearcut/wooded

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☒ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   sand

8. General Comments:
   Land recently clear-cut. Overland and riparian vegetation removal destabilizing soils
   Riparian Zone Width: 0 (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☒ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: Clear-cutting by land owner destabilizing banks and soils.

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris                Date: 12-17-19

Field Personnel:                Photo No.: site 6

1. Erosion Area Location:
   ID: 6   Lat: 33.388166   Long: -85.452611   Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☒ Other: creek - river confluence

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☒ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   sand-silt

8. General Comments:
   sedimentation at confluence. banks stable and vegetated. Survey via drone
   Riparian Zone Width: wooded, undeveloped (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris                                    Date: 12-17-19

Field Personnel: [signatures]                            Photo No.: Site 7

1. Erosion Area Location:
   ID: 7   Lat: 33.383992   Long: -85.452846   Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☒ Other: confluence creek and river

3. Physical Properties:
   Length: 75 ft
   Width: ~5 ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☒ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☒ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☒ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☒ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   Survey via drone. Confluence of creek and river. Some sedimentation at confluence. Some bank erosion
   Riparian Zone Width: undeveloped area, forested (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☒ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: Natural riverine processes.

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-4-19

Field Personnel: [signatures] Photo No.: 8

1. Erosion Area Location:
   ID: 8 Lat: ______ Long: ______ Time: 2:20

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☒ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 100 ft
   Width: 10 ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☒ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☒ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☒ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☒ Extreme Floods
   - ☒ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Sand

8. General Comments:
   Tree clearing along river bank exacerbating natural erosion from river flows
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☒ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-17-19

Field Personnel: [signatures] Photo No.: Site 9

1. Erosion Area Location:
   ID: 9 Lat: 33.377324 Long: -85.458787 Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 450 ft
   Width: ~5 ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☒ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☒ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☒ Leaning or fallen trees
   - ☒ Other: Residential, grassy

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Sand - silt

8. General Comments:
   Survey via drone footage

   Riparian Zone Width: 0 (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☒ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: Bank destabilization due to tree clearing. Riprap at toe of slope

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris                                   Date: 12-17-19

Field Personnel: [signatures]                           Photo No.: Site 10

1. Erosion Area Location:
   ID: 10   Lat: 33.377848   Long: -85.458511   Time: ____

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ____

3. Physical Properties:
   Length: 150 ft
   Width: ~5 ft
   Shape: ____
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☒ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☒ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ____

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☒ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☒ Leaning or fallen trees
   - ☒ Other: residential, grassy

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☒ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   sand - silt

8. General Comments:
   Rip-rap along toe of upstream portion of bank. Survey via drone

   Riparian Zone Width: 0   (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☒ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ____

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: Clear cutting of riparian veg. destabilizing bank. Portions armored with rock. Some erosion from overland flow into river outside top of bank

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris

Date: 12-11-19

Field Personnel: [signatures]

Photo No.: 11

1. Erosion Area Location:
   ID: 11  Lat: ______  Long: ______  Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   No erosion. vegetated and stable
   
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______
   
   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-4-19

Field Personnel: [illegible] Photo No.: 12

1. Erosion Area Location:
   ID: 12 Lat: ______ Long: ______ Time: 1105

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 80ft
   Width: 1ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank (isolated)
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: developed, grassy residential

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Clay

8. General Comments:
   No erosion of note. Isolated undercutting near start of con-wall from wave action
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris    Date: 12-4-19

Field Personnel: [signature] [signature]    Photo No.: 13

1. Erosion Area Location:
   ID: 13    Lat: ____    Long: ____    Time: 10:58

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☒ Cove
   - ☐ Other: ____

3. Physical Properties:
   Length: ____
   Width: ____
   Shape: ____
   Slope:
   - ☒ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank (upstream adjacent bank)
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ____

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☒ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: roadway embankment

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ____

8. General Comments:
   Isolated undercutting @ normal high water. No erosion at site. More severe undercutting along adjacent upstream bank. Old road bed eroding.
   Riparian Zone Width: ____ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ____

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ____

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-4-19

Field Personnel: [illegible] Photo No.: 14

1. Erosion Area Location:
   ID: 14 Lat: ______ Long: ______ Time: 1053

2. Position in Landscape:
   - ☒ Levee/Embankment
   - ☒ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☒ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☒ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☒ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: Roadway, embankment

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   sand

8. General Comments:
   Base of Hwy. Drainage erosion above PBL

   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☒ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☒ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris

Date: 12-4-19

Field Personnel: [signatures]

Photo No.: 15

1. Erosion Area Location:
   ID: 15   Lat: ____   Long: ____   Time: 10:01

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ____

3. Physical Properties:
   Length: 0
   Width: ____
   Shape: ____
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ____

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: Developed, wooded and grassy residential

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ____

8. General Comments:
   No erosion, sea wall and rip rap installed on adjacent banks

   Riparian Zone Width: ____ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ____

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ____

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris    Date: 12-4-19

Field Personnel: [signatures]    Photo No.: 16

1. Erosion Area Location:
   ID: 16   Lat: ____   Long: ____   Time: 10:05

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☒ Cove
   - ☐ Other: ____

3. Physical Properties:
   Length: 10 ft
   Width: ____
   Shape: ____
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☒ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ____

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☒ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ____

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☒ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Sand

8. General Comments:
   Drainage coming into lake. Erosion above PBL.

   Riparian Zone Width: ____ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ____

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ____

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris    Date: 12-4-19

Field Personnel: [signatures]    Photo No.: 17

1. Erosion Area Location:
   ID: 17   Lat: ____   Long: ____   Time: 10:11

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☒ Cove
   - ☐ Other: ____

3. Physical Properties:
   Length: ____
   Width: ____
   Shape: ____
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ____

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☒ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: Power line crossing

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   None

8. General Comments:
   Power line crossing. No erosion of note. Slight undercutting at normal pool level
   Riparian Zone Width: ____ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ____

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ____

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris    Date: 12-4-19

Field Personnel: [signatures]    Photo No.: 18

1. Erosion Area Location:
   ID: 18   Lat: ______   Long: ______   Time: 9:45 am

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 300
   Width: 2-5 ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: Developed, Grassy

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Clay

8. General Comments:
   Collapsed ~~seawall~~ concrete sidewalk along bank

   Riparian Zone Width: 0   (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☒ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: Land clearing destabilization of shoreline, wave action undercutting bank, apparent loss of shoreline

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris                                  Date: 12419

Field Personnel: [signatures]                                  Photo No.: 19

1. Erosion Area Location:
   ID: 19     Lat: ______     Long: ______     Time: 9:35

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 150 ft
   Width: 3 ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☒ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: Developed, grassy

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Clay soil with rip-rap installation

8. General Comments:
   Seawalls along adjacent banks.

   Riparian Zone Width: 0'     (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☒ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris  Date: 12-4-19

Field Personnel: [signatures]  Photo No.: 20

1. Erosion Area Location:
   ID: 20  Lat: ____  Long: ____  Time: 9:30

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☒ Cove
   - ☐ Other: ____

3. Physical Properties:
   Length: ____
   Width: ____
   Shape: ____
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☒ Other: no erosion of note, slight undercutting of normal high water

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☒ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ____

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ____

8. General Comments:
   NO erosion of note. slight undercutting at normal summer pool due wave action
   Riparian Zone Width: 0' (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ____

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ____

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris

Date: 12-4-19

Field Personnel: [signatures]

Photo No.: 21

1. Erosion Area Location:
   ID: 21 Lat: Long: Time: 9:00

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other:

3. Physical Properties:
   Length: 100'
   Width: 2'
   Shape:
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☒ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank (minor, isolated areas)
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other:

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☒ Other: residential grass cutting w/ story

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   sands, recent rip-rap along portion of bank

8. General Comments:

   Riparian Zone Width: 20' trees (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☒ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other:

   Explain Reasoning for Potential Cause of Erosion/Sedimentation:

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris

Date: 12-17-19

Field Personnel: [signature]

Photo No.: E22

1. Erosion Area Location:
   ID: 22 Lat: ______ Long: ______ Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 30
   Width: 4
   Shape: ______
   Slope:
   - ☒ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☒ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☒ Leaning or fallen trees
   - ☒ Other: Developed, Grassy

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☒ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   silts/sands, Fine Sandy Loam

8. General Comments:
   land clearing adjacent, residential / camp area
   Riparian Zone Width: ~5 ft (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☒ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: clearing of bank vegetation in area

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-17-19

Field Personnel: [signature] Photo No.: E23

1. Erosion Area Location:
   ID: 23 Lat: ______ Long: ______ Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 400
   Width: 10
   Shape: ______
   Slope:
   - ☒ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☒ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☒ Agricultural
   - ☒ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☒ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☒ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☒ Extreme Floods
   - ☒ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Fine sandy loam

8. General Comments:
   Very little riparian veg., older growth cut down and removed for much of bank
   Riparian Zone Width: ~ 0-5 ft (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☒ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☒ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris

Date: 12/4/19

Field Personnel: [signatures]

Photo No.: 24

1. Erosion Area Location:
   ID: 24 Lat: ______ Long: ______ Time: 9:15

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: 30 ft
   Width: 5 ft
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☒ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☒ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☒ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☒ Exposed roots or root undercutting
   - ☒ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☒ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Clay, 5 ft

8. General Comments:
   undeveloped wooded area. isolated more severe erosion areas
   some undercutting along and recent banks. Busiest area late summer
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☒ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris

Date: 12-4-19

Field Personnel: [signature]

Photo No.: Sed - 1

1. Erosion Area Location:
   ID: Sed - 1 Lat: ______ Long: ______ Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   Right descending bank. sediment result of river inflow
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris  Date: 12-4-19

Field Personnel: [signature]  Photo No.: sed-2

1. Erosion Area Location:
   ID: sed-2  Lat: ______  Long: ______  Time: 11:00

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   left descending bank below bridge to Erosion pt 14 cove
   sediment result of river inflow
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris

Date: 12-4-19

Field Personnel: [signature]

Photo No.: 4-sed and 3-sed

1. Erosion Area Location:
   ID: 4-sed and 3-sed Lat: ______ Long: ______ Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   left descending bank. almost joined w/ sed-3. Sed-3 on right descending upstream. sediment result of river inflow
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-4-19

Field Personnel: [illegible signature] Photo No.: sed-5

1. ~~Erosion~~ Sed Area Location:
   ID: 5 Lat: ______ Long: ______ Time: 1038

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   Along Right Descending Bank, several docks inaccessible @ winter pool
   sed along left descending bank @ mouth of cove as well, sediment result of riverine flow
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris Date: 12-16-17

Field Personnel: [signature] Photo No.: Sed-6

1. Erosion Area Location:
   ID: 6 Lat: ______ Long: ______ Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   Could not access via boat. Survey via aerial imagery. Sedimentation result of Pineywood creek inflow.
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT
## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris    Date: 12-17-19

Field Personnel: [signature]    Photo No.: Sed - 7

1. Erosion Area Location:
   ID: Sed - 7    Lat: ______    Long: ______    Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope: ☐ Steep (> 20%) ☐ Moderate (8% to 20%) ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   Survey via aerial imagery, site inaccessible via boat.

8. General Comments:
   No local construction. Sediment from Wedowee creek inflow.

   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris    Date: 12-17-19

Field Personnel: [signature]    Photo No.: sed-8

1. Erosion Area Location:
   ID: sed-8    Lat: ______    Long: ______    Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☒ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   inaccessible via boat. survey via aerial imagery. along right descending bank. sediment result river inflow
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# R. L. HARRIS PROJECT

## EROSION & SEDIMENTATION STUDY SITE EVALUATION FORM

Water Body: RL Harris  Date: 12-17-19

Field Personnel: [signature]  Photo No.: Sed-9

1. ~~Erosion~~ Area Location:
   ID: Sed-9  Lat: ______  Long: ______  Time: ______

2. Position in Landscape:
   - ☐ Levee/Embankment
   - ☐ Steep bank
   - ☐ Floodplain Terrace
   - ☐ Main Channel/Main Body of Lake
   - ☐ Cove
   - ☐ Other: ______

3. Physical Properties:
   Length: ______
   Width: ______
   Shape: ______
   Slope:
   - ☐ Steep (> 20%)
   - ☐ Moderate (8% to 20%)
   - ☐ Gentle (< 8%)

4. Erosion Processes:
   - ☐ Direct scour from river or tributary flows
   - ☐ Piping
   - ☐ Slumping due to scoured toe of bank
   - ☐ Gully or rill erosion from overland flows towards lake
   - ☐ Other: ______

5. Adjacent Land Use / Vegetative Cover:
   - ☐ Agricultural
   - ☐ Undeveloped, Grassy
   - ☐ Undeveloped, Wooded
   - ☐ Road Crossing/Bridge
   - ☐ Roadway, Gravel
   - ☐ Roadway, Paved
   - ☐ Park
   - ☐ Unvegetated
   - ☐ Early successional vegetation
   - ☐ Exposed roots or root undercutting
   - ☐ Leaning or fallen trees
   - ☐ Other: ______

6. Hydrologic Impact Information (Erosion area affected during or by):
   - ☐ Extreme Floods
   - ☐ Above normal high-water level
   - ☐ Within range of normal water level fluctuations

7. Description of Exposed Soils including Types and Depths:
   ______

8. General Comments:
   Inaccessible via boat. Sediment result of Creek inflows. No local construction or source identified. Local agricultured fields possible source.
   Riparian Zone Width: ______ (Provide additional comments on back of sheet)

9. Potential Cause of Erosion/Sedimentation (check all that apply):
   - ☐ Project operations (water level fluctuations; maintenance/construction activities)
   - ☐ Natural factor independent of operations (e.g., seasonal flooding, riverine processes, etc.
   - ☐ Land use (e.g., farming, ranching, mining, development, etc.)
   - ☐ Anthropogenic (Foot/bike paths, vehicle traffic, waves from boats, etc.)
   - ☐ Other: ______

   Explain Reasoning for Potential Cause of Erosion/Sedimentation: ______

# APPENDIX D

# PHOTOGRAPHS OF EROSION SITES

**Erosion Site 1 – Lake Harris/Little Tallapoosa River**


**Erosion Site 2 – Lake Harris/Little Tallapoosa River**

**Erosion Site 3 – Lake Harris/Little Tallapoosa River**


**Erosion Site 4 – Lake Harris/Little Tallapoosa River**

**Erosion Site 5 – Lake Harris/Little Tallapoosa River**

**Erosion Site 6 – Lake Harris/Little Tallapoosa River**

**Erosion Site 7 – Lake Harris/Little Tallapoosa River**

**Erosion Site 8 – Lake Harris/Little Tallapoosa River**

**Erosion Site 9 – Lake Harris/Little Tallapoosa River**

**Erosion Site 10 – Lake Harris/Little Tallapoosa River**

**Erosion Site 11 – Lake Harris/Little Tallapoosa River**


**Erosion Site 12 – Lake Harris/Little Tallapoosa River**

**Erosion Site 13 – Lake Harris/Little Tallapoosa River at Old US 431**


**Erosion Site 14 – Lake Harris/Little Tallapoosa River at Old US 431**

**Erosion Site 15 – Lake Harris/Mud Creek**


**Erosion Site 16 – Lake Harris/Mud Creek**

**Erosion Site 17 – Lake Harris/Mud Creek**


**Erosion Site 18 – Lake Harris/Little Tallapoosa River**

**Erosion Site 19 – Lake Harris/Little Tallapoosa River**


**Erosion Site 20 – Lake Harris/Little Tallapoosa River**

**Erosion Site 21 – Lake Harris/Little Tallapoosa River**


**Erosion Site 22 – Tallapoosa River at Malone**

**Erosion Site 23 – Tallapoosa River approx. 1-mile Below Malone**

**Erosion Site 24 – Lake Harris/Little Tallapoosa River**

**Sedimentation Site 1 – Lake Harris/Little Tallapoosa River**


**Sedimentation Site 2 – Lake Harris/Little Tallapoosa River**

**Sedimentation Site 3 – Lake Harris/Little Tallapoosa River**


**Sedimentation Site 4 – Lake Harris/Little Tallapoosa River**

## Sedimentation Site 5 – Lake Harris/Little Tallapoosa River

## Sedimentation Site 6 – Lake Harris/Pineywood Creek

**Sedimentation Site7 – Lake Harris/Wedowee Creek**

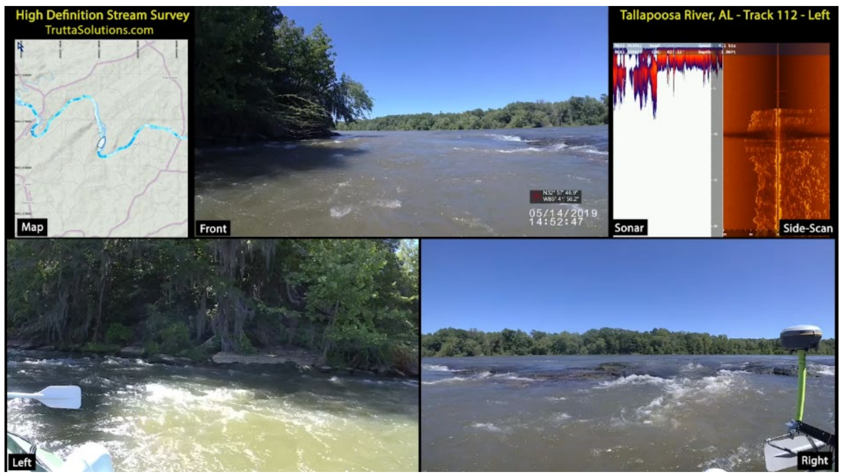
**Sedimentation Site 8 – Lake Harris/Tallapoosa River**

## Sedimentation Site 9 – Lake Harris

# APPENDIX E

# HIGH DEFINITION STREAM SURVEY REPORT

# *Tallapoosa River*
# *High Definition Stream Survey*
# *Final Report*

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*Submitted to:*
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Alabama Power Company

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## Introduction

The Tallapoosa River has a 4,675 square mile watershed that begins in Georgia and flows through eastern Alabama. There are four impoundments formed on the Tallapoosa River located just before it joins the Coosa River near Montgomery to become the Alabama River. Alabama Power Company (APC) manages these impoundments. As part of the re-licensing process for the R.L. Harris Hydroelectric Project, APC is conducting a study to identify and assess erosion and sedimentation and to determine the relationship between operations and wetted habitat in the Tallapoosa River downstream of Harris Dam. The area of focus for the Tallapoosa River is the 44-mile stretch of river below Harris Dam and continuing downstream to the Peters Island Landing (Figure 1 and Figure 2).

To better understand conditions in the Tallapoosa River study reach, APC contracted Trutta Environmental Solutions (TRUTTA) to complete a High Definition Stream Survey. In general, the HDSS approach follows a standardized series of steps which rapidly and systematically collects and processes large amounts of river condition information. TRUTTA completed both longitudinal and cross-section channel depth profiles to collect bathymetric data and streambank condition. The objectives of this project were to:

- collect duel track high-resolution, geo-referenced longitudinal surveys on 44 miles of the main channel of Tallapoosa River.
- produce stream-view video, classify left and right bank condition (on a scale of 1-5, with 1 being Fully Functional condition and 5 being Non-Functional condition), and water depth to create a database of information collected,
- analyze data by creating aquatic habitat GIS layers for left and right bank condition scores, and water depth,
- create 0.1-mile (160 m) segments of tracklog in order to average left, right and combined streambanks to prioritize the worst areas of erosion,
- complete 40 survey-grade cross sections.

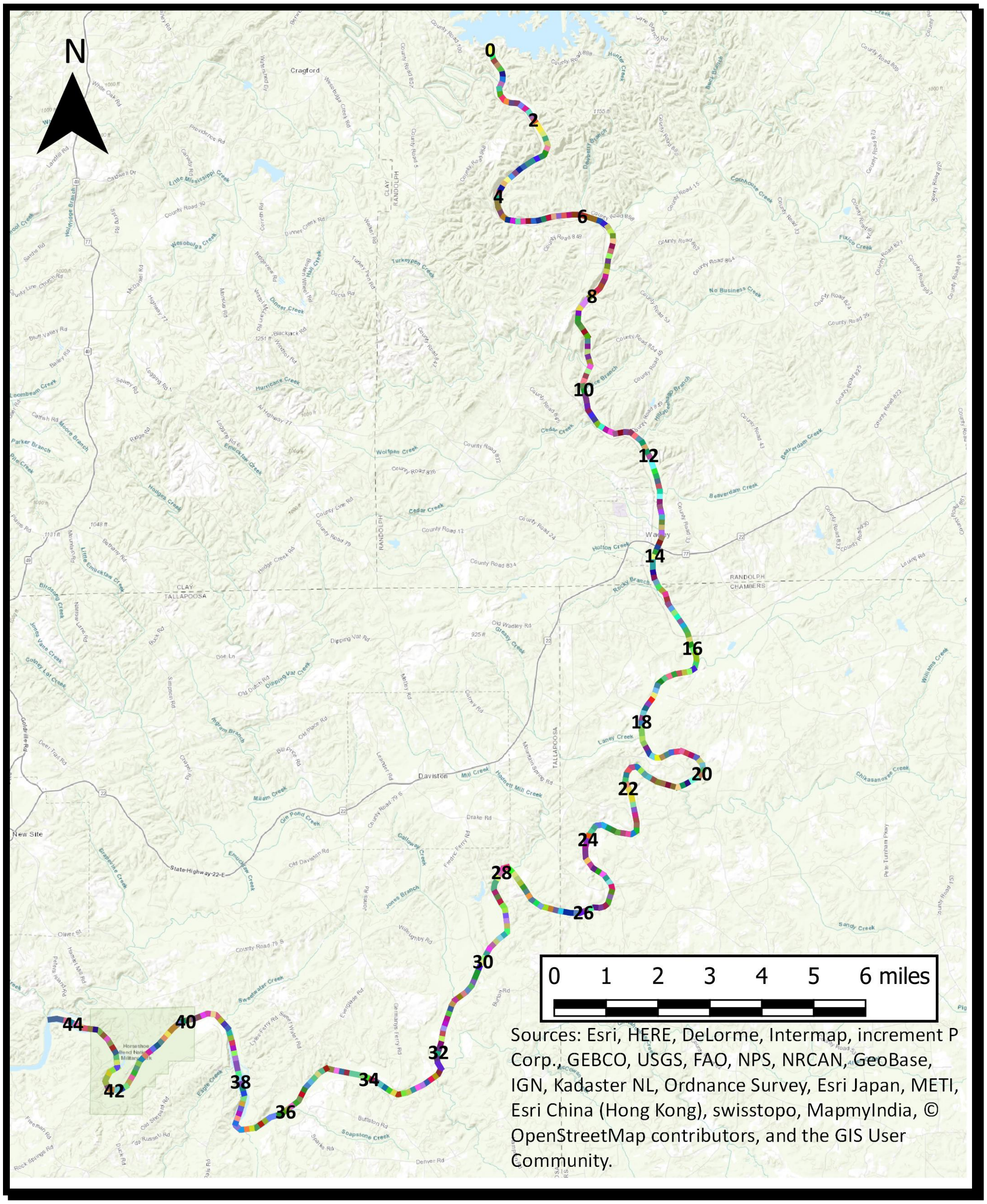



*Figure 1: Survey distance on Tallapoosa River downstream of R.L. Harris dam. Colors are 0.1 mile increments. River Miles are calculated starting at R.L. Harris Dam and going downstream.*

*Figure 2: The Tallapoosa River below the R. L. Harris Dam.*

# Methods

## *Field Methods*

### *Longitudinal and Cross-section High Definition Stream Survey*

Two boat HDSS systems collected geo-referenced video (forward, left, and right), water depth, side-scan sonar, and high-resolution GPS information on 44 miles of the Tallapoosa River. The survey started below the R. L. Harris Dam and continued to an access point at the end of Peters Island Road. The boats ran in roughly parallel tracks, with one boat closer to the left bank and one closer to the right bank. The duel tracklog approach was used due to the width of the river and provided high-quality imagery of instream and streambank conditions.

In addition to the longitudinal survey, 40 cross-section water depth transects were surveyed in the area requested by APC. The cross-section sonar recordings were linked with RTK GPS using cellphone towers as GPS base stations where network coverage allowed. We recorded the highest precision for surface water elevation for each transect and the latitude, longitude, and water depth for each GPS point on the transect.

## *Analysis*

### *Data Classification*

All data were collected, organized, and classified to analyze data by creating aquatic habitat GIS layers for depth and left and right streambank condition. The GPS time, location, and depth information were linked to each second of the left and right tracklogs. This resulted in video referenced to a common location and time. The individual files were assembled to form a continuous stream-view tracklog of the Tallapoosa River. The video was classified using HDSS video coder software which allowed an appropriate assessment score to be applied to each second of the video and associated GPS location. To standardize the results from the dual track surveys, the data were mapped onto a centerline so that the data collected from the separate boats along the same area of the river could be compared (Figure 3).

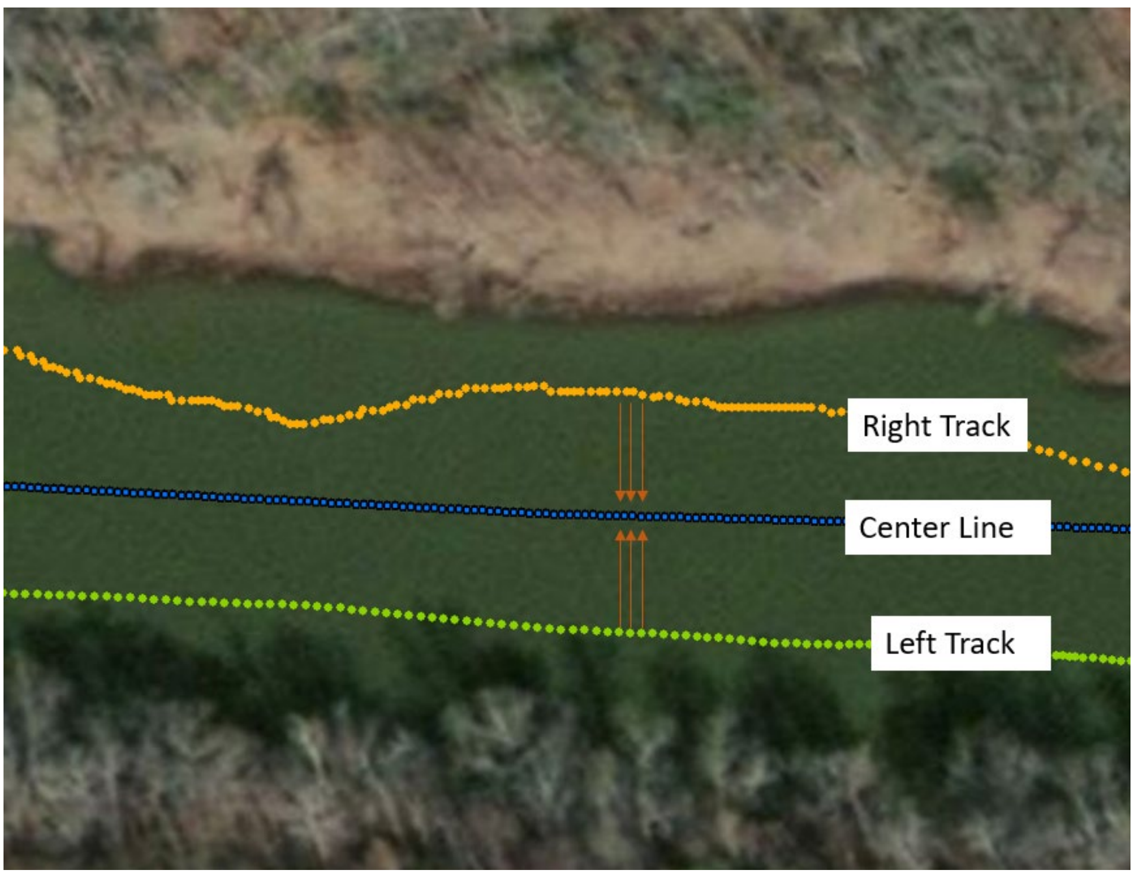



*Figure 3: Example of mapping the data from the left and right boat survey tracks to a common centerline to allow the comparison of data at a single location.*

### *Bank Condition*

Naturally occurring streambank erosion provides a direct supply of sediment to fluvial systems creating the habitats necessary to support a wide array of species. However, excessive erosion is often damaging to the riverine systems by reducing habitat heterogeneity, increasing water temperatures, lowering dissolved oxygen, and smothering and suffocating aquatic life (Wilber 2001). This excess erosion contributes to the total load in sediment impaired streams.

Multiple methods focusing on the stream bank condition and erosion potential have been used to determine the source and magnitude of stream bank erosion. The most commonly used method to assess stream bank erosion is the Bank Erosion Hazard Index (BEHI) developed by Rosgen (1996). This method requires a trained individual to collect data in the field on bank height, bank full height, root depth, root density, surface protection, and bank angle to determine its potential for erosion. The Bank Erosion Susceptibility Index (BESI) developed by Connell (2012) collects parameters similar to BEHI such as bank angle, bank height, surface protection, and riparian diversity but utilizes a Streambank Video Mapping System to visually score the habitat, allowing for a rapid assessment of erosion susceptibility at the landscape scale. Utilizing his method, Connell (2012) determined he was able to rapidly identify areas susceptible to erosion and that field time, costs, and environmental impacts were reduced.

The method used to score Bank Condition for this project was similar to BESI developed by Connell (2012) for landscape scale assessments of streambank erosion susceptibility. Bank Condition scores reflect the potential for streambank erosion or streambank failure and is a visual integration of streambank angle, height, surface protection, and riparian condition. Compared to the BEHI method developed by Rosgen (1996), our method utilized a riparian condition parameter as a surrogate for root depth and root density and data were viewed on high definition video captured from the HDSS system. Sass and Keane (2012) created and validated a similar surrogate for the BEHI root parameters while assessing streambank erosion in Kansas. Additionally, video has been used with success to determine streambank erosion rates (Hensley and Ayers 2018) and areas susceptible to erosion (Connell 2012). The major advantages of this method over traditional erosion assessments is the reduction of field time, cost, and uncertainty when extrapolating data to represent the entire river.

Left and right bank condition was visually assessed from the high definition video for both sides of the river. Each streambank was viewed independently during the classification process. To avoid error due to different observers, scoring of Bank Condition was performed by a single experienced classifier. The Bank Condition score consisted of five bank condition levels ranging from Fully Functional (1) to Non-functional (5) (Figure 4 and Table 1) and were continuously assessed for the entire sampling area.


*Figure 4: Example of the HDSS Bank Condition Scoring System.*

*Table 1: Bank Condition Scores, description and relative erosion potential and human impact.*

| Bank Condition Score | Bank Condition Class | Description | Erosion Potential | Human Impact |
|---|---|---|---|---|
| 1 | Fully Functional | Banks with low erosion potential, such as, bedrock outcroppings, heavily wooded areas with low slopes and good access to flood plain. | Low to High | Low to High |
| 2 | Functional | Banks in good condition with minor impacts present, such as, forested with moderate bank angles and adequate access to flood plains. | | |
| 3 | Slightly Impaired | Banks showing moderate erosion impact or some impact from human development. | | |
| 4 | Impaired | Surrounding area consists of more than 50% exposed soil with low riparian diversity or surface protection. Obvious impacts from cattle, agriculture, industry, and poorly protected streambanks | | |
| 5 | Non-functional | Surrounding area consists of short grass or bare soil and steep bank angles. Evidence of active bank failure with very little stabilization from vegetation. Contribution of sediment likely to be very high in these areas. | | |

### *Cross-Section Transects*

The cross-section data collected on the river was plotted in ArcGIS 10.2 to identify the cross-section points from the longitudinal points. A line was created through the points and the points were snapped to the line (Figure 5). The cross-sectional data was then assembled with a Transect ID, coordinate information for each point location, water depth, water surface elevation and the bottom elevation for each point.

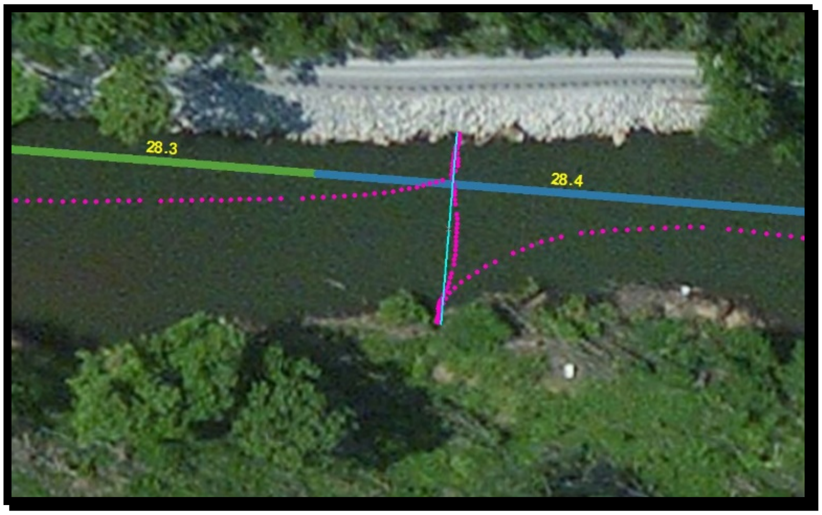



*Figure 5: Example of cross section data (magenta dots) and final line (thin, light blue line) created in post-processing. The number on the thick green and blue line refer to the river miles in 0.1 increments. This example is from the Harpeth River, TN.*

## Results

### *River Discharge*

The two flow gages most relevant to the Tallapoosa River flows were the USGS 02414500 TALLAPOOSA RIVER AT WADLEY, AL and USGS 02414715 TALLAPOOSA RIVER NR NEW SITE, AL. (HORSESHOE BEND). Prior to survey, flows were monitored to ensure relatively normal flow conditions during the survey. During the surveys, flows closer to the R. L. Harris dam had higher fluctuation than further downstream near Horseshoe Bend. (Figure 6 and Figure 7).

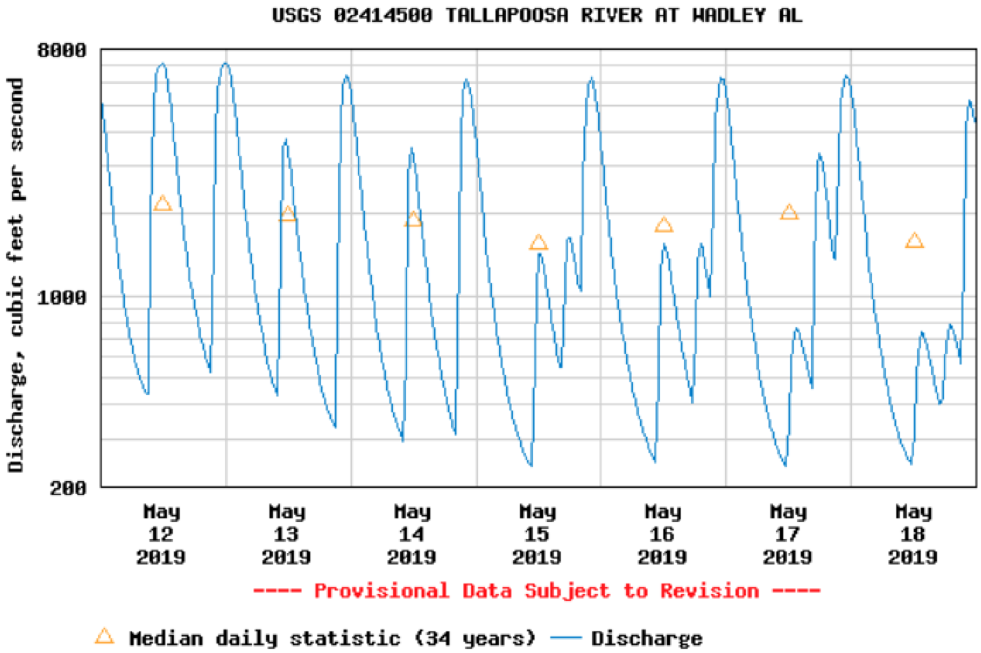



*Figure 6: USGS 02414500 TALLAPOOSA RIVER AT WADLEY, AL.*

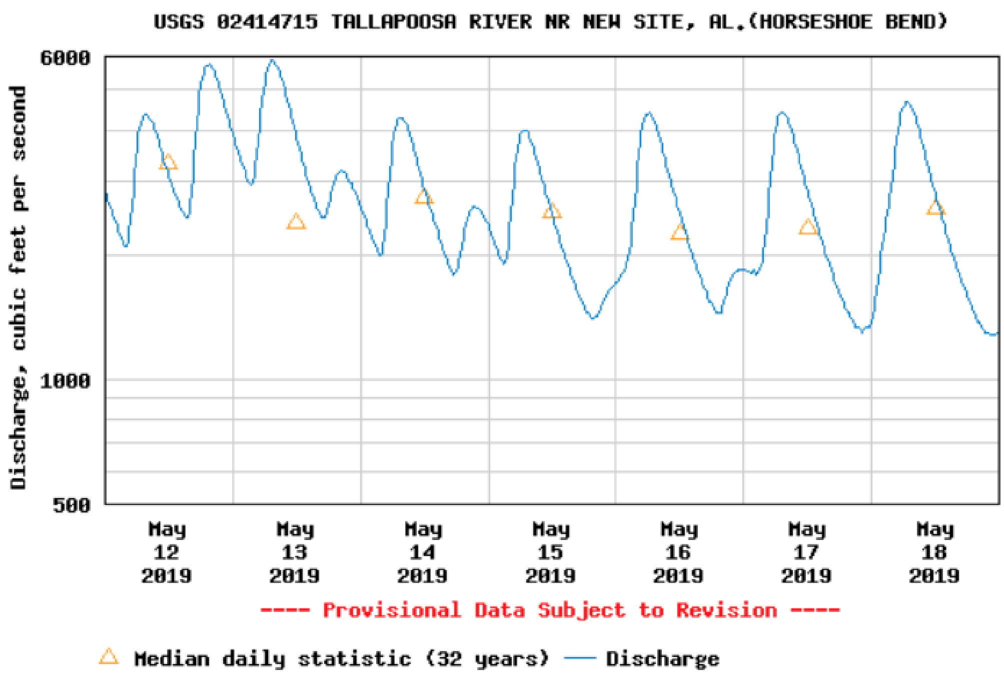



*Figure 7: USGS 02414715 TALLAPOOSA RIVER NR NEW SITE, AL. (HORSESHOE BEND).*

## *HDSS*

### *HDSS Survey*

The first objective of this survey was to document water depth and streambank conditions during the survey. We completed the surveys on 5-14-2019, 5-15-2019 and 5-16-2019. Table 2 provides the survey track number with associated start date and time. The Track number is a three-digit number that represents the Day-Boat (riverside)-Track for reference to the Video Tracks of the survey (Figure 8 and Figure 9). We used the HDSS platform to gather a right and left track to document the streambank and water depth for the full survey. We created stream-view video for both left and right survey tracks (Figure 10)

*Table 2: Survey Track collection information.*

| Track | Day | Date | Start Time |
|---|---|---|---|
| 111 | 1 | 2019-05-14 | 12:52:23 |
| 112 | 1 | 2019-05-14 | 14:17:33 |
| 113 | 1 | 2019-05-14 | 15:47:39 |
| 121 | 1 | 2019-05-14 | 12:54:36 |
| 122 | 1 | 2019-05-14 | 14:24:40 |
| 123 | 1 | 2019-05-14 | 15:59:46 |
| 211 | 2 | 2019-05-15 | 08:11:33 |
| 212 | 2 | 2019-05-15 | 10:16:40 |
| 213 | 2 | 2019-05-15 | 12:26:48 |
| 214 | 2 | 2019-05-15 | 14:06:54 |
| 221 | 2 | 2019-05-15 | 08:10:23 |
| 222 | 2 | 2019-05-15 | 10:15:52 |
| 223 | 2 | 2019-05-15 | 12:26:01 |
| 224 | 2 | 2019-05-15 | 14:06:05 |
| 311 | 3 | 2019-05-16 | 13:17:53 |
| 312 | 3 | 2019-05-16 | 14:33:49 |
| 313 | 3 | 2019-05-16 | 16:23:56 |
| 321 | 3 | 2019-05-16 | 13:17:36 |
| 322 | 3 | 2019-05-16 | 14:32:34 |
| 323 | 3 | 2019-05-16 | 16:17:40 |

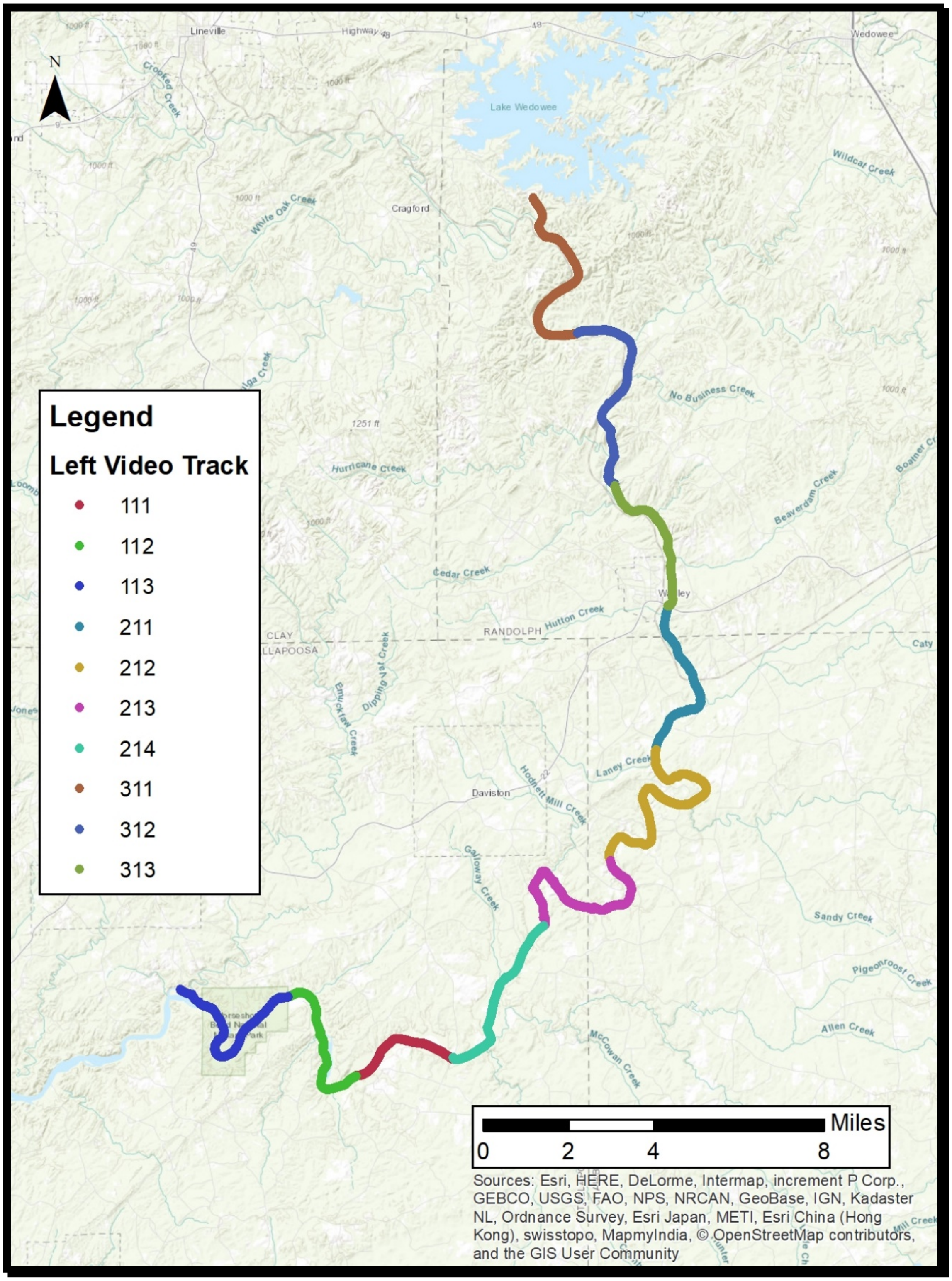



*Figure 8: Left HDSS Video Tracks for the Tallapoosa River.*

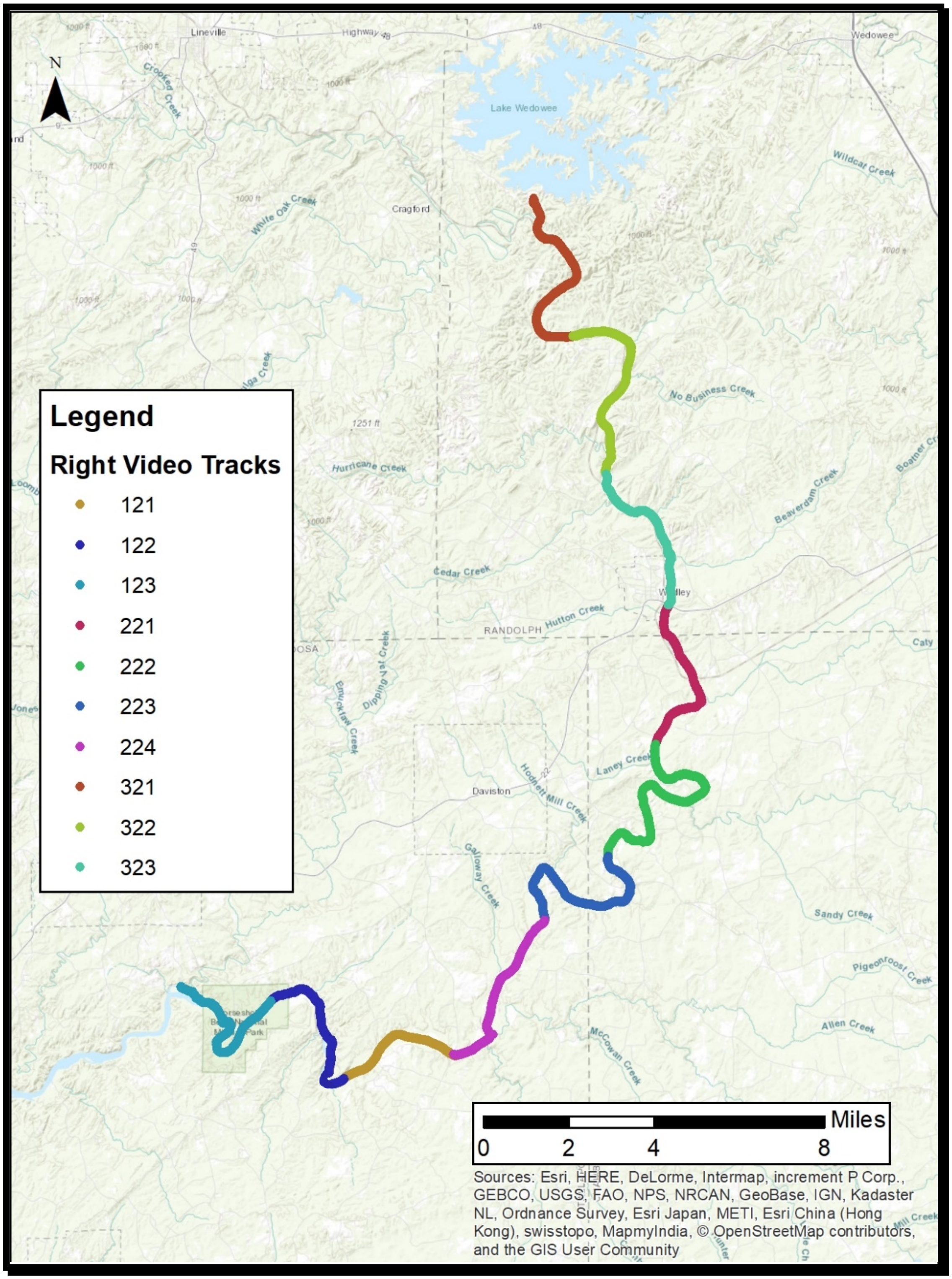



*Figure 9: Right HDSS Video Tracks for the Tallapoosa River.*

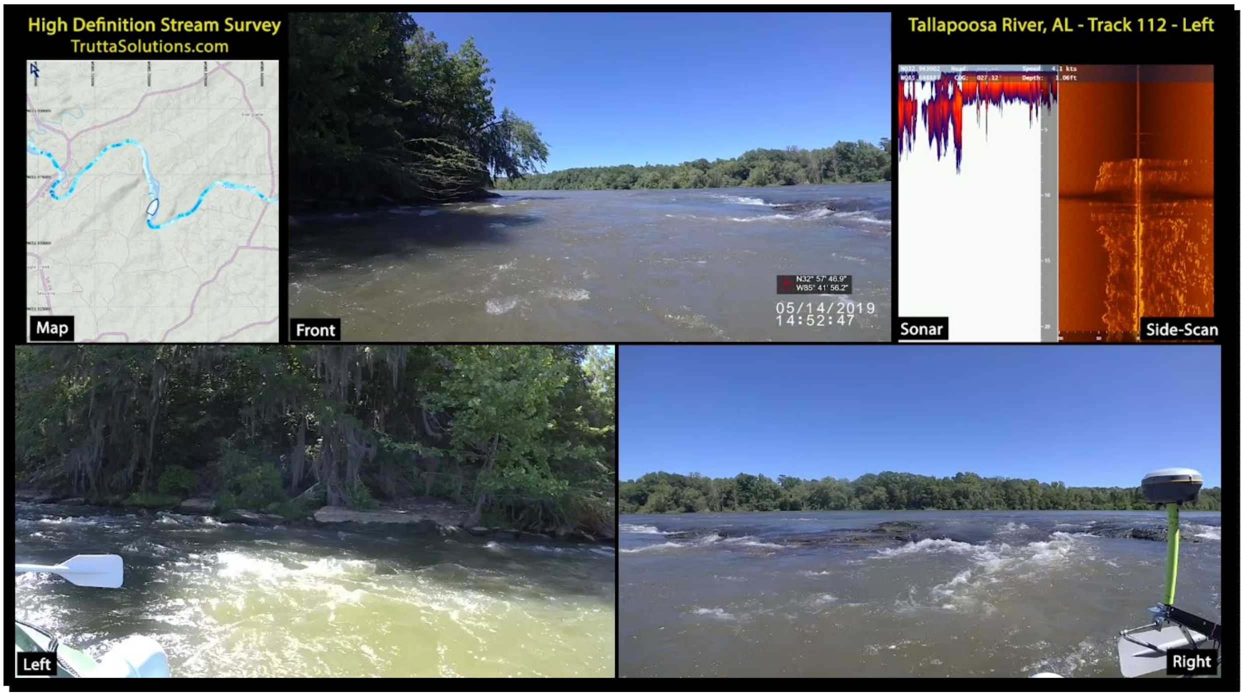
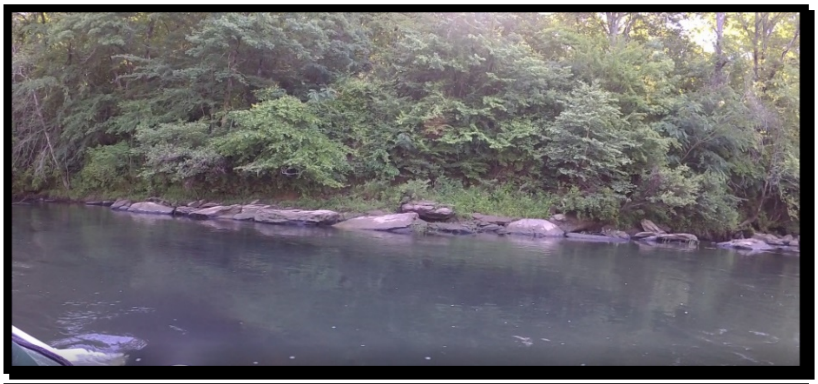



*Figure 10: Example of Video Track output from the Tallapoosa HDSS project. Video Track number is in the upper right corner of the video.*

## *Assessing the condition of the streambanks*

One of the goals of the Tallapoosa River HDSS project was to document and classify the streambank condition for the left and right banks of the river. To do this, we classified the HDSS video into one of five classes representing the extent of impairment on the streambank. The following images (Figure 11) from the Tallapoosa River survey provide example of the five classes use in the streambank scoring.

1: Fully Functional



2: Functional

3: Slightly Impaired

4: Impaired

5: Non-Functional

*Figure 11: Examples from the Tallapoosa River survey of the five streambank impairment classification levels.*

In addition to classifying the streambank condition, we also classified the extent of human modification to the streambank. This classification scores modification into three classes: No modification, moderate modification, and high modification. In general, these scores represent the extent of streambank hardening observed. Moderate modification is typically rip-rap or some other non-impervious modification while high modification is impervious concrete shoreline. We also added a classification confidence to the streambank classification score. The confidence rating reflected the clarity of the streambank in the HDSS field video. The Tallapoosa River had extensive rocky shoals and in a number of places these shoals forced the boat operator away from the streambank decreasing the visibility of the streambank to the video classifier. There were three classes used in the classification – Good visibility, Impaired visibility and no visibility. The majority of the survey was in the Good Visibility class.

The following map images show the following classification results:

Left Bank:

- Streambank Condition - Figure 12
- Streambank Modification - Full: Figure 13, Upper: Figure 14, Middle: Figure 15, Lower: Figure 16
- Streambank Data Confidence – Figure 17

Right Bank:

- Streambank Condition - Figure 18
- Streambank Modification - Full: Figure 19, Upper: Figure 20, Middle: Figure 21, Lower: Figure 22
- Streambank Data Confidence - Figure 23

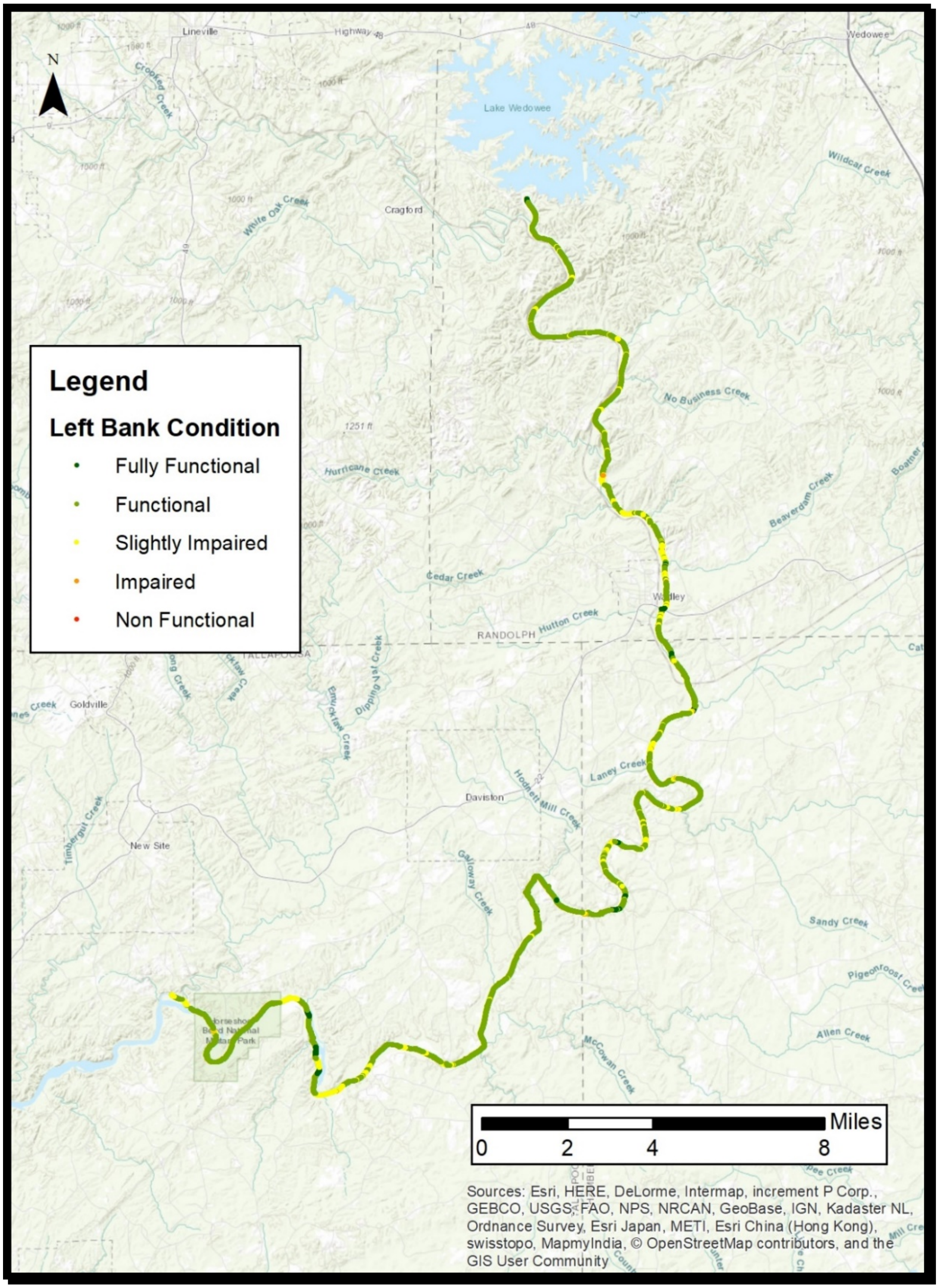



*Figure 12: Left Bank Condition Score for the Tallapoosa River HDSS project.*

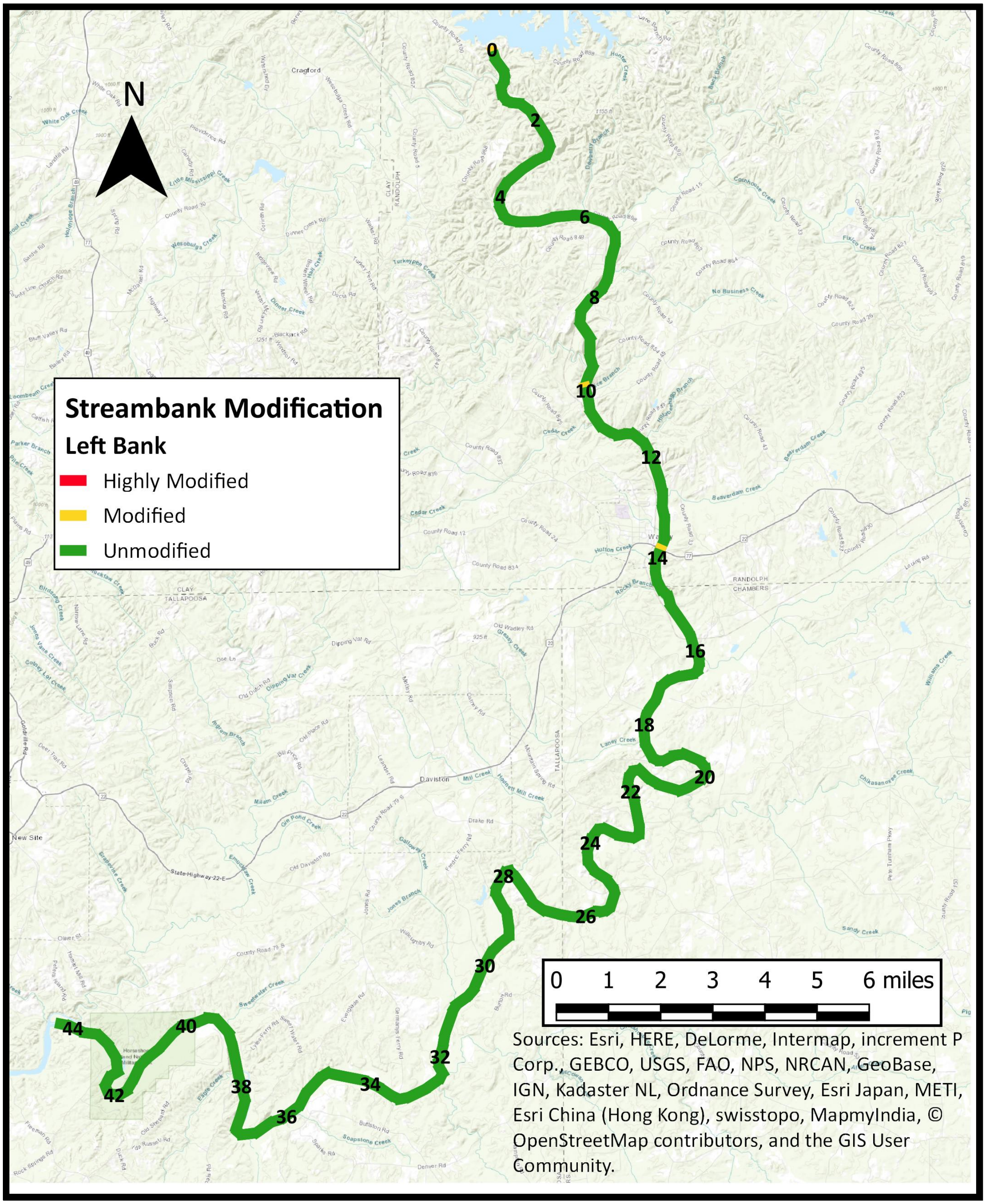



*Figure 13: Left Bank Modification Score for the Tallapoosa River HDSS project.*

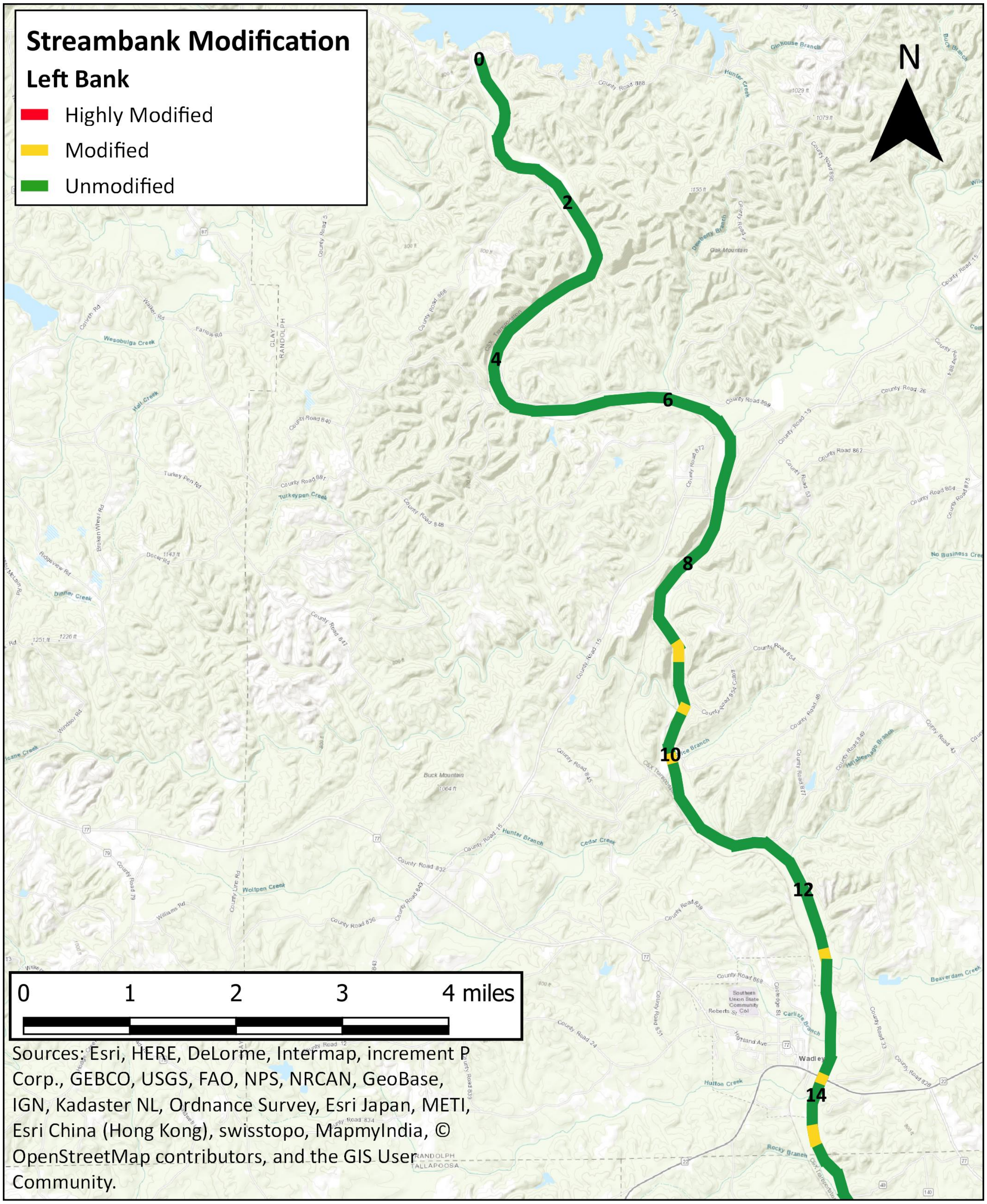



*Figure 14: Left Bank Modification Score for the upper Tallapoosa River HDSS project.*

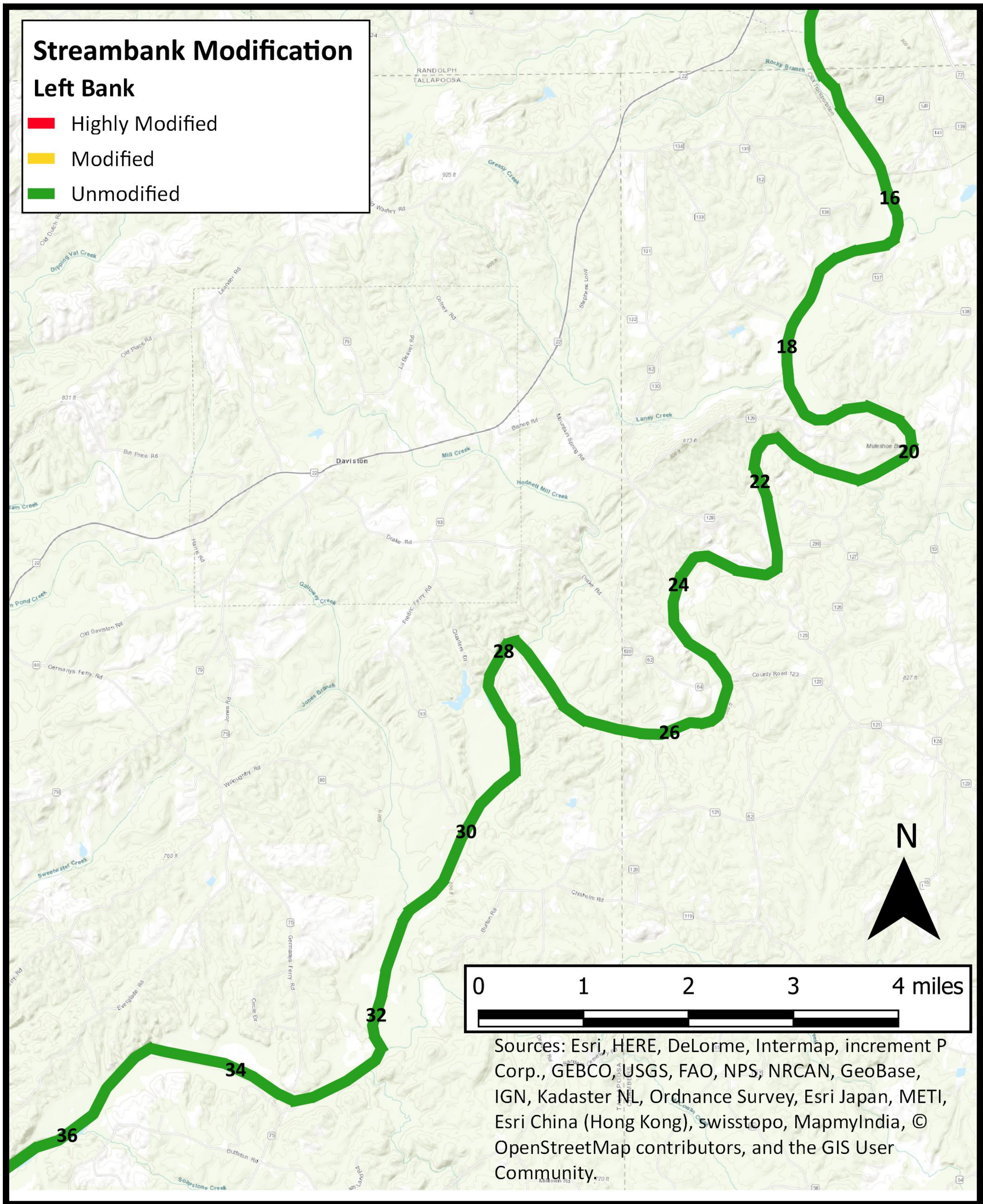



*Figure 15: Left Bank Modification Score for the middle Tallapoosa River HDSS project.*

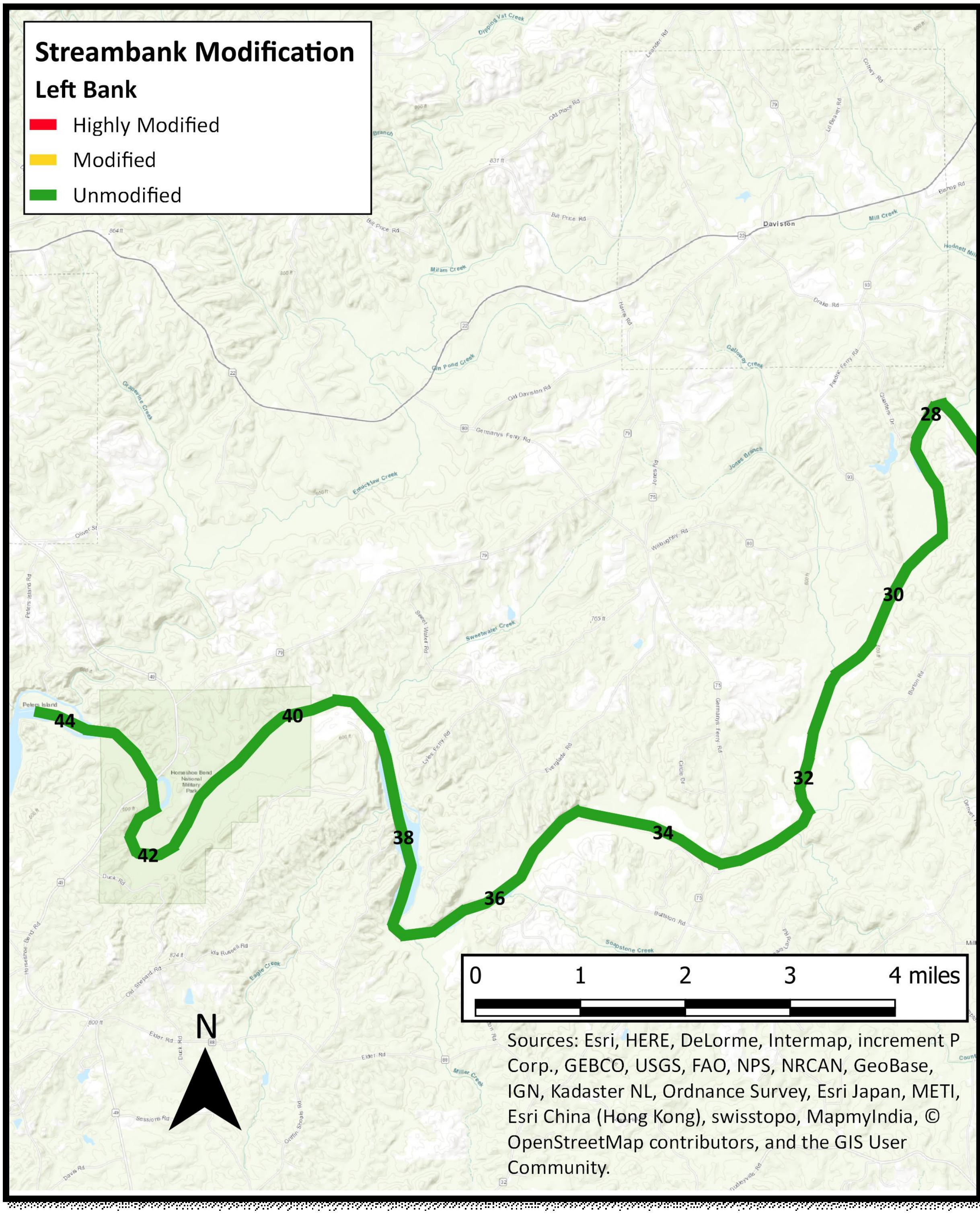



*Figure 16: Left Bank Modification Score for the lower Tallapoosa River HDSS project.*

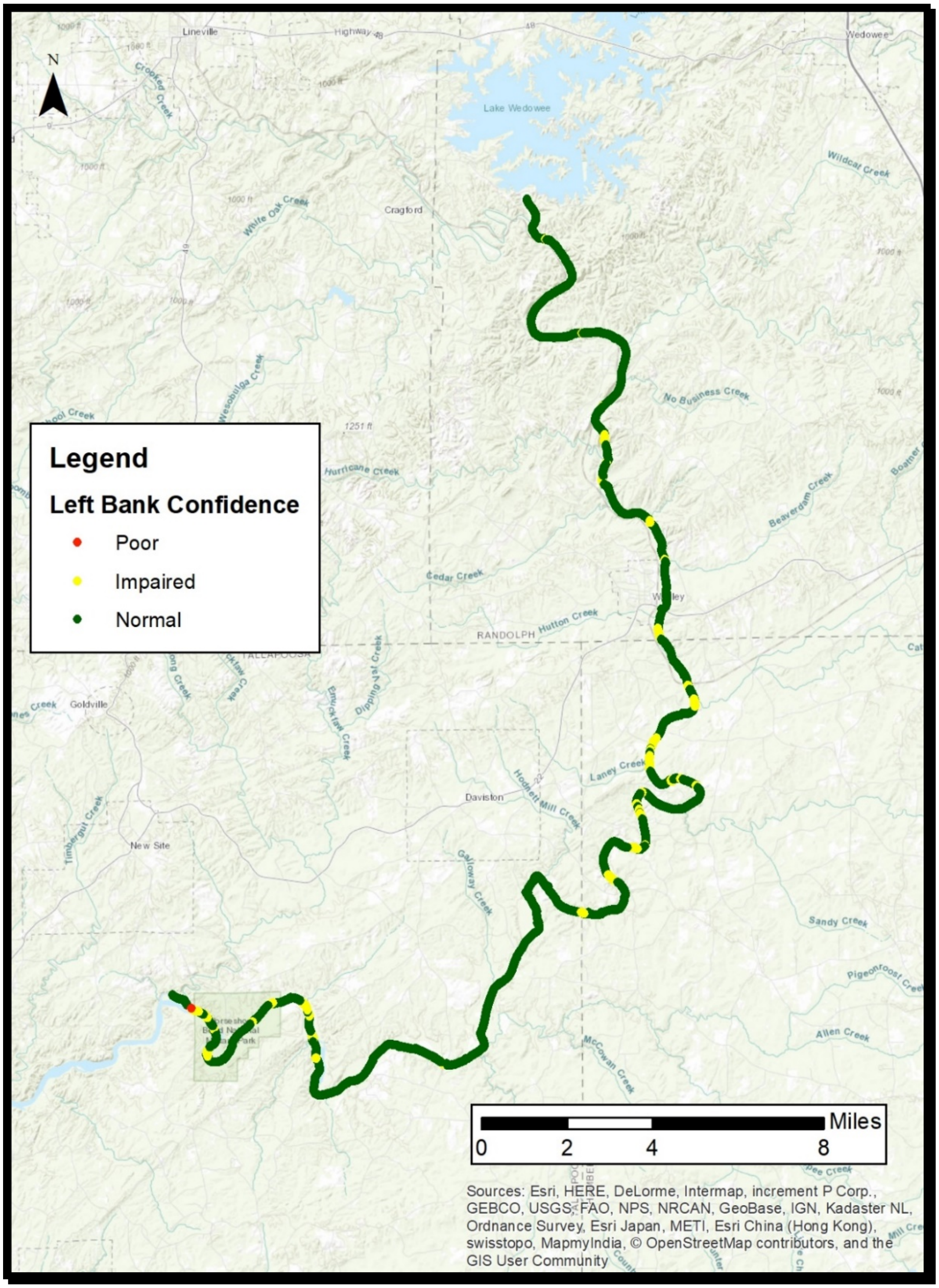



*Figure 17: Left Bank Data Confidence Score for the Tallapoosa River HDSS project.*

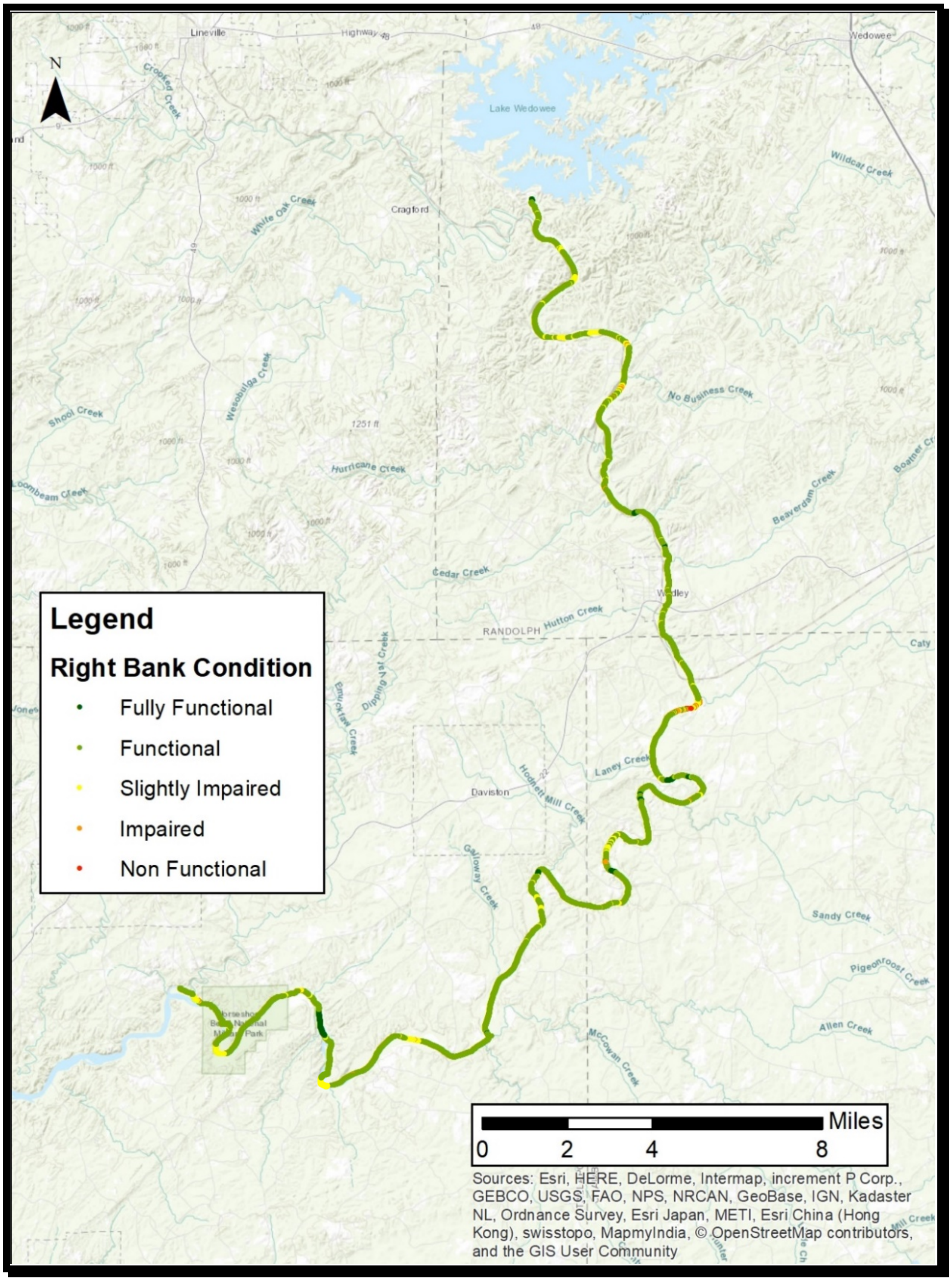



*Figure 18: Right Bank Condition Score for the Tallapoosa River HDSS project.*

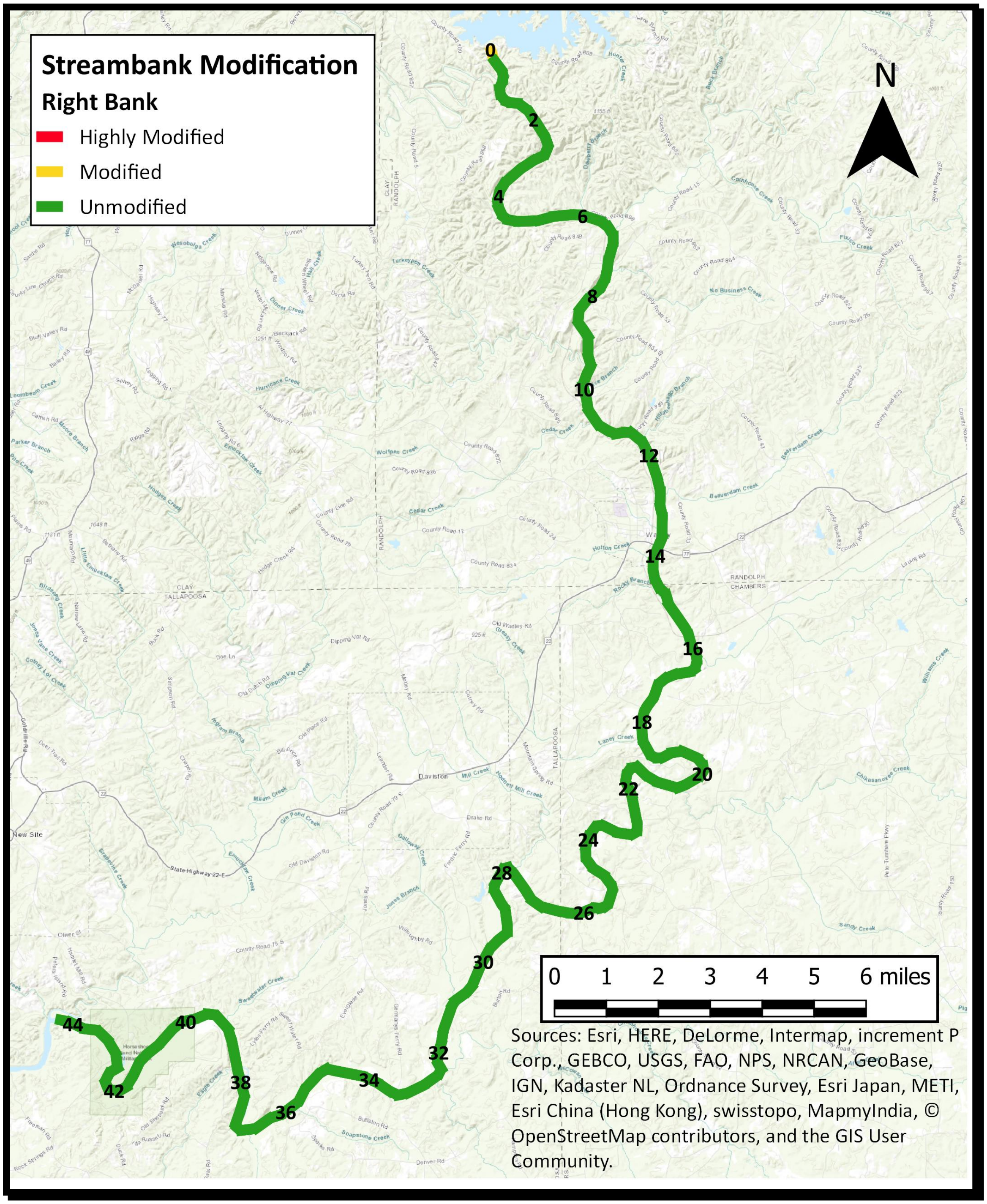



*Figure 19: Right Bank Modification Score for the Tallapoosa River HDSS project.*

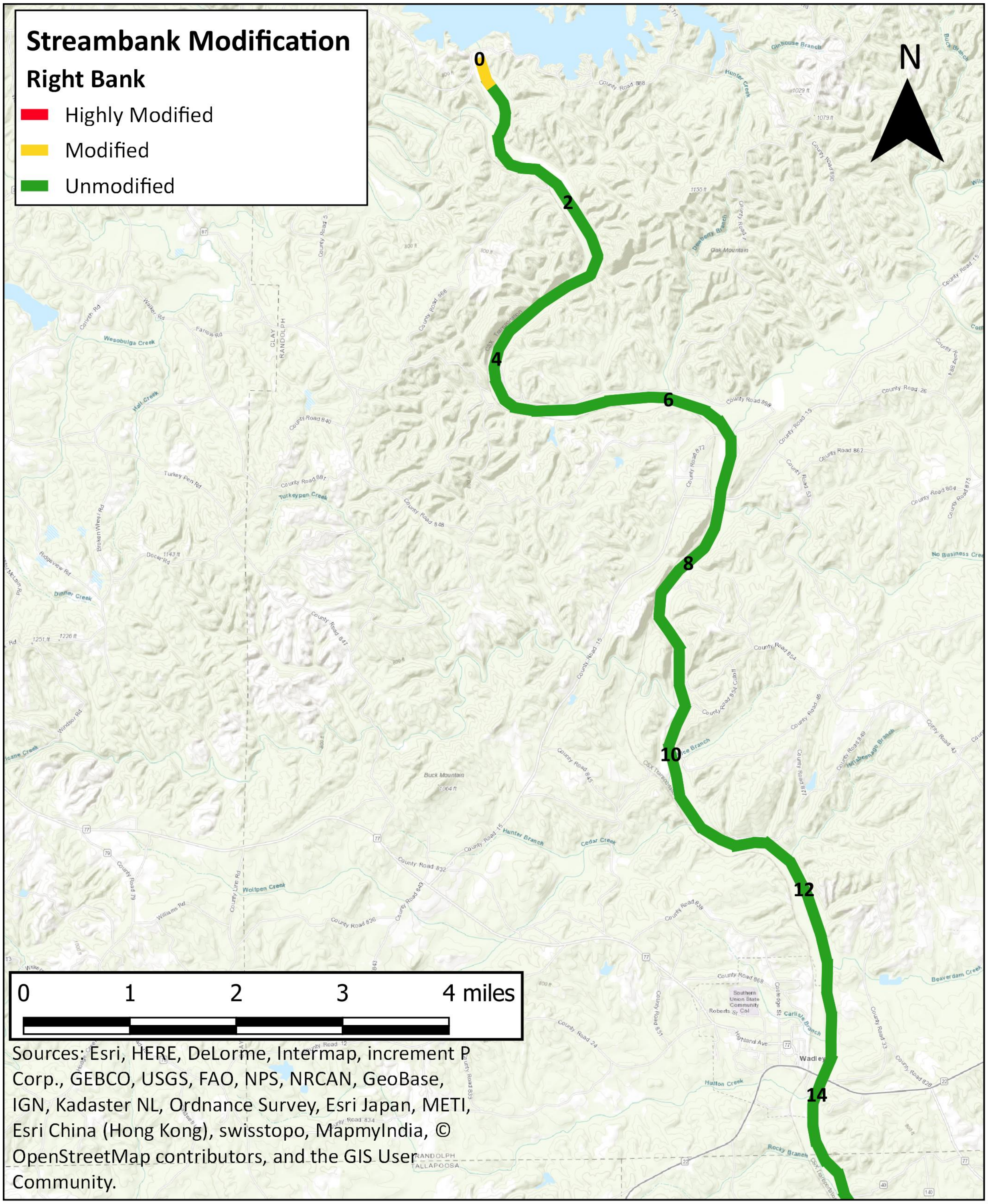



*Figure 20: Right Bank Modification Score for the upper Tallapoosa River HDSS project.*

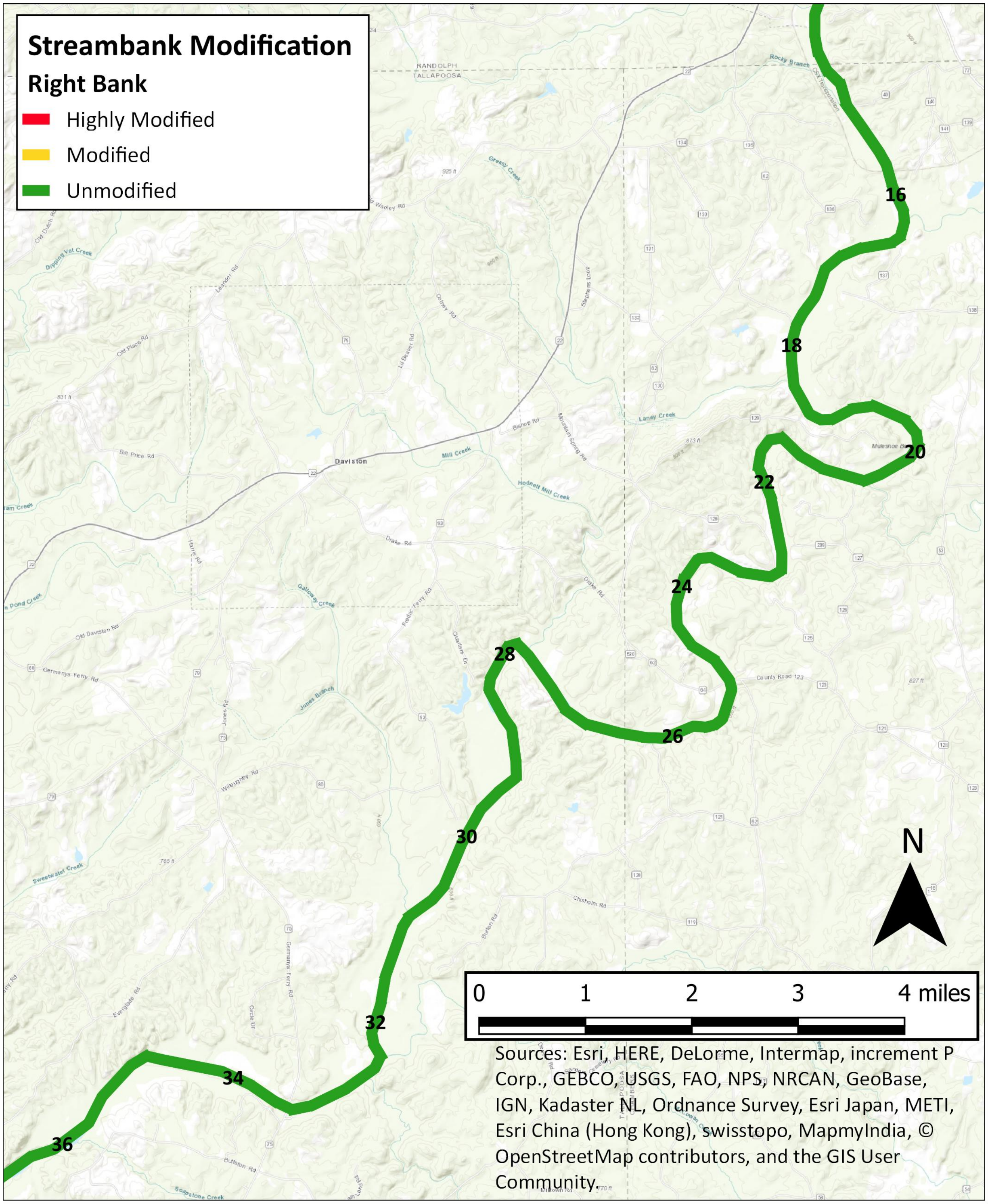



*Figure 21: Right Bank Modification Score for the middle Tallapoosa River HDSS project.*

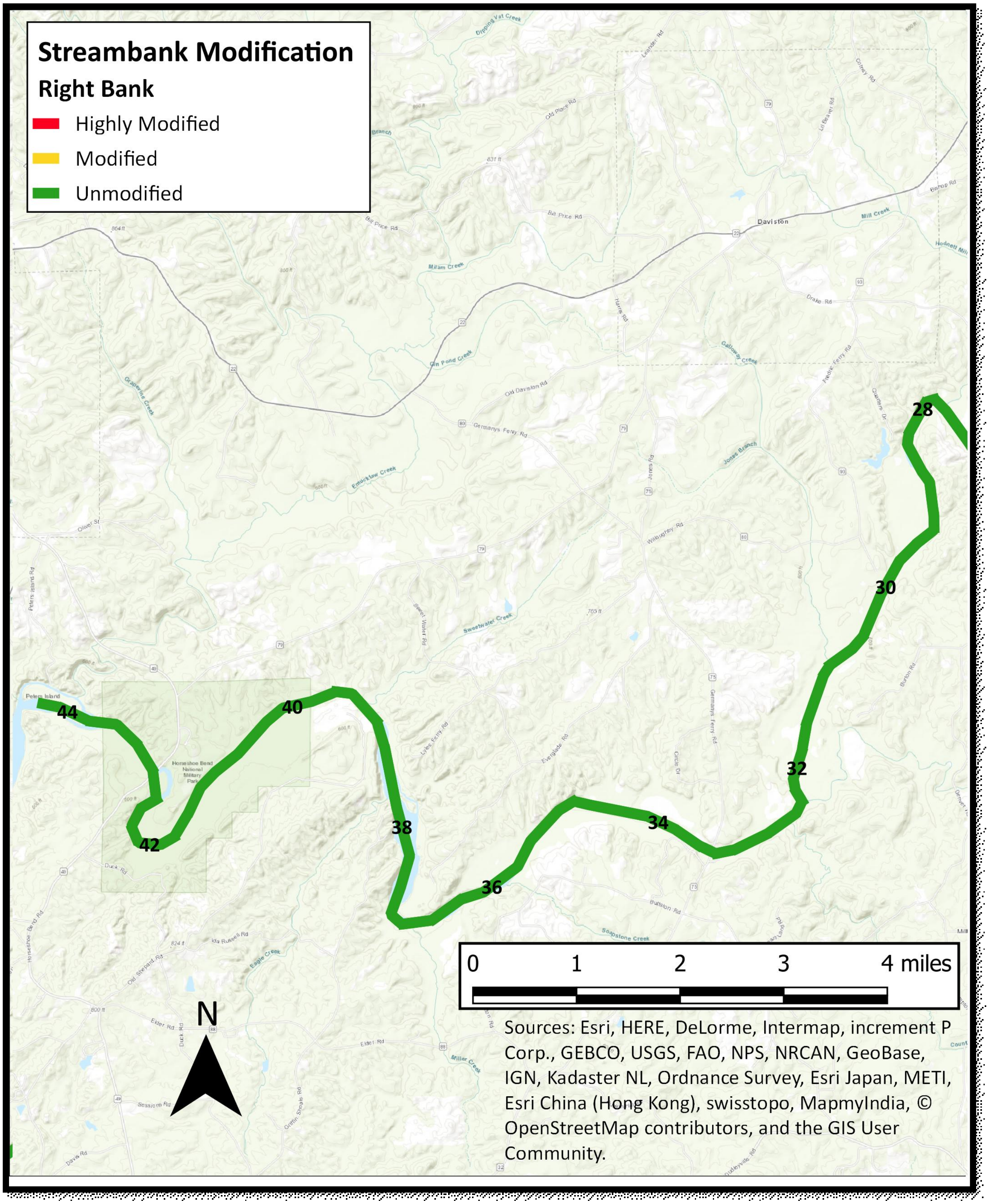



*Figure 22: Right Bank Modification Score for the lower Tallapoosa River HDSS project.*

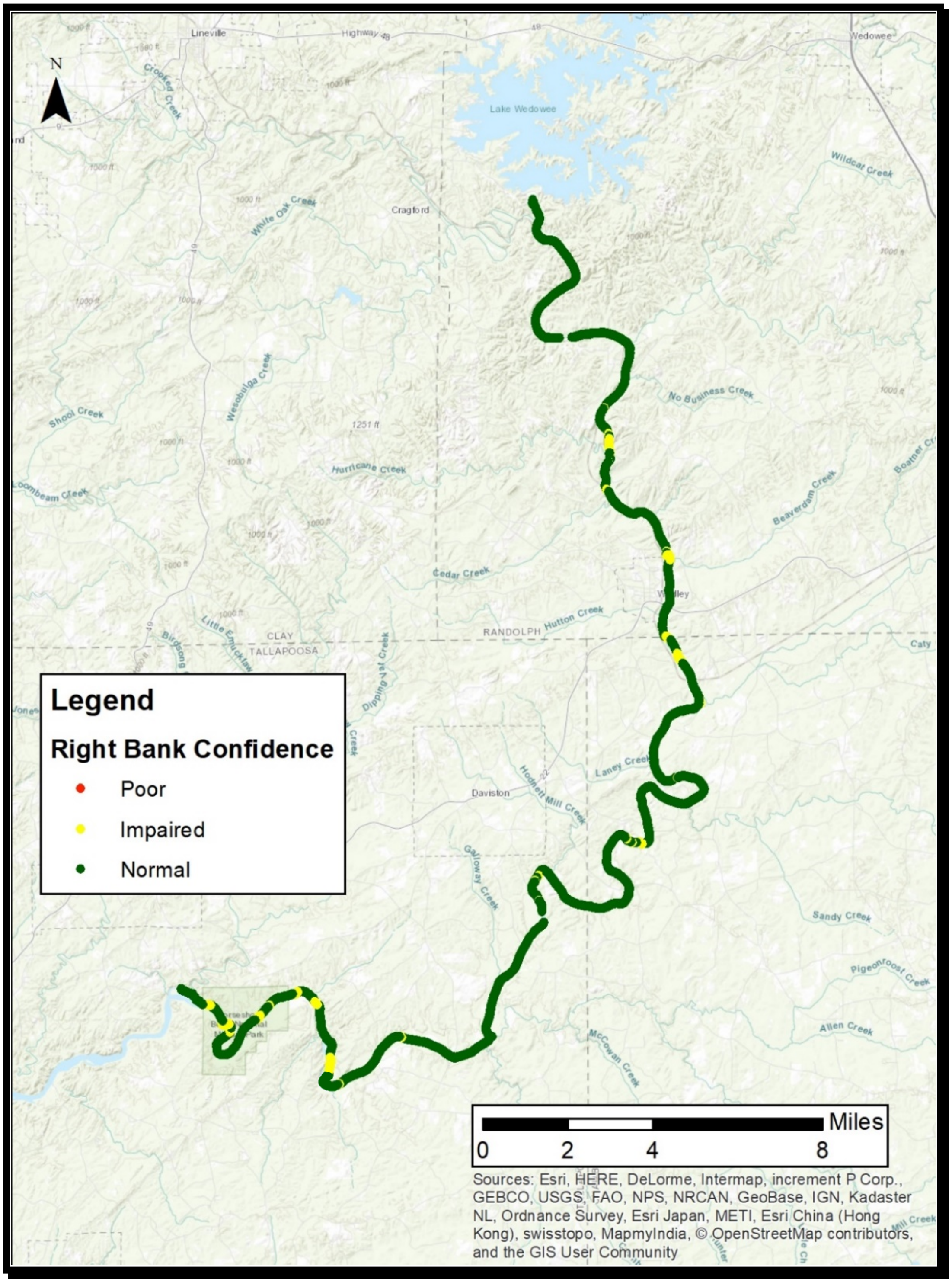



*Figure 23: Right Bank Confidence Score for the Tallapoosa River HDSS project.*

## Average River Conditions

The data for both tracklogs were integrated onto a centerline track of the Tallapoosa River to facilitate comparisons. There was little trend, either increasing or decreasing in a downstream direction for the occurrence of bank condition scores (Figure 24). The average water depth deepened in a downstream direction, but shallow shoals were still present throughout the survey segment (Figure 25). As with the point data for water depth, the discharge fluctuations associated with power generation influence both between-day and during-day water depths and should be used with caution. Integrated maps of left and right track water depth and left and right streambank condition are shown in figures:

- Full survey area - Figure 26
- Upper survey area - Figure 27
- Middle survey area - Figure 28
- Lower survey area - Figure 29

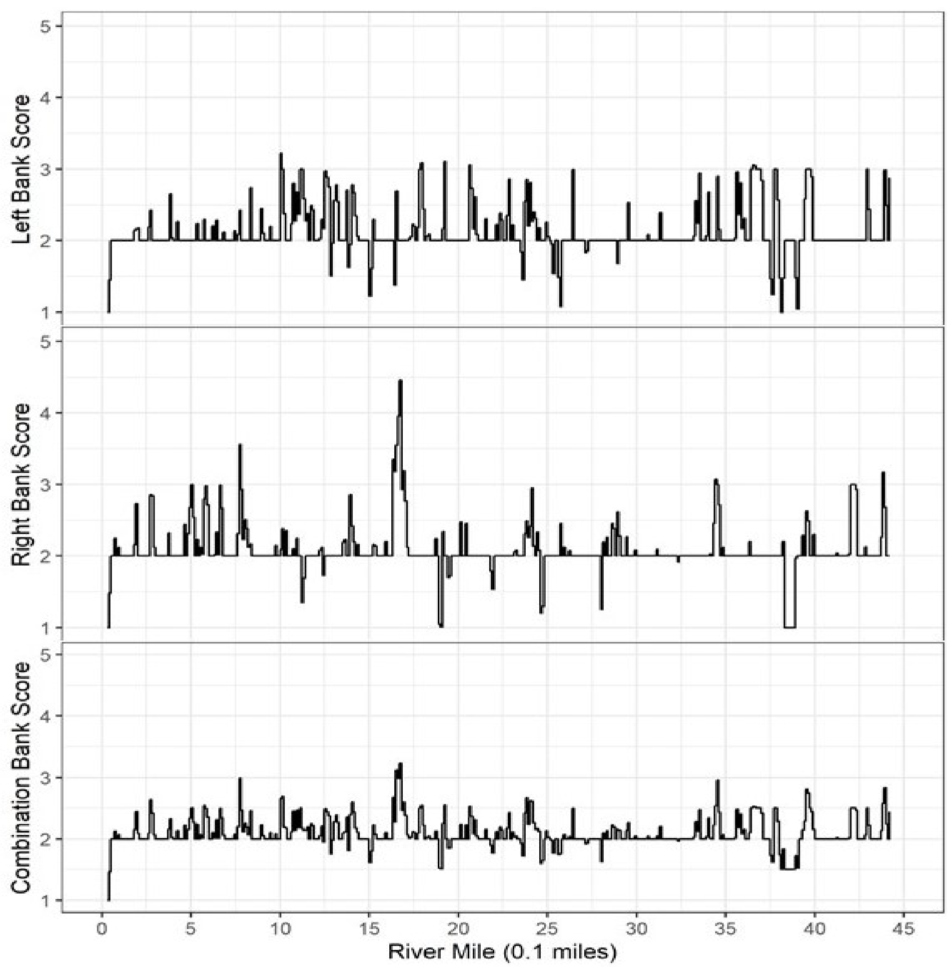



*Figure 24: Average bank condition score by river mile (0.1 mile)*

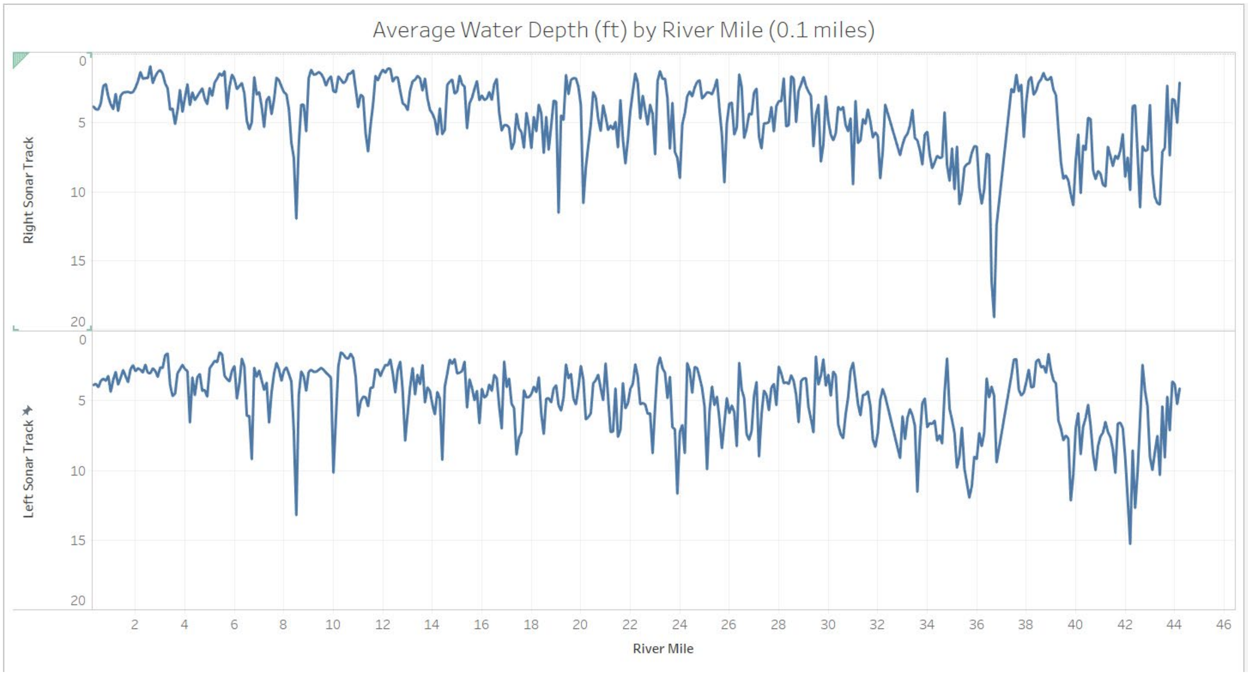



*Figure 25: Average water depth (ft) by river mile (0.1 mile)*

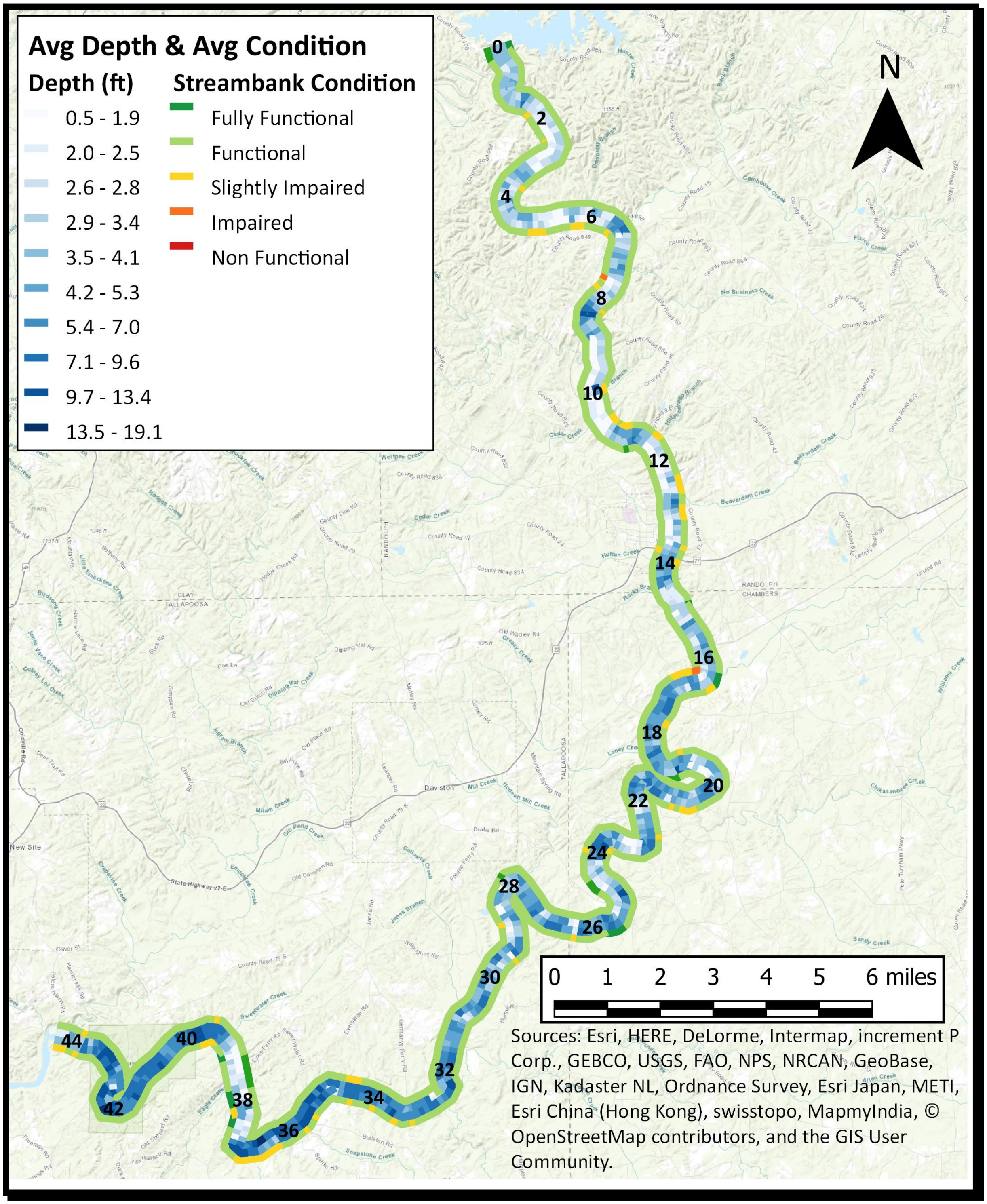



*Figure 26: Water depth and relative bank condition for the Tallapoosa survey area.*

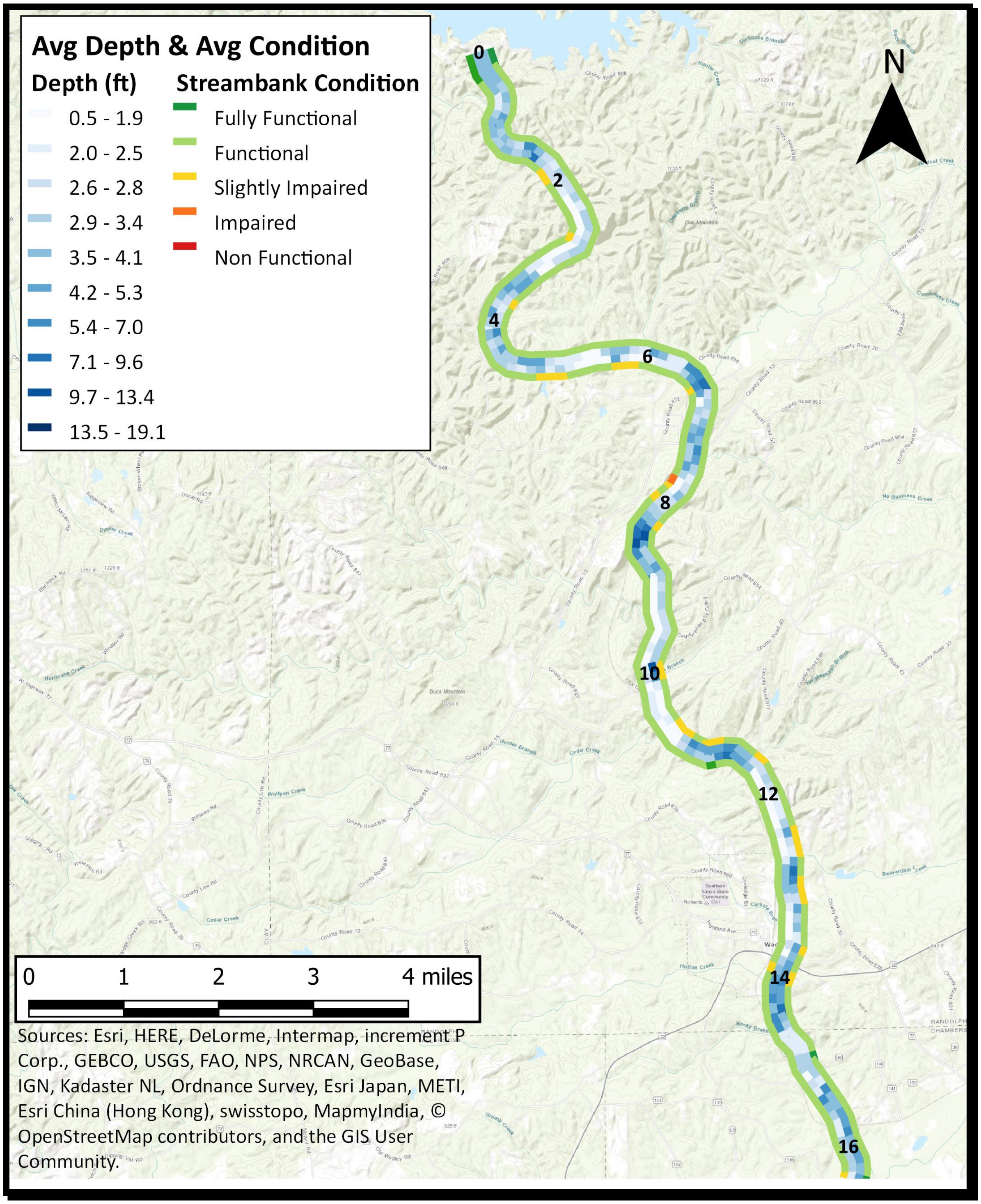



*Figure 27: Water depth and relative bank condition for the upper Tallapoosa River survey area.*

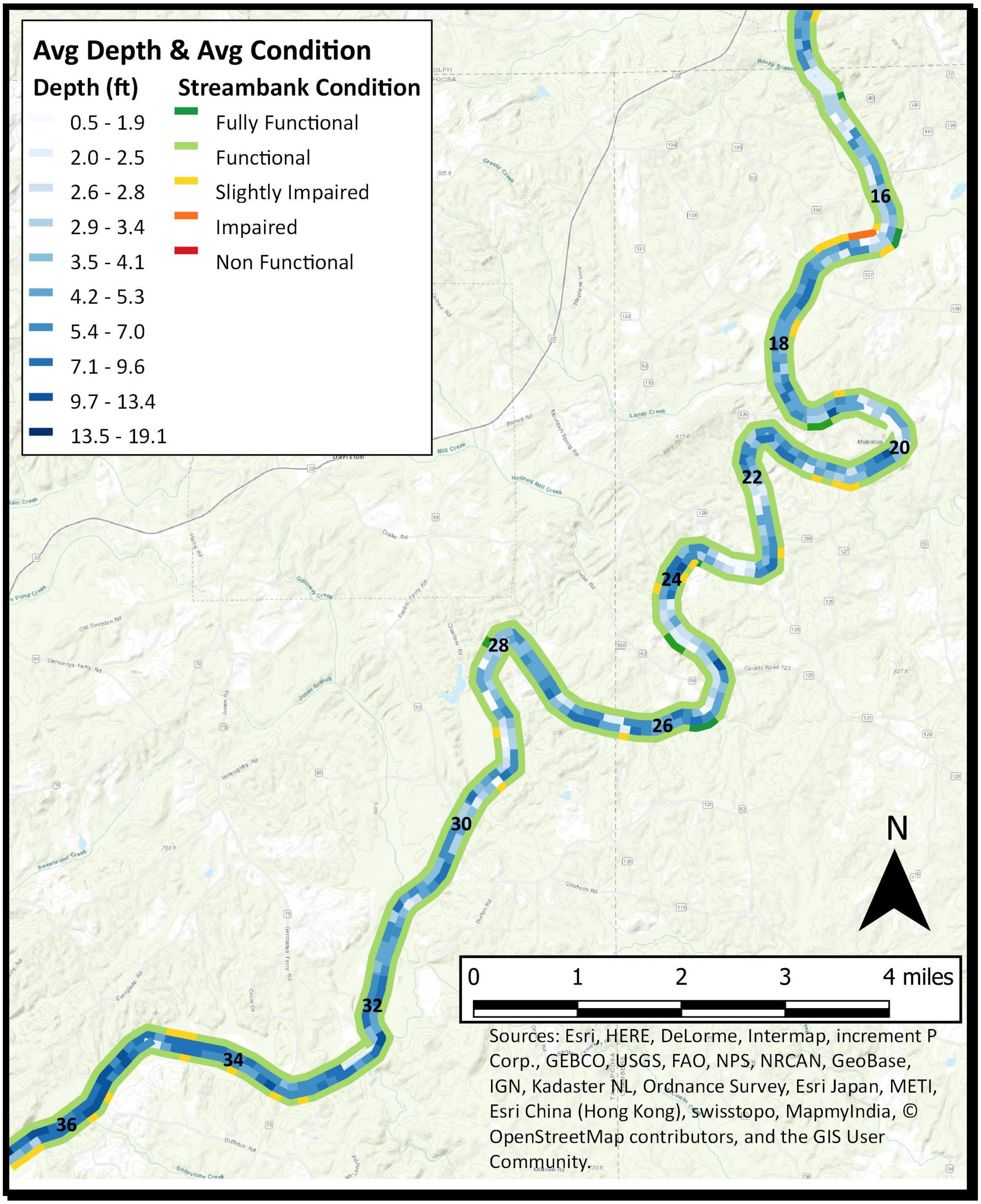



*Figure 28: Water depth and relative bank condition for the middle Tallapoosa River survey area.*

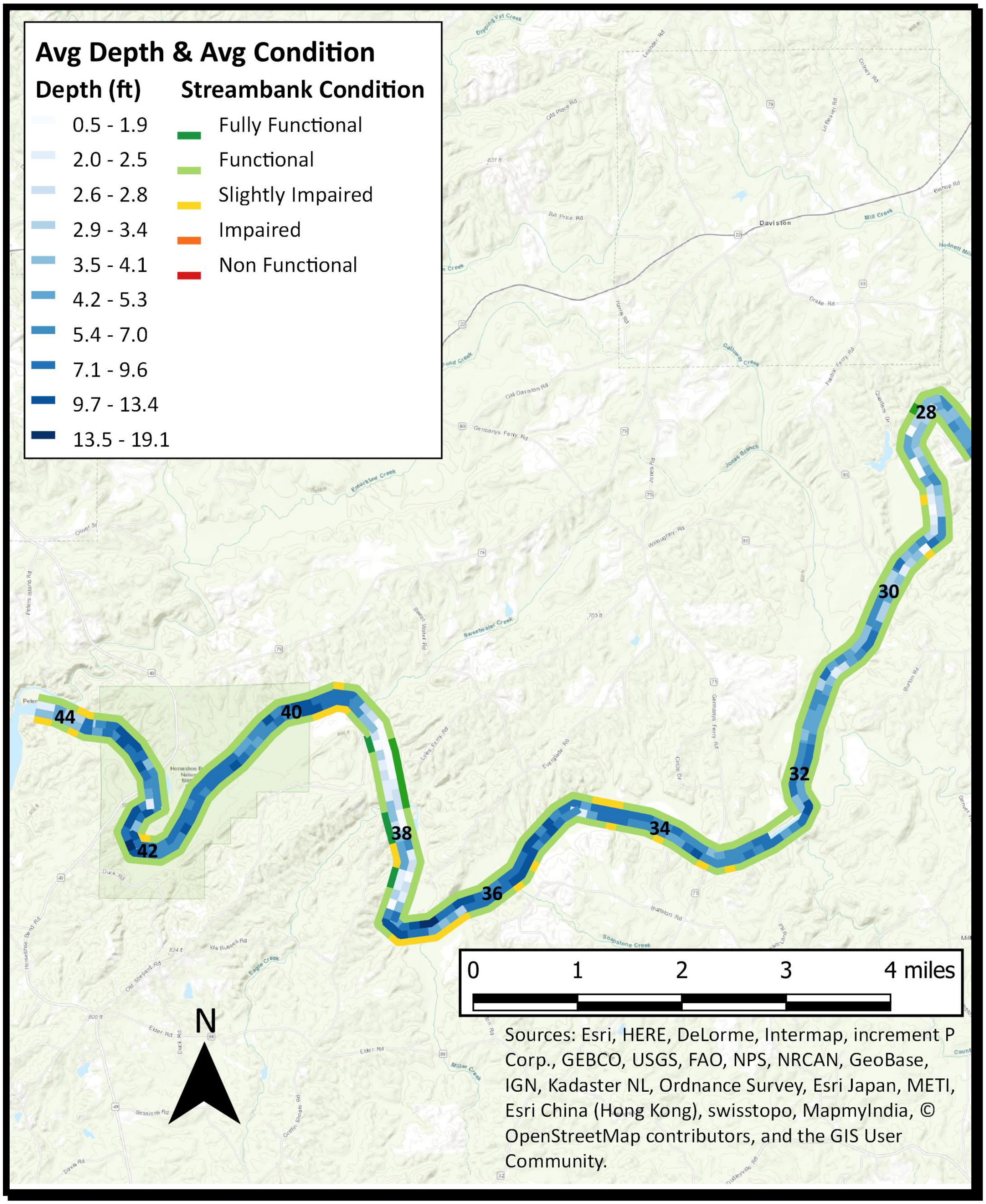



*Figure 29: Water depth and relative bank condition for the lower Tallapoosa River survey area.*

### *Ranking the Streambank Areas in most need of management concern*

Another goal of the project was to rank the Top 15 worst streambank areas to allow managers to better understand specific areas of failing streambank on the Tallapoosa River. We averaged the point information into 0.1-mile (161m) segments to help facilitate finding the problem areas. Table 3 and Figure 31 to Figure 34 show the results of this ranking. A total of 20 sites were provided for the left bank segments as many segments were tied with a score of 3 (slightly impaired).

Interestingly, only one area scored as impaired to non-functional. This area was located on the right bank between river mile 16.3 to 16.9 (Figure 30). This is a very positive finding as many rivers we have surveyed in the Southeastern US have much more extensive bank erosion issues.

*Figure 30: Example images of worst area on right bank of the Tallapoosa River between river mile 16.3 and 16.9.*

*Table 3: Ranking for the river segments in most need of management concern. Twenty sites are provided for the left bank due to ties in Average Left Bank Condition Scores among segments.*

| Rank | Left Bank River Mile | Avg Left Bank Condition | Right Bank River Mile | Avg Right Bank Condition | Both Bank River Mile | Avg Combination Bank Condition |
|---|---|---|---|---|---|---|
| 1 | 10.00 | 3.22 | 16.70 | 4.45 | 16.70 | 3.23 |
| 2 | 19.20 | 3.11 | 16.60 | 3.96 | 16.50 | 3.12 |
| 3 | 17.90 | 3.09 | 7.70 | 3.57 | 7.70 | 2.99 |
| 4 | 20.60 | 3.05 | 16.50 | 3.55 | 16.60 | 2.98 |
| 5 | 36.50 | 3.05 | 16.30 | 3.35 | 34.50 | 2.95 |
| 6 | 36.60 | 3.04 | 16.90 | 3.20 | 43.90 | 2.83 |
| 7 | 10.10 | 3.00 | 16.40 | 3.18 | 39.50 | 2.82 |
| 8 | 11.10 | 3.00 | 43.80 | 3.17 | 39.60 | 2.74 |
| 9 | 11.20 | 3.00 | 34.40 | 3.07 | 10.10 | 2.69 |
| 10 | 17.80 | 3.00 | 34.50 | 3.00 | 16.30 | 2.68 |
| 11 | 36.40 | 3.00 | 5.00 | 3.00 | 23.80 | 2.67 |
| 12 | 36.70 | 3.00 | 42.00 | 3.00 | 10.00 | 2.65 |
| 13 | 36.80 | 3.00 | 42.10 | 3.00 | 2.70 | 2.63 |
| 14 | 36.90 | 3.00 | 42.20 | 3.00 | 24.00 | 2.62 |
| 15 | 37.70 | 3.00 | 6.60 | 2.99 | 24.10 | 2.61 |
| 16 | 37.80 | 3.00 | | | | |
| 17 | 39.50 | 3.00 | | | | |
| 18 | 39.60 | 3.00 | | | | |
| 19 | 39.70 | 3.00 | | | | |
| 20 | 42.90 | 3.00 | | | | |

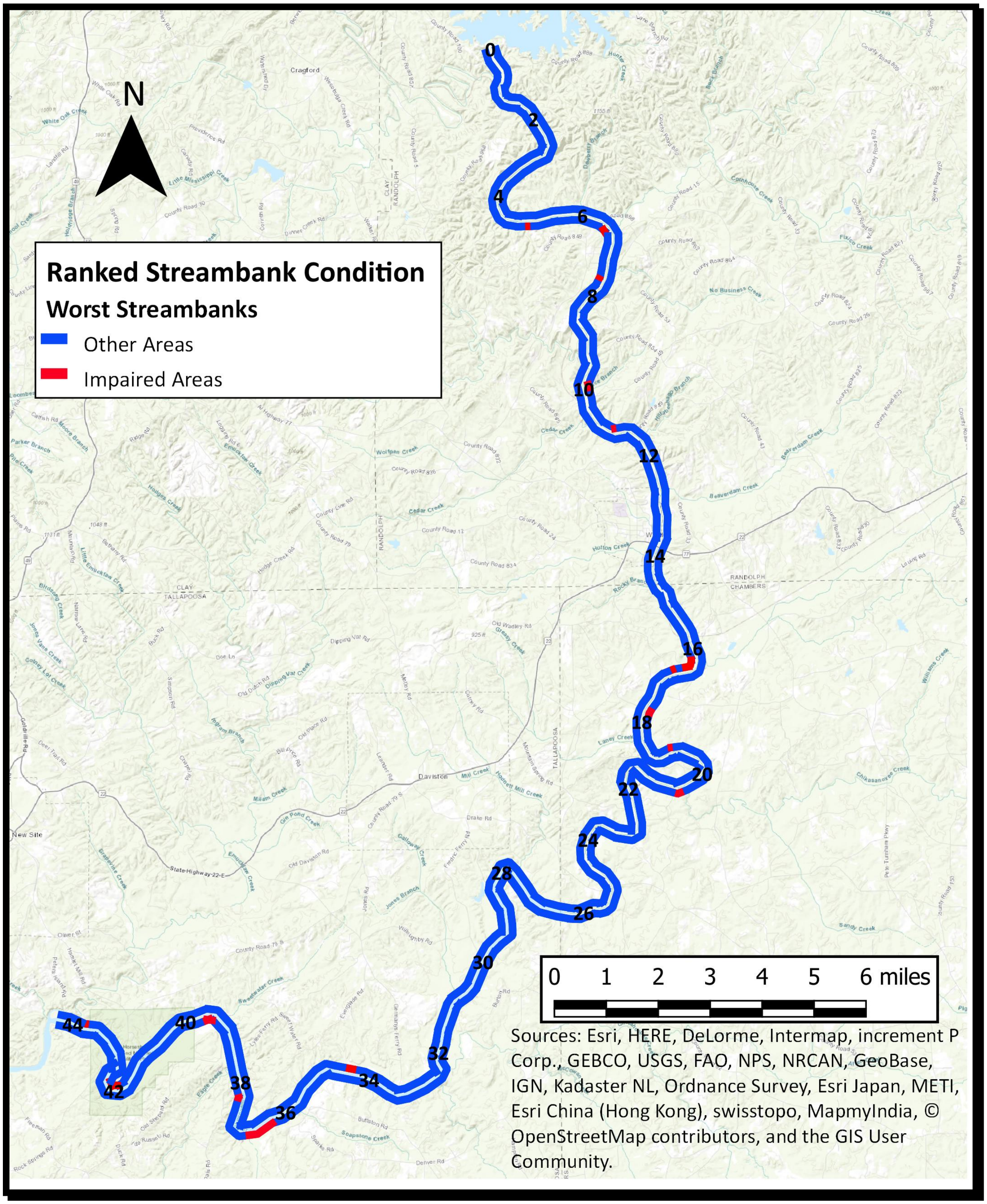



*Figure 31: Worst Bank Condition Areas from the HDSS results for the Tallapoosa River.*

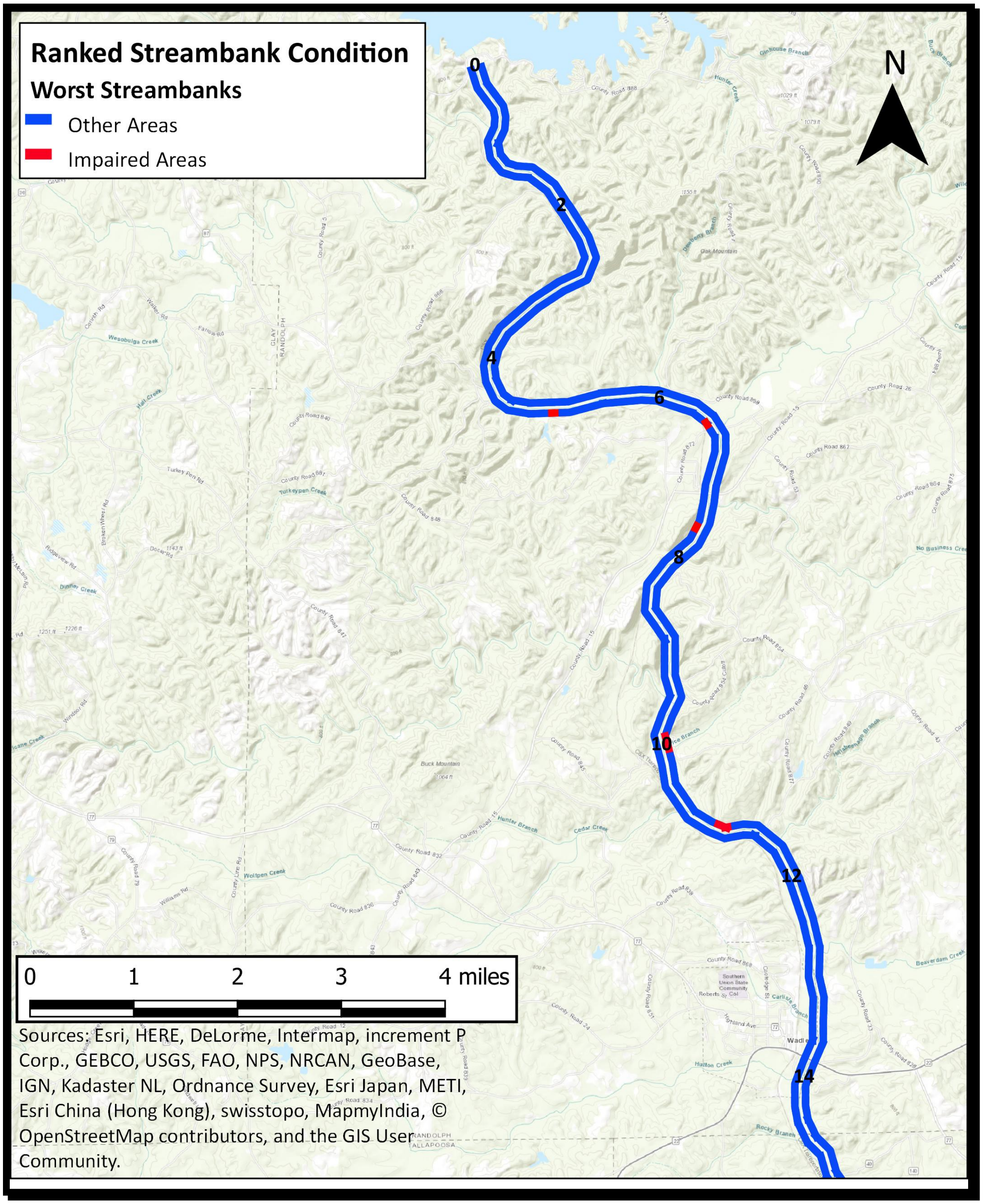



*Figure 32: Worst Bank Condition Areas from the HDSS results for the upper survey section of the Tallapoosa River.*

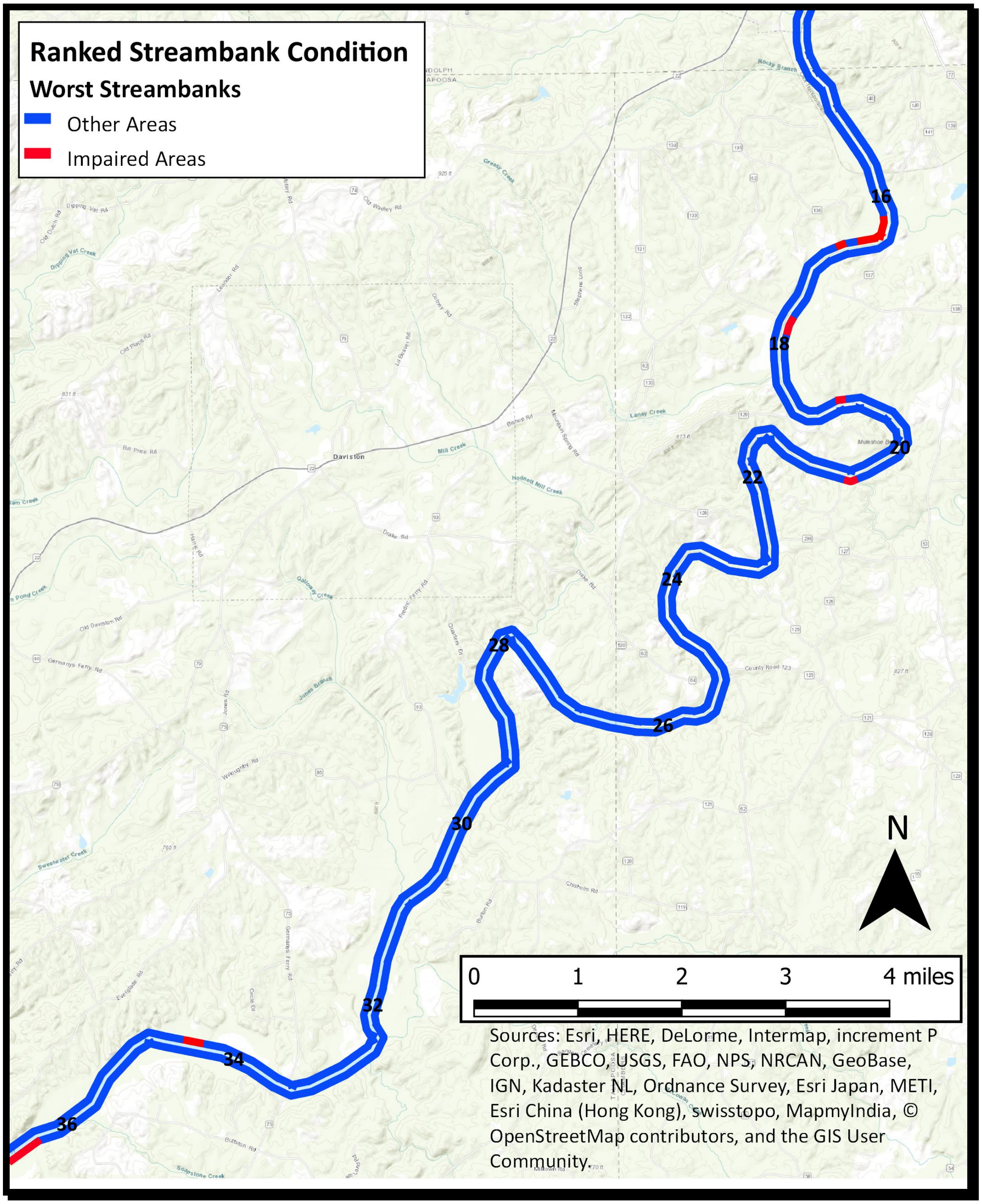



*Figure 33: Worst Bank Condition Areas from the HDSS results for the middle survey section of the Tallapoosa River.*

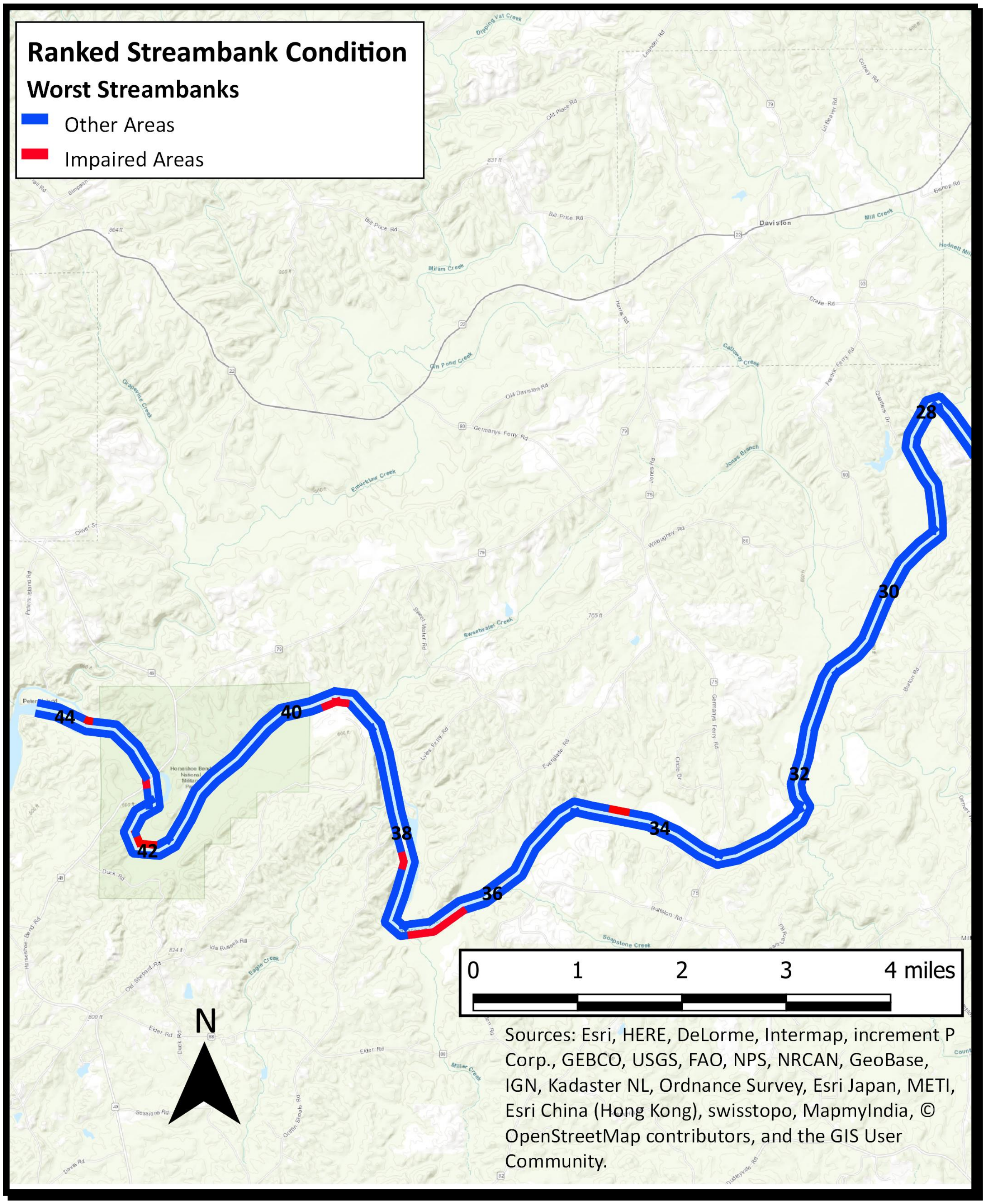



*Figure 34: Worst Bank Condition Areas from the HDSS results for the lower survey section of the Tallapoosa River.*

## *Cross-Sectional Transects*

A total of 40 cross-sectional bathymetric transects (XS) were completed for the Tallapoosa River HDSS project. The HDSS survey covered 44 miles of the Tallapoosa River below R. L. Harris Dam and while we attempted cross-sections at 82 different locations, many had to be dropped due to very poor GPS coverage resulting from the distance from cellular base stations, tall trees and high bluffs along the river. Map locations for the 40 transects are shown in Figure 35. An additional survey day (Day 4), 2019-05-17 was needed to repeat some areas surveyed from Day 1 to fill in missing transect areas.

We provided the transect information in digital format for use in modeling flow conditions in the river segment below R. L. Harris dam. The Tallapoosa River is a regulated river with fluctuating flows as the result of power generation. We traveled down river and observed changes in stage height as a result of the power peaking flows. Some measures showed a rise in downstream water surface elevation, likely due to catching up with the flow pulse. Additionally, surveys among days showed different water surface elevations in similar areas. We reported the survey day and date to help address these river discharge related issues (Table 4).

A plot of water surface elevation as compared to River Mile showed that the river was generally falling at a consistent rate except for a large elevation drop between miles 37.2 and 38.8 (Figure 36). A linear trend model was computed for Surface Water Elevation given River Mile (Table 5). The model was significant at $p <= 0.001$. The generalized slope model predicts that the Tallapoosa River drops 2.4 ft per mile.

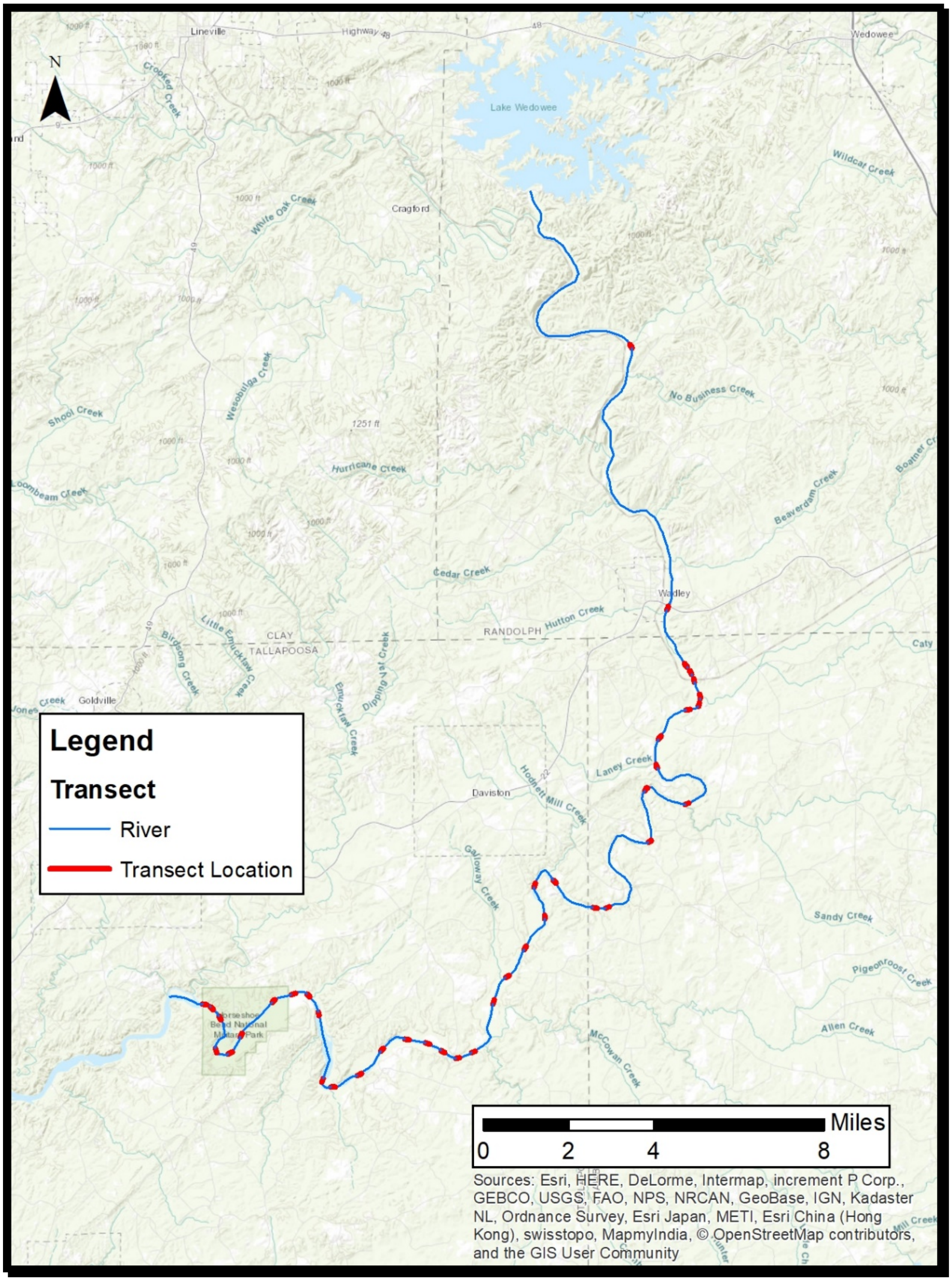



*Figure 35: Location of the 40 cross-sectional bathymetric transects on the Tallapoosa River.*

*Table 4: Bathymetric transect information for the Tallapoosa survey.*

| Transect Number | River Mile | Water Surface Elevation (ft) | Date | Survey day |
|---|---|---|---|---|
| 1 | 6.7 | 641.03 | 2019-05-16 | 3 |
| 2 | 13.9 | 603.84 | 2019-05-15 | 2 |
| 3 | 15.4 | 596.17 | 2019-05-15 | 2 |
| 4 | 15.6 | 596.13 | 2019-05-15 | 2 |
| 5 | 15.8 | 595.61 | 2019-05-15 | 2 |
| 6 | 16.2 | 595.56 | 2019-05-15 | 2 |
| 7 | 16.4 | 594.37 | 2019-05-15 | 2 |
| 8 | 16.7 | 592.66 | 2019-05-15 | 2 |
| 9 | 17.7 | 592.54 | 2019-05-15 | 2 |
| 10 | 18.4 | 592.27 | 2019-05-15 | 2 |
| 11 | 20.5 | 586.77 | 2019-05-15 | 2 |
| 12 | 21.6 | 586.01 | 2019-05-15 | 2 |
| 13 | 22.9 | 584.65 | 2019-05-15 | 2 |
| 14 | 26.0 | 570.65 | 2019-05-15 | 2 |
| 15 | 26.3 | 570.58 | 2019-05-15 | 2 |
| 16 | 27.5 | 567.82 | 2019-05-15 | 2 |
| 17 | 28.3 | 565.08 | 2019-05-15 | 2 |
| 18 | 29.1 | 561.52 | 2019-05-15 | 2 |
| 19 | 30.0 | 561.01 | 2019-05-15 | 2 |
| 20 | 30.8 | 560.80 | 2019-05-15 | 2 |
| 21 | 31.5 | 560.73 | 2019-05-15 | 2 |
| 22 | 32.9 | 562.08 | 2019-05-17 | 4 |
| 23 | 33.3 | 561.86 | 2019-05-17 | 4 |
| 24 | 33.7 | 561.64 | 2019-05-17 | 4 |
| 25 | 34.1 | 560.67 | 2019-05-14 | 1 |
| 26 | 34.6 | 560.53 | 2019-05-14 | 1 |
| 27 | 35.3 | 560.30 | 2019-05-14 | 1 |
| 28 | 36.1 | 560.14 | 2019-05-14 | 1 |
| 29 | 36.8 | 560.09 | 2019-05-14 | 1 |
| 30 | 37.2 | 560.47 | 2019-05-17 | 4 |
| 31 | 38.8 | 541.87 | 2019-05-17 | 4 |
| 32 | 39.3 | 536.60 | 2019-05-17 | 4 |
| 33 | 39.7 | 534.19 | 2019-05-14 | 1 |
| 34 | 40.2 | 534.02 | 2019-05-14 | 1 |
| 35 | 41.3 | 533.61 | 2019-05-14 | 1 |
| 36 | 41.8 | 533.55 | 2019-05-14 | 1 |

| Transect Number | River Mile | Water Surface Elevation (ft) | Date | Survey day |
|---|---|---|---|---|
| 37 | 42.2 | 533.47 | 2019-05-14 | 1 |
| 38 | 43.1 | 532.22 | 2019-05-14 | 1 |
| 39 | 43.4 | 532.09 | 2019-05-14 | 1 |
| 40 | 43.6 | 532.74 | 2019-05-17 | 4 |

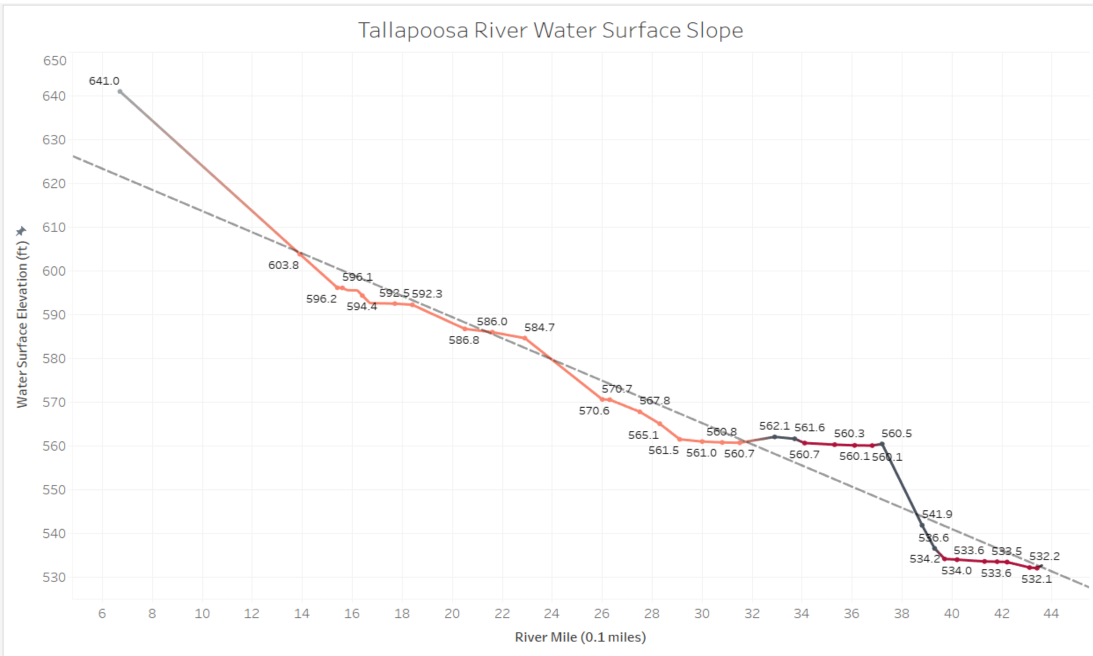



*Figure 36: Water Surface Elevation to River Mile for the Tallapoosa survey. Colors reflect different days of the survey. The dotted line is the linear trend line.*

*Table 5: Trend line statistics for the generalized slope relationship for the Tallapoosa River.*

P-value: < 0.0001

Equation: Elevation = -2.42269*R Mile + 637.847

Coefficients

| Term | Value | StdErr | t-value | p-value |
|---|---|---|---|---|
| R Mile | -2.42269 | 0.0942128 | -25.7151 | < 0.0001 |
| intercept | 637.847 | 2.92464 | 218.094 | < 0.0001 |

## Conclusions

The High Definition Stream Survey (HDSS) approach proved to be a rapid method to collect a wide range of useful information about the Tallapoosa River. We surveyed 44 miles and collected data on the stream bottom, water depth, and the condition of both riverbanks. The resulting data will be highly useful for a range of river management issues. The cross-section transect information is useful to help better understand the quantity of water available at different discharges, while the longitudinal information can be used to support targeted restoration, habitat improvement or other water management projects.

The HDSS video is exceptionally useful in providing a baseline documentation of conditions throughout a long stretch of the bypass reach during May of 2019. If future surveys are completed, comparison with this survey completed in 2019 allowed us to directly compare the changes in river conditions between surveys. This repeated approach would allow trends in change to the river corridor conditions over time to be accurately documented.

Finally, use of the HDSS video allows for a wide range of interested viewers to see the conditions throughout the river. It is unlikely that most river managers, public officials, decision-makers, or other interested parties will have time to spend boating down the Tallapoosa River to look for problem areas. With the HDSS video, it is easy to review the instream conditions and view specific problem areas. The availability of this video should improve decision-making throughout the river as the worst problems can be identified and addressed using a comparative prioritization scheme.

A more specific discussion of what we observed during our Tallapoosa River HDSS survey focuses on the general condition of the streambanks and difficulties associated with collecting bathymetric transects. The general condition of the streambanks on the Tallapoosa River was relatively good. On average, much of the river scored as functional or slightly impaired streambank condition. Much of the slight impairment areas were due to the fluctuating flows eroding the streambank within a few feet of the water surface and streambank interface. Only one area scored in the impaired/non-functional class, and this area would be an excellent area to focus streambank rehabilitation efforts. Any sedimentation issues observed in the river downstream of R.L. Harris dam likely are not due to streambank failure as currently much of the river is in decent condition. Although we did not directly survey areas outside of the main river channel, if sedimentation issues are observed in the Tallapoosa main channel, it is likely due to sedimentation coming in from tributary streams and not from the main channel streambanks.

The Tallapoosa River below R. L. Harris dam is a wide river with numerous rocky shoals. Changes in river stage due to the hydropower peaking releases changed river conditions rapidly and required substantial effort to accurately collect bathymetric cross-section transects. Quantifying the travel time of discharge pulses would help the transects more appropriately reflect a more standard (stable) water surface elevation. Additionally, we recommend that satellite-based GPS correction be used for the Tallapoosa River transects in the future. The satellite-based GPS correction is not as precise as the cellular-based GPS corrections but will be available in a much wider area an allow many more transects to be collected in a more even distribution pattern. The loss in vertical resolution is likely much less than the error associated with the constantly fluctuating discharge so resolution loss may not be a big issue.

Overall, the HDSS project on the Tallapoosa River was an interesting project. The HDSS method provides water managers with an integrated suite of stream corridor information to support effective decision-making. We collected continuous geo-referenced imagery of instream, streambank, and bathymetric data over a long reach. Using the HDSS approach, we delivered to managers and stakeholders more data at lower cost as compared to traditional methods. The HDSS platform allowed us to provide data-rich, 1-meter resolution GIS layers representing numerous instream and streambank parameters. These parameters can be combined in informative ways to create powerful decision-support tools allowing for a new holistic approach to river and stream management.

# References

Connell, B. 2012. "GIS-Based Streambank Video Mapping to Determine Erosion Susceptible Areas." MS thesis, University of Tennessee.

Hensley, K.J. and P.D. Ayers. 2018. Estimating Streambank Erosion Rates with a GPS-Based Video Mapping System. Journal of the American Water Resources Association. 54:6.

Rosgen, D.L. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, CO. 353pp.

Sass, C.K. and T.D. Keane. 2012. Application of Rosgen's BANCS Model for NE Kansas and the Development of Predictive Streambank Erosion Curves. Journal of the American Water Resources Association. 48:4 774–87.

Wilber D.H. and D.G. Clarke. 2001. Biological Effects of Suspended Sediments: A Review of Suspended Sediment Impacts on Fish and Shellfish with Relation to Dredging Activities in Estuaries. North American Journal of Fisheries Management. 21:4.

# APPENDIX F

# NUISANCE AQUATIC VEGETATION SURVEY REPORT

# NUISANCE AQUATIC VEGETATION SURVEY REPORT

R.L. HARRIS HYDROELECTRIC PROJECT

FERC NO. 2628

Prepared by:

**Alabama Power Company**

and

**Kleinschmidt Associates**

January 2021

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# 1.0 INTRODUCTION

Alabama Power Company (Alabama Power) is the Federal Energy Regulatory Commission (FERC) licensee for the R.L. Harris Hydroelectric Project (Harris Project) (FERC No. 2628). On June 1, 2018, Alabama Power filed a Pre-Application Document and began the Integrated Licensing Process (ILP) for the Harris Project.

On November 13, 2018, Alabama Power filed ten proposed study plans for the Harris Project. FERC issued a Study Plan Determination on April 12, 2019, which included FERC staff recommendations. Alabama Power incorporated FERC's recommendations and filed the Final Study Plans with FERC on May 13, 2019.

As part of the FERC-approved Erosion and Sedimentation Study Plan, Alabama Power conducted surveys for nuisance aquatic vegetation during the 2020 growing season at nine sedimentation sites identified by stakeholders during the October 19, 2017 issue identification workshop and the September 11, 2019 Harris Action Team (HAT) 2[1] meeting. This survey report describes the methods that Alabama Power used to assess the occurrence of invasive aquatic vegetation on Harris Reservoir as well as the findings.

[1] HAT 2 includes the following resource issues: water quality, water quantity, and erosion and sedimentation issues.

## 2.0 METHODS

On December 4, 2019, Alabama Power visited the sedimentation sites on Harris Reservoir that were accessible via boat to conduct field verification. Sedimentation sites covering approximately 116.2 acres were located on the mainstem Little Tallapoosa River and two of its tributaries (Pinewood Creek and Wedowee Creek) as well as the mainstem Tallapoosa River and one of its tributaries (Wedowee Creek) (Figure 2-1 to Figure 2-4). On August 26, 2020, an Alabama Power biologist and a Kleinschmidt Associates scientist conducted vegetation surveys at all nine sedimentation sites.

Each site was visually inspected for vegetation and identified to the lowest practical taxa. Sonar was used to locate submersed vegetation in deeper or more turbid areas where visual inspection was not possible. Presence or absence of aquatic vegetation was verified using a drag rake in areas of low visibility.

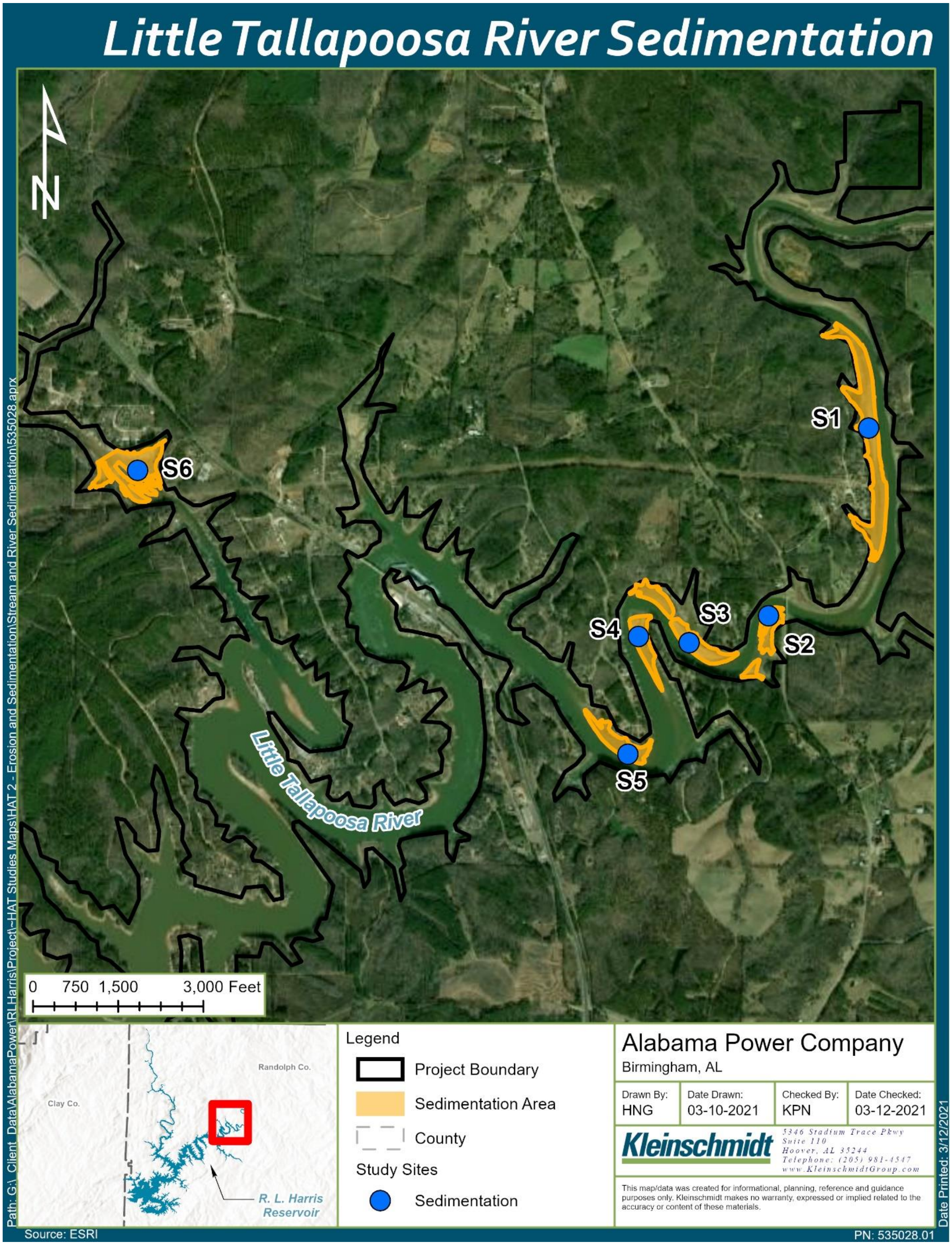



**Figure 2-1 Little Tallapoosa River Sedimentation Areas**

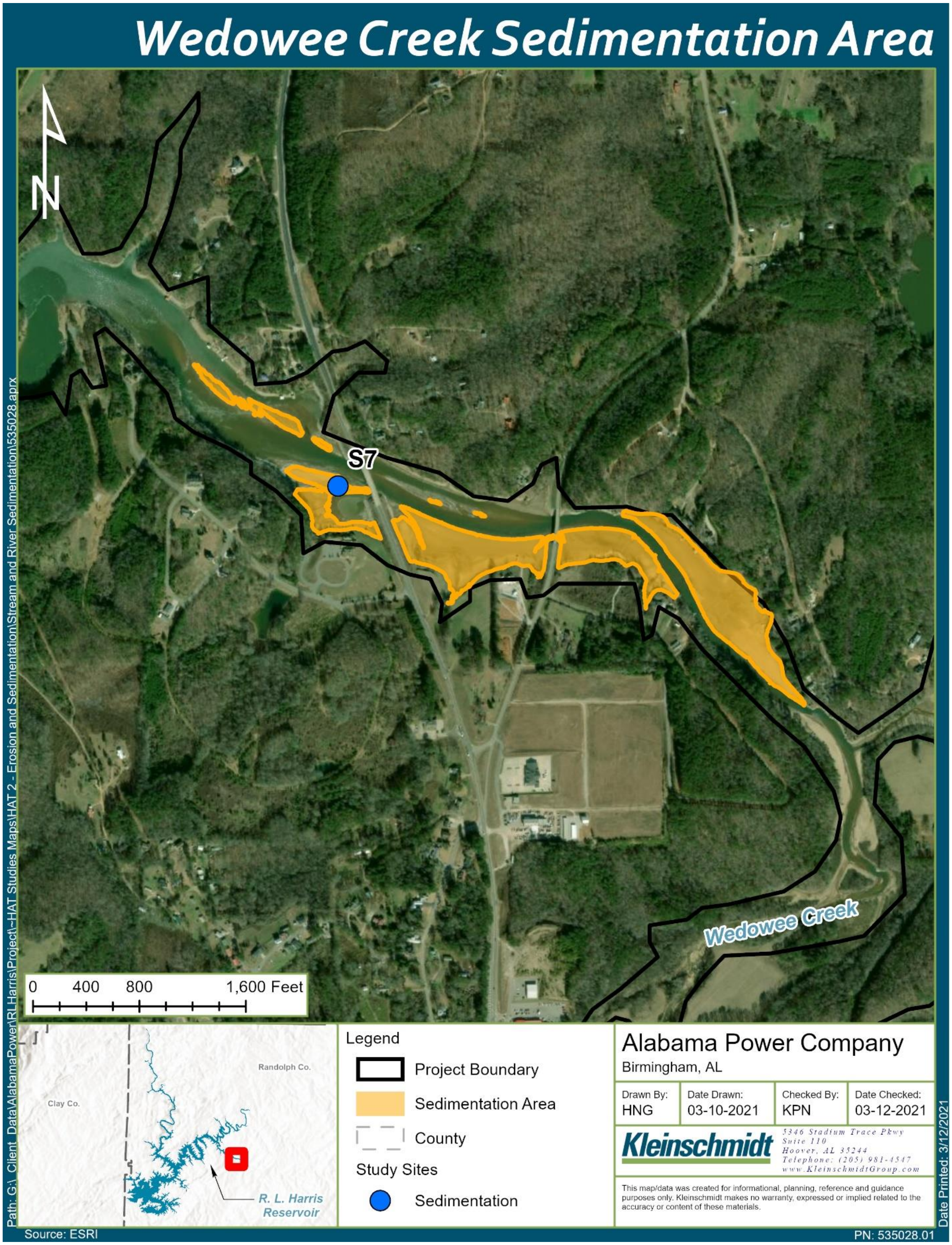



**Figure 2-2 Wedowee Creek Sedimentation Areas**

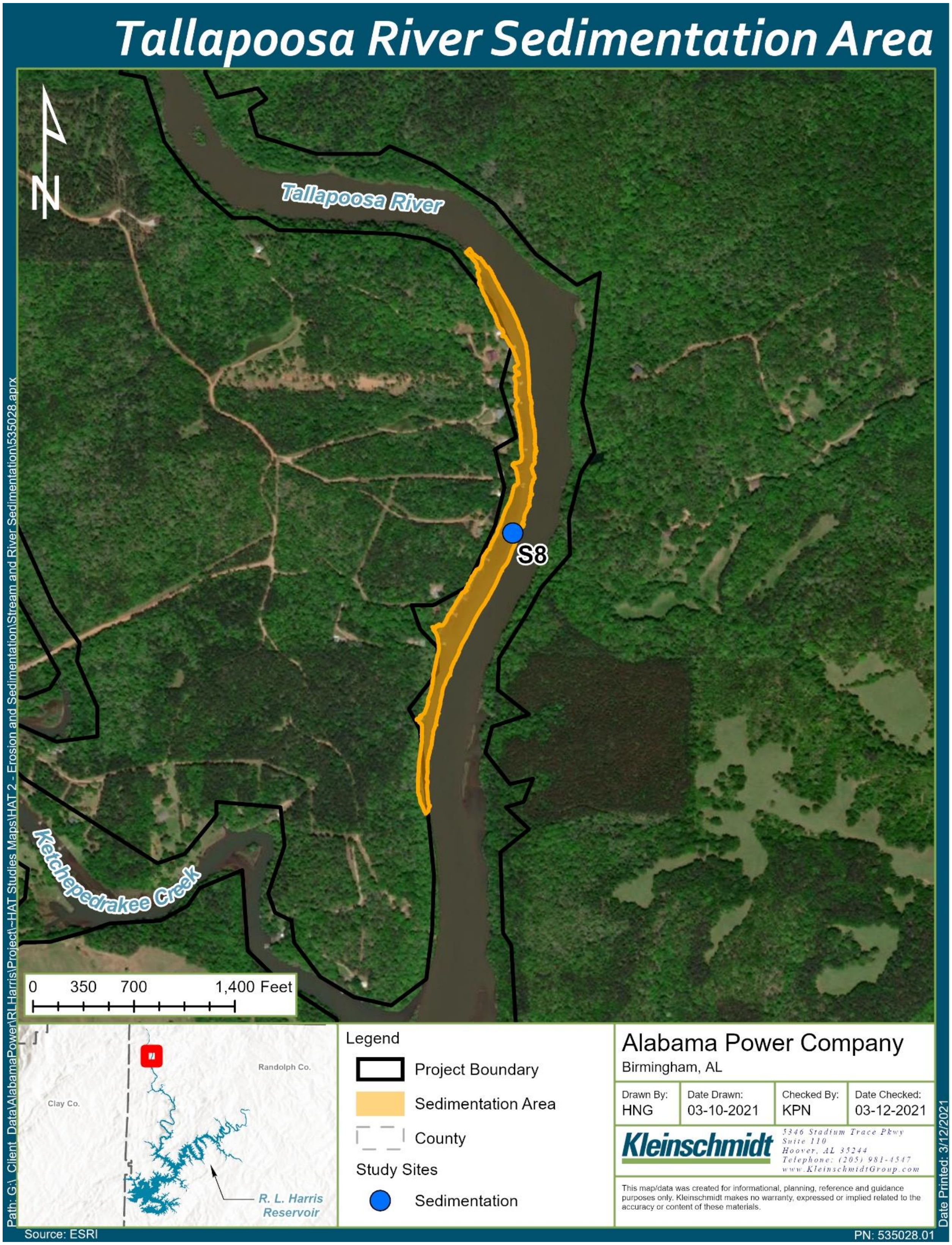



**Figure 2-3 Tallapoosa River Sedimentation Areas**

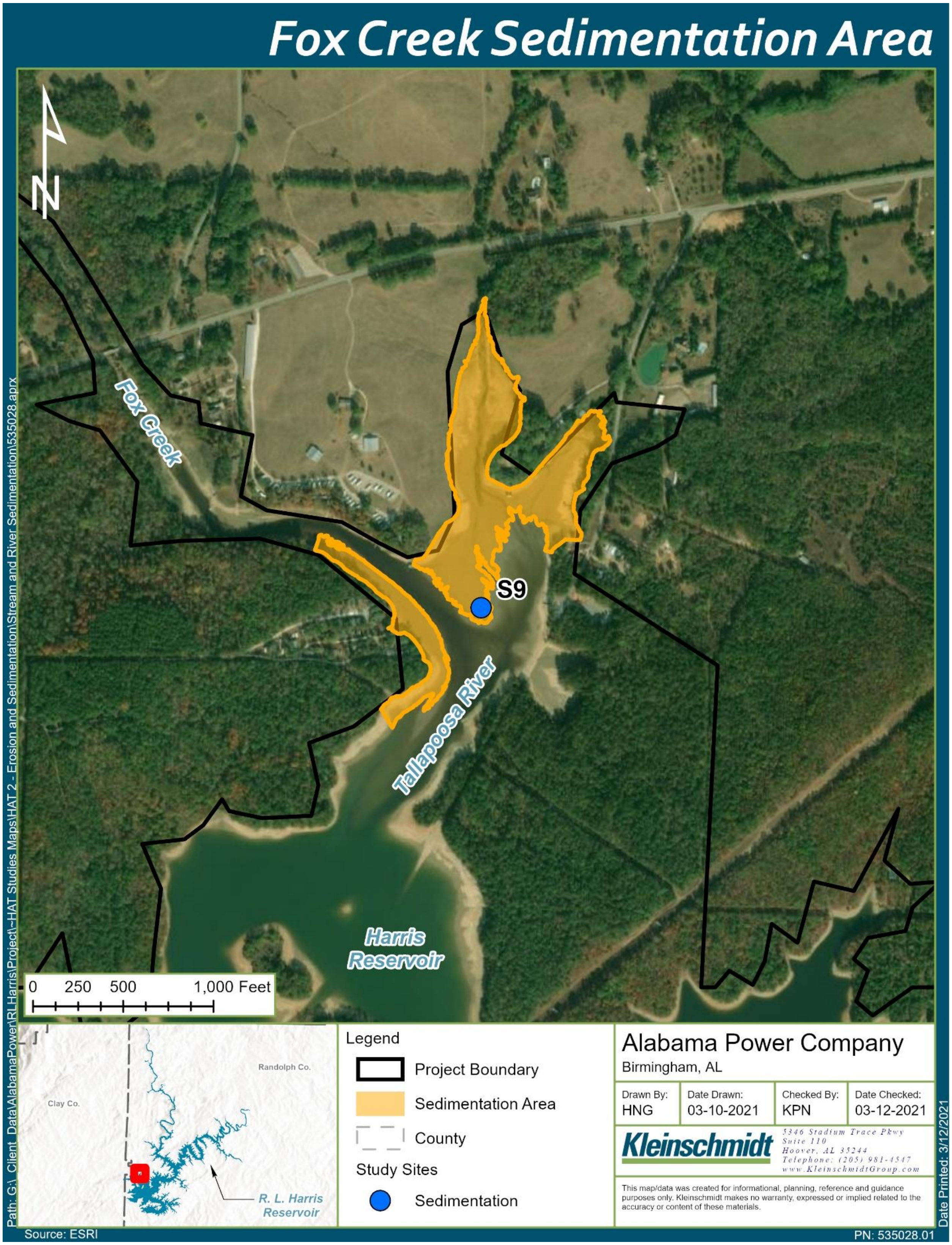



**Figure 2-4 Fox Creek Sedimentation Areas**

## 3.0 RESULTS

At the nine sedimentation sites surveyed, American Water-willow (*Justicia americana*), Pickerel Weed (*Pontederia cordata*), Alligator Weed (*Alternathera philoxeroides*), and juncus grass (*Juncus* spp.) were observed (Table 3-1). No submersed vegetation species were found at any of the sites. American Water-willow, a native species, was most common and found at 7 of the 9 sedimentation sites. Two sites (Site 4 and 5) on the Little Tallapoosa River had no vegetation. The only non-native species identified was Alligator Weed at Site 8, which was estimated to cover less than 0.50 acres of the approximately 11.6-acre sedimentation area (Table 3-1).

**Table 3-1 Species of Aquatic Vegetation Identified at Each Sedimentation Site and the Estimated Coverage in Acres**

| Site | Location Description | Sedimentation Acreage | American Water-willow | Pickerel Weed | *Alligator Weed | Juncus Grass |
|---|---|---|---|---|---|---|
| S1 | Little Tallapoosa River | 23.8 | <0.25 | <0.10 | | |
| S2 | Little Tallapoosa River | 5.0 | <0.10 | | | |
| S3 | Little Tallapoosa River | 6.6 | <0.10 | | | |
| S4 | Little Tallapoosa River | 5.5 | | | | |
| S5 | Little Tallapoosa River | 6.7 | | | | |
| S6 | Pineywood Creek | 13.6 | < .25 | | | |
| S7 | Wedowee Creek | 26.1 | <.25 | | | |
| S8 | **Tallapoosa River | 10.6 | 1.00 | | <0.50 | |
| S9 | Fox Creek | 18.3 | <0.25 | | | <0.25 |

* Non-native plant to this area

** High turbidity in this area

## 4.0 SUMMARY AND CONCLUSIONS

The presence or absence of aquatic vegetation and algae is dependent on several factors including type of substrate, water depth, water clarity, and water chemistry, as well as nutrient levels. In southeast reservoir systems, late summer typically yields clear, warm, and static waters (McLean 2020, personal communication), which are ideal for growth of submersed aquatic vegetation (Barko et al. 1986). Turbid conditions may reduce the growth of submersed vegetation by restricting the amount of available sunlight at greater depths. Another factor that may prevent the growth of submersed vegetation is fluctuating water levels. Harris Reservoir currently experiences an eight-foot winter (November to April) drawdown which periodically exposes vegetation in shallower areas of Harris Reservoir to desiccation and freezing. These conditions can inhibit the establishment of some species of submersed vegetation (Bates and Smith 2009) along the perimeter of the Harris Reservoir.

Alligator Weed was the only non-native aquatic plant species found during the survey. It covered a small portion of one site and was patchy and sparse. Although it is not native to the area, Alligator Weed typically does not overrun an area like other invasive species. The Alligator Weed at Site 8 will be monitored during future surveys.

## 5.0 REFERENCES

Barko, J.W., M.S. Adams, and N.L. Clesceri. 1986. Environmental factors and their consideration in the management of submersed aquatic vegetation: a review. Journal of Aquatic Plant Management 24:1-10.

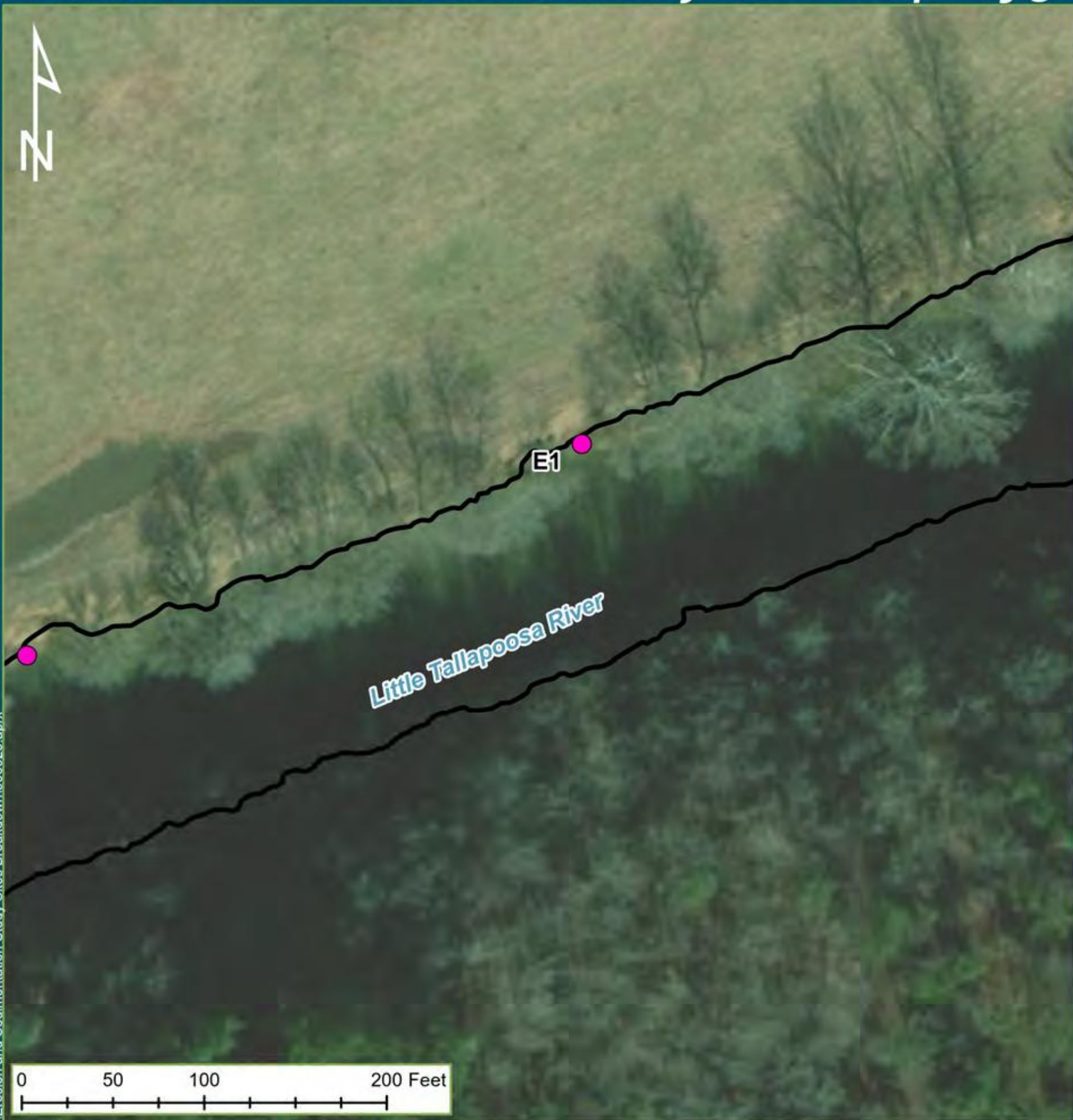
Bates, A.L. and C.S. Smith. 2009. Submersed plant invasions and declines in the southeastern United States. Lake and Reservoir Management 10:53-55.

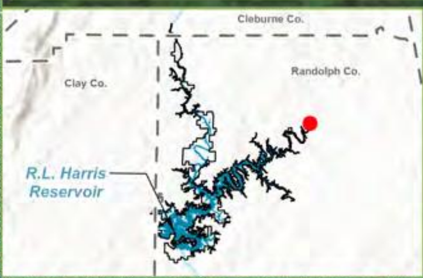
McLean, T. 2020. Personal communication. Alabama Power.

# APPENDIX G

# EROSION AND SEDIMENTATION SITE AERIALS

# Erosion and Sedimentation Study Sites - Map 1 of 32




Legend
- Project Boundary
- 785' Contour
- 793' Contour

Study Sites
- Erosion
- Sedimentation

Land Use
- Natural/Undeveloped
- Recreation/Public Use

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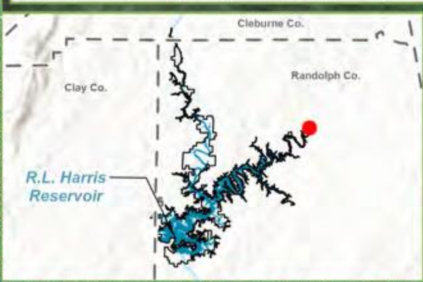
# Erosion and Sedimentation Study Sites - Map 2 of 32


Legend

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- 793' Contour

Study Sites

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- Sedimentation

Land Use

- Natural/Undeveloped
- Recreation/Public Use

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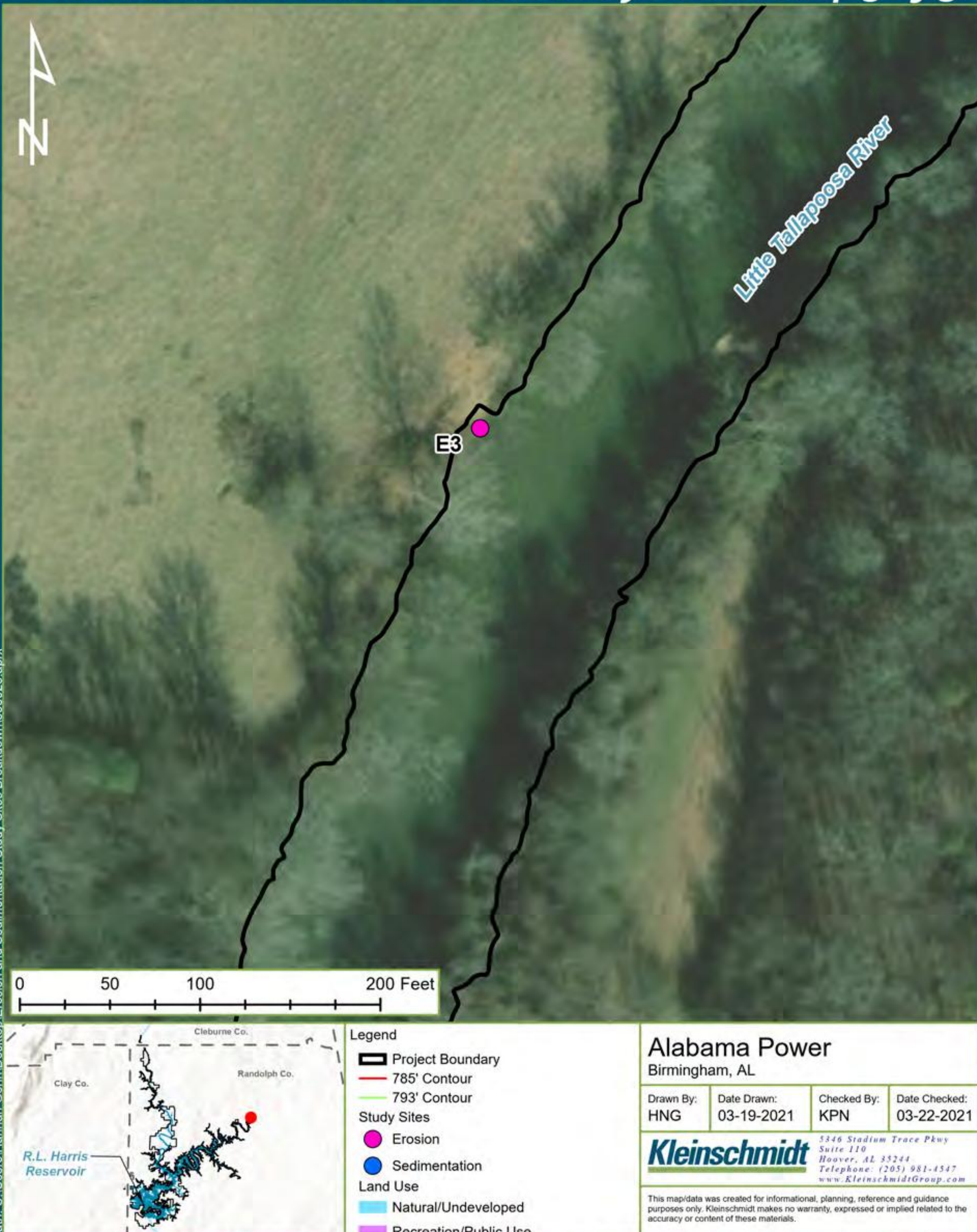


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# Erosion and Sedimentation Study Sites - Map 4 of 32


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- 785' Contour
- 793' Contour

Study Sites
- Erosion
- Sedimentation

Land Use
- Natural/Undeveloped
- Recreation/Public Use

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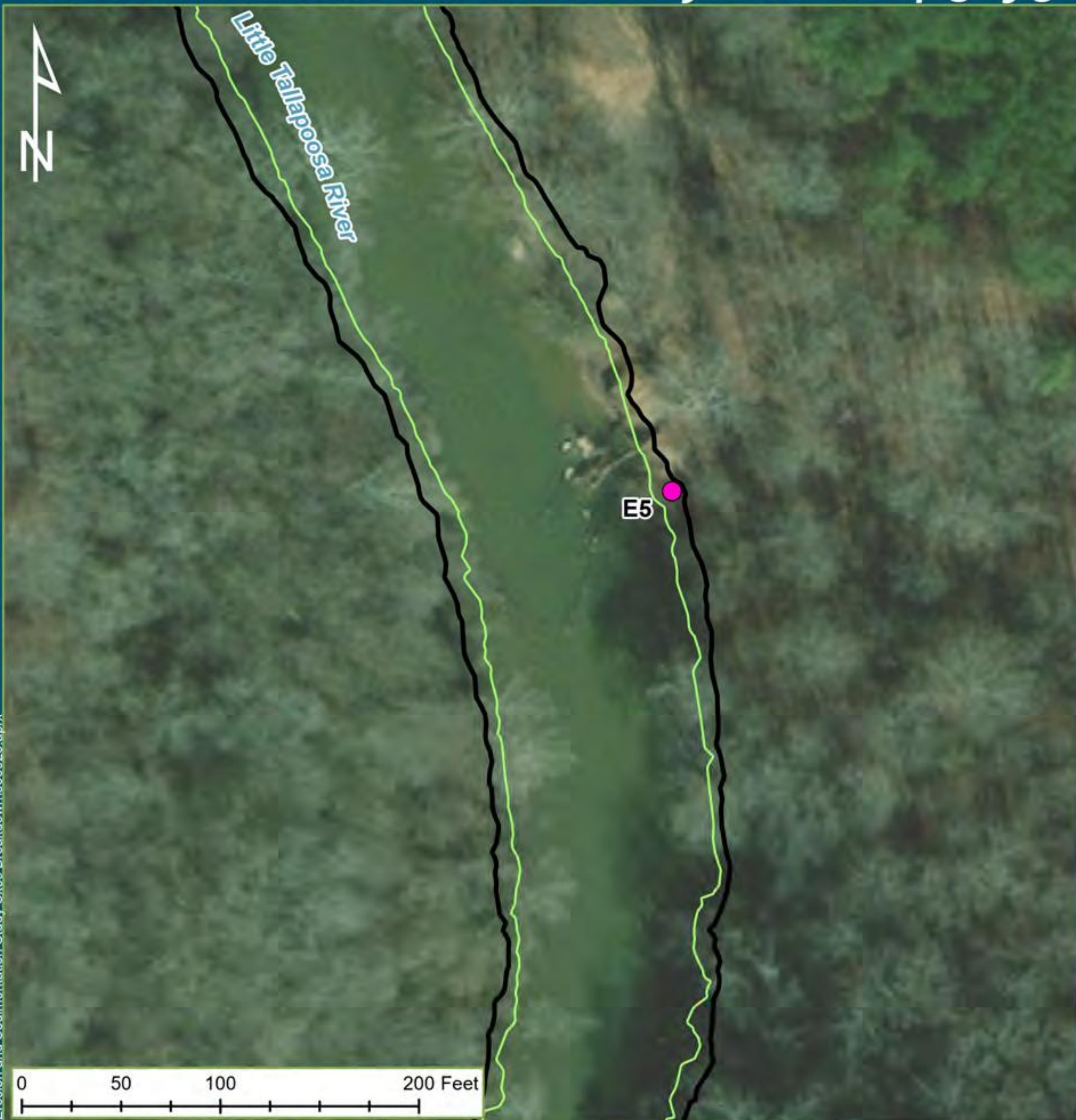
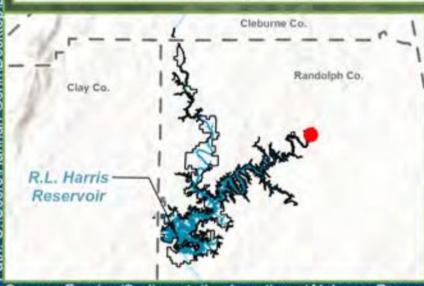
# Erosion and Sedimentation Study Sites - Map 5 of 32




Legend
- Project Boundary
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- 793' Contour

Study Sites
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Land Use
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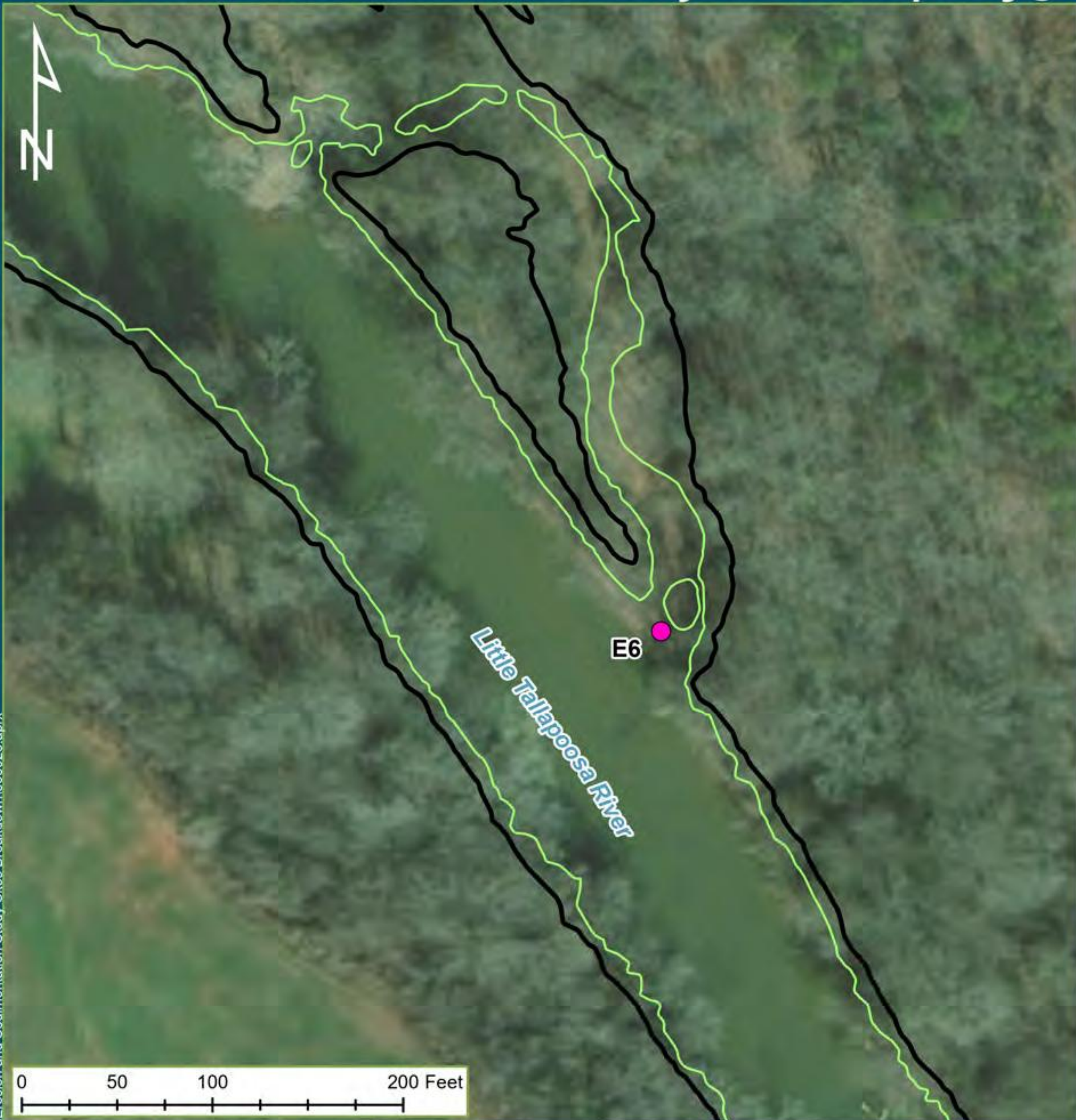


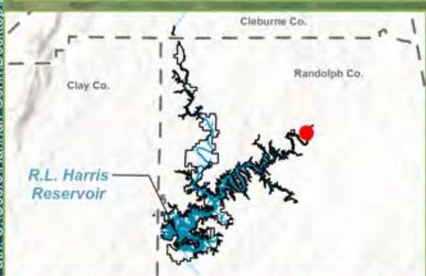


Legend
- Project Boundary
- 785' Contour
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Study Sites
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- Sedimentation

Land Use
- Natural/Undeveloped
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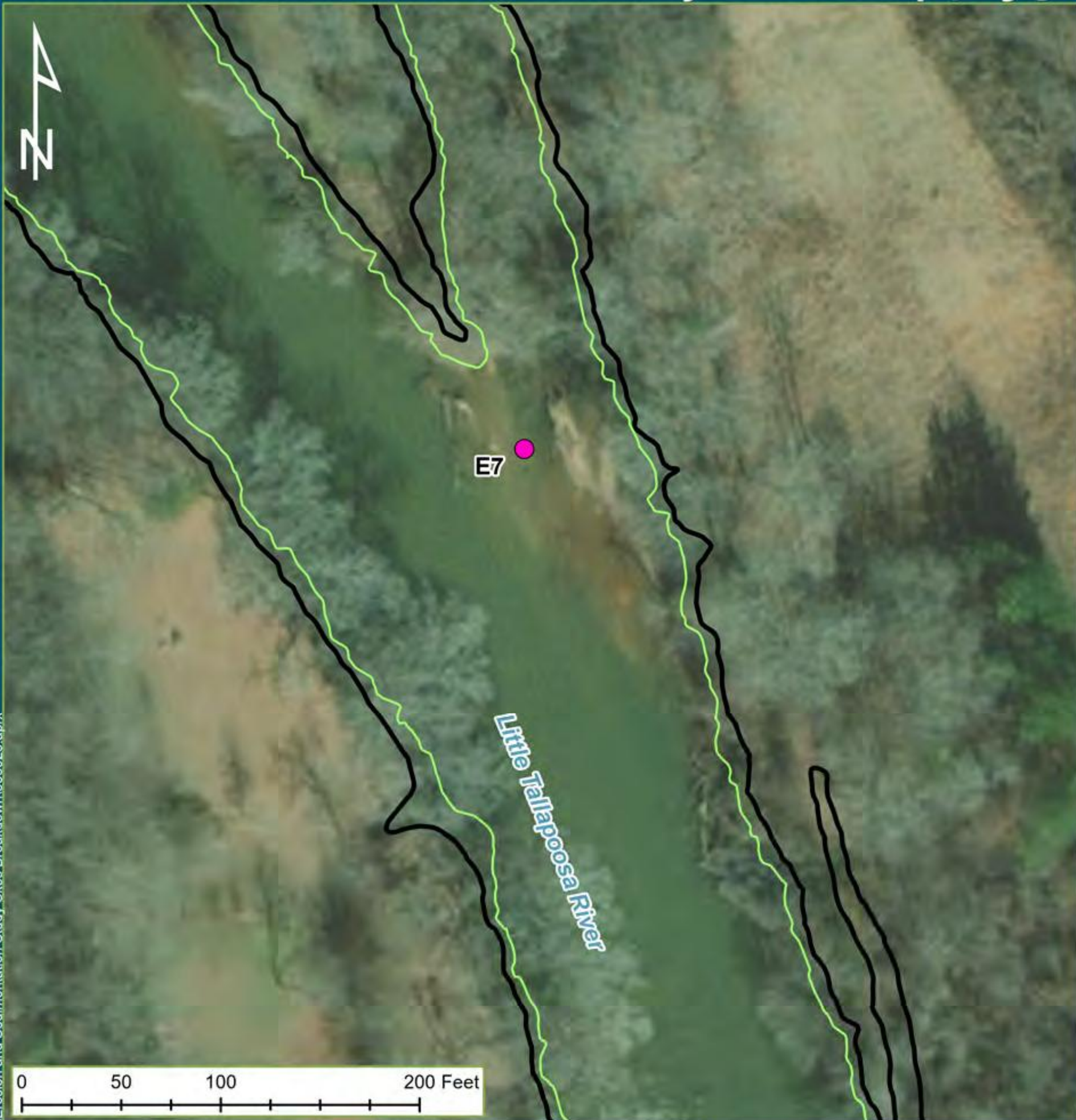
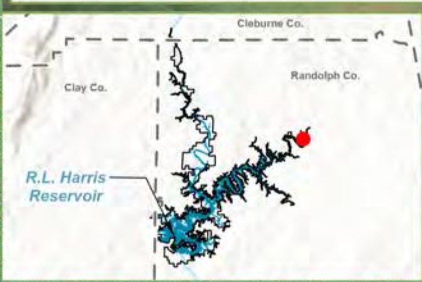
# Erosion and Sedimentation Study Sites - Map 7 of 32




Legend
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- 785' Contour
- 793' Contour

Study Sites
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- Sedimentation

Land Use
- Natural/Undeveloped
- Recreation/Public Use

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Source: Erosion/Sedimentation Locations (Alabama Power, 2019), Project Boundary (Alabama Power, 2019), Aerial Imagery (ESRI, 2020)

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# Erosion and Sedimentation Study Sites - Map 8 of 32


Legend
- Project Boundary
- 785' Contour
- 793' Contour

Study Sites
- Erosion
- Sedimentation

Land Use
- Natural/Undeveloped
- Recreation/Public Use

Alabama Power
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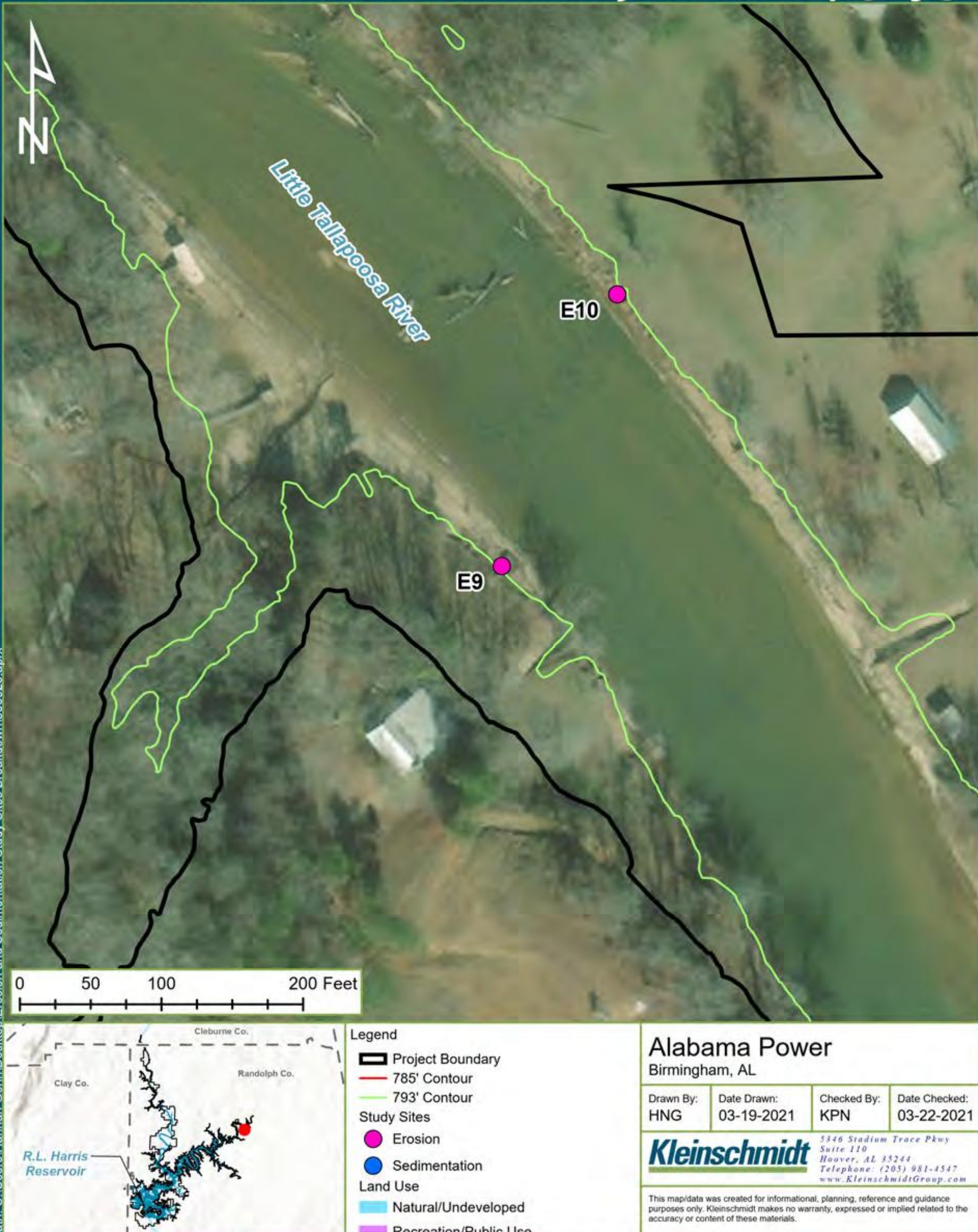
PN: 535028.01

# Erosion and Sedimentation Study Sites - Map 9 of 32

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Source: Erosion/Sedimentation Locations (Alabama Power, 2019), Project Boundary (Alabama Power, 2019), Aerial Imagery (ESRI, 2020)

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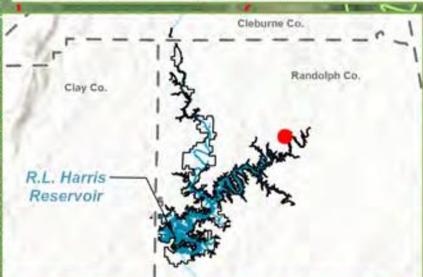
# Erosion and Sedimentation Study Sites - Map 10 of 32


Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

- Natural/Undeveloped
- Recreation/Public Use

Alabama Power
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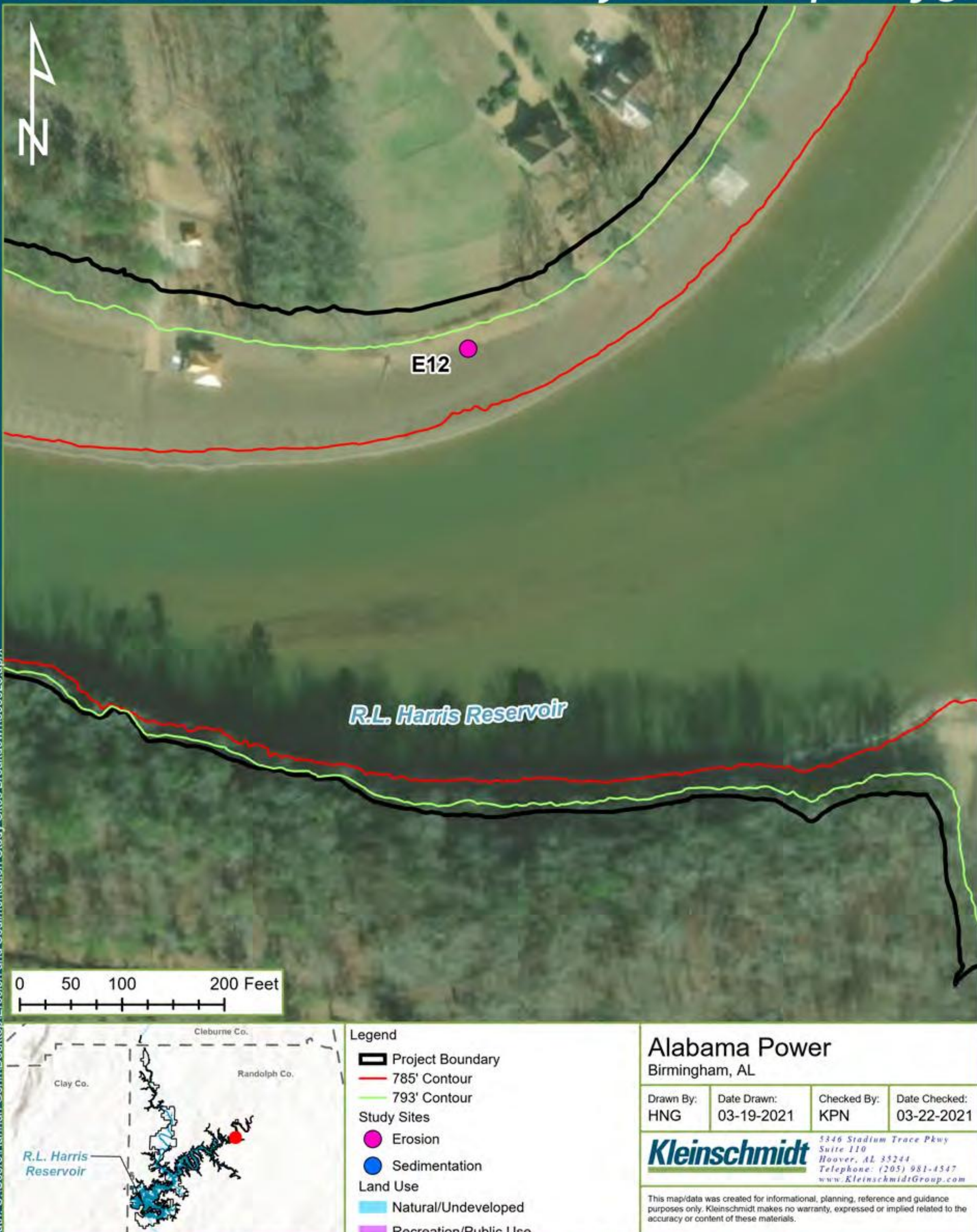
# Erosion and Sedimentation Study Sites - Map 11 of 32






Legend
- Project Boundary
- 785' Contour
- 793' Contour

Study Sites
- Erosion
- Sedimentation

Land Use
- Natural/Undeveloped
- Recreation/Public Use

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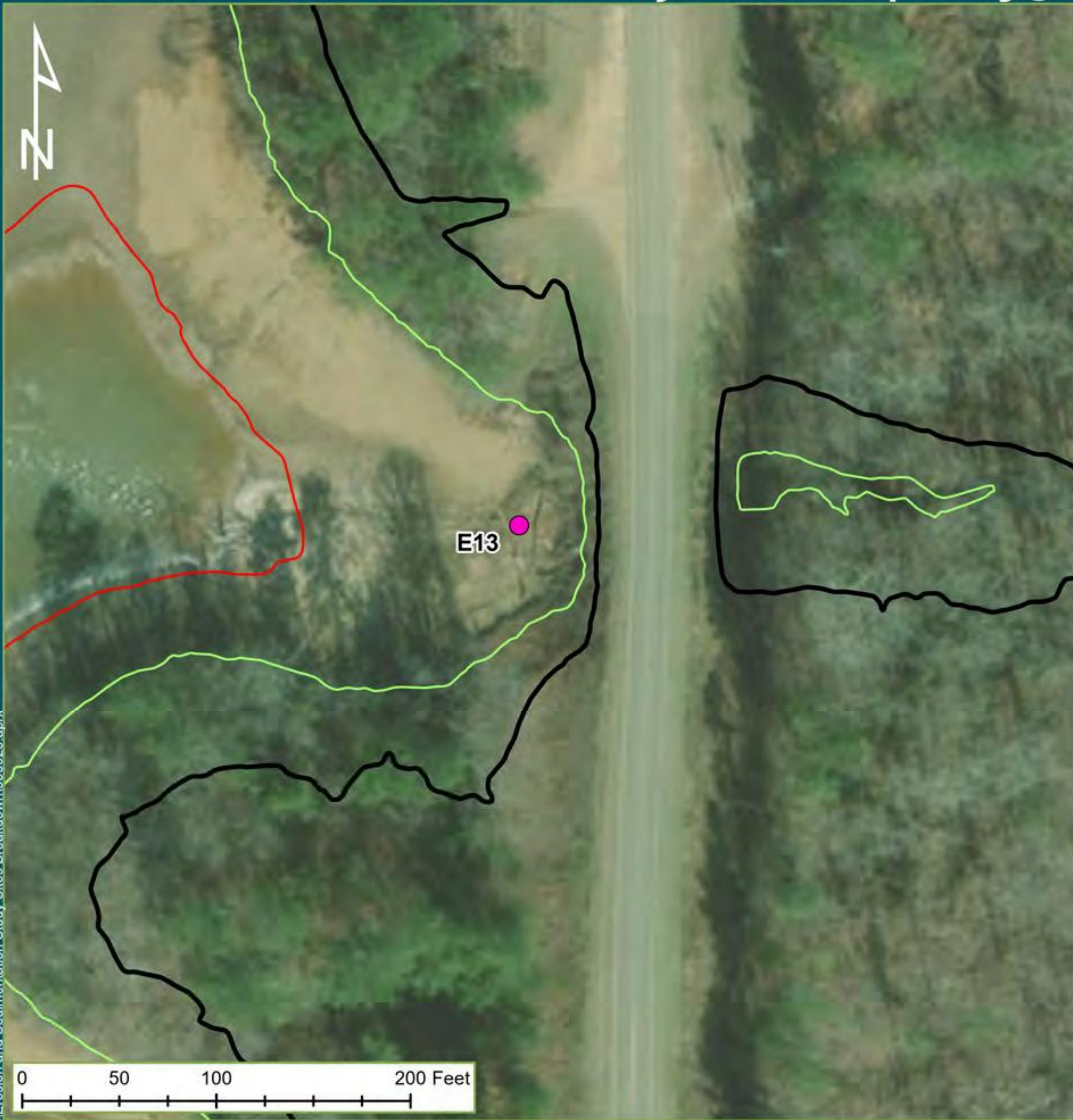
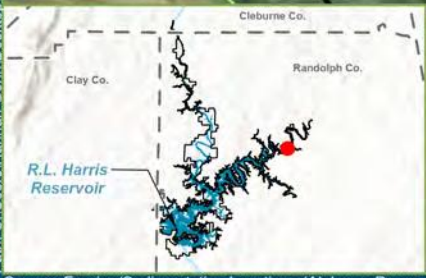
# Erosion and Sedimentation Study Sites - Map 12 of 32




Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

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- Recreation/Public Use

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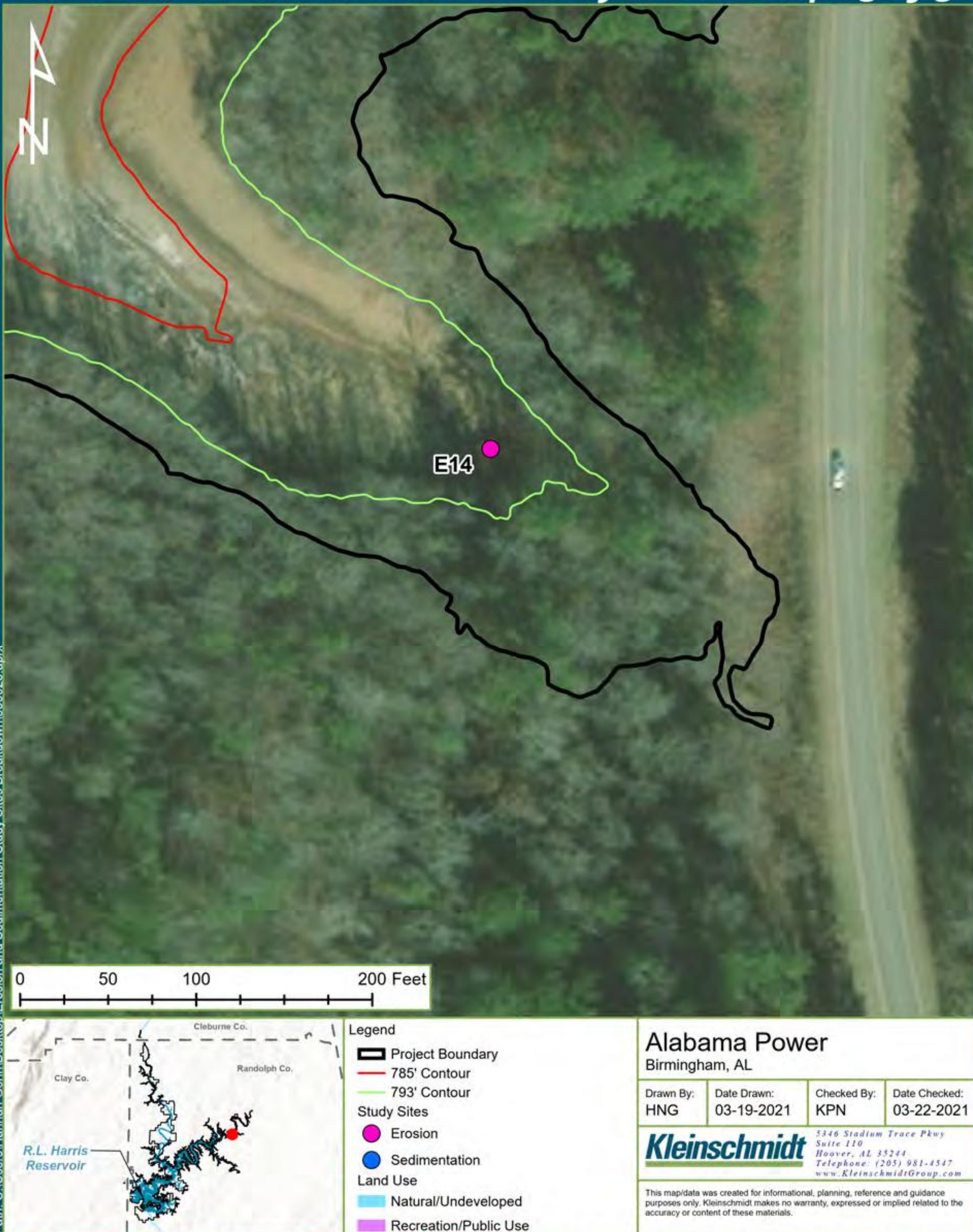
# Erosion and Sedimentation Study Sites - Map 13 of 32




Legend

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- 785' Contour
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Study Sites

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Land Use

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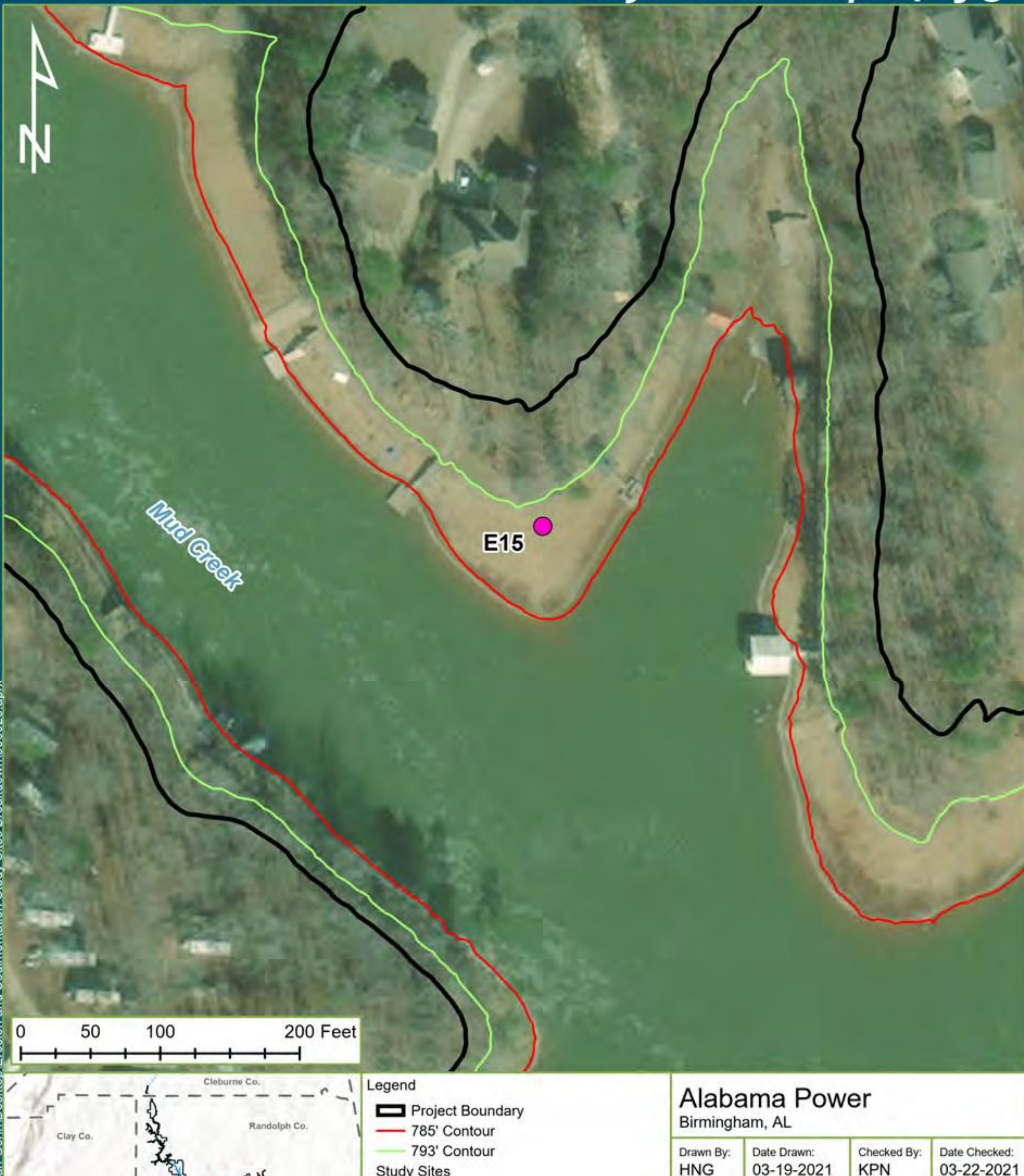
# Erosion and Sedimentation Study Sites - Map 14 of 32




Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

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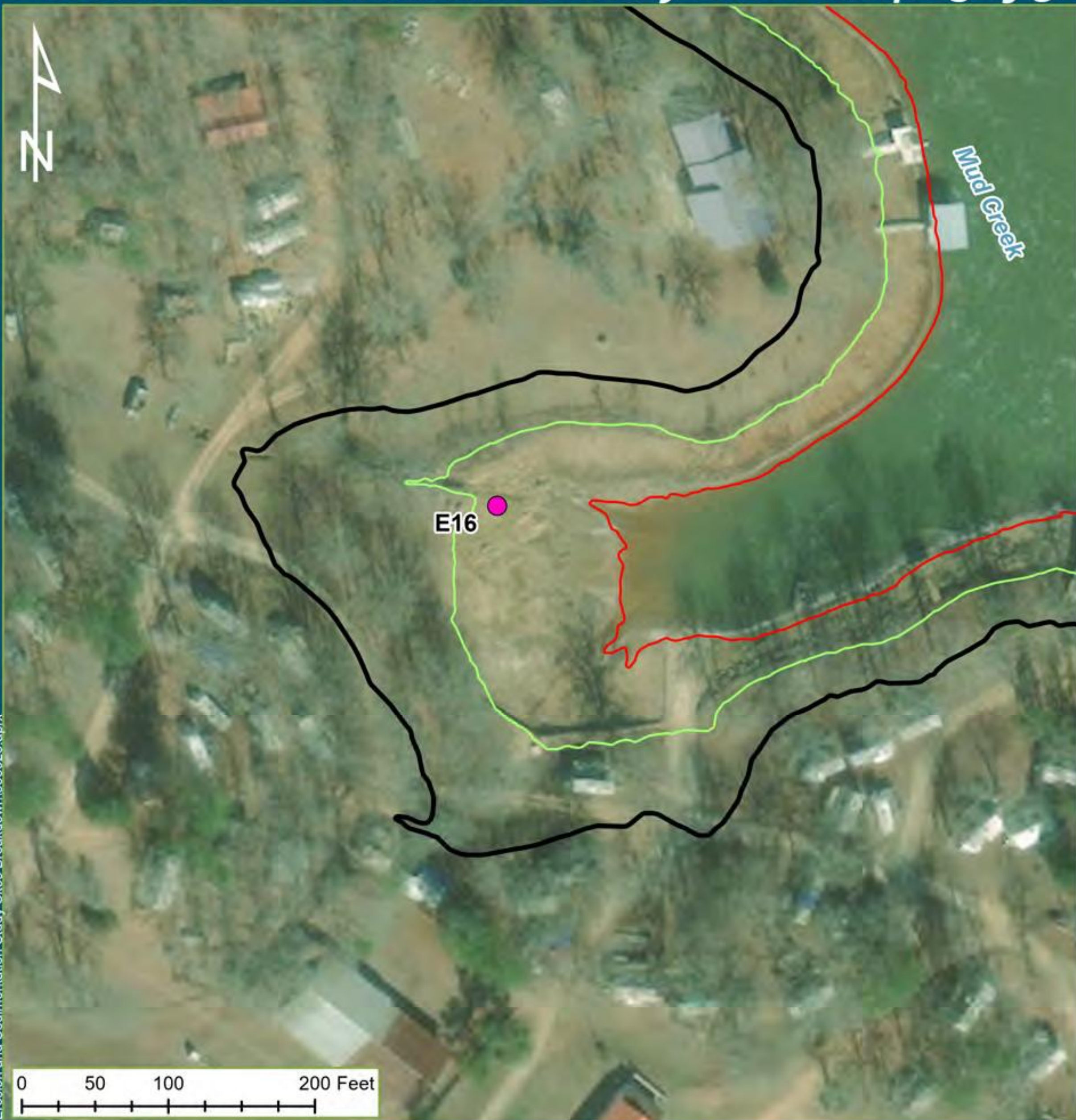
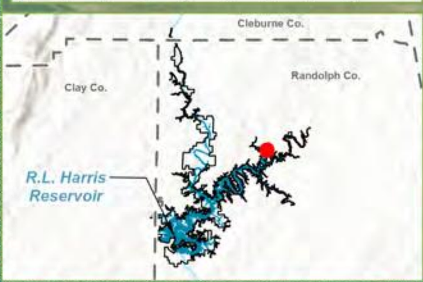
# Erosion and Sedimentation Study Sites - Map 15 of 32




Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

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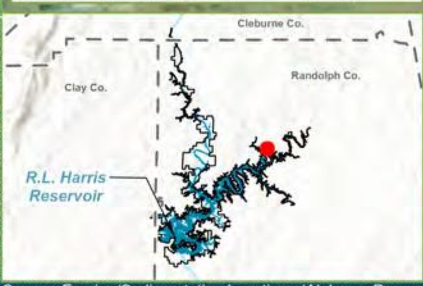
# Erosion and Sedimentation Study Sites - Map 16 of 32




Legend

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Study Sites

- Erosion
- Sedimentation

Land Use

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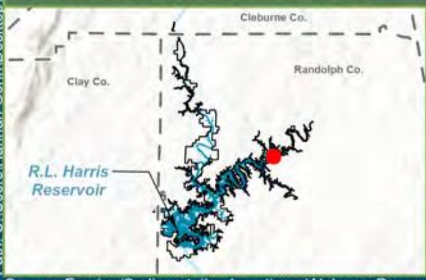
# Erosion and Sedimentation Study Sites - Map 17 of 32


Legend

- Project Boundary
- 785' Contour
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Study Sites

- Erosion
- Sedimentation

Land Use

- Natural/Undeveloped
- Recreation/Public Use

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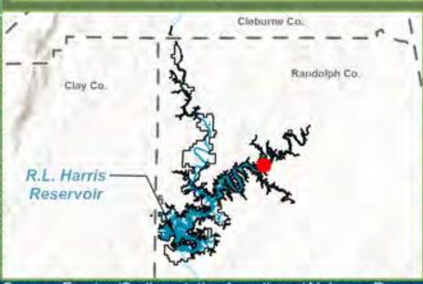
# Erosion and Sedimentation Study Sites - Map 18 of 32


Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

- Natural/Undeveloped
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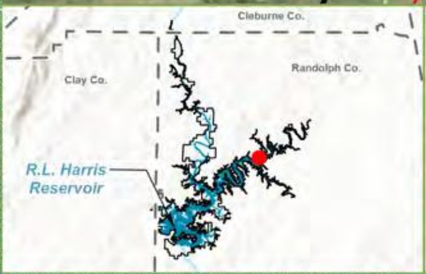
# Erosion and Sedimentation Study Sites - Map 19 of 32


Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

- Natural/Undeveloped
- Recreation/Public Use

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# Erosion and Sedimentation Study Sites - Map 20 of 32


Legend
- Project Boundary
- 785' Contour
- 793' Contour

Study Sites
- Erosion
- Sedimentation

Land Use
- Natural/Undeveloped
- Recreation/Public Use

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# Erosion and Sedimentation Study Sites - Map 21 of 32



Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

- Natural/Undeveloped
- Recreation/Public Use

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# Erosion and Sedimentation Study Sites - Map 22 of 32



Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

- Natural/Undeveloped
- Recreation/Public Use

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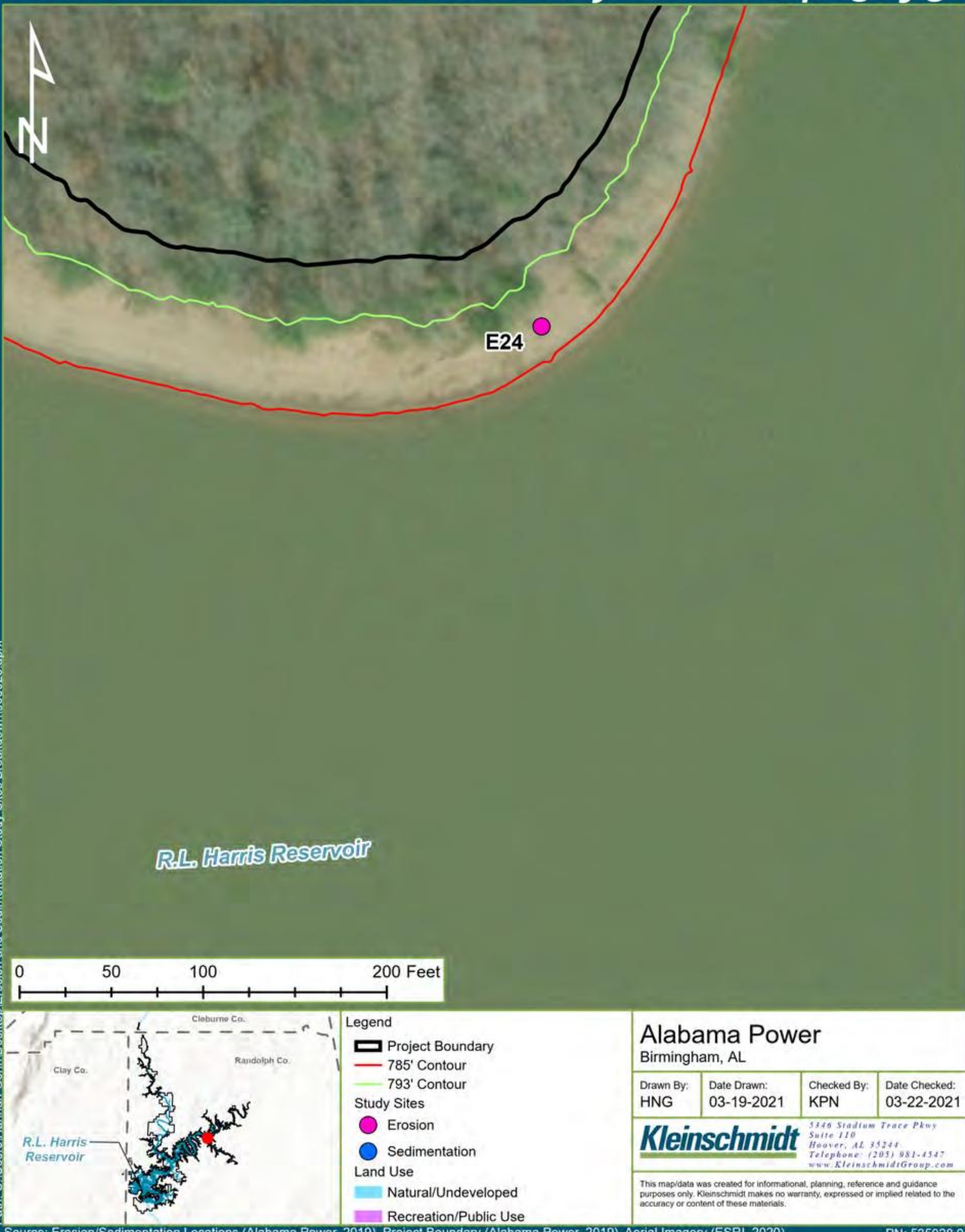
# Erosion and Sedimentation Study Sites - Map 23 of 32




Legend

- Project Boundary
- 785' Contour
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Study Sites

- Erosion
- Sedimentation

Land Use

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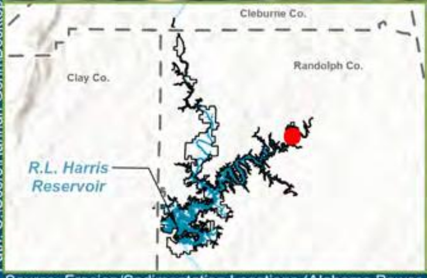
# Erosion and Sedimentation Study Sites - Map 24 of 32


Legend

- Project Boundary
- 785' Contour
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Study Sites

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- Sedimentation

Land Use

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Alabama Power
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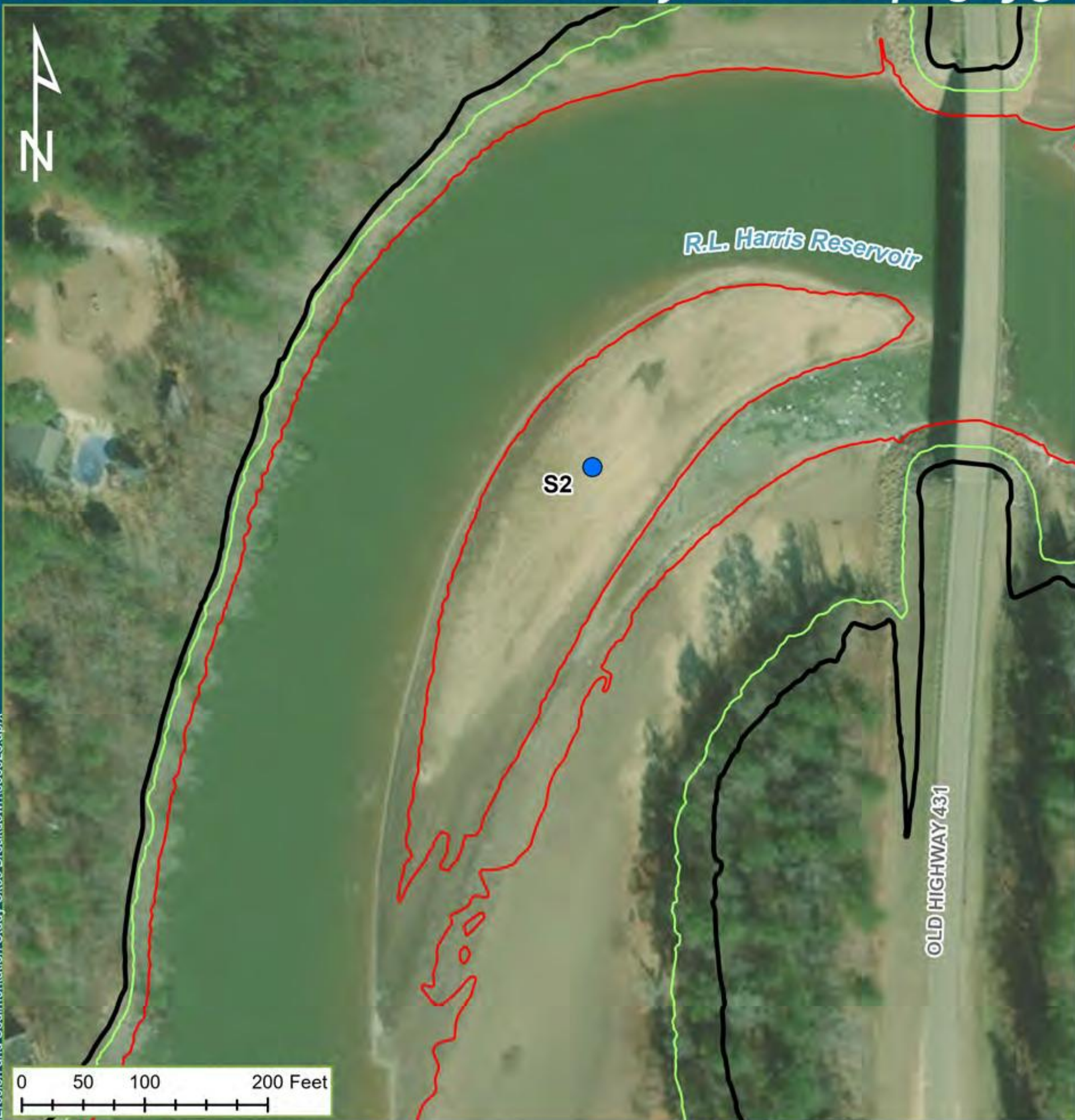
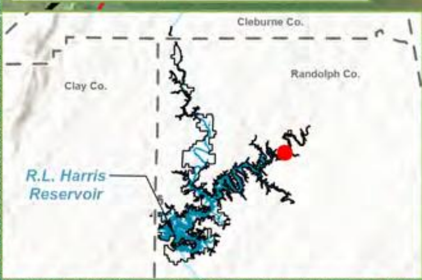
# Erosion and Sedimentation Study Sites - Map 25 of 32




Legend

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Study Sites

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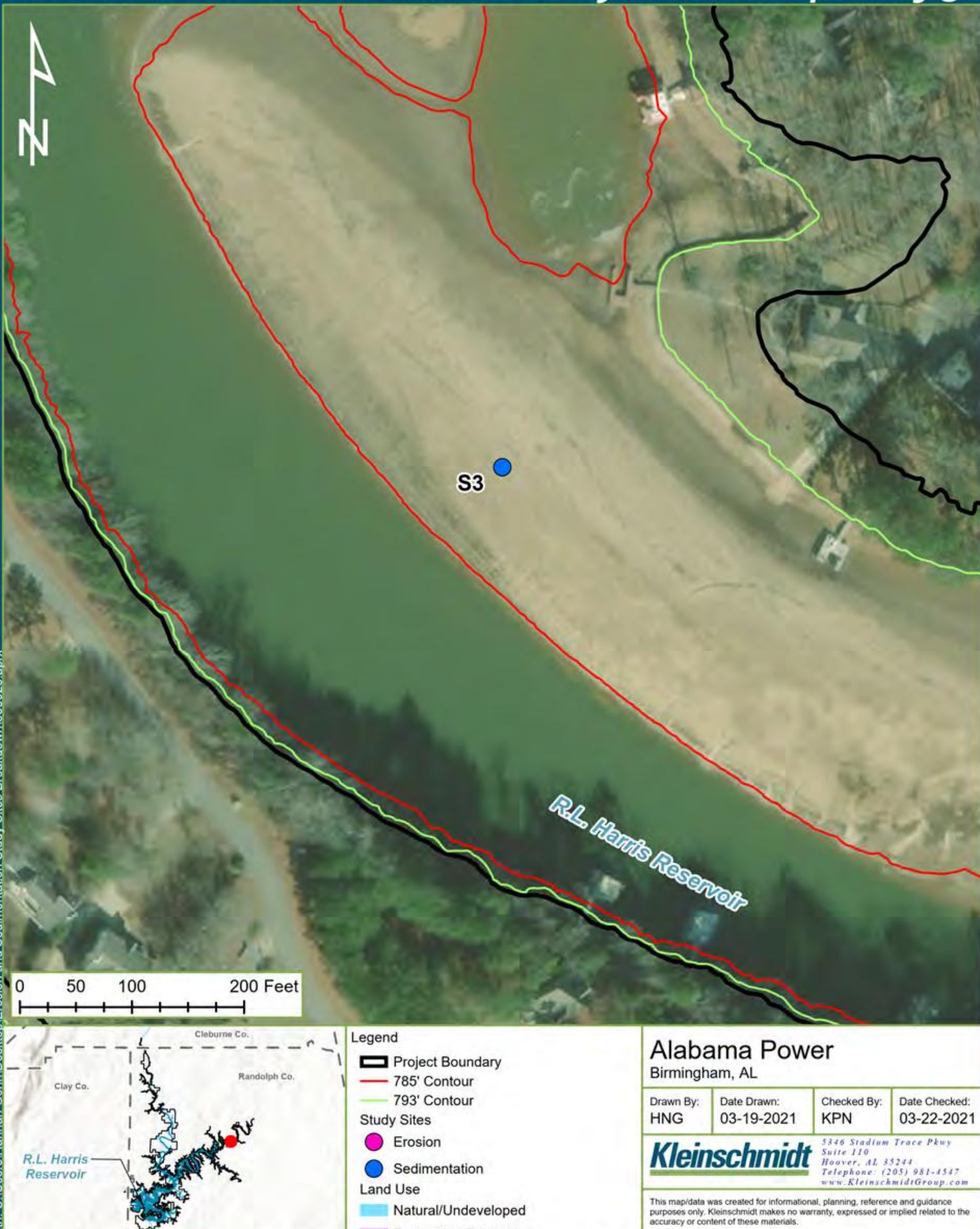
# Erosion and Sedimentation Study Sites - Map 26 of 32

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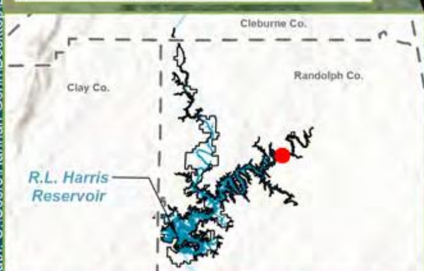
# Erosion and Sedimentation Study Sites - Map 27 of 32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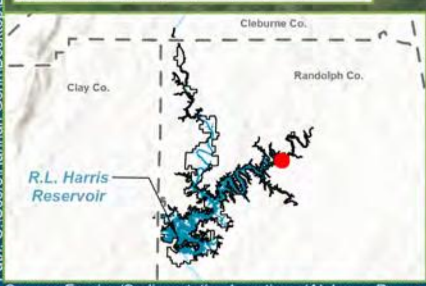
# Erosion and Sedimentation Study Sites - Map 28 of 32


Legend

- Project Boundary
- 785' Contour
- 793' Contour

Study Sites

- Erosion
- Sedimentation

Land Use

- Natural/Undeveloped
- Recreation/Public Use

Alabama Power
Birmingham, AL

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| --- | --- | --- | --- |
| HNG | 03-19-2021 | KPN | 03-22-2021 |

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Hoover, AL 35244
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Source: Erosion/Sedimentation Locations (Alabama Power, 2019), Project Boundary (Alabama Power, 2019), Aerial Imagery (ESRI, 2020)

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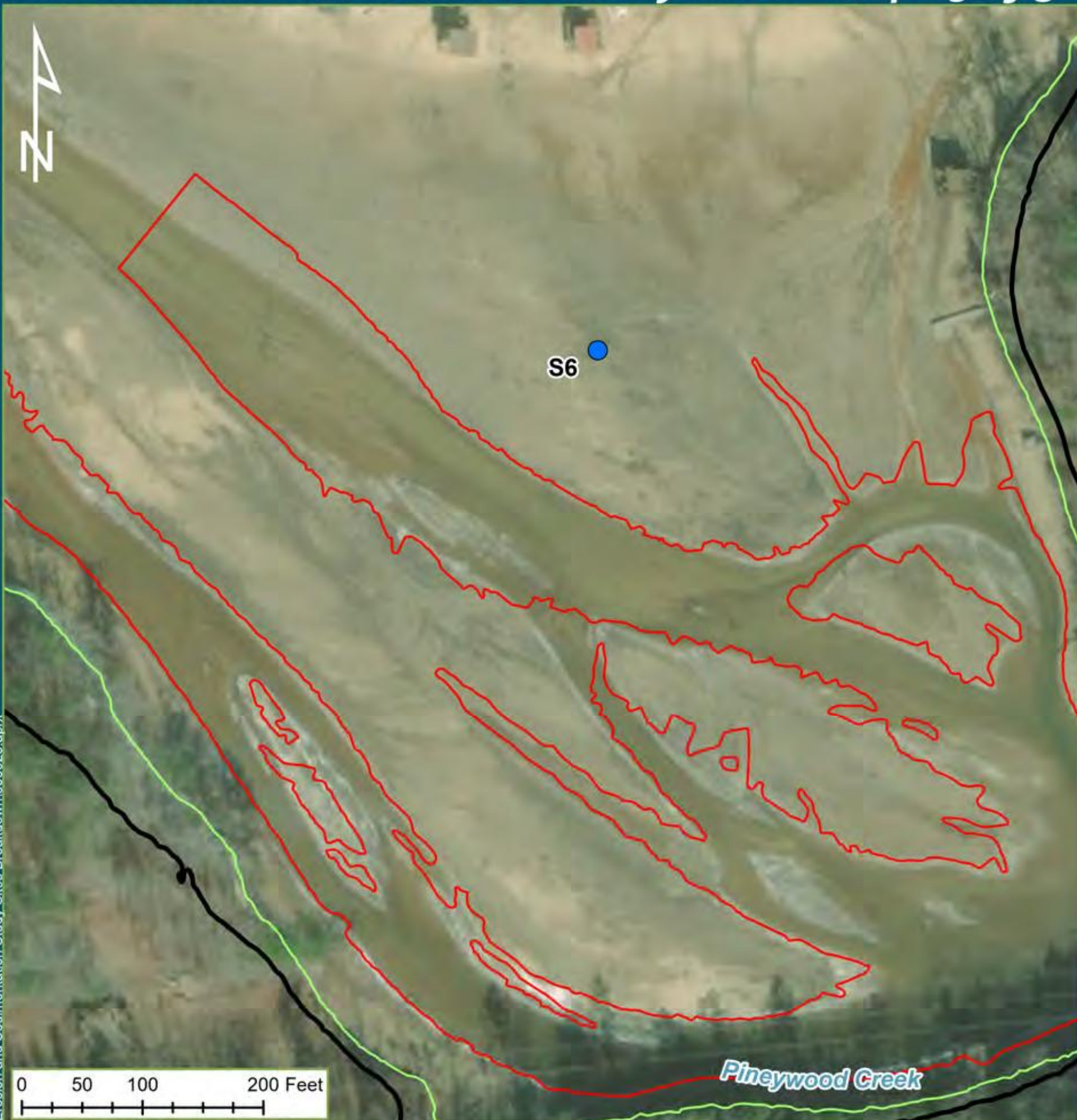
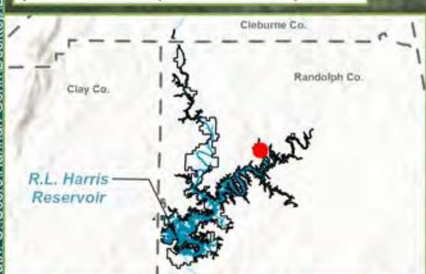
# Erosion and Sedimentation Study Sites - Map 29 of 32

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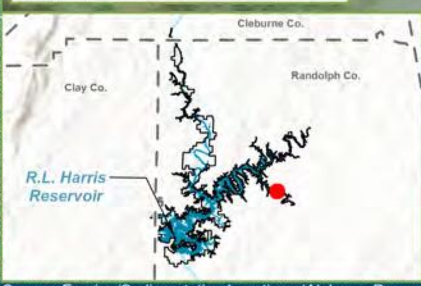
# Erosion and Sedimentation Study Sites - Map 30 of 32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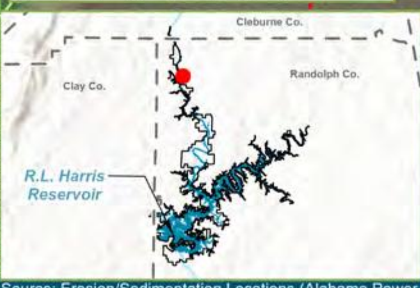
# Erosion and Sedimentation Study Sites - Map 31 of 32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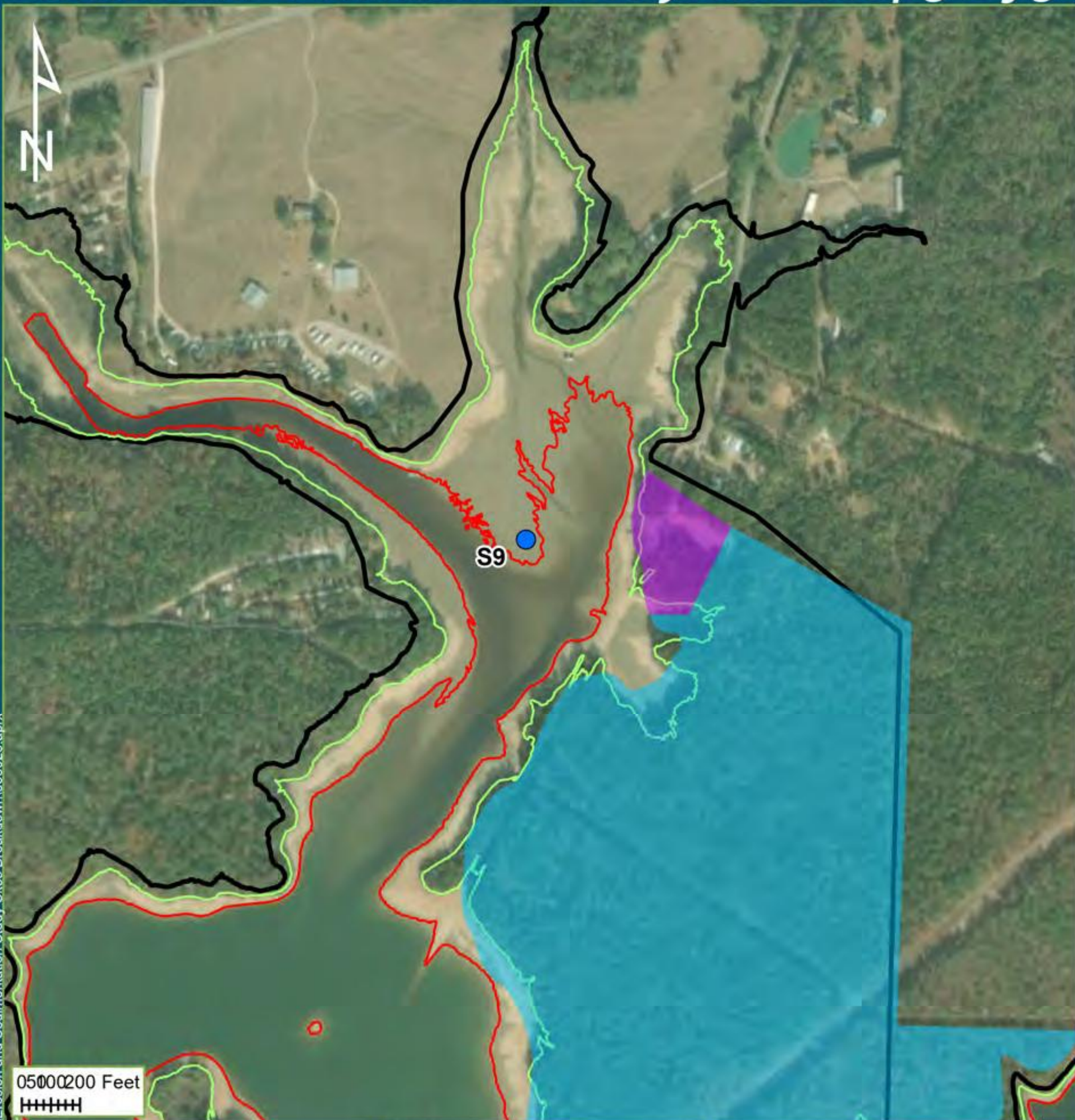
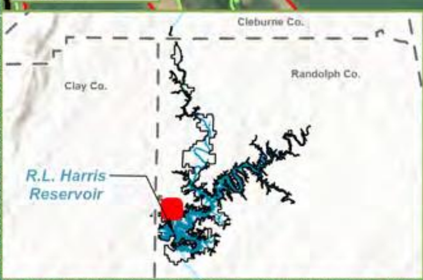
# Erosion and Sedimentation Study Sites - Map 32 of 32

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