

Lake Accotink Task Force Findings Report



December 8, 2023

Lake Accotink Task Force Final Findings Report Errata:

Below is a list of revisions accepted as amendments during the December 4, 2023 Lake Accotink Task Force Meeting.

1. Page 1, Paragraph 1:
 - a. Original: In 2019, the Board of Supervisors (BOS) approved a plan to dredge the entire 49-acres of Lake Accotink and engage in regular maintenance dredging going forward.
 - b. Revision: In 2019, the Board of Supervisors (BOS) approved a plan to dredge the entire approximately 49 to 55 acres of Lake Accotink and engage in regular maintenance dredging going forward. With the footnote “County staff has stated the official size of Lake Accotink is 55-acres. The Lake Accotink Task Force finds the County has published documents with sizes of Lake Accotink that range from 49 to 55 acres. ”
2. Page 2, Paragraph 1:
 - a. Original: A statistical analysis was performed on the April 2023 results of the Lake Accotink Dredging Public Survey and is provided with this report.
 - b. Revision: The Lake Accotink Dredging Public Survey was open from February 16 through April 1, 2023. The results that were published on April 14, 2023 are discussed in this report.
3. Page 2, Paragraph 2:
 - a. Original: Official data and information request from County staff was initially submitted in October 1, 2023. Due to the limited time for Task Force members to review the available data provided by County staff, the Task Force was not able to provide conclusive findings for the process evaluation section at this time.
 - b. Revision: To facilitate this, official document requests, some of which had to go through the Freedom of Information Act process, were submitted. Therefore, materials were not received in sufficient time to review, discuss, or render findings.
4. Page 2, Paragraph 3:
 - a. Original: The second is that the community be involved in any future park planning processes, including reviews of the analyses, as is currently being done for the Long Branch Central Watershed Management Area Project.
 - b. Revision: The Task Force suggests that the community be involved in this process and included in development of the master plan program, design goals and guidelines, and participate in design milestone deliverable reviews and analyses, consistent with Park Authority Policy.
5. Page 3, Paragraph 3:
 - a. Original: The Task Force further finds that most, if not all, of the dredge spoils can, and should, remain on-site in Lake Accotink Park.

- b. Revision: The Task Force further finds that most, if not all, of the dredge spoils in an initial dredge should remain on-site in Lake Accotink Park to the maximum extent feasible.
6. Page 56, Paragraph 3:
- a. Original:

The areas examined were:

- A brief review of County and contractor research on dewatering sites, sediment transportation, and sediment disposal.
- Limited review and comparison of reports previous dredges.
- History of the initial search for a public lake for the County; the lease, then purchase of Fort Belvoir Reservoir that became the County's first lake: Lake Accotink.
- Apparent change in practice on community input into dredge project, February 10, 2022 to February 15, 2023.

The subcommittee members evaluating the process and authority for Staff's recommendation not to dredge examined and requested information in the following areas:

Brief Review of County and County contractors' preparations for a dredge

- Sufficient documentation for initial review was provided for three of the costliest aspects of the dredge project: dewatering sites, sediment transportation, and sediment disposal. Further investigation was beyond the scope of this report and information was relayed to other members of the Task Force.

Studies and Plans for previous dredges of Lake Accotink

-- Requests were made for studies and plans for previous dredges of Lake Accotink for comparison with current plans. The request was only partially fulfilled and no systematic comparison could be made. The estimated date for delivery of the remaining material is 6 December.

Inquiry into documentation for purported 1960s dredge

- Parallel inquiry, but independent of the search into previous, well-documented dredges, was prompted by repeated assertions in County and contractor publications that the first dredge of Lake Accotink took place in the 1960s. Research is ongoing, but no evidence has been found of dredging plans, bids from/contracts

with dredging companies, data for transportation or disposal of sediment, or follow-up reports. Army dredge in 1950s is not ruled out.

Research on historic and official interest in and later lease and purchase of Fairfax County's first public lake: Lake Accotink

-- Brief inquiry was made into the Fairfax County's interest in acquiring a lake, and the later lease and purchase of Fairfax County's first public lake: Lake Accotink. A search of minutes from Board of Supervisors meetings during the 1950s revealed a near decades-long interest in acquisition of the Fort Belvoir Reservoir/Lake Accotink property. That interest was literally illustrated in the Planning Director's documents of 1958, which labeled the reservoir as a future County Lake two years before it was leased. Initial inquiries on acquisition were made at the behest of the Board of Supervisors, and the lake was leased and later purchased by the Fairfax County Park Authority in 1960 and 1965, respectively. The sales contract included the provision that the property forever be maintained as a public park and public recreation area and comply with the non-discriminatory provisions of the Civil Rights Act of 1964.

Change in practice regarding community input in the dredge project

-- Change in practice regarding communication and community input in the dredge project from 2016-2021 to near silence between Feb 10, 2022 and Feb 15, 2023. Public meetings and media reports between 2016-2018 show strong public participation and involvement in the decision process. When doubts arose on whether the lake would be dredged, advocacy groups formed to convince the County that Lake Accotink was worth saving. In Oct 2019, the Board of Supervisors gave the green light for DPWES to move forward and hire one contractor to design the dredge and another to carry it through. A report produced in Dec 2021 showed most dewatering locations had been eliminated. At a public meeting held on Feb 10, 2022, it was noted that the proposed dewatering sites in Wakefield Park and Southern Drive had generated controversy. Staff stated that several more potential sites in Mason and Lee Districts were being assessed. No public meetings were held for a year. On Feb 15, 2023, the DPWES director announced his plan to recommend Lake Accotink not be dredged at the next Board of Supervisors Environmental Committee meeting. That meeting was held on April 25, 2023.

b. Revision:

To facilitate this, official document requests, some of which had to go through the Freedom of Information Act process, were submitted. Therefore, materials were not received in sufficient time to review, discuss, or render findings.

7. Page 137, Appendix A.1

- a. Add: *Quote: From my farm upbringing to extensive backpacking, the outdoors is core for my sense of well-being. The ever-changing light from the sky and clouds reflected on Lake Accotink provides a rare chance to feel the vast unity of nature within reach of busy urban life.*

Delegate Vivian Watts

Following the December 4, 2023 meeting, the Findings Report agreed to capture changes to the Conclusion section of the report after the acceptance of the document. The changes were made with minimal changes to address errors in information provided, make grammatical revisions. However, the Final Report subcommittee ensured the key findings expressed in the Conclusion are consistent with the executive summary and the chapters. Below are a list of Revisions made:

1. Page 103, Paragraph 1:

- a. Original: The Task Force did not “vote” on whether we wanted the “full dredge” from 2019 or the “do nothing” from DPWES 2023. Our report is an analysis of the recommendation from staff to not proceed with the full dredge of the lake and an analysis of options other than traditional dredging for the future of Lake Accotink.
- b. Revision: The Task Force did not “vote” on whether we wanted the “full dredge” from 2019 or the “no dredge” recommendation from DPWES in 2023. Our report is an analysis of the value of the Lake to the community, the recommendation from staff to not proceed with the full dredge of the lake, and the options other than traditional dredging for the future of Lake Accotink.

2. Page 103, Paragraph 4:

- a. Original: The Lake Accotink dam is over 100 years old and any solutions to the lake must take into account preserving future generations’ options to replace or remove the dam. At the November 27, 2023 Task Force meeting, FCPA stated that they are working with the State to conduct a study in 2024 to determine whether the classification as a high-hazard dam can be changed.
- b. Revision: The Lake Accotink dam is 80 years old and any solutions to the lake must take into account preserving future generations’ options to replace or remove the dam. At the November 27, 2023 Task Force meeting, FCPA stated they are working with the State to conduct a study through the end of 2024 to determine whether the dam’s classification as a high-hazard dam can be changed.

3. Page 60-104:
 - a. Original: The page header states, “6. The Future of Lake Accotink”
 - b. Revision: “6. Options to Consider Other than Traditional Full Dredging”

Lake Accotink Task Force Findings Report

December 8, 2023

Cover Photo

Accotink Lake, Virginia. July 12, 2023. Photo by Peter Roof, News camera operator for NBC Washington' Chopper4 News Helicopter, from Save Lake Accotink Community Facebook Page.

Disclaimer

The opinions expressed in this report are those of the authors in the Lake Accotink Community Task Force and should not be construed as representing the opinions or policies of the Fairfax County government.

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EXECUTIVE SUMMARY

In 2019, the Board of Supervisors (BOS) approved a plan to dredge the entire approximately 49 to 55 acres of Lake Accotink and engage in regular maintenance dredging going forward. Cost estimates continued to increase, and in March 2023, the Fairfax County Department of Public Works and Environmental Services (DPWES), recommended not dredging the Lake and restarting the Master Planning process to consider other options for the Park. In May of 2023, the BOS then established the Lake Accotink Task Force. The mission of the Task Force was to review and consider the staff recommendation, ensuring that all options were considered to preserve Lake Accotink in the most sustainable, equitable and cost-effective manner. The Task Force was also asked to explore and consider options other than traditional dredging for the future of Lake Accotink, including options for a managed wetland and/or hybrid options for managed wetlands with a smaller open water feature. Lastly, the Task Force was asked to develop findings on these matters and submit them to the Board of Supervisors to inform the Board's decision regarding the future of Lake Accotink.

In the early meetings of the Task Force, the primary focus became the development of the findings report. Through group discussion, Task Force members determined that the findings report needed to provide the BOS a comprehensive understanding of the value of the Lake, a technical review on the analysis that supported the staff recommendation and provide alternative options to not performing a traditional dredge of Lake Accotink. To accomplish this, the Task Force divided into three subcommittees: The Value of Lake Accotink to Lake Accotink Park and to the County, Impacts of and Issues with Staff Recommendation to Not Dredge and Options to Consider Other than Traditional Full Dredging. Each subcommittee was tasked with scheduling meetings outside of the full Task Force meetings to evaluate available data and develop a list of findings that would inform the Board's decision regarding the future of Lake Accotink. The information provided below is the result of the subcommittees' efforts over the last several months since the Task Force first met in June of 2023.

The Task Force considered the comprehensive value of Lake Accotink on the Park and the surrounding community, including an evaluation of socioeconomic, recreational and environmental factors. A wide variety of data and open-source information that included testimonials from the community, community surveys, publicly-available databases and environmental studies conducted on the lake was reviewed. The Task Force determined the value of the Lake extends beyond a summation of economic factors and needs to consider the socioeconomic, recreational and environmental factors that justify its existence. The Task Force found several neighborhoods less than a mile to Lake Accotink have a considerably higher number of residences that identify as economically disadvantaged compared to the median

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household within the County. The Lake offers opportunity for access and amenities to individuals with disabilities, which aligns with the One Fairfax Policy. Lake Accotink serves a number of environmental and health benefits to the ecosystem and community. Lake Accotink provides sediment control for the Accotink Creek watershed and is a valuable habitat for local flora and fauna, which is a key component identified from testimonials collected of what attracts people to Lake Accotink Park. Members of the Task Force also highlighted the value of the dam for trapping sediment and expressed concern with the potential impact to the Accotink Creek watershed downstream of the Lake and the unknown cost to Fairfax County of allowing Lake Accotink to fill with sediment. The importance of the existing plant and wildlife interaction at the Lake to visitors of the Lake is highlighted. The Task Force believes that any future plans for the Lake needs to consider the ecology of the Lake to optimize the benefits to wildlife and to attract visitors to the Lake. The Lake Accotink Dredging Public Survey was open from February 16 through April 1, 2023. The results that were published on April 14, 2023 are discussed in this report. The Task Force finds that a new survey, using a third-party entity with representation from this Task Force, needs to be developed and administered to ensure a more balanced and equitable survey is conducted. Results from an updated well-developed community survey could better inform the Board of Supervisors how the community and the County value the existence of the Lake within the Park and County.

Additionally, the Task Force explored two avenues of investigation with respect to the DPWES Staff recommendation not to dredge Lake Accotink but instead to refocus on completing a new master plan for Lake Accotink. The first was the process and authority for reaching that recommendation. The goal for evaluating process and authority was to research, analyze, compile and present findings focused on the following five areas: process for the decision, authority governing the decision process, contractors involved in the decision process, approving authority of the decision process and financial impacts of the process. To facilitate this, official document requests, some of which had to go through the Freedom of Information Act process, were submitted. Therefore, materials were not received in sufficient time to review, discuss, or render findings.

The second avenue of research was associated with the cost and environmental basis for the recommendation not to dredge. The Task Force identified three key findings. The first is the County's analysis of cost relied on a variety of assumptions that included a mix of dated and excessively conservative parameters. Efforts to plan the future of the area require consistent information in order to provide apples-to-apples comparisons for alternatives and projections. The Task Force suggests that the community be involved in this process and included in development of the master plan program, design goals and guidelines, and participate in design

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milestone deliverable reviews and analyses, consistent with Park Authority Policy. The third is that stream restoration above and below Lake Accotink will be important to support the future health of the Lake or its alternative. Stream restoration should include those areas where the erosion/turbulence issues are the greatest, not just where access is easiest and County-owned lands are available.

The Task Force was asked to explore and make findings of potential future(s) for Lake Accotink other than the full dredging called for in the 2019 plan or the recommendation not to dredge put forward by DPWES.

The Task Force finds that a smaller lake, in the range of 20 to 40 acres, can preserve a significant open water feature with a program of regular maintenance dredging. The Task Force further finds that most, if not all, of the dredge spoils in an initial dredge should remain on-site in Lake Accotink Park to the maximum extent feasible. The Task Force also finds that some combination of a managed wetland and a grassland are viable options for the portions of the original 110-acre lake that have already, or will in the near to mid-future, fill in. Moreover, the Task Force finds that kayak trails and other recreation options could accompany a managed wetland/grassland and a smaller lake.

INTRODUCTION

1.1. Background

Lake Accotink Park comprises about 476 acres of open water, woodlands, trails, picnic areas, and waterfront activities and is visited by over 250,000 people annually¹. The 55-acre Lake Accotink within the park is a manmade impoundment of Accotink Creek. In 1918, the U.S. Army built a dam to create a reservoir for troops mobilized for World War I and trained at Camp A. A. Humphreys (present-day Fort Belvoir). The Camp downsized after the war. The dam was dismantled when engineers felt it threatened the safety of the railroad bridge.² The Army rebuilt the dam in 1943, and the impoundment again served as a reservoir for Fort Belvoir. Pollution from development in the upper part of the watershed eventually caused Fort Belvoir to search for another water source. After another source was found, the reservoir was declared surplus, and Fairfax County Park Authority (FCPA) leased it as a lake for fishing and boating, then purchased it in 1965. The Lake is the key feature of the park and the reason for its name.

The Lake is located within the 52 square mile Accotink Creek watershed, of which 30.5 square miles flow into the Lake. Accotink Creek discharges to Accotink Bay, then flows into Gunston Cove, the tidal Potomac River, and ultimately the Chesapeake Bay. The Accotink Creek watershed is highly developed, with about 87 percent of the watershed draining to the non-tidal portion of the creek. The developed area comprises commercial, industrial, transportation, and residential properties. These land cover types result in more than 28 percent of the non-tidal watershed being covered by impervious surfaces.³ These impervious surfaces increase the volume and velocity of water within streams during and immediately following storm events, resulting in stream bank erosion and increasing the sediment load the creek carries into Lake Accotink. Thus, the Lake requires periodic dredging to maintain recreational use, and it was dredged in 1985 (211,000 cubic yards removed) and 2008 (193,000 cubic yards removed).⁴

The increased stream bank erosion and sediment load have contributed to the designation of Accotink Creek as an impaired water (Category 5 of Virginia's Integrate List of Impaired Waters) by the Virginia DEQ, with sediment identified as one of the stressors resulting in the benthic macroinvertebrate community not meeting state established thresholds for healthy

¹ Fairfax County Department of Public Works and Environmental Services (DPWES). April 25, 2023. Lake Accotink Dredging Recommendation to the Fairfax County Board of Supervisors Environmental Committee, Christopher Herrington, Director DPWES, Jai Cole Executive Director Fairfax County Park Authority, and Charles Smith, Branch Chief, DPWES.

² Burke Historical Society, A History of Lake Accotink Part 1, June 24, 2020.

³ Interstate Commission on the Potomac River Basin (ICPRB). August 30, 2017. Volume II, Sediment TMDLs for the Accotink Creek Watershed, Fairfax County, Virginia.

⁴ Arcadis, U.S., Inc. June 18, 2021. Field Assessment Report (Final), Lake Accotink Dredging Project, Project # SD-000041-001, Prepared for Fairfax County, Virginia, Department of Public Works and Environmental Services, Stormwater Planning Division.

populations. This led to the development of the Total Maximum Daily Load (TMDLs) for sediment, the goal of which is the recovery of benthic invertebrate populations to healthy levels. The Accotink Creek Sediment TMDL establishes the total pollutant loading that Accotink Creek can receive without exceeding water quality standards, allocates a sediment load to holders of discharge permits, and specifies the percentage of sediment reduction permit holders must achieve.⁵ Fairfax County's Municipal Separate Storm Sewer System (MS4) permit authorizes the County to discharge stormwater to Accotink Creek, which has a sediment waste load allocation and a required percentage of sediment reduction that must be achieved. The County has adopted an MS4 Program Plan that documents the implementation of all MS4 permit requirements, including the programmatic and legal authorities required to meet the "Special Condition for the Chesapeake Bay TMDL."⁶

The County's MS4 Compliance Plan includes a watershed plan for Accotink Creek that identifies areas of opportunity for implementing structural and non-structural improvement projects, such as stream restorations and stormwater facility retrofits that will facilitate compliance with the Chesapeake Bay TMDL and the Accotink Creek sediment TMDL.

1.2. Dredging Alternative Evaluations

Through a community engagement process conducted from 2016 to 2019 as part of the Park's Master Plan revision cycle, the decision was made to implement a permanent dredging program to maintain an open, boatable resource.⁷ The vision for the project was to develop a plan to dredge the Lake and process the spoils in the powerline easements in Wakefield Park at an estimated cost of \$30 million. The 2017 Lake Accotink Sustainability Plan was prepared for the FCPA during this engagement.⁸ It evaluated the feasibility of six potential options for the long-term management of the Lake with respect to suitability for public use, environmental benefits (primarily water quality) and cost-effectiveness. The options included:

⁵ Section 303(d) of the Clean Water Act (CWA) and the United States Environmental Protection Agency's (EPA) Water Quality Planning and Management Regulations (40 CFR part 130) generally require states to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not meeting water quality standards. TMDLs represent the total pollutant loading that a waterbody can receive without exceeding water quality standards (ICPRB 2017).

⁶ The Chesapeake Bay TMDL identifies total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS) as the Pollutants of Concern (POC). Virginia developed and adopted a Watershed Implementation Plan (WIP) that establishes the framework for meeting the Chesapeake Bay TMDL. The WIP requires holders of Municipal Separate Storm Sewer System (MS4) permits to implement a phased approach for meeting required reductions over three five-year permit cycles based on the following schedule: 5 percent of required reductions by the end of the first permit cycle; a total of 40 percent of required reductions by the end of the second permit cycle; and, 100 percent of required reductions by the end of the third permit cycle.

⁷ DPWES, April 25, 2023 <https://storymaps.arcgis.com/stories/b85512da45b8420085167291998d19af>

⁸ Wetland Studies and Solutions (WSSI). May 31, 2017. Lake Accotink Sustainability Plan, Fairfax County, Virginia, WSSI #22647.01, Prepared for Fairfax County Park Authority, Park Planning Branch.

2. Introduction

- Do nothing.
- Dredge on approximately 15-year intervals to maintain recreational opportunities of the Lake.
- Construct of a sediment forebay (either just upstream or within the existing footprint of the Lake).
- Install of “beaver dam” structures in line with Accotink Creek upstream of the Lake.
- Remove the existing dam and return Accotink Creek to a single thread channel within the current lake footprint.
- Remove a portion of the existing dam to create a smaller lake and a single thread channel.

According to the 2017 Sustainability Plan, previous studies had shown that the rate at which sediment accumulated in the Lake was variable and dependent upon the amount of rainfall. A study performed by HDR Engineering⁹ developed a methodology for predicting sediment capture in the Lake. The applicability of this trapping efficiency model to Lake Accotink was evaluated in the Sustainability Plan using bathymetric survey data from 2001, 2011, and again in 2015. The average trapping efficiency was determined to be 47 percent. Assuming an average annual inflow rate of 48 cubic feet per second and an approximate annual sediment delivery to the Lake of approximately 46,000 cubic yards, the Sustainability Study determined that the Lake needed to be dredged to an 8-foot depth to maintain reasonable recreational use. Maintaining the current plan of dredging the Lake on approximately 15-year cycles would continue to provide sediment-trapping benefits and open-water recreational opportunities for the community. Still, it would not provide TMDL credits to the County for sediment removal.¹⁰

In 2020, DPWES, with support from the FCPA, initiated an analysis of dredging alternatives conducted by Arcadis US, Inc.¹¹ for the Lake Accotink Dredging Project. It evaluated alternative dredging, dewatering methods and sites, sediment transport pipeline alignment, and disposal. Arcadis evaluated environmental impacts and regulatory issues for the alternatives.

The alternatives analysis was guided by the following considerations provided to Arcadis by Fairfax County:

⁹HDR Engineering, Inc. February 2002. Final Lake Accotink Dredge Study.

¹⁰WSSI 2017.

¹¹ Arcadis, U.S., Inc. July 2021a. Alternatives Analysis Report, Lake Accotink Dredging Project, Project # SD-000041-001, Prepared for Fairfax County, Virginia, Department of Public Works and Environmental Services, Stormwater Planning Division.

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- Lake Accotink will be dredged.
- The dredge material will be conveyed to a dewatering location through a pipeline unless alternatives are identified that will not require pumping of sediment.
- Dewatered dredge material will be transported by truck to the disposal location.

The goal of the Lake Accotink Dredging Project was to:

- Remove sediment to increase lake depth to 8 feet for the benefit of recreational users and maintain the Lake as an aesthetic amenity in accordance with the County's Lake Accotink Park Master Plan.
- Implement a maintenance dredging program.¹²

Arcadis reviewed previous estimates of sediment loading and retention in the lake.¹³ The estimated sedimentation rates of previous evaluations ranged from 8,000 to 22,750 cubic yards per year. Arcadis estimated a sedimentation rate of 8,000 tons/year or 9,400 cubic yards per year, assuming a bulk density of 63 pounds per cubic foot. This sedimentation rate was used to project the need for a 5-year interval for maintenance dredging and the associated estimated cost.

In January 2023, Arcadis issued a revised memo containing a preliminary estimate of construction costs for the preferred option for a base dredge and future maintenance dredges.¹⁴ The preferred plan called for hydraulic dredging and building a pipeline along the Cross County Trail to pump the slurry to the Wakefield Park Maintenance Facility for dewatering. The estimated cost was \$95.3 million (estimated range of \$66.7 million to \$143.0 million). The base dredge estimate assumed the removal of 500,000 cubic yards of sediment, dewatering the slurry at Wakefield Park Maintenance Facility, and transporting the material by truck for disposal at the Luck Ecosystems facility in Centreville, VA. Costs for the base dredge were calculated using 2022 dollars and then escalated to 2025. Costs for four post-base dredging maintenance events were estimated at 5-year intervals based on the estimated sediment deposition rate and

¹²Arcadis 2021a

Fairfax County Department of Public Works and Environmental Services (DPWES). October 30, 2023. Lake Accotink Dredging Project (AC89-0009). <https://www.fairfaxcounty.gov/publicworks/stormwater/plans-projects/lake-accotink-dredging-ac89-0009>.

¹³ Arcadis 2021b.

¹⁴ Arcadis, U.S., Inc. January 31, 2023 Revision. Memo, Lake Accotink Dredging Project, Base Dredge Construction Costs. Memo from Michael Wooden, PE, Arcadis to Charles Smith, Fairfax County DPWES. Issues July 13, 2021, Revised March 4, 2022 and January 31, 2023.

the need to maintain the desired 8-foot lake depth (Event 1, \$46.5 million; Event 2, \$59.4 million; Event 3, \$96.8 million; Event 4 \$123.5 million).

1.3. DPWES Staff Recommendation

On April 25, 2023, DPWES staff presented its recommendation to the Fairfax County BOS Environmental Committee.¹⁵ DPWES staff recommended that Lake Accotink not be dredged due to significant community and environmental impacts and excessive cost. Staff further recommended that attention be refocused on resuming Lake Accotink Park's Master Plan after completing a management plan for the Lake and dam. The plan would create and implement a vision for the park that is economically and environmentally sustainable; provide enriching recreational, educational, and quality of life opportunities for residents; allow for proactive management of the landscape over time; and improve the ecosystem and wildlife habitat.

This recommendation was based on the cost and environmental impact findings of the Arcadis Lake Accotink Dredging Alternatives Analysis Report¹⁶, including the following:

- Estimated cost of the base dredging was higher than originally estimated and amounted to roughly \$95 million, with an additional \$300 million over the first twenty years of maintenance dredging due to:
 - 43 percent more sediment than originally estimated would need to be removed in the base dredge.
 - Dredge material processing costs were more than originally expected.
 - Free disposal of dredged spoils options was unavailable as they had been for previous dredge events; thus, trucking and disposal costs were higher than in the original conception.
 - Market adjustments and costs to complete the dredging work rose dramatically after the pandemic began.
 - Frequent maintenance dredging, projected every five years to keep up with the sediment accumulation, would require a year of work and 15,000 truck trips for each recurring dredge.
- Environmental and community impacts, including:

¹⁵ DPWES April 25, 2023.

¹⁶ Arcadis, U.S., Inc. July 2021a

2. Introduction

- The amount of hydraulically dredged sediment would require a larger site to process the dredged material.
- The Wakefield Park Maintenance Facility would require clearing of upland and wetland forest.

In the April 2023 DPWES presentation to the Environmental Committee, staff also considered the following impacts of not dredging in their recommendation:

- Community Impacts:
 - Loss of some or all open water aesthetic and recreational opportunities.
 - Continued management of Lake Accotink Park for social, recreational and aesthetic benefits.
 - Avoidance of trucking, noise, and disruption of recreation resources.
- Environmental Impacts:
 - Most of the sediment not captured by the Lake will be caught within the Accotink Creek floodplain based on a USGS study.¹⁷
 - Stream restoration of Accotink Creek channels to reduce stream sediment load and assist in the recovery of stream organisms would continue as required.
 - Forest cover and wetlands would not be impacted at the Wakefield Park Maintenance Facility.
 - The Park Authority would have the opportunity to manage the Lake footprint for higher quality habitat and climate resiliency.
- Regulatory
 - As required by the Accotink Creek Sediment TMDL and the County's MS4 Permit, Fairfax County must reduce sediment loading to Accotink Creek within the stream channels above and below Lake.
 - Staff stated that the removal of sediment by Lake Accotink assumed in the Accotink Creek sediment TMDL is not essential to meeting the Fairfax County Sediment TMDL for Accotink Creek. Staff anticipate minimal increase in additional assigned sediment load reduction below the Lake to meet the Sediment TMDL and

¹⁷ Noe, G.B. K.G. Hopkins, P.R. Claggett, E.R. Schenk, M.J. Metes, L. Ahmed, T.R. Doody and C.R. Hupp. 2022. Streambank and floodplain geomorphic change and contribution to watershed material budgets. Environmental Research Letters 17: 064015.

the County's MS4 Permit. These additional sediment load reductions were anticipated through stream restoration and other projects funded through the existing stormwater program.

- Project Costs:
 - Not dredging would save an estimated \$16 million in the annual cost of dredging over 25 years (before debt service)

PROCESS OF FORMING THE FUTURE OF LAKE ACCOTINK TASK FORCE

Following the staff recommendation presented on April 25, 2023, Supervisor James Walkinshaw announced at the Board's Environmental Committee meeting held that same day to establish a Task Force on the Future of Lake Accotink. It was determined that former BOS Chairman Sharon Bulova would chair the Task Force, and its membership would include former Braddock District Supervisor John Cook and consist of representatives of the community, environmental and nonprofit organizations, and a representative of the Park Authority.

Furthermore, Task Force members would liaise with their representative communities and organizations by relaying information and soliciting feedback. County staff were to serve in an advisory role. The Task Force would meet regularly and:

- Conduct a review and develop findings on the previous studies performed by Arcadis and WSSI on the dredging plan to ensure that all possible options have been considered to preserve Lake Accotink in the most sustainable, equitable, and cost-effective manner possible.
- Identify relevant information needs and questions that should be addressed should the Board proceed with studying a managed wetland option and develop findings on the potential impacts of the managed wetland option.
- Identify relevant information needs and questions that should be addressed should the Board consider a hybrid option involving some area of open water along with a managed wetland and develop findings on the potential impacts of the hybrid option.
- Task Force findings would also consider the impacts on the environment, surrounding communities, recreational uses of the park, and financing, including ongoing maintenance, where information was available to task force members.

On May 23, 2023, the Board of Supervisors unanimously approved Supervisor James Walkinshaw's motion to create a Task Force on the Future of Lake Accotink.¹⁸ Chairman Jeff McKay and Supervisor Rodney Lusk were cosponsors of the motion.

¹⁸ Fairfax County Supervisor James Walkinshaw to Fairfax County Board of Supervisors, May 23, 2023, Board Matter, Motion to Create a Task Force on the Future of Lake Accotink. <https://www.fairfaxcounty.gov/topics/sites/topics/files/assets/documents/lakeaccotink/lake-accotink-task-force-board-matter.pdf>.

1.4. List of Task Force Members

Sharon Bulova, Individual (Chair)

John Cook, Individual (Co-Chair)

Vicki Arnold, Individual

Ken Balbuena, North Springfield Civic Association

Anne Ball, Sierra Club – Great Falls

Matt Bright, Earth Sangha

Bryan Campbell, Friends of Long Branch Stream Valley

Karen Campblin, Fairfax NAACP

Sandy Collins, Friends of Accotink Creek

Mary Cortina, Planning Commission

Michael Deloose, West Springfield Civic Association

Cathy Field, North Springfield Civic Association

Charlotte Hannagan, Kings Park Civic Association

James Heo, Mount Vernon/Springfield Chamber of Commerce

Diane Hoffman, Braddock District Land Use and Environment Committee

Kerry Hubbard, Individual

Chris Jones, GMU – Potomac Environmental Research and Education Center

Mary Keeser, Friends of Lake Accotink Park (FLAP)

David Kepley, Faith Alliance for Climate Solutions

Stella Koch, Environmental Quality Advisory Council

Jakelin Lake, Individual

Chris Landgraff, Northern Virginia Regional Commission

Marta Morrissey, Franconia District Land Use Committee

Gail Nittle, Springfield Civic Association

Allan Robertson, Save Lake Accotink

Ernest Rodriguez, Mid-Atlantic Off-Road Enthusiasts (MORE)

Hasan Shah, Individual

Martin Shepherd, Ravensworth Farm Civic Association

Evelyn Spain, Planning Commission

Kiel Stone, Park Authority Board

Delegate Vivian Watts, Virginia House of Delegates

Steve Yannucci, Individual

Larry Zaragoza, Environmental Quality Advisory Council

Meghan Walker, Danbury Forest Civic Association

1.5. Lake Accotink Task Force Meeting Dates

The full Task Force meetings were held at the Fairfax County Government Center from 7:00 p.m. to 9:00 p.m. (approximately), as noted on the meeting schedule. The work of the Task Force was completed by the end of the calendar year 2023. Meetings were held in person and streamed on Channel 16. A brief time was set aside at the beginning of each meeting for public comment.

1. Full Task Force Meeting Dates

June 26, 2023

July 10, 2023

July 24, 2023

August 14, 2023

September 11, 2023

October 2, 2023

November 6, 2023

November 27, 2023

December 4, 2023

2. Subcommittee 1 – The Value of Lake Accotink to Lake Accotink Park and the County

August 14, 2023

August 21, 2023

September 05, 2023

September 26, 2023

October 10, 2023

October 24, 2023

November 11, 2023

3. Subcommittee 2 - Impacts and Issues with Staff Recommendation not to Dredge

August 14, 2023

August 28, 2023

September 18, 2023

September 25, 2023

October 10, 2023

October 16, 2023

October 23, 2023

October 30, 2023

November 13, 2023

November 20, 2023

4. Subcommittee 3 - Options to Consider Other than Traditional Full Dredging

August 14, 2023

August 21, 2023

September 25, 2023

October 23, 2023

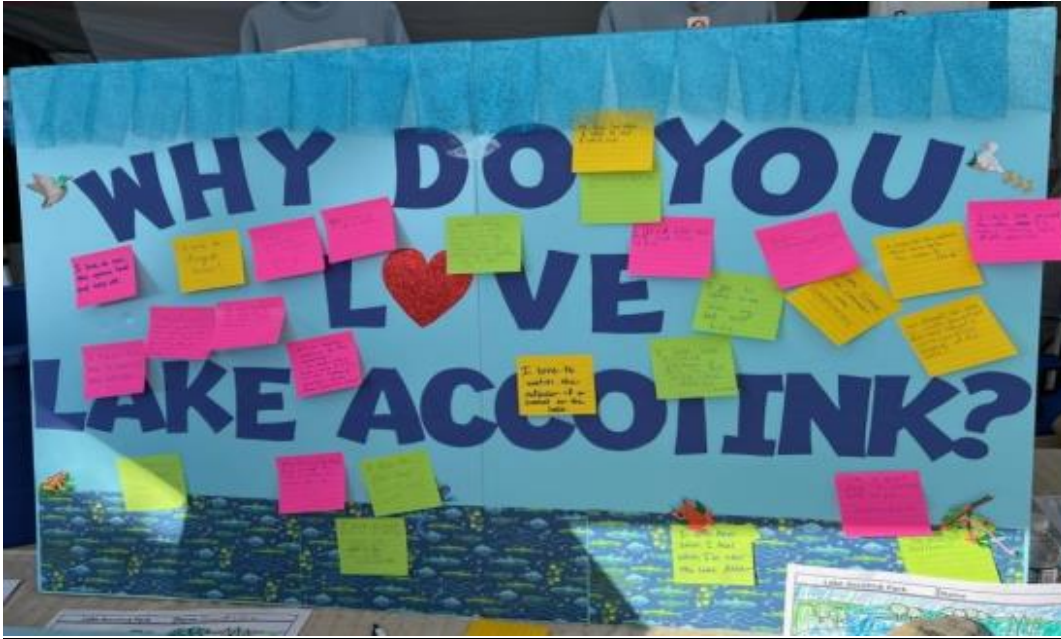
VALUE OF LAKE ACCOTINK TO LAKE ACCOTINK PARK AND TO THE COUNTY

1.6. Purpose

The subcommittee was assigned the crucial responsibility of conducting a thorough assessment of Lake Accotink's social, economic, recreational, and environmental significance to Lake Accotink Park and to the County. During early meetings of the Lake Accotink Task Force, many of the members of this subcommittee discerned that with all the discussion, survey questions, and presentations done about Lake Accotink and whether it's worth dredging, a consideration of the value of Lake Accotink to Lake Accotink Park and to Fairfax County (especially its residents) had been conspicuously missing. Gail Nittle, the subcommittee co-chair, stated, "How can the Board of Supervisors determine whether to dredge Lake Accotink when the value of the Lake has not been researched, discussed and evaluated? Making a decision to permanently destroy what members of the Board of Supervisors and members of DPWES, among others, have called a County 'treasure' warrants more than a look at the possible price tag of dredging! This subcommittee wants to ensure that the Board of Supervisors has a comprehensive understanding that the value of Lake Accotink includes more than just the economic cost and benefits of a lake, but also gives weighted consideration to the socioeconomic, recreational and environmental factors associated with the community and the visitors of the Lake."

1.7. Some Benefits of Lake Accotink

Figure 4-1: Picture of Community Input Poster Board on “Why Do You Love Lake Accotink?”



Above is a picture of posted sticky notes on this board at the 61st Lake Accotink Anniversary Celebration held on September 26, 2023. People posted answers to the question, “Why Do You Love Lake Accotink?”. Their answers can be found in the Appendix A.1.

During the August 21, 2023, Values subcommittee meeting, Co-Chairperson Gail Nittle presented a packet of material that included community-written testimonials advocating for the County to save Lake Accotink. One testimony, written by a local resident who asked not to be named, included a list of benefits of Lake Accotink. Members of this subcommittee discussed this list in greater detail during that meeting and offer their reflections below:

Place of gathering and recreational resource: Lake Accotink is an easily accessible place to gather, especially for low-income families living nearby who can walk or bike to it. It’s also attractive to people from all over the county who come to enjoy the beauty of the Lake and to boat or kayak on the water. People bring their families, children play in the sand, and they walk around the Lake, enjoying the views.

ADA accessibility: Lake Accotink is the only Fairfax County Park Authority (FCPA) lake that allows for disabled people to park and have a full view of the water from their

4. Value of Lake Accotink to Lake Accotink Park and to the County

cars.¹⁹ The park provides ADA access to the marina and most trails without navigating bumpy surfaces. The Lake has two dedicated ADA fishing spots.

Apartment dwellers: Having Lake Accotink nearby is a compelling reason to choose Springfield for apartment dwellers looking for easily accessible outdoor recreation.

Future recreational resource: The 2022 Springfield-Franconia Market Study, authorized by the BOS, identified a large regional demand for new housing for multifamily development and a projected need for 1,000 to 1,600 additional multifamily units. Lake Accotink Park would provide those new apartment dwellers and families with nearby recreational resources they will want and need.

Educational resources: Lake Accotink Park provides classes, trails for youth fishing, kayaking courses, summer camps (fishing, kayaking, wildlife) and field trips from local schools.

Photography destination: Wedding and family photographers use the Lake as the perfect backdrop.

Celebration focal point: Weddings, churches, and businesses, as well as individuals and families, use the Lake facilities for parties, picnics and other receptions. These entities rent the pavilions by the Lake and utilize the Lake's amenities such as paddle boating, kayaking and other waterfront activities. These rentals generate income for the Park Authority.

Home Buyers: Having Lake Accotink within easy walking or biking distance is an incentive to buy in the neighborhoods surrounding the Lake. Proximity to the Lake enhances property value.

1.8. Testimonials

Testimonials are an important part of understanding the value of Lake Accotink. They are important factors, like evaluating the economic and environmental costs and benefits of the Lake. They demonstrate the value of Lake Accotink beyond what the numbers may indicate and should be a weighted consideration in the future of the Lake. Below are just a few excerpts from testimonials collected by our subcommittee that emphasized the sentiments of the subcommittee. Appendix A.1 contains a comprehensive list of the full testimonials from former

¹⁹ FCPA staff on 11/30/2023 stated that Lake Fairfax and Burke Lake are also fully accessible with ADA spaces and routes to boardwalks, marinas, and supporting facilities.

4. Value of Lake Accotink to Lake Accotink Park and to the County

elected officials to well-known local community members who generously offer their reflections on what Lake Accotink means to them. Additionally, excerpts from testimonials are included throughout the chapter to highlight the community importance of the socioeconomic, recreational, and environmental factors associated with Lake Accotink.

Sharon Bulova (former Chairman of the Fairfax County Board of Supervisors, former Braddock District Supervisor):

“There isn’t a time in my life that hasn’t been touched by Lake Accotink. So many wonderful things happen there. As an elected official, the Cardboard Boat Regatta was my all-time favorite annual event. Kids from all over the county lined the perimeter of the lake with some of the most hilarious home-built cardboard and duct-taped boats. I was a regular judge and I loved it so much! In 1995 I started Braddock Nights at Lake Accotink and have many fond memories of listening to the Kings Park Band play some great music while the sun slowly sank over the lake. Kids in the neighborhood have grown up remembering these magical evenings.

But what has touched me most directly is personal.

I moved into a newly built Richmarr L-shaped rambler with a carport in Kings Park West in 1971. My son, David, was two years old. Nine months after moving in, my second child, Karin, was born. Kings Park West is about seven miles from Lake Accotink. It was the perfect place to visit with my young family. Feeding the ducks and tossing stones into the water didn’t cost any money and gave David and Karin a good hour or more of delight before we headed home for nap time.

Looking back, I can see David’s future written all over his childhood activities. He loved to dig in the dirt... (in 2006 David was elected to the Virginia House of Delegates and serves on the Agriculture, Chesapeake and Natural Resources committees.)

We, our children, and grandchildren are shaped by the world we experience as we grow into adulthood. As adults, it’s up to us to protect and nurture the things that matter.”

Figure 4-2 Photograph of Recreational Boating on Lake Accotink



Photograph taken by local photographer Thomas Kinder of visitors of all ages boating on Lake Accotink.

John C. Cook (former Braddock District Supervisor, Fairfax County Board of Supervisors):

"Lake Accotink is a gem both for the community at large and for the individuals who visit it... You would not know that tens of thousands of people are within a couple miles of you when you are in the park. It's a true get-away in nature..."

We are a wealthy county with a high cost of living. It can cost hundreds of dollars to take your family almost anywhere. That's a tough situation for people who are not wealthy. Having a beautiful park and lake where anyone can go without charge is the clearest example we have in the county for truly equitable recreation and social enjoyment.

We need to save the Lake."

Anonymous Saratoga resident at October 25, 2023, Save Lake Accotink Meeting:

"When we moved here from the Philippines, we were very poor. Life was stressful, and we had few opportunities to relieve that stress. We couldn't afford to go anywhere or do anything. We relied on our trips to Lake Accotink to regain some breathing space and to keep my siblings and me out of trouble. I loved exploring the trails, but what I enjoyed most was sitting by the water. I needed the peace the lake brought me. I still need it. So many others like my family and me need Lake Accotink."

Sandy Frieswyk (author of *“The Grace of Lake Accotink”*):

“On any given day, you can see several people parked in (the Lake Accotink) marina enjoying a meal or simply enjoying the view. Quite often, the people there appear to be enjoying exactly the same experience as I did with my mother. Additionally, you can see visitors with mobility challenges walking down the well-paved sidewalks to the water’s edge and sitting on the very accessible benches to take in the view. Sitting in my car, I watched as two women, one middle aged and one older and in a wheelchair, exited their car and head down to the water’s edge...”

Grace is a perfect example of the people of Fairfax County who will be denied use of waterfront lake views and enjoyment of our parks if Lake Accotink is allowed to disappear. In these days of increased accessibility efforts, equity, and goals of ‘One Fairfax,’ I cannot fathom how the County can allow this loss to occur.”

Figure 4-3 Woman in a Wheelchair Looking at Lake Accotink



Photograph of a woman in a wheelchair utilizing an ADA-complaint location close to the water’s edge.

Ed Morrissey, Head Coach/Coordinator (Special Olympics Area 26, Alpine Ski and Snowboard Team, Lake Accotink provides practice area for the team):

“The Special Olympics, Area 26, Alpine Ski and Snowboard Team uses Lake Accotink for training before the snow flies. Our athletes compete in three events - slalom, giant slalom, and super giant slalom - and the lake is the perfect spot for getting them in shape before we hit the slopes. The lake is also a great place for us to practice because we have limited funds and we're not charged for holding our practices at the park.”

Figure 4-4: Photograph of Special Olympic Athletes training at Lake Accotink



Picture of Coach Ed Morrissey working with Special Olympic Athletes training on the slope of the Lake Accotink Dam for the Alpine Ski and Snowboard events.

“We use the slope of the dam to practice turns going down a slope. It's fun and useful for the athletes and provides great views of the water. As part of the training regimen, athletes also run up the steps and then along the path at the top of the dam.

We've practiced at Lake Accotink for years, it's just perfect for the needs of our athletes, and serves an important role in preparing them for competition.”

Susan Frieswyk (local resident of Springfield and author of *Impact of Losing Lake Accotink for Disabled Citizens of Fairfax County*):

“According to a 2019 study from the National Institute on Disability, Independent Living, and Rehabilitation Research, Fairfax County had a total of 1,131,851 residents, of whom 81,935, or 7.2% were classified as having a disability.²⁰ You can only imagine that the described positive effects [See Full Testimonial in Appendix X.1] of water views are equally beneficial to all people, including those with disabilities...

...Lake Accotink Park provides the opportunity to park a car within view of the water and provides paved sidewalks and benches for those who are able to exit their car and move a short distance to the water's edge...”

²⁰ Paul, S., Rafal, M., & Houtenville, A. (2020). *2019 State Report for Virginia County-Level Data: Prevalence*. Durham, NH: University of New Hampshire, Institute on Disability.

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Figure 4-5: Photograph of the Windshield View of the Lake from the Handicapped Parking Spaces at Lake Accotink Park



Picture of Susan Frieswyk, local resident of Springfield who identifies as a disabled person, enjoying the lake front view of Lake Accotink from her van.

“My family has lived in Springfield since March of 1997. During that time, my mother experienced increasing mobility issues, eventually becoming wheelchair-bound. It was often a great pleasure for us to get her in the car, pick up lunch from a local eatery, and drive to the marina parking at Lake Accotink Park. We would sit and watch the waterfowl, jumping fish, paddle boats and kayaks while we ate. We would also visit on some evenings to watch the sun go down over the water. Since my mother’s passing in 2021, I have developed mobility issues of my own, and my sister and I continue those visits to the Lake.”

Jamie Petrik (realtor with Debbie Dogrul Realty and long-time Fairfax County resident):

“Removing the serenity of Lake Accotink would take away a gemstone from our County Parks. Lake Accotink also abuts some lower income housing in Fairfax County. These residents rely on the close proximity of the Lake for everything from individual fishing to family gatherings. This is a group that struggles financially, that can’t afford the OBX summer trips. To remove a phenomenal outlet for their mental wellness puts an additional stress on that overlooked population. I applaud the efforts of those trying to keep the “Lake” in Lake Accotink. It has served our community for years. We spend money and build efficient roads to bring people closer to work; I feel we are “missing the boat” by not reexamining the importance of the mental wellness of those families in this area in regards to Lake Accotink.”

Figure 4-6: Photograph Demonstrating Recreational Activities at Lake Accotink



Photograph taken by local photographer Thomas Kinder of visitors of all ages enjoying Lake Accotink through activities such as walking along the shoreline, fishing, and observing wildlife in the Lake.

Janice Buckley (realtor and long-time resident of Springfield, VA):

“As a realtor who sells largely in our Springfield community, Lake Accotink Park is always something that I highlight to potential buyers. I don't think I can emphasize enough how access to the park and the Lake activities are critical to the vibrancy of the Springfield community. For those of us who have been around Springfield for a long time the park and the activities around the Lake are a tradition.”

1.9. Analysis of the Lake Accotink Dredging Community Survey

A community survey is an excellent tool to garner feedback on how the community values the Lake. Fairfax County administered the *Lake Accotink Dredging Community Survey* from February 16, 2023, to April 1, 2023, in an effort to “gain invaluable insight from the community and visitors on their vision for Lake Accotink Park.” The subcommittee believes that the Fairfax County administered survey had a flawed methodology in the data collection, resulting from a poor design. Subcommittee member Ken Balbuena performed a statistical analysis of the survey results and provided the following conclusions. The full analysis is provided in Appendix A.2 of this chapter.

4. Value of Lake Accotink to Lake Accotink Park and to the County

The open-ended questions measured qualitative data that needed to be converted into quantitative data. This led to nearly a quarter of survey takers not responding to the single question pertaining to agreement with the staff's recommendations to not dredge Lake Accotink or pursue an offline lake option. The responses were ambiguous, with subjective interpretation of data, and the County staff's survey report did not align with the subcommittee's independent analysis in many areas.

Since the questions did not use a Likert scale (e.g., a scale of 1-5) for a more thorough data capture, the subcommittee could not perform a more robust analysis such as independent samples t-tests or multiple linear regression to see if there are additional correlations across variables. The survey could not be analyzed enough to build different data models that demonstrate which variables have greater explanatory power in how a survey taker responded to questions.

The County's survey report was misleading in that it fundamentally reported on data that did not respond to the unit of analysis that should have been reported on: The survey taker's agreement or disagreement with the staff's recommendation. The strict interpretation of what constituted support for dredging Lake Accotink or an offline lake option depended on whether a respondent *explicitly* mentioned keywords in their survey, so County staff did not account holistically for the merits of the comments.²¹ The reported figures were not clearly communicated to the reader of the report, and what was reported was misleading (e.g., 26% of *total* survey respondents supporting a lake dredge when the note indicated the figure being discussed should have been the percentage of the 53% of survey takers who responded to the question asking their opinion of staff's recommendation).

Additionally, since the survey failed to ask specifically whether the respondents agreed or disagreed with the staff's recommendation, no exact measurement could be done to empirically capture data objectively and consistently. For example, a simple yes or no question could have resulted in better feedback.

There were other data collection efforts that the survey captured that were either flawed, irrelevant to the staff's recommendation in the subcommittee's opinion, or not included in the County staff's survey report. Understanding where survey takers live in relation to the park was skewed since the options overlapped data points. Capturing activities that survey takers do at the Lake was useful, but it focused more on the park instead of the Lake. When there were

²¹ FCPA stated on 11/30/2023 that each response was read and interpreted holistically and then coded by two different people to maximize accuracy.

4. Value of Lake Accotink to Lake Accotink Park and to the County

opportunities to determine correlations based on the limited quality data available, the County staff's survey report did not reference any of these correlations.

Finally, the subcommittee found that staff may have generated bias (intentional or unintentional) by continually referencing Huntley Meadows as a comparative project.²² The subcommittee's independent analysis, however, did not find significant results when accounting for the need for "50,000 greenhouse-emitting trucks" to haul away spoils. While it also did not find evidence to support the presence of bias with regard to the un-delineated \$395 million figure that did not always include the timeline for the expenditure, the subcommittee's analysis did not include general references to "cost" that were found in several of the survey responses. As such, the subcommittee does not want to rule out the presence of this bias since it was not possible to determine a numeric value of "cost" in those responses.

Overall, the subcommittee does *not* believe the survey administered by the County is a fully reliable source since:

1. Low data quality does not provide irrefutable empirical data for analysis.
2. No robust data analysis has been conducted that demonstrates correlations between variables.
3. There are inconsistent methods for reporting analytical findings that are not centered around the proper unit of analysis investigated by the survey.

1.10. Value of Lake Accotink from A Socioeconomic and Equity and Recreational Perspective

"We [Fairfax County Park Authority] want to make sure that more of our residents can access nature and recreational experiences with fewer barriers. Improving the 10-minute walk access to parks ensures parks and green spaces are located equitably, serving all residents and maximizing their positive impact on the overall quality of life for everyone."²³

²² FCPA stated on 11/30/2023 that Huntley Meadows was not referenced in the survey questions

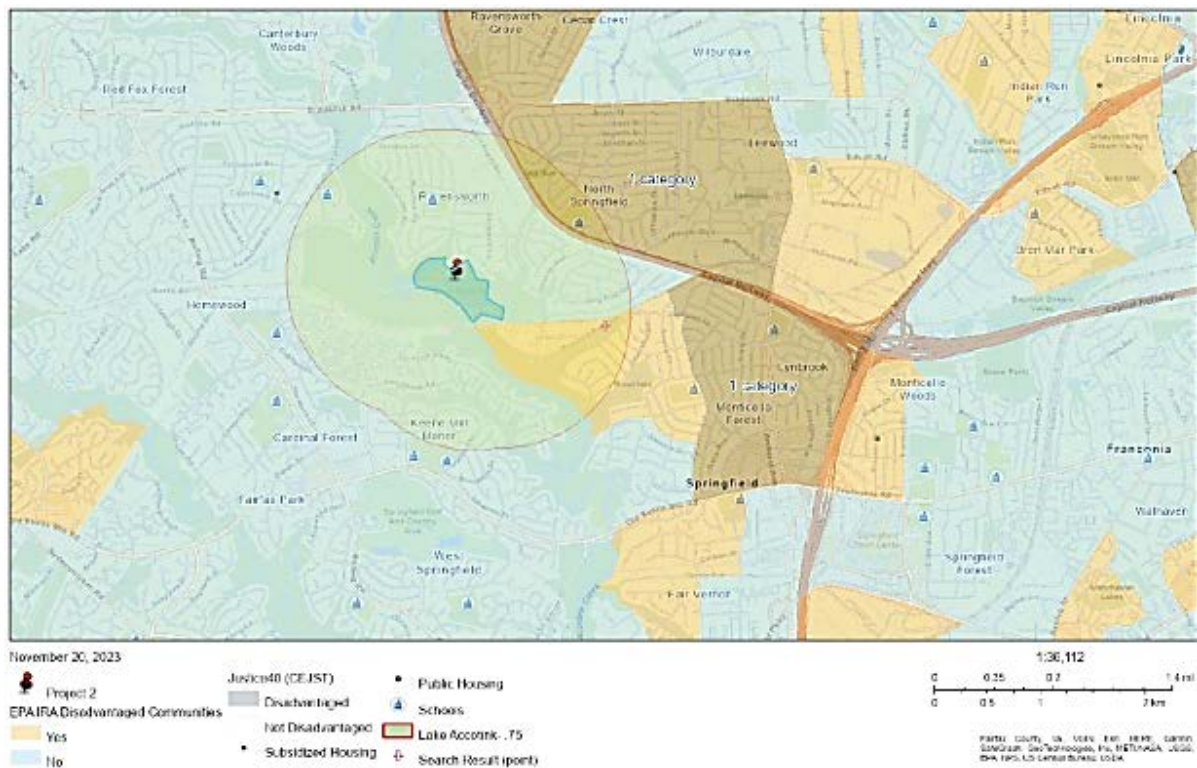
²³ Jai Cole, Executive Director of Fairfax County Park Authority. Overcoming Barriers to Park Equity. National Recreation and Park Association *Park & Recreation Magazine*. September Issue. August 24, 2023.

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1.10.1. The Importance of Inclusion of Socioeconomic Benefits and Equity Considerations for the Future of Lake Accotink

As discussed in further detail later in this section, water positively affects both our physical and mental well-being. Coupled with being surrounded by open public lands and equipped with amenities such as trails, water activities, rides, nature-learning opportunities and gathering spaces, a water body can transform spaces into exemplary and unique community treasures. Of the five waterfront parks listed on the FCPA Waterfront webpage, only three would be considered lakefront parks: Lake Accotink Park, Lake Fairfax Park, and Burke Lake Park. Only one of these FCPA parks is within a 0.75-mile radius of two neighborhoods identified as disadvantaged or underserved as defined by President Biden’s Executive Order 13985: Lake Accotink Park.²⁴

Figure 4-7: Map from the USEPA E.J. Screen Community Report 0.75-mile radius around Lake Accotink



The Map from US EPA EJ Screen Community Report identifies two neighborhoods (North Springfield and Brookfield) categorized as EPA IRA Disadvantaged Communities. The North Springfield neighborhood is also designated as a disadvantaged community according to the Justice40 categorization.

²⁴ FCPA staff stated on 11/30/2023 while these vulnerable communities are within a .75 mile distance, the walkability to the park from these neighborhoods may be impeded by barriers such as I-495.

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Definition of “underserved community” (Executive Order 13985): refers to people who have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life and can include those who are Black, Latino, Indigenous and Native American persons, and Asian Americans and Pacific Islanders; people with Limited English Proficiency; elderly, geographically isolated or educationally disenfranchised people; as well as those of ethnic, religious, and national origin minorities; women; children; individuals with disabilities, LGBTQ+; and persons affected by persistent poverty or inequality.

Lake Accotink offers a unique set of amenities unavailable at other nearby locations. While Huntley Meadows is a beautiful park and a treasure in its own right, it provides a very different amenity set and recreational opportunities. Lake Accotink has been a place where families have held reunions, sports teams have held end-of-season celebrations, and others have gone to play putt-putt, ride the carousel, or enjoy a day on the water. It is a park for all people and all demographics.

Title I elementary schools with the highest level of poverty receive funds that are used for staff and resources to meet the needs of their students and families. Schools are identified for Title I funds based on the percentage of students eligible for the Community Eligibility Provision (CEP) program, a non-pricing meal service option for schools and school districts in low-income areas.²⁵

According to the Fairfax County Public School Title I Schools website, Lynbrook Elementary School and Crestwood Elementary School, two schools within less than five miles of Lake Accotink, are both Title I Schools.²⁶ In fact, in a review of a database search performed on the USA EPA EJScreen Tool provided in Appendix A.3.1. of “Schools within Five Mile Radius of Lake Accotink,” 21 schools were identified as either Title I Schools or participated in the Community Eligibility Provision. A five-mile radius was selected as the search area as it was the survey area of the County’s Lake Accotink Dredging Public Survey.

According to the January 2021 Fairfax County Transit Network Map, Lake Accotink is serviced by several transportation modes; while there is always room for improving the County’s public

²⁵ USDA Community Eligibility Provision. <https://www.fns.usda.gov/cn/community-eligibility-provision>. December 3, 2023.

²⁶ Fairfax County Schools Title I Identified Schools. <https://www.fcps.edu/about-fcps/performance-and-accountability/title-i/title-i-identified-schools>. November 23, 2023.

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transportation system, visitors can enter the park via trails, a pedestrian bridge, car, Fairfax Connector, and Metrobus.²⁷

As mentioned previously, this is the only lakefront park in Fairfax County that is within close proximity to areas that have been identified as disadvantaged by the Biden Administration’s Justice40 Climate and Economic Justice Screening Tool, including North Springfield as well as western Annandale; please see the “Lakefront in Fairfax, VA” map for more information in Appendix A.3.2 of this chapter. At the heart of the fate of Lake Accotink is equity.

Fairfax County developed the Fairfax County Vulnerability Index to ensure equitable solutions are implemented across the County. Using GIS mapping and census data, including socioeconomic status, household composition, transportation, and race/ethnicity, County divisions’ efforts are better equipped to identify disparities, develop equitable and viable improvement, and increase access to quality-of-life programs and amenities, as needed.

A score of 1 to 5 was given to each block group for each indicator, 5 representing the most vulnerable and 1 representing the least vulnerable. Within the area of concern, one block group, Geoid 510594307001, Block Group 1, located southwest of the Lake, reports a high vulnerability index description (3.0). While the overall score may be average or lower than the county average, enclaves and multi-family dwellings rely on the Lake for water activities and recreation.

Equity is also the cornerstone of President Biden’s Executive Order 13985 and Fairfax County’s One Fairfax Policy. The One Fairfax Policy defines equity as: “The commitment to promote fairness and justice in the formation of public policy that results in all residents – regardless of age, race, color, sex, sexual orientation, gender identity, religion, national origin, marital status, disability, socio-economic status or neighborhood of residence or other characteristics – having opportunity to fully participate in the region’s economic vitality, contribute to its readiness for the future, and connect to its assets and resources.”

1.10.2. Comparison of Amenities of Lake Accotink Park to Other County Parks with Lakes

Lake Accotink’s surrounding population has seen noticeable demographic shifts between the 2010 and 2020 Decennial Census. Two neighborhoods, North Springfield and Kings Park, saw a reduction in the median age. Springfield also has an apartment complex within its boundaries, which typically has a transient population. The Caucasian population reduced in every

²⁷ Fairfax County Transit Network Map- January 2021.

https://www.fairfaxcounty.gov/connector/sites/connector/files/assets/documents/pdf/ffx_systemmap_2019_web.pdf.
November 23, 2023.

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neighborhood, with the Asian population being the largest growth. Additionally, the Hispanic population grew in every neighborhood, with North Springfield having the largest growth in that ethnicity. The average number of occupants (i.e., house size) grew for every community, with Springfield growing by nearly an entire person. The poverty rate increased in four of the five communities, with the lowest household incomes occurring in North Springfield and Springfield, where Lake Accotink's main entrances are located. Two Title I schools are directly within communities touching Lake Accotink: Crestwood Elementary and Lynbrook Elementary. Four additional Title I schools – Annandale Terrace Elementary, Braddock Elementary, Bren Mar Park Elementary, and Poe Middle – are less than four miles from the Lake.

Lake Accotink provides recreational and environmental value to these evolving communities with younger populations and less disposable income than in previous years. The Lake is accessible to them on foot or by bike trails and does not require traveling additional miles away to larger lakes like Burke Lake Park or smaller lakes like Huntsman Lake, Lake Mercer, Royal Lake Park, or Woodglen Lake. Lake Braddock does not have publicly available recreational activities on the Lake because it is private for only the residents of the Lake Braddock Community Association.²⁸

In the following sections, we provide information available on the subpages of the fairfaxcounty.gov website for Lake Accotink and lakes/parks closest to Lake Accotink. Since we are charged with finding the value of Lake Accotink to the park, we focused on aquatic activities because the land-based activities at Lake Accotink Park will remain unchanged regardless of whether the Lake is dredged.

Lake Accotink vs. Burke Lake

We first examined the recreational activities at Burke Lake, the largest public lake in proximity to Lake Accotink.

From Lake Accotink Park²⁹: It's hard to believe that the beltway is less than a mile away when you're standing on the tranquil and quiet shores of Lake Accotink Park. This 476-acre park provides excellent opportunities to relax, learn, and enjoy the natural resources of both Lake Accotink and Accotink Creek. In addition to trail systems and waterfront activities Lake Accotink Park offers many family-friendly activities including, picnic areas, class, camps, and special events.

²⁸ <https://www.lakebraddock.com/page/222~303051/new-resident-information>

²⁹ <https://www.fairfaxcounty.gov/parks/accotink>

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Facilities and activities vary with the season and include bike rentals, canoe and pedal boat rentals, boat launch, fishing, [and] restrooms.

The trail section by the dam frequently floods during rain events and there is no bypass.

- *[From Lake Accotink Park's Marina page³⁰]:* Swimming, windsurfing, paddleboarding and gas powered boat motors are prohibited. Virginia State Fishing License required for fishing.
- Small boats powered by electric motors, sailboats under 15 feet, canoes, kayaks and rowboats are allowed on the Lake. Pay \$5 launch fee at marina. Season passes available for \$40.
- An ADA accessible boat launch has been installed at the marina and can be accessed by checking in at the marina during marina business hours or by calling the visitor center at 703-569-3464, when the marina is closed.

From Burke Lake Park: ³¹ Burke Lake Park's centerpiece is a 218-acre lake with 5.25 miles of fishing shoreline, four fishing bulkheads at the state game area, a new fishing pier, and a boat launching dock.³² Both the fishing bulkheads and the fishing pier are accessible to persons with disabilities. *[Note: For fall 2023, the marina is "Closed due to staffing," per the park's seasonal schedule.³³]*

- Privately owned boats with electric motors are permitted on the Lake.
- No gasoline powered water-craft are permitted.
- Inflated boats may be used on the Lake, provided they have a minimum of three separate air chambers.
- *No remote controlled or sail boats are permitted.*
- *Swimming and windsurfing are prohibited.*
- Our waterfront parks are now featuring free fishing pole rods for rent at Burke Lake Park, Lake Accotink Park, Lake Fairfax Park and Riverbend Park.³⁴

The Fairfax County website also has a page on boating that compares aquatic activities at these two parks.³⁵ The table below provides the side-by-side descriptions on the page with our comparative summary.

³⁰ <https://www.fairfaxcounty.gov/parks/lake-accotink/bike-boat-rentals>

³¹ <https://www.fairfaxcounty.gov/parks/burke-lake/marina>

³² <https://www.fairfaxcounty.gov/parks/burke-lake/marina>

³³ <https://www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/waterfront/burkelake/burke-lake-facility-hours.pdf>

³⁴ <https://www.fairfaxcounty.gov/parks/burke-lake/fishing>

³⁵ <https://www.fairfaxcounty.gov/parks/boating>

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Table 4-1: Summary of Aquatic Amenities at Lake Accotink and Burke Lake with a Comparative Summary.

Lake Accotink ³⁶	Burke Lake ³⁷
<p>Lake Accotink has canoe, kayak and pedal boat rentals. There is a launch ramp and marina. Gas motors are prohibited. The park occasionally offers kayaking classes and tours. Lake Accotink also has an annual cardboard regatta in early summer.</p>	<p>There are two boat launch areas on the 218-acre lake. Electric motors are allowed. Gas motors are not. Kayaks are prohibited unless being used for fishing. There is a 24-hour, state-owned launching area at the dam end of the lake for fishing boats only. There is a boat launch with a marina on the upper end of the lake. Inflated boats with at least three air chambers are permitted. Rowboat, fishing kayak and canoe rentals are available, and the lake has a tour boat. Pets are not allowed on rental or tour boats.</p>
<p>Comparison</p>	
<p>Both lakes have boat launches and permit canoeing. Lake Accotink does not have kayaking restrictions, whereas Burke Lake limits kayak use to fishing. Lake Accotink offers pedal boat rentals, while Burke Lake allows for inflated boats with at least three air chambers. Rowboats are not specifically mentioned at Lake Accotink like they are at Burke Lake.</p>	

Lake Accotink vs. Parks with Small Lakes

The Fairfax County webpage also has a page that describes the amenities at “parks with small lakes.”

From Huntsman Lake: ³⁸ The Dorothy Lane entrance on the south side of the lake has limited street parking, basketball courts, picnicking, a playground and a paved network of trails. It is a walk of a few hundred yards from this park area to the lake. Although there are trails in the area, there is no loop trail on parkland around the lake. There are no restroom facilities. Beaver, turtles, heron and other birds are common sightings. The maintenance access roads on the north side of the lake are behind locked gates, so the lake is not accessible to towed boats. Small boats, such as canoes, are legal, but they must be carried or wheeled by hand to lakeside. Huntsman Lake was drained in 2014 for dredging and structural work and then restocked with fingerlings in fall 2014 and summer 2015.

³⁶ Ibid

³⁷ Ibid

³⁸ <https://www.fairfaxcounty.gov/parks/small-lakes>

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From Lake Mercer: ³⁹ Although the park's address is 9500 Silverbrook Road, its main entrance is off Hooes Road where there is limited parking for about ten vehicles in a gravel lot on county property below the dam.

There are no trashcans, picnicking, playground or restroom facilities. The park features hiking, biking and fishing, and it contains natural and historic areas. There is no public road to the water's edge and there is no boat ramp, but there are a couple of places where small craft, like canoes, can be launched if you're willing to carry or wheel them in by hand. No motors are allowed... Summer shoreline access to the lake waters is limited by flora. There is access to the lake area by bike or foot from South Run Recreational Center and via several other neighborhood trails.

From Royal Lake Park: ⁴⁰ A one and three-quarter mile loop trail around the lake begins from the parking lot...The developed area at Royal Lake Park off Eastlake Drive on the short, northwest wing of the lake's J-shape includes a parking lot, a playground, a basketball court and tennis courts. The maintenance access road leading to the lake is not available for boat launching. Concerts are held next to the lake in the summer... The 38-acre lake was dredged in 2016. A fish save was conducted at the lake in October 2015 prior to the dredging. Staff relocated juvenile bass and crappie to Brookfield Pond along with a large number of bluegill and redear sunfish. Lakes Barton and Braddock received all the large game fish along with a considerable number of juveniles and various forage species.

From Woodglen Lake: ⁴¹ There are trails, though there's no loop trail all the way around the lake, and the shoreline can be hard to reach in places because of flora... Boating is limited to carry-in craft, and motors are banned. The lake was dredged in 2015, and a forebay was created to make the lake more efficient at trapping sediment. Woodglen drains an area of about 1.16 square miles and has a surface area of about 12.5 acres at normal pool. Public parking for access to the lake is at the end of Fireside Court near the dam. There's space for only a handful of cars. There's a paved trail running from there for about two-tenths of a mile across the top of the dam and out of the park on the other side of the dam. There is no public parking at the Zion Drive trail entrance on the upper end of the lake. There are no facilities at the lake.

³⁹ <https://www.fairfaxcounty.gov/parks/small-lakes>

⁴⁰ <https://www.fairfaxcounty.gov/parks/small-lakes>

⁴¹ <https://www.fairfaxcounty.gov/parks/small-lakes>

4. Value of Lake Accotink to Lake Accotink Park and to the County

Results of Lake Accotink vs. Parks with Small Lakes Comparison

Table 4-2: A Matrix of Amenities Offered at Each Park

	Canoes/Kayaks	Paddle Boats	Inflated Boats	Boat Launch	Fishing	Restrooms	Trails Around the Lake	ADA Compliant	Parking
Lake Accotink	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Ample
Burke Lake	Yes ¹	No	Yes	Yes	Yes	Yes	Yes	Yes	Ample
Huntsman Lake	Yes ²	No	No	No	Not Listed	No	No	No	Limited
Lake Mercer	Yes ²	No	No	No	Yes	No	Yes	No	Limited
Royal Park Lake	Not Listed	No	No	No	Not Listed	Not Listed	Yes	Yes	Limited
Woodglen Lake	Yes ²	No	No	No	Not Listed	No	No	No	Limited

This table compares Lake Accotink Park amenities to five other Fairfax County Parks within 5 miles of Lake Accotink. These amenities include water and land activities, ADA compliance, restrooms, and parking availability. For this table, YES1 means 'Kayaks are only permitted if used for fishing,' and Yes2 means 'Canoes or kayaks must be carried.' Additionally, 'Ample' parking is anything not defined as 'Limited' per descriptions of park amenities on the FCPA *Parks with Small Lakes*, Burke Lake, or Lake Accotink websites.

Lake Accotink and Burke Lake are the most comprehensive parks in terms of aquatic amenities, and Burke Lake is the only true comparable park to Lake Accotink. None of the parks with small lakes match the recreational value of Lake Accotink, have restrooms, or are able to accommodate vehicular traffic.

The subcommittee did not do a socioeconomic review of the communities surrounding Burke Lake or any parks with smaller lakes. However, we are able to measure population trends for the communities surrounding Lake Accotink, which show greater diversity, younger age demographic shifts, and a greater number of households living below the poverty line who could benefit from a walkable lake. Lake Accotink's proximity to several Title I schools within a short distance also reflects the equity lens of the One Fairfax Policy that should be guiding the County's decisions.

1.11. Environmental Value of Lake Accotink to Lake Accotink Park and the County

1.11.1. Lake Accotink: The Calming Effects and Health Benefits of Water

Adapted from the testimonial of Sandy Frieswyk (local resident and member of Save Lake Accotink)

Nature as Healer

We've known for a long time that spending time in nature is good for our mental health⁴². No matter where you live, it's one of the best and most accessible ways to boost your mood.

Spending time in forests, parks, and gardens, especially if you live in urban settings, has a measurable effect on your well-being.⁴³ There is evidence that the mental boost that comes with spending time in nature goes beyond happiness and well-being.

The list of other benefits is extensive and can include:⁴⁴

- increased attention
- creativity
- memory
- helps aid sleep
- helps those experiencing anxiety or depression
- relieves some symptoms of conditions such as ADHD in children and adults.

Epidemiological studies now show that people who live in greener areas tend to have better mental health. It is not quite certain whether this is thanks to nature or because people who are already healthier for other reasons choose to live in greener areas.⁴⁵ A study in 2013 that examined data on more than 1000 people who made a move to a different location found significant benefits to relocating to greener urban areas. For the first time, there was direct support for the idea that green spaces were making people feel less blue.⁴⁶

“Blue Spaces:” The Benefits of Being by Water

⁴² Nurtured by Nature. <https://www.apa.org/monitor/2020/04/>. November 23, 2023.

⁴³ Ibid

⁴⁴ Ibid

⁴⁵ White, M.P., Alcock, I., Grellier, J. et al. Spending at least 120 minutes a week in nature is associated with good health and wellbeing. *Sci Rep* 9, 7730 (2019). <https://doi.org/10.1038/s41598-019-44097-3>.

⁴⁶ Why spending time near water gives us a powerful mental health boost. <https://www.newscientist.com/article/mg25533950-700-why-spending-time-near-water-gives-us-a-powerful-mental-health-boost/>. December 01, 2023.

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Now, a new focus by physical and mental health researchers is on the benefits of being by so-called “blue spaces,” open water. New studies show that blue spaces - water - are beneficial for soothing a troubled mind and promoting a sense of relaxation.⁴⁷ Being by the water is useful for people dealing with stress, anxiety, depression, and a number of other mental health concerns.⁴⁸ Spending time near water areas can lower exposure to air pollution, extreme heat and noise.⁴⁹

Importantly, researchers found that being near water can decrease cortisol levels—the stress hormone—in a person’s body.⁵⁰ Spending time in a blue space can also lower blood pressure. It has been determined that being near water produces a calming effect in people.⁵¹

But in some ways, the benefits of being by water isn’t new; the Victorians knew this, prescribing visits to the ocean to breathe in ocean air as a treatment for melancholy. So did the French, who, for centuries, sent people with ailments to natural springs. The Greeks sought out natural springs and baths to restore the mind and body, while the Japanese practiced misogi, an ancient water cleansing ritual that is still practiced today.⁵²

The organization BlueHealth collected and studied data from representative samples of people across 18 countries. This is what they found:

“Blue spaces can benefit physical and mental health. People who live near (within 1km of) a major blue space are often physically healthier and have better mental health than those living further away. One reason for this is that these people also tend to be wealthier, with homes near high quality blue spaces costing more.

But this is only half the story. In Europe, it seems that the health of the poorest in society benefits most from living near water, especially where local blue spaces provide accessible opportunities for physical activity and building positive social networks. What we need to do

⁴⁷ The Science Behind How Just Being Near Water Can Help Mental Health — Even Virtually
<https://www.sokyahealth.com/mood/the-science-behind-how-just-being-near-water-can-help-mental-health-even-virtually>.
September 04, 2023.

⁴⁸ Ibid

⁴⁹ Ibid

⁵⁰ Waterscapes for Promoting Mental Health in the General Population
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8618438/>. November 30, 2023.

⁵¹ Ibid

⁵² Ibid – Footnote 29.

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now is to improve access to high-quality blue space for deprived communities while minimizing risks, thus reducing health and environmental inequalities.”⁵³

In another recent study, British researchers recruited more than 20,000 people across the United Kingdom to use a smartphone app that sent them a questionnaire about how they were feeling at random times.⁵⁴ The participants had to submit their answers in real-time. The researchers collected more than a million responses and found that people were happier when they were in nature of any kind compared to an urban environment. However, water areas - blue spaces - were the happiest locations "by some distance," the researchers wrote.

While some previous studies concentrated on the benefits of being near the sea, more current studies have looked at a range of blue spaces.⁵⁵ The results show that, when compared to green spaces, such as forests and parks, blue spaces scored better for physical and mental well-being.

The best scenario of all, according to the study results, is living or visiting somewhere where green and blue spaces meet, as they do in Lake Accotink Park. Research also shows that living near blue spaces can buffer against some of the mental health inequalities associated with socio-economic differences.⁵⁶ Past research on green spaces has sometimes been accused of focusing too narrowly on the middle classes. Still, two large studies have now shown that people who live in lower-income neighborhoods but live close to water, either the ocean, ponds, lakes, or streams, are mentally and physically healthier than would be expected, given the barriers that may be creating gaps in opportunity.⁵⁷

We will further address the socio-economic benefits of Lake Accotink for the surrounding community in another section of our report.

In conclusion, due to the increasing pressures of life, especially in urban communities, community planners need to consider the importance of keeping blue spaces, as well as green spaces, as a resource to promote good mental health. Studies suggest that a neighborhood blue

⁵³ Read About the Benefits of Blue Spaces. https://bluehealth2020.eu/wp/wp-content/uploads/2020/11/Read-about-the-benefits-of-blue-spaces_BlueHealth-Project_Horizon-2020.pdf. September 04, 2023.

⁵⁴ Happiness is Greater in Natural Environments. <https://www.sciencedirect.com/science/article/abs/pii/S0959378013000573>. December 01, 2023.

⁵⁵ Waterscapes for Promoting Mental Health in the General Population. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8618438/>. December 01, 2023.

⁵⁶ Ibid – See Footnote #28

⁵⁷ Ibid – See Footnote #28

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space, a stream, a lake, a pond, or an ocean is more beneficial for psychological and mental health than just a neighborhood green space.

When considering the future of Lake Accotink, please consider the calming effects and health benefits it provides to its many visitors. Spending time in its beautiful blue space can be deeply restorative, as the many people who frequent Lake Accotink will tell you.

1.11.2. Lake Accotink's Value to the Lake Accotink Park Environment and Beyond

Lake Accotink provides valuable environmental benefits to an unhealthy, highly urbanized watershed. The Lake removes vast quantities of regulated pollutants from Accotink Creek and is a habitat for valuable flora and fauna.

Environmental Value Overview

In this section, we take a closer look at the value Lake Accotink brings to the environment of Lake Accotink Park and the Accotink Creek Watershed. Lake Accotink sits in the middle of the Accotink Creek Watershed.⁵⁸ The creek's mainstem is approximately 24 miles long, with 68 total miles of stream, including tributaries, above the Lake. The watershed drains an area of roughly 52 square miles, making the Accotink Creek watershed the second largest in Fairfax County. Because of its location, Lake Accotink plays an important role in the Accotink Creek ecosystem, Lake Accotink Park, and the surrounding community, including tributaries, public parks, and residential neighborhoods. "Lake Accotink functions as a flood and sediment control facility⁵⁹ in a critical location."⁶⁰ "Lake Accotink is [also] a vital link in the environmental and genetic corridor which links open space from Little River Turnpike, Route 236, all the way to Fort Belvoir."⁶¹

Land use of the Accotink Creek's watershed is categorized as 87% urban, consisting of 28% impervious surfaces.⁶² That is 45 square miles of urban sprawl, of which 15 square miles, or one-third of the watershed's developed surface, is covered by parking lots, highways, driveways, and buildings. Much of the land development in the Accotink Creek Watershed occurred before

⁵⁸ Interstate Commission on the Potomac River Basin (ICPRB). August 30, 2017. Volume II, Sediment TMDLs for the Accotink Creek Watershed, Fairfax County, Virginia. (ES-1). <https://www.deq.virginia.gov/home/showpublisheddocument/3895>

⁵⁹ DPWES stated on 11/29/2023 that Lake Accotink does not provide flood control. It is a run of the river dam and storm flows pass right through.

⁶⁰ Fairfax County Park Authority Strategic Planning Team. 1992. *Lake Accotink Park General Management Plan*. <https://www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/plandev/lake-accotink/lap-1993-gmp.pdf>

⁶¹ Ibid. See Footnote #1.

⁶² ICPRB. Volume II Sediment TMDLs. (ES-1).

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the existence of stormwater management regulations.⁶³ There remains a deficit of stormwater management resources and facilities to address the watershed's needs under clean water regulations.⁶⁴ Vast volumes of unmitigated stormwater erode the streambanks of Accotink Creek and its tributaries at an estimated rate of 17,730 tons of sediment per year. Adding all sediment sources together, Accotink Creek transports 21,561 tons of sediment annually.⁶⁵

“Section 303(d) of the Clean Water Act (CWA) and the United States Environmental Protection Agency's (EPA) Water Quality Planning and Management Regulations (40 CFR part 130) generally require states to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not meeting water quality standards. TMDLs represent the total pollutant loading a waterbody can receive without exceeding water quality standards.”⁶⁶ The Virginia Department of Environmental Quality (DEQ) identified suspended sediment as a pollutant of interest in Accotink Creek and issued three separate sediment TMDLs for the Accotink Creek Watershed, one for upper Accotink Creek, which ends at Lake Accotink; Long Branch, a major tributary of upper Accotink Creek; and lower Accotink Creek, which begins at the Lake Accotink Dam spillway. Fairfax County must, therefore, reduce the sediment load of these three waterways by 73%, 70%, and 39%, respectively.⁶⁷

The lower Accotink Creek sediment TMDL requires Fairfax County to reduce the sediment load in lower Accotink Creek by 39%, which is roughly half as much of a reduction as the other Accotink Creek Watershed TMDLs. The necessary sediment load reduction for lower Accotink Creek is significantly lower than the necessary reductions for upper Accotink Creek and Long Branch “due to the 47% trapping efficiency of Lake Accotink....” The TMDLs estimate that Lake Accotink sequesters 6,982 tons of sediment annually. “While the TMDL does not prescribe that the Lake will be maintained exactly as has been done in the past, it does assume that there will be an average sediment removal of 47% provided by dredging or an equivalent management practice.”⁶⁸ Important distinctions must be made here: 1) Dredging Lake Accotink will cost \$206

⁶³ Fairfax County Department of Public Works and Environmental Services. *Stormwater Service District*. <https://www.fairfaxcounty.gov/publicworks/stormwater/stormwater-service-district>; Department of Public Works and Environmental Services. 2023. *Lake Accotink Overview*. <https://www.fairfaxcounty.gov/topics/sites/topics/files/assets/documents/lakeaccotink/lake-accotink-task-force-board-presentation-0626-lake-accotink-overview.pdf>; HDR Engineering, Inc. 2002. *Lake Accotink Sediment Management Program Study*. Provided via email from Charles Smith.

⁶⁴ See ICPRB. *Volume II Sediment TMDLs*; DPWES. *Accotink Creek Watershed Management Plan*. (6-1).

⁶⁵ ICPRB. *Volume II Sediment TMDLs*. (ES-10).

⁶⁶ *Ibid* at ES-1-2.

⁶⁷ *Ibid* at ES-11.

⁶⁸ *Ibid* 3-37

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per ton of sediment.⁶⁹ 2) “[E]quivalent management practices” cost \$29,240 per ton of sediment reduction credits.⁷⁰

Fairfax County’s TMDL compliance relies on Lake Accotink, yet county staff have stated that allowing Lake Accotink to fill completely with sediment will have little impact downstream.^{71, 72} This is misleading. County staff is relying upon the fact that DEQ is not actively monitoring the sediment load in Accotink Creek.⁷³ Instead of actually measuring the sediment load, each watershed improvement project is assigned a sediment load reduction credit.⁷⁴ No work is being done to verify whether the assigned sediment load reduction credits accurately reflect an observed sediment load reduction downstream.⁷⁵ There is, therefore, no evidence that the stormwater improvement projects in the Accotink Creek Watershed have reduced the sediment loads on Accotink Creek, Lake Accotink, or Gunston Cove.⁷⁶ There is, however, anecdotal evidence that the sediment load in Accotink Bay and Gunston Cove, where Accotink Creek empties, is increasing.⁷⁷ As Lake Accotink fills in, it will sequester less and less sediment, so more and more sediment heads downstream into lower Accotink Creek.⁷⁸ (See Lake Volume Reduction chart below.)⁷⁹ Until DEQ discovers that the sediment load on lower Accotink Creek has increased, Fairfax County can allow Lake Accotink to fill in with sediment and allow any volume of sediment to transit the Lake Accotink Dam spillway on its way to the Chesapeake Bay with impunity. It is highly unlikely that DEQ will fail to notice as much as a 48% sediment load increase in lower Accotink Creek as Lake Accotink fills in.⁸⁰ When future benthic invertebrate surveys fail to meet targets, it will trigger new or amended obligations that will likely cost much more than the cost of dredging Lake Accotink.

⁶⁹ See Smith, Charles, DPWES. November 4, 2023. Lake Accotink Watershed Project Status. Via electronic mail; Arcadis. 2023. Dredging Program Review. https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/projects/2023-02_dredgeprogrampresentation_ada.pdf

⁷⁰ DPWES. October 3, 2023. *Lake Accotink Watershed Project Status*. Provided via email from Charles Smith.

⁷¹ DPWES offered clarification on 11/29/2023 stating that compliance can be reached by other means.

⁷² ICPRB. Volume II Sediment TMDLs. (3-37); DPWES. February 15, 2023. *Lake Accotink Virtual Meeting*. <https://www.youtube.com/watch?v=DDMISwkvQyo>

⁷³ See ICPRB. Volume II Sediment TMDLs. (5-1-13).

⁷⁴ Ibid.

⁷⁵ See ICPRB. Volume II Sediment TMDLs. (3-25-29).

⁷⁶ DPWES stated on 11/29/2023 that the County monitors all stream restorations once every five years to verify they are still performing and to retain our credits for sediment and nutrient reduction. they also inspect all storm water detention facilities for the same purpose.

⁷⁷ Jones, Dr. Chris. July 10, 2023. Task Force on the Future of Lake Accotink Meeting.

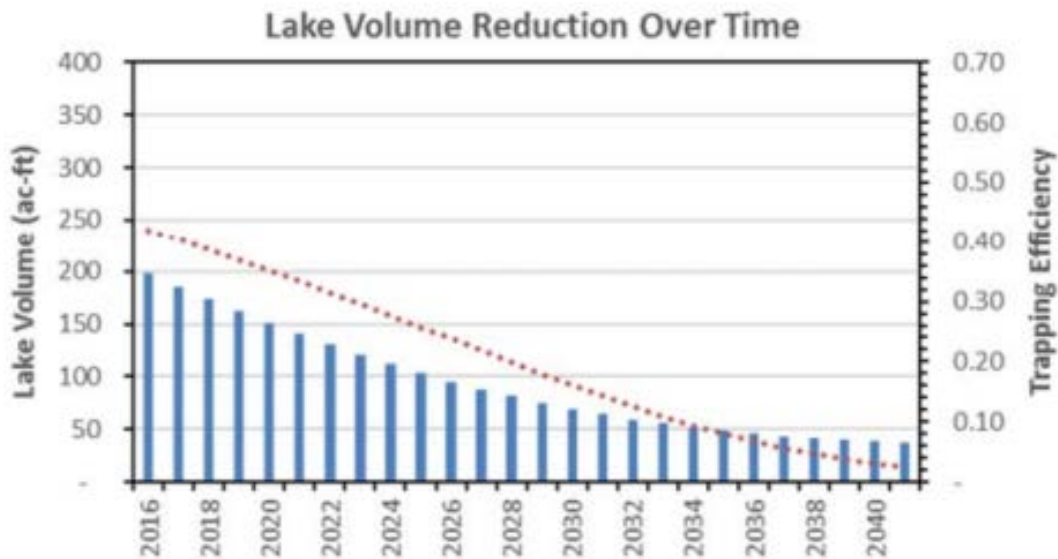
⁷⁸ WSSI. *Lake Accotink Sustainability Plan*. (3).

⁷⁹ DPWES stated on 11/29/2023 that LimnoTech staff estimates that the sediment starved water leaving the lake reacquires its sediment load from the stream banks below the lake and delivers about the same amount of sediment to lower Accotink Creek and Accotink Bay as if the lake was not there. This is the typical condition below impoundments.

⁸⁰ See ICPRB. Volume II Sediment TMDLs. (ES-11).

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Figure 4-8: Graph Of Lake Accotink’s Water Volume And Sediment Trapping Efficiency Over Time⁸¹



This graph shows a calculated estimate of Lake Accotink’s water volume decreasing from 2016 through 2042 from approximately 240-acre feet (ac-ft) in 2016 to 10-ac-ft in 2042. The chart’s right vertical axis represents the decreasing lake sediment trapping efficiency by percentage points. Each blue bar represents a two-year span. In 2016, the Lake’s sediment trapping efficiency was approximately 35%. Estimates for 2042 show the Lake’s sediment trapping to be below 10%.

Lake Accotink is the greatest stormwater and pollution control facility in the Accotink Creek Watershed. Stormwater runoff from vast swaths of impervious surface has caused and continues to cause great damage to the watershed ecosystem. Accotink Creek is still impaired, but Lake Accotink blunts the force of the polluted waters that flow into it. As discussed below, the wildlife of lower Accotink Creek rely upon Lake Accotink, without which their presence at the park would decline. Lake Accotink is a critical component of Central Fairfax County’s environmental health.

1.11.3. Wildlife Impacts if Lake Accotink Fills in With Sediment

“I love Lake Accotink because I get to play with the fishies.”

People were asked, “Why Do You Love Lake Accotink?” at two celebrations, the Lake’s 61st Anniversary Celebration and the Springfield Town Center Fall Fest. Above and below are some of the responses from the 61st Anniversary Celebration referring to the wildlife that live at or visit the Lake:

⁸¹ WSSI. *Lake Accotink Sustainability Plan*. (3).

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- *“I love to see the geese land and take-off”*
- *“It’s a great place to go fish.”*
- *“Catching fish is easy.”*

Figure 4-9: Bald Eagles at Lake Accotink Park



The photo provided by Mike Murray, taken at Lake Accotink on 11/16/23, shows a pair of adult bald eagles perched on a tree at Lake Accotink Park.

Lake Accotink is a popular stopover and breeding habitat for numerous species of birds, mammals, reptiles, amphibians, and insects, according to a 2017 report written by Kristen Sinclair, an ecologist with the FCPA. While reptiles and amphibians have not been well inventoried in the park, the County has counted over 146 species of birds recorded at the park from 2001 to 2016, as reported by the FCPA Natural Resource staff.⁸² As evidenced by the comments from testimonials, social media posts from local photographers, and the annual Christmas Bird Count held at Lake Accotink Park, birding is a valued pastime at the Lake.

While it is true that many of the wildlife that call Lake Accotink home also would adapt to the Lake becoming a wetland habitat, a few notable exceptions would not. One is the bald eagle

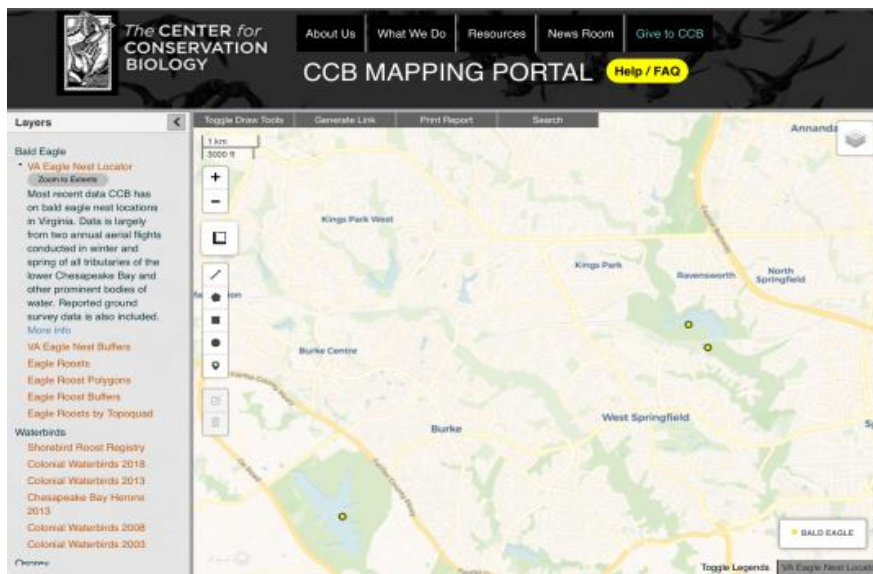
⁸² Burke, John. “Re: John Burke has shared a folder “2023” with you.” Received by Meghan Walker/ Bryan Campbell. November 5, 2023.

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pair that has been making the Lake their home for several years, as documented by local photographers and posted on several social media webpages associated with those photographers or Lake Accotink. A bald eagle nest has been observed active on the southern side of the Lake, on the Danbury Forest/Cardinal Forest side of the dam, and offspring have been observed in many of those years.

According to the National Wildlife Federation, bald eagles prefer large bodies of water situated within woodland areas for their nests and hunting grounds.^{83,84} The non-profit group, The Center for Conservation Biology (CCB), found that the next closest bald eagle nest is at Burke Lake, 4.59 miles away from residents who live on the eastern side of Lake Accotink (Crestwood, North Springfield, Ravensworth neighborhoods), as shown on the CCB map below.⁸⁵

Figure 4-10: Screenshot from the Center for Conservation Biology Virginia Bald Eagle Nest Locator



⁸³ DPWES staff stated on 11/29/2023 that Eagles are highly adaptive and commonly live away from water bodies, frequently eating primarily road-killed deer. As Dave Lawlor reported to the Task Force about the Huntley Meadows wetland restoration, eagle activity increased after the wetland was restored and the habitat diversified. Lake Accotink fish productivity could be expected to improve in a managed wetland scenario, and waterfowl habitat would also improve. Both are primary food resources for bald eagles.

⁸⁴ National Wildlife Federation Wildlife Guide: Bald Eagles <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Birds/Bald-Eagle#:~:text=They%20prefer%20lakes%20and%20reservoirs,all%20types%20of%20water%20habitats.> November 23, 2023.

⁸⁵ Center for Conservation Biology Mapping Portal. <https://www.ccbbirds.org/maps/#eagles.> November 23, 2023.

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Screenshot of the Bald Eagle Nest Locator showing two bald eagle nests identified at Lake Accotink Park. The observation shown below the dam was last recorded in 2011. The observation along the edge of the Lake was last recorded in 2019. As included in this report, local photographers have photographed bald eagles at the Lake as recently as November 2023.

Accessibility Considerations for Viewing Wildlife

Burke Lake is also less accessible to those residents and visitors who need mobility assistance. While the fishing piers at Burke Lake are ADA-accessible, only Lake Accotink has an ADA-accessible boat launch at the marina. Kayaking on Lake Accotink is a popular activity during warm weather months and grants visitors the opportunity to observe wildlife up close on the Lake. Removal of the Lake and the marina would remove a key access point for those who would like to experience birdwatching and boating on the Lake but require additional assistance.

Figure 4-11: Freshwater Mussel Observed Below the Lake Accotink Dam

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Photograph of freshwater mussel found below the dam during a 2015 freshwater mussel survey sponsored by Friends of Accotink Creek. This photograph was provided by Friends of Accotink and was taken in June 2015.

In addition to the bald eagles, another population that would be negatively affected by the removal of the dam, or by the removal of the Lake as a sediment trapping location, would be the freshwater mussel population that live, and thrive, directly below the dam. Friends of Accotink Creek commissioned a study of the mussel population in 2016 that found three different species of native freshwater mussels in this area. The mussels found were, on average, older, some as old as 20 years, indicating a long-term stable habitat below the dam. The Virginia Department of Wildlife Resources says only 30% of the 82 freshwater mussel species in the state are considered stable. The mussels below the dam play a critical role in the stream health below the dam; if they die, so does their contribution to the lower Accotink watershed.

People at the Springfield Town Center Fall Festival held on October 21, 2023, wrote what they love about Lake Accotink:

- ***“Catching fish is easy.”***

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- *“I love to fish.”*
- *“The geese are kind to me.”*

Wildlife Viewing Below the Dam

Exploring the stream via the Connolly Cross County Trail south of the dam is easily accessible from the paved trail from the lower parking lot below the train trestle. It is the longest stretch of accessible trail in the county, which lists the next closest accessible trail with comparable wildlife as Huntley Meadows Park, a significant distance for residents who live in the neighborhoods around Lake Accotink.⁸⁶ Fishing stations along the trail south of the dam are also popular and accessible from the parking lot under the train trestle.

The stream's health below the dam depends heavily on Lake Accotink to trap sediment. The FCPA clearly shows that stream health is significantly better below the dam than above because the dam and the Lake trap sediment.⁸⁷ Removing the dam and allowing the Lake to fill in would eventually push the sediment further downstream and destroy the habitat below the dam, thereby reducing access for those requiring accessible trails to wildlife and their habitats. Therefore, equity of access is critical when considering the value of Lake Accotink, both in terms of proximity of various wildlife for local residents and access for those visitors who need mobility assistance.

⁸⁶ <https://www.fairfaxcounty.gov/parks/accessible/trails>

⁸⁷ <https://www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/plandev/lake-accotink/lap-mtg-displayboards-031416>.

Figure 4-12: Scenic Views of Wildlife at Lake Accotink



*“I love seeing the blue heron catching fish by the Lake,”
Attendee at the Springfield
Fest.*

1.11.4. Valuing the Aquatic

Plant Life of Lake Accotink

The Lake Accotink Dredging Project, Story Map website,⁸⁸ utilizes an image of a barren Lake. Still, park patrons have a different image of the Lake as a thriving habitat that attracts wildlife and people. At the Lake’s 61st Anniversary Celebration held at Lake Accotink Park on August 27, 2023, representatives of the advocacy group Save Lake Accotink asked people, “Why Do You Love Lake Accotink?” Below are some of the responses referring to the nature at the Lake:

- ***“I love all the nature that habitates [sic] the Lake.”***
- ***“It’s nature.”***
- ***“It’s a great place to exercise and enjoy NATURE.”***

The aquatic plant community is an integral part of nature that patrons of the park value as part of Lake Accotink. For the purposes of this discussion, aquatic plants refer to the plant species, which include subaquatic vegetation, floating vegetation and emergent wetland vegetation species that can thrive in sustained inundated hydrologic conditions.

⁸⁸ Lake Accotink Dredging Project Story Map website.

<https://storymaps.arcgis.com/stories/b85512da45b8420085167291998d19af>, November 19, 2023.

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Figure 4-13: Photo Comparison of Lake Accotink



The photograph on the left, from Fairfax County’s “The Future of Lake Accotink Story Map,” appears to be taken in the late fall when much of the perennial and seasonal plant life would be past its peak. The picture on the right is provided by local photographer Thomas Kinder, posted on the Save Lake Accotink Facebook page, and depicts patrons of the park viewing the Lake during the growing season when plant life is present and vibrant.

Since plant life plays such a significant part in attracting wildlife and people, it’s important that the future of Lake Accotink consider the value of the aquatic vegetative community associated with Lake Accotink. The Northern Virginia Soil and Water Conservation District website on Aquatic Plant Control⁸⁹ states that “aquatic plants are a necessary component of a pond; they contribute oxygen to the water, provide cover, food, and nesting and nursery habitat for aquatic animals, and protect the shoreline from erosion.” The United States Geological Survey (USGS) definition of lake is a ‘body of water surrounded by inland’.⁹⁰ There is no federal, state, or local regulatory definition that differentiates an open body of water as a lake or pond. Therefore, for purpose of this document, the terms are interchangeable. However, generally speaking, a lake is a deep body of water and ponds are shallower as indicated by the USGS.

Assessing the value of the aquatic plant community in Lake Accotink should study the economic, environmental, and emotional factors that encapsulate that value. It’s important to not just understand the actual existing conditions of the aquatic environment dynamic between biotic and abiotic environmental factors, but also understanding the importance of those interactions to patrons of the Lake.

⁸⁹ Northern Virginia Soil and Water District – Excess Aquatic Vegetation in Your Pond website. <https://www.fairfaxcounty.gov/soil-water-conservation/pond-problems>. November 12, 2023.

⁹⁰ USGS - What is the difference between lake and pond; mountain and hill; river and creek? Podcast <https://www.usgs.gov/media/audio/what-difference-between-lake-and-pond-mountain-and-hill-or-river-and-creek>. November 12, 2023.

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Figure 4-14: Photographs of Wildlife Interaction with the Aquatic Plant Community in Lake Accotink



The photograph on the left is provided by local photographer Thomas Kinder taken from the Save Lake Accotink Facebook page depicts a Whitetail Deer and Canadian Geese using the aquatic vegetation as passage and source for finding food. The picture on the right, also provided by Thomas Kinder, from the Save Lake Accotink Facebook page, depicts an Eastern Painted Turtle inhabiting the aquatic vegetation at Lake Accotink.

Past vegetative assessments conducted at Lake Accotink from Fairfax County's Department of Public Work and Environmental Services and FCPA were requested as part of the effort of the Lake Accotink Task Force to evaluate the County's efforts to assess the value of Lake Accotink. While information from previous studies could be provided inventorying the terrestrial vegetative environment at the park, no information was provided that demonstrated a qualitative or quantitative inventory of the existing aquatic vegetative community that exists in the Lake. The subcommittee was able to make assumptions of what the plant community based on the understanding of tolerant species most likely associated with the urban land-use of the watershed for Lake Accotink and upstream surveys of tributaries to the Lake. However, no conclusive information has been provided to or has been discovered by this subcommittee.

The Fairfax County Department of Public Works and Environmental Services Spring 2023 public survey referenced earlier in this chapter did not seek to inquire the public's opinion on their impression of the aquatic vegetation community value to the Lake. One of the findings of this subcommittee highlights the inadequate execution and analysis of the aforementioned community survey and a new comprehensive survey needs to be conducted. A new community survey should include a method of assessing how the community values the aquatic plant life to the Lake. Any future plans for the Lake should include a more comprehensive diagnostic understanding of the economic, environmental and emotional factors affecting the aquatic plant community at Lake Accotink. Additionally, any goals set for the future of Lake Accotink

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should include preservation and enhancement of the aquatic plant community that optimizes the ecological and cultural benefits of the Lake.

IMPACTS AND ISSUES WITH STAFF RECOMMENDATION NOT TO DREDGE: SUBCOMMITTEE REVIEW OF STAFF RECOMMENDATIONS

This subcommittee explored two avenues of investigation with respect to DPWES staff's recommendation not to dredge Lake Accotink but to instead refocus on completing a new master plan for Lake Accotink:

- the cost and environmental basis for the recommendation not to dredge, and
- the process and authority for reaching that recommendation.

1.12. Impacts

The County's decision not to dredge reflected concerns for high costs and significant community and environmental impacts. The subcommittee reviewed the following as part of our evaluation of the cost and environmental basis for Staff's recommendation:

- Lake Accotink Sustainability Plan.⁹¹
- The Arcadis reports for the Lake Accotink Dredging Project and the Base Dredge Cost Estimate.⁹²
- Sediment TMDLs for the Accotink Creek Watershed.⁹³
- USGS study referenced by staff— Noe, G.B. K.G. Hopkins, P.R. Claggett, E.R. Schenk, M.J. Metes, L. Ahmed, T.R. Doody and C.R. Hupp. 2022. Streambank and floodplain geomorphic change and contribution to watershed material budgets. Environmental Research Letters 17: 064015.
- USGS data from the stations on Long Branch and upstream of Braddock Road.
- Lake Accotink Watershed Project Status provided by DPWES staff via electronic communication on October 3, 2023.⁹⁴
- DPWES Lake Accotink Dredging Project information available at <https://www.fairfaxcounty.gov/publicworks/stormwater/plans-projects/lake-accotink-dredging-ac89-0009>, updated on October 30, 2023.
- The Fairfax County Chesapeake Bay TMDL Action Plan Final Approved by Virginia Department of Environmental Quality (DEQ).⁹⁵

⁹¹ WSSI 2017.

⁹² Arcadis July 2021a.

Arcadis, U.S., Inc. July 9, 2021b. Technical Memorandum, Lake Accotink Dredging Project – Sedimentation Evaluation, Prepared by Shannon Dunn, Arcadis.

Arcadis 2023

⁹³ ICPRB 2017

⁹⁴Smith 2023.

⁹⁵ Fairfax County. August 15, 2017. Chesapeake Bay TMDL Action Plan Final Approved by Virginia DEQ

The subcommittee's findings are summarized below with respect to:

- Cost of alternatives to dredging
- Estimates of Sediment Loading and Impact on Maintenance Dredging Intervals and Cost
- Impacts to Aquatic Systems below Lake Accotink
- Regulatory Impacts

All the discussions by the task force, and this subcommittee specifically, were predicated on the Accotink dam remaining in place. Should future inspection of the dam indicate that the Lake needs to be drained to remove the dam, then the findings of the task force and this subcommittee would not be relevant. However, if the Fairfax County Park Authority determines that the dam needs to be repaired, and these repairs require the Lake to be drained, then dredging operations should be planned and implemented at the same time.

The findings presented herein only address the direct costs presented in the staff recommendation not to dredge. The subcommittee is not able to evaluate the potentially significant "Human Costs" associated with the decision not to dredge.

1.12.1. Cost of Alternatives to Dredging

DPWES staff cited the higher-than-expected cost of base dredging and maintenance dredging as a justification for its recommendation. They provided no information on the costs associated with not dredging or other alternatives. Comparing estimated project costs is impossible. Staff expressed concern about funding for the base and maintenance dredging but did not indicate a funding source for the costs of either the activities (other than stream restoration) required for the "No Action Condition" or any potential alternative.

The April 25, 2023 DPWES staff presentation to the Fairfax County Board of Supervisors Environmental Committee and information presented on the project website does not assess the aesthetic or recreational impacts that would result from the loss of some or all the open water features (DPWES 2023).⁹⁶ It assumes that these can be replaced by "restoring Accotink Creek to its pre-lake condition by removing part of the dam and converting the open water of the lake to a managed wetland environment,"⁹⁷ which would be an entirely different recreational and aesthetic experience. In actuality, the pre-lake condition would be a stream corridor comprised of woodlands and agricultural fields but without a dam. The "pre-lake condition" of 1917 or any earlier year will not re-create itself. The information provided by staff

⁹⁶ DPWES Apr 25, 2023.

⁹⁷ (<https://storymaps.arcgis.com/stories/b85512da45b8420085167291998d19af>)

and compiled as part of the Accotink Dredging Project does not provide any information to suggest that the majority of Park users would be fine with shifting the experience from open water to wetlands.

1.12.2. Estimates of Sediment Loading and Impact on Maintenance Dredging Interval and Cost

It appears that an important issue leading to the staff recommendation is the increase in the estimated cost of dredging from the original \$30 million to \$60 million and then approximately \$90 million, with additional costs for maintenance dredging every 5 years. However, knowing how much sediment is entering the Lake is critical to providing staff with the ability to make informed decisions.

As indicated in Figure 5-1 below, sediment inflows into the Lake varied significantly among the studies, including the Sustainability Report, the Arcadis Dredging Alternatives report and the Sediment TMDL. The sediment loading estimate affects the frequency and the cost associated with maintenance dredging. Furthermore, the projection of subsequent dredging events, costs, amounts to be dredged, and frequency assume that the same amount of material will continue to enter the Lake over time without considering reductions resulting from Upper Accotink Creek stream restoration/outfall improvements/bmp retrofits, or the current sediment trapping that may be occurring in the existing wetlands present at and above the head of the Lake identified in the *Field Assessment Report for the Lake Accotink Dredging Project*.⁹⁸ The resumption of the master planning process for Accotink Park should consider how the existing wetlands in the Park could be improved as a managed wetlands for a park resource and assist with sediment management for the creek potentially reducing the amount of sediment entering the Lake.

Following our request for clarification of the sediment loading rate, we understand that sediment loading estimate will be based on the extensive database that the USGS has accumulated and compiled over the past decade on the Accotink Creek mainstem and the Long Branch Tributary. The database allows us to estimate sediment loading to Lake Accotink using a sediment weight of 45 pounds per cubic foot. Based on information provided in the studies referenced above,⁹⁹ and the October 30th, 2023 electronic communication,¹⁰⁰ the subcommittee

⁹⁸ Arcadis, June 2021.

⁹⁹ Arcadis July 2021a and b
Arcadis 2023
ICPRB 2017
WSSI 2017

¹⁰⁰ Curtis, S. October 30, 2023. Electronic communication from Shannon Curtis, Chief, Watershed Assessment Branch, Fairfax County Stormwater Planning Division, Department of Public Works & Environmental Services, to R. Christian Jones, Craig Taylor, Chris Ruck, Charles Smith, Aaron Porter, Aaron George, Tim Schmitt, Lynne Mowery, Jonathan Witt, Christopher Herrington, Joni Calmbacher, Justin Pistore concerning the Accotink Creek Sediment Load Conversation Follow Up.

developed the following tables of the most current inflow information. More historical flow information can be found summarized in the Arcadis Technical Memorandum.¹⁰¹

Sediment weight per cubic foot, and sediment retention by the Lake as a percentage of the sediment inflow are the two main factors affecting the subsequent estimates of the amount that will need to be dredged for the base dredge event and the frequency of subsequent maintenance dredging. Sediment loading to the Lake is evaluated using sediment weights (pounds per cubic foot (cf)), while retention of sediment in the Lake uses sediment cubic yards to compare to the volume of the Lake. Figure 5-1 and Figure 5-2 compare the sediment inflow and retention among the most recent information to demonstrate how sensitive any analysis is to the assumptions it uses.

The subcommittee's review of the various estimates of sediment loading estimates and methodologies concluded that all future analyses of alternatives for Lake Accotink must be done with the same set of assumptions so that it is possible to evaluate alternatives.

¹⁰¹ Arcadis 2021b.

Table 5-1: Sediment Loading to and Retention in Lake Accotink Assuming Sediment Weight of 45 pounds/cubic foot⁵

Sediment Weight 45 #/cf	Inflow		Deposited ¹		Yrs to 150,000
	CY	Tons	CY	Tons	CY
USGS Average Annual,10/30/23 email, plus 13% Baseload	20,778	12,623	9766	5933	15
Arcadis Technical Memo 7/9/21 @ 47% retention	20,000	12,150	9400	5711	16
LimnoTech Recommendation in 10/30/23 Email	21,399	13,000	10058	6110	15
TMDL 8/30/2017 Table 3-18	24,454	14,856	11494	6982	13
WSSI Lake Accotink Sustainability Plan 2017	46,000	27,945	21620	13134	7
Dredge Program Cost assumption 5 yr. cycle ²	63,830	38,777	30000	18225	5
TMDL Required Reduction ³	(22064)	(13404)	(10370)	(6300)	
FFC Active & Completed Stream Projects	(7318)	(4445)	(3439)	(2089)	
FFC Active & Completed Stream Projects after 2020	(5502)	(3343)	(2586)	(1571)	
LimnoTech Rec. for 5 years then less FFC A&C ⁴			7180		18

1 Calculations assume a retention rate of 47%

2 Based on assumption by Arcadis of deposition of 150,000cy over a five-year period for an average of 30,000cy.

3 Base table provided by Staff; Fairfax County only claims 50% of what it abates. Requirement is from Table ES-8 of the TMDL.

4 Based on LimnoTech Deposition for 5 yrs, then less FFC Current & Active for the remainder.

5 Sediment weight of 45lbs/cf based on the 10/30/23 email.

Figure 5-1: Calculations of Sediment Loading to and Retention in Lake Accotink Assuming Sediment Weight of 45 pounds/cubic foot, with colums for inflow, deposited, and years to 150,000 CY

Table 5-2: Sediment Loading to and Retention in Lake Accotink Assuming Sediment Weight of 80 pounds/cubic foot⁵

Sediment Weight 80 #/cf	Inflow		Deposited ¹		Yrs to 150,000 CY
	CY	Tons	CY	Tons	
USGS Average Annual,10/30/23 email, plus 13% Baseload	11,688	12,623	5493	5933	27
Arcadis Technical Memo 7/9/21 @ 47% retention	20,000	21,600	9400	10152	16
LimnoTech Recommendation in 10/30/23 email	12,037	13,000	5657	6110	27
TMDL 8/30/2017 Table 3-18	13,756	14,856	6465	6982	23
WSSI Lake Accotink Sustainability Plan 2017	25,875	27,945	12161	13134	12
Dredge Program Cost assumption 5 yr. cycle ²	63,830	68,936	30000	32400	5
TMDL Required Reduction ³	(12411)	(13404)	(5833)	(6300)	
FFC Active & Completed Stream Projects	(4116)	(4445)	(1935)	(2089)	
FFC Active & Completed Stream Projects after 2020	(3095)	(3343)	(1455)	(1571)	
LimnoTech Rec. for 5 years, then less FFC A&C ⁴			4038		34

1 Calculations assume a retention rate of 47%

2 Based on assumption by Arcadis of deposition of 150,000cy over a five-year period for an average of 30,000cy

3 Based table provided by Staff, Fairfax County only claim 50% of what it abates. Required is from Table ES-8 of the **TMDL**.

4 Based on LimnoTech Deposition for 5 yrs. then less FFC Current & Active for the remainder

5 Sediment weight of 85lbs/cf is from tables provided by Staff.

Figure 5-2: Calculations of Sediment Loading to and Retention in Lake Accotink Assuming Sediment Weight of 80 pounds/cubic foot, with columns for inflow, deposited, and years to 150,000 CY.

Based on the information presented in Figure 5-1 and Figure 5-2, the subcommittee concluded the following:

1. Arcadis’ 2023 Dredge Program Cost assumption that 150,000 cubic yards of sediment would need to be removed from the Lake at five-year intervals was a gross over-estimate. At 45 pounds/cf it would take 15 years to deposit the same 150,000 cubic yards in the Lake. At 80 pounds/cf it would take 27 years to deposit 150,000 cubic yards. If the current Active and Completed Stream Restoration Projects are completed in five years, the duration between maintenance dredging could increase to 18 and 34 years, respectively, and greatly increase the environmental sustainability for maintaining the lake.
2. While the reduction in sediment loading resulting from stream restoration projects was not incorporated in the staff recommendation not to dredge, reduction in sediment

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loading affects the amount of sediment coming into the Lake, retained by the Lake, and the length of the intervals for maintenance dredging. Based on the County's data for active and completed Accotink Creek watershed projects,¹⁰² inflow could be reduced by 25 percent, resulting in a significant reduction in sediment entering the Lake.

3. A lower inflow estimate has a significant impact on the Dredge Program Cost estimate.
 - a. It would essentially remove the large maintenance dredging events cost of \$326 million because of longer intervals between maintenance dredging events. With a longer interval between dredging, the need for a permanent pipeline may be eliminated, resulting in additional savings in pipeline costs.
 - b. The basis for the development of the 500,000 cubic yards estimate for the initial dredge was not apparent from the information that the subcommittee reviewed, but a lesser flow rate may reduce the sediment calculation by 100,000 cubic yards. The result would be a savings of \$19 million for a total of \$76.3 million (rather than the \$95.3 million in the Arcadis estimate). There did not appear to be a sediment removal estimate associated with the 2020 bathymetry survey, which is the most current information. Re-evaluation of the dredge volume and the estimated area needed for dredge dewatering should include re-evaluation of the feasibility of alternative dredge processing sites that were previously rejected, such as the Robinson Terminal location, which would further increase the environmental sustainability of dredging.
 - c. The basis for the need for the 8-foot depth for the initial dredge was not clear from the information reviewed. Each foot of depth appears to be worth about 80,000cy and a \$15.2 million savings from the \$95.3 million. The final dredging cost analysis should indicate the reasons or guidance considered for setting the desired lake depth at 8 feet, such as supporting boating, improving the health of the aquatic community, and lengthening the time between maintenance dredging events.
4. The reduced rate of inflow makes it potentially feasible to retain the existing Lake with a small annual maintenance dredge of 10,000 cubic yards. That amount would become smaller still as the upstream stream restoration projects come online.

¹⁰² Smith 2023.

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5. The Arcadis inflow estimate of 63,830 for a 5-year cycle would also apply to the successful design or life cycle of a smaller lake or a wetland or any of the other alternatives under consideration.

The subcommittee believes it is imperative that all evaluations of alternatives use the same set of critical assumptions that will allow an apples-to-apples comparison between these alternatives and retaining Lake Accotink. Staff should re-evaluate the estimates for the frequency of maintenance dredging and associated costs and consider the decrease in sediment from stream restoration as well as the sediment loading data from the USGS.

Based on the spreadsheets of the stream restoration projects provided by staff, the cost of stream restoration projects required by the MS4 permit are considerable and will take time to implement and produce benefits for the watershed. Considering the tons or cubic yards of sediment currently removed by the Lake (47 percent of incoming sediment) and the estimated cost of dredging, the unit cost for pounds or tons of sediment removal through the dredging project is lower than the average cost from the stream restoration projects. This suggests that dredging would facilitate a reduction of sediment load while the stream restoration projects are implemented and minimize impacts to Accotink Bay, Gunston Cove, and the Potomac River, in line with the 47 percent sediment trapping rate attributed to the Lake in the Accotink Creek Sediment TMDL.

1.12.3. Impacts to Aquatic Systems Below Lake Accotink

While the TMDL, the Arcadis reports and the Lake Accotink Sustainability report acknowledge the role that Lake Accotink performs in removing sediment from the system (47 percent capture of incoming sediment) the staff's recommendations do not provide a timeline for the implementation of planned stream restoration and outfall projects in the Upper Accotink. The recommendations do not take into account the reduction of sediment loading into the Lake as a result of the planned stream restoration projects, and they do not offer a substitute to replace the Lake Accotink's sediment removal function for Lower Accotink Creek or how that would impact Lower Accotink Creek itself, Accotink Bay, Gunston Cove, and the Potomac River.

The studies, save the TMDL, were focused on Lake Accotink and did not evaluate management of the sediment flow from the watershed, through the Lake, and into the Potomac River although sediment reduction is required as part of the County's MS4 permit. While Lake Accotink has served as a sediment trap, the extent to which the lower Accotink Creek floodplain captures and retains suspended sediments is unclear and is not supported by Noe et al. Based

5. Impacts and Issues with Staff Recommendation not to Dredge

on the subcommittee's research, the USGS study provides little specific information for Accotink Creek, and it does not indicate that there is sediment capture in the downstream floodplain.

The Noe study was a modeling effort focused on trying to quantify sediment budgets over all stream reaches in the entire Chesapeake Bay watershed (roughly 74,133 stream reaches). To do this, the researchers sampled 68 stream and river sites (less than 0.1 percent of all reaches in the watershed). An important criterion in site selection was whether they had a USGS stream gauging station in the reach. Secondly, they were selected to represent all landscapes in terms of upstream geology, physiographic provinces, hydrology, land use, and drainage area. Accotink Creek above Lake Accotink was one of their 68 stream segments, and they looked at a 100-meter segment near the gauge at Braddock Road. The only information in the paper that pertains specifically to Accotink Creek is Figure 2 which shows that upper Accotink Creek streambank erosion slightly exceeds floodplain deposition. But this conclusion only applies to the 100-meter segment (not even a whole reach) that was studied. Thus, this study does not specifically evaluate the sediment balance elsewhere in the Accotink Creek watershed, nor should it be cited as an authoritative source for areas it did not evaluate.

Meeting the suspended solids TMDL limits below Lake Accotink dam will require more than just removing suspended solids from the water while resident in the Lake because sediments will continue to be suspended by turbulent flow and stream bank/instream erosion. To reduce the load of suspended solids in downstream waters, downstream stream restoration will be needed. Given the impact both above and below Lake Accotink, the needs for stream restoration should focus on where the erosion/turbulence issues are the greatest, not just where access is easiest and county-owned land are available.

1.12.4. Regulatory Impacts

The regulatory impacts with respect to the Accotink Creek Sediment TMDL, the Chesapeake Bay TMDL, and the county MS4 permit requirements should have been explained so that the impacts of the staff recommendation could be considered. The staff recommendation indicated that a minimal increase in additional assigned sediment load reduction below the Lake was expected. Staff anticipated the necessary reductions could be achieved through the existing stormwater program and funding resources. Not dredging would result in a minimal increase in regulatory requirements or associated costs.

The basis for these assumptions, the results of any preliminary coordination with DEQ to discuss the recommendation not to dredge, and the resulting TMDL and MS4 permit implications should have been provided to the Board of Supervisors Environmental Committee and on the

project web page so that the public could fully understand the ramifications of the recommendation. These include:

- The required coordination with DEQ, the timeline for this coordination, and the information to be provided.
- Whether additional projects would need to be added to the stormwater program.
- Whether certain projects would need to be accelerated and the funding implications of that.

1.13. PROCESS AND AUTHORITY

The subcommittee pursued process and authority as two lines of inquiry. In some cases, the documentation requested was not provided with adequate time for the subcommittee to fully review, discuss, and render findings.

To facilitate this, official document requests, some of which had to go through the Freedom of Information Act process, were submitted. Therefore, materials were not received in sufficient time to review, discuss, or render findings.

Additional References:

NUSAC Incorporated. November 1981. A Diagnostic Feasibility Study for the Restoration of Lake Accotink, Virginia, NUSAC Report No. 667. NUSAC Inc., 7926 Jones Branch Drive, McLean Virginia 22102

OPTIONS TO CONSIDER OTHER THAN TRADITIONAL FULL DREDGING: SUBCOMMITTEE ANALYSIS

1.14. Criteria For Analyzing Options

Paramount in our findings is that we must consider strategic interventions that will allow Fairfax County residents and leadership to plan carefully and then implement the most sustainable option for the best use of Lake Accotink in fulfilling its potential to:

- ✓ Serve as a center of robust biodiversity within its suburban enclosure.
- ✓ Be resilient to climatic change through its capacity to function as a Stormwater Management Facility.
- ✓ Improve and protect water quality in downstream habitats.
- ✓ Provide educational opportunities and serve as an example of best practices for similar projects.
- ✓ Offer visitors an aesthetic and calming resource through its substantial open water feature.
- ✓ Afford all Fairfax County residents and visitors with publicly delivered equitable and inclusive recreational opportunities in keeping with the principles of One Fairfax Policy¹⁰³.

The Subcommittee finds that the following criteria would be appropriate for analyzing options regarding the future of Lake Accotink.

Any option for the future of Lake Accotink should consider the implementation cost, including financial cost, timeline, and disruption to the community. Additionally, the following criteria were part of our analysis and consideration when determining the viability and value of each proposed solution.

A. Sustainability Criteria, both economic and ecologic:

1. Cost
 - a. Initial cost and ongoing, i.e., maintenance costs (including dam)
 - b. Dredging implications, even if reduced, including disposal
2. Ecological
 - a. Ability to withstand ecological threats and remain ecologically viable

¹⁰³ <https://www.fairfaxcounty.gov/topics/one-fairfax>.

6. Options to Consider Other than Traditional Full Dredging

B. Environmental Criteria:

1. Water quality and sediment
 - a. Sediment reduction downstream?
 - b. Nutrient (nitrogen and phosphorus) reduction downstream?

2. Implication of trapped nutrients in a wetland - Benefit? Problem?
 - a. Compare sediment trapping in the Lake now vs. anticipated sedimentation in the proposed solution (in a lake or spread out in a wetland or a combination)
 - b. Impact of the dam on sedimentation
 - c. Compare nutrient pollution entering the park vs. nutrient pollution leaving the park
 - d. Would a managed wetland improve the quality of the stormwater it receives?
 - e. TMDL impact and debris management

3. Habitat:
 - a. Wildlife
 - i. Impacts
 - ii. Biodiversity
 - iii. Availability of various species for diversity
 - iv. Fishery
 - b. Aquatic and Land Vegetation
 - i. Biodiversity
 - ii. Quality of vegetation
 - iii. Tree canopy considerations
 - iv. Availability of various species for diversity
 - c. Grants/subsidies availability for native species and grassland habitation

4. Topological changes
 - a. Dam - can the current dam be repurposed?
 - b. Impact on community infrastructure
 - c. Stream channel degradation and instability
 - d. Impact on floodplain

6. Options to Consider Other than Traditional Full Dredging

5. Climate changes

- a. Carbon sink value and sequestration
- b. Impact of more significant and more frequent storm events
 - i. Flooding potential:
 - 1. Implications of keeping or removing the dam
 - 2. Implications of wetlands vs. lake vs. combination

C. **Community and Social Criteria:**

- 1. Aesthetic value
- 3. Recreational options
 - a. Passive (enjoyment of nature)
 - b. Active (miniature golf, carousel, ball field, boating, kayak, playground, biking)
- 4. Fairfax County resident value (especially those who may not have access to natural areas and parks in their communities)
- 5. Equity analysis
- 6. Natural environment equity/justice and accessibility
- 7. Impact on all the stakeholders
- 8. Educational benefits from options implemented
- 9. Revenue stream considerations (from recreation usage, "membership," access, donation drives, and tax levies)

1.15. OPTIONS TO RETAIN A SMALLER LAKE ACCOTINK

The subcommittee finds that maintaining a smaller Lake Accotink is feasible. Our assessment included three smaller-sized lakes. Each is viable. All would require an initial dredge and then periodic maintenance dredging. County staff recommends separating a smaller lake from the mainstream channel to reduce silt buildups and thereby reduce future dredging¹⁰⁴. LimnoTech, however, stated that an "offline" lake would be susceptible to algae blooms and not necessary for viable construction, although an online lake would require maintenance dredging. The Subcommittee finds that the "offline" lake is not a viable option as it does not serve the greater purposes of the Lake.

¹⁰⁴ This statement stems from conversations between Charles Smith and John Cook and Michael DeLoose, and comments during Task Force presentations

Figure 6-1: A smaller lake solution to dredging Lake Accotink word cloud



This word cloud is a collage of words most associated with this section of the report, such as 22-acre lake, smaller Lake Accotink, 1850 railroad embankment, and Pipeline Construction. The words illustrate some of the more important concepts discussed in the text. The bigger and bolder words are of most importance.

A. Lake Structure

1. An approximately 41-acre lake would cover the area from the marina to the “big island” currently visible from the marina. It would require an approximately 9 million cubic feet initial dredge at a ballpark-estimated cost of \$34 million to reach an 8-foot depth (not including handling of dredge spoils).
2. A 22-acre lake would cut across the current round/visible lake, although it would track projected silt fill-in over the next several years in its design. This option would require a dredge of approximately 3.9 million cubic feet at a ballpark-estimated cost of \$24 million (not including the cost of handling dredge spoils). Both options would require periodic maintenance dredging.
3. A 33-acre lake is a mid-point, discussed later in the grassland section.

The appendices provide an outline of the dredging costs, statistics, and design of each option.

6. Options to Consider Other than Traditional Full Dredging

4. Per County staff, dredging would require construction activities to prepare locations for sediment stockpile and dredging operations, equipment staging, a pipeline to transport the slurry to a stockpile and drying location, and periodic maintenance dredging operations.
 - i. Staging of equipment and materials in the vicinity of the Marina can occur throughout the Park, and vehicles can enter the Park via Accotink Park Road. Some smaller loads could come from the Heming Avenue entrance, but the narrow, steep road from that area down to the Marina would likely limit the load size.
 - ii. Staging equipment and materials in the upper end of the Lake can occur via the service road that enters the Park near the intersection of Queensberry Avenue and Hatteras Lane, used during the installation of the 54-inch sanitary sewer across the lakebed in 1967. This access route may require maintenance or repair to carry loads expected during dredging operations.

B. Dredge Methods

1. Hydraulic dredging would probably be necessary, given the limitations of mechanical dredging. (Mechanical dredging requires one machine with limited reach to scoop sediment and then deposit it into a barge or land area within reach of the machine's arm. Hydraulic dredging allows the pumping of wet sediment to drying areas farther away.) Hydraulic dredging will require one or more drying areas. For comparison's sake, the original full dredge in the 2019 Plan called for up to seven acres of drying area. The 41-acre lake option would require half of that¹⁰⁵ (or less if some spoils were available for immediate use, as discussed below). A smaller lake would require a smaller drying area. Sediment processing includes stacking in a drying area with proper supports and moving sediment again once dried.
2. The subcommittee also finds that DPWES should reconsider using dry dredge methods to move silt. Dry dredge involves draining the Lake and having heavy-duty earthmoving equipment excavate the silt to accomplish the desired depth and area of the dredge. DPWES has failed to explore all options for this method by not

¹⁰⁵ Per clarification from Charles Smith, DPWES on 11/28/2023, the drying area has to do with the rate and methods used to dry the material. If completing the project quickly were desired, it could require more area. The minimum acreages estimated by Arcadis were assuming using passive dewatering methods and producing ~1,000 cubic yards per day.

6. Options to Consider Other than Traditional Full Dredging

including the use of coffer dams and other technology to protect the dredge area from washouts during storm events.¹⁰⁶

C. Handling of Dredge Spoils

1. Per County staff, the following options may be available on-site for handling dredge spoils, presenting the issues discussed:
 - a. The 1850's railroad embankment could retain the spoils. The drainage system installed as part of the 1985 dredge is failing, and there are significant concerns about a developing sinkhole in the upper basin.
 - b. Structural and geotechnical evaluations are critical to determine if the 1850s railroad embankment and the associated stacked stone drainage culvert can support the deposition of additional sediment on the upstream side.
 - c. If the embankment and culvert can support the pressures, drainage system replacement must occur prior to pumping spoils up to the basin from the Lake.
 - d. The basin is about 6 acres in size. Sediment would likely be about 40 feet deep across the entire basin, so the embankment reinforcement would need to accommodate those loads.
 - e. The basin contains wetlands that would be eliminated and require mitigation. The current federal guidance is that the County would need to buy credits in a wetland bank to compensate for the impacts. Another option may be to create additional wetlands from the reduction in the Lake size to make up for those filled by drying operations.
 - f. Pipeline construction to the basin is required. Due to the elevation changes, the most logical route would be the trail along the Lake's southern edge up to the basin. This pipeline would either be on the surface temporarily for later removal or buried for future use. There would be temporary trail impacts.
 - g. Construction access to the basin to rebuild the drainage system, reinforce the railroad embankment, manage the deposit of spoils, and other dredge activity would be along the Washington Gas driveway and public trail from Rolling Road.

¹⁰⁶ Per clarification from Charles Smith, DPWES on 11/28/2023, recent staff reviews of reports prepared for the Park Authority and DPWES in 1967, 1981, 2002 and 2021 (Arcadis) all concluded that hydraulic dredging would be the most effective and mechanical excavation would be very difficult. It is possible that if small areas were cordoned off they could be kept dry, but it is not likely feasible for any scale. However, construction and maintenance of large coffer dams may be difficult to construct and maintain especially given flashy nature of Accotink Creek. This could limit available qualified contractors, drive up cost and reduce feasibility.

6. Options to Consider Other than Traditional Full Dredging

2. For deposition of spoils on an expanded Lake Accotink Island:
 - a. There would need to be heavy construction access from Queensbury Avenue and Hatteras Lane to build necessary coffer dams and turbidity curtains to contain material while it is drying out and initial vegetation becomes established. The height of the spoils would determine the duration and extent of the construction activity.
 - b. The County would have to mitigate wetland impacts. The current federal guidance is that the County would need to buy credits in a wetland bank to compensate for the impacts.
 - c. Materials would be pumped from the barge into containment within the Lake footprint. Note that given the quantity of material, hydraulic dredging would likely be a better option than mechanical dredging. Mechanical dredging would require trucks to move material around in the fill areas to deposit it and bulldozers to shape the deposited spoils. It would be wet, and the drying process would greatly slow construction. Hydraulic dredging would rely on repeated cycles of pumping materials into containment structures/materials and then waiting for it to dry enough to set up additional infrastructure to deposit more material on top of it. A larger deposit area would likely reduce construction time and costs.

D. Assessment of Smaller Lake Options

The Subcommittee assesses the smaller lake options under its assessment criteria as follows:

1. There are significant costs to dredging even a smaller lake and providing ongoing maintenance dredging and handling dredge spoils. The costs, however, are far less than those of a full lake dredge and are in line with the 2019 estimated costs of a full lake dredge, which the BOS approved. The costs are reasonable and viable given the tremendous community and environmental benefits of preserving a lake at this location¹⁰⁷.
2. The small lake options present significant environmental benefits. A smaller lake would help capture sediment that would otherwise go downstream. It would

¹⁰⁷ Per clarification from Charles Smith, DPWES, on 11/28/2023, it is likely that even in the base dredge for a smaller lake there would be sediment processing, transport and disposal. Final quantities that could be disposed on site versus amounts hauled away and associated costs will depend on final dredge volume, amount of sediment permitted to be wasted on-site, and current market rates for handling, transportation and disposal.

6. Options to Consider Other than Traditional Full Dredging

maintain a lake habitat and increase the biodiversity of the entire park in conjunction with a managed wetland and grassland. Indeed, the smaller lake option would achieve the desired preservation of a fishery habitat and a habitat for bald eagles and other predator birds.

3. There is no doubt that preserving a smaller lake meets significant community and social goals. Even a small lake would allow the maintenance of the current marina area, a community gathering place for picnics, birthday parties, and many others who enjoy the calming effects of a lake environment. And, importantly, a small lake would still preserve the beauty that so many find in a lake for generations to come.
4. Preserving a smaller lake would contribute to the County's equity policy. Historically, land use policies did not designate public parks and recreation for people of color, other marginalized groups, those with low income, or people with disabilities or provide the opportunity to experience and engage in high-quality parks and recreation, thus magnifying the inequity. Lake Accotink provides access and accommodations to everyone regardless of income, education, race, disabilities, or ethnicity. Lake Accotink strives to continuously offer a tremendous opportunity for equity and inclusion by providing an open space and recreational area for everyone by removing barriers. Lake Accotink is proud to welcome community members throughout the county to enjoy all the amenities and recreation the Park offers.
5. Preserving the Lake will likely support more options for recreation in the Park as a whole than could a lake-less park environment, including boating options.

1.16. MANAGED WETLANDS OPTION

A managed wetland option for Lake Accotink presents several unique opportunities to preserve existing wetlands, restore and create a new wetland habitat, and add recreational amenities to Lake Accotink, all while lowering dredging costs and reducing, but not eliminating, the timeline towards permanent, on-going dredging. Analysis of the wetlands option is provided here as a companion to a smaller lake, but it could also stand on its own. A wetlands option is also compatible with a grassland option.

Figure 6-2: A wetlands solution to dredging Lake Accotink word cloud



This word cloud is a collage of words most associated with this section of the report, such as wetlands, wildflowers, elevated walkways, and ADA accessible. The words illustrate some of the more important concepts discussed in the text. The bigger and bolder words are of most importance.

A. A managed wetland can take different forms.

1. No one-size-fits-all solution to a managed wetland at Lake Accotink exists. A managed wetland could incorporate areas dominated by trees (i.e., swamp forests), areas dominated by wildflowers and grass-like plants (i.e., marshes), or established as distributed islands along the Lake's margins or some combination thereof.
2. The establishment of managed wetlands does not preclude the creation of other habitats elsewhere in the Lake, such as grassland plant communities, restoration to upstream sections of Accotink Creek, or restoration of upland plant communities in the surrounding parkland.
3. A managed wetland can function to buffer and protect a smaller lake by bringing that lake functionally "off line."¹⁰⁸ It could incorporate the entirety of the Lake. Likewise, a wetland limited to the margins of the existing lake footprint could provide a similar function. Many of those options may be similar in terms of delivering useful wetland

¹⁰⁸ Per communication with Charles Smith, DPWES September 6, 2023 & WSP-LimnoTech presentation on October 2, 2023.

6. Options to Consider Other than Traditional Full Dredging

habitat. Still, different configurations can significantly impact public use of the Lake and the Park at large.

4. This flexibility allows the integration of a managed wetland option into many visions for the future of Lake Accotink.

B. A managed wetland can provide recreational features to Lake Accotink.

1. County DPWES staff and WSP-LimnoTech contractors stated that new amenities and features, such as boardwalks created in Lake Accotink Park, can become a part of a managed wetland. Elevated walkways, designed to be ADA accessible, prioritize habitat connectivity and limit disruptions to wildlife movement.¹⁰⁹
2. A managed wetland can coexist with other recreational features envisioned during or implemented after a Master Plan process, such as water trails for kayaks and boats. Trails, walkways, viewing platforms, or other methods of passive recreation could expand recreational options for photographers and wildlife enthusiasts.

C. The creation of managed wetlands would provide a new habitat that is currently absent or of inferior quality in and around the Lake.

1. Per DPWES staff correspondence, Floating Aquatic Vegetation and Submerged Aquatic Vegetation are less abundant in Lake Accotink than expected, likely due to high turbidity levels in the Lake. A lack of aquatic vegetation means a less diverse plant community in and around the Lake but less habitat for wildlife, ranging from invertebrates to amphibians, reptiles, birds, and fish. Degraded habitats with low native biodiversity and cover are also more vulnerable to invasive species, which can further degrade habitat quality. A wetland restoration could reintroduce a natural plant community to the Lake and provide the necessary habitat for a more diverse array of wildlife in the park.
2. This condition of heavy silt deposition leading to degradation of wetland plant community and animal habitat is similar to degradation from construction silt deposition that Huntley Meadows suffered in 1987. Restoration of smaller lakes, e.g., Royal Lake, included lakeshore restoration of native emergent vegetation and functions as habitat for native birds like Blue Heron and Red-winged Blackbirds. In

¹⁰⁹ We note, however, that the volume and velocity of stormwater during major weather events, unless mitigated, could create difficulties in maintaining any manufactured infrastructure within a wetland enclave, such as boardwalks or viewing stands.

6. Options to Consider Other than Traditional Full Dredging

addition to the value to wildlife, prioritized restoration of lakeshore habitat in areas of high visibility could increase aesthetic appeal and encourage bird watching. Establishing a managed wetland “could greatly improve water quality... [and] could provide improved habitat for aquatic life and associated terrestrial life.”¹¹⁰

D. Reusing dredge spoils, a necessary component of wetland creation at Lake Accotink, will reduce the frequency of required permanent dredging and is essential to reducing costs.

1. The WSP-LimnoTech report assumes the reuse of dredge spoils for wetland creation, regardless of the form that may take. Consultants presenting to the Task Force strongly recommended against trucking in sediment from outside the Lake for wetland creation (see Oct. 2, 2023 meeting).
2. Reusing dredge spoils on site for wetland creation reduces cost and allows deeper dredging elsewhere in the Lake. Such reuse eliminates the need for a dredge-spoils pipeline to Braddock Road and a permanent dewatering facility at the entrance to Wakefield Park substantially reducing dredging costs. It also reduces the impact on carbon sequestration from clearing trees for a dewatering site and the carbon load generated by truck traffic to relocate dredge spoils.
3. While reusing dredge spoils on site does not eliminate the incoming sediment into the Lake, it provides a low-cost option for those spoils and significantly prolongs the requirement before permanent maintenance dredging must occur to maintain a smaller open lake.
4. Other lakes in our region, on private and public lands, have ongoing dredging operations. Evaluating those conditions for lessons learned may be appropriate. Likewise, the development or discovery of other solutions could alter dredging costs. Establishing wetlands by reusing dredge spoils and extending the timeline to maintenance dredging is not “kicking the can down the road.” Instead, this management strategy would allow a generation of park users to appreciate the Lake, derive recreational value from it, and create ecologically meaningful habitat along the way.

¹¹⁰ Email correspondence with Charles Smith, DPWES, Sept 14, 2023.

6. Options to Consider Other than Traditional Full Dredging

5. Moving sediment from locations outside Lake Accotink presents an increased risk of invasive species into the Lake, surrounding forests, and downstream areas – an ecological hazard that would be costly to manage. Invasive species are an ever-present risk at every park in Fairfax County, but limiting the movement of soils and sediments is an effective risk mitigation strategy. Reusing the dredge spoils on site for as long as possible reduces invasive species risk to Lake Accotink and other potential deposit sites.

E. A managed wetland could function to store atmospheric carbon – a goal for Fairfax County.

As a habitat class, wetlands are more effective than forests, grasslands, or croplands at sequestering carbon into the soil. The staff report data indicates that wetlands store 643 tons of carbon while losing only 43 tons, and a temperate grassland stores 236 tons, while losing only seven tons (per hectare at a ground depth of one meter).¹¹¹ Reusing dredge spoils on site (see above) would also save significant levels of greenhouse gas emissions into our environment, at a time when the County has pledged to reduce its carbon footprint, by diminishing the need for continuous heavy trucking of dredge spoils as envisioned in the staff recommendation.

F. A managed wetland can protect a smaller lake.

1. Wetland islands that isolate a high-velocity channel from a deeper, dredged lake could reduce sedimentation rates within the Lake footprint. Diverting sediment around and away from the remaining lake area achieves reduced maintenance costs and preservation of an open-water area for recreation. The creation of these wetland islands would likely utilize dredge spoils in the Lake (see above).
2. Wetland islands, designed to isolate a main channel, could be aesthetic elements in their own right, be interesting to boaters, provide cover and habitat for wildlife, and be unobtrusive enough to allow a sufficiently sizeable continuous body of open water for passive and active recreational needs.
3. The ability to hold the sediment in the islands largely depends on establishing proper native vegetation, likely including a mix of wetland forbs (i.e., wildflowers),

¹¹¹ IPCC and NASA data as cited in the FCPA presentation, August 7, 2023, p.4.

6. Options to Consider Other than Traditional Full Dredging

graminoids (sedges, rushes, grasses), and trees and shrubs. Engineered solutions like large stone borders (armoring), coconut coir mats, or deployment of other methods could protect islands during vegetation establishment.

G. A managed wetland does not create hazards for park users or nearby property owners; in fact, it may reduce them.

1. A managed wetland will not worsen flooding impacts in the Lake or upstream from the Lake. A managed wetland could reduce downstream flooding impacts by reducing water velocity over the dam, reducing sediment remobilization, or catching woody debris.
2. A healthy, managed wetland would not significantly impact mosquito presence in the Park. Indeed, increased habitat for other invertebrates that prey on mosquitoes, like dragonflies, would increase in a managed wetland scenario. Similarly, increasing native wetland vegetation will reduce algal blooms, which are already a problem in Lake Accotink.

H. A dam retrofit is compatible with a managed wetland and may be desirable to park users.

1. The Commonwealth of Virginia ranks the existing dam as a high priority for removal or retrofit because of fish impacts. The dam, retrofitted with fish passages, can reconnect Accotink Creek fish populations to the Lake. Improved connectivity should benefit “anadromous and catadromous fish” (e.g., Striped Bass, American Eel, or American Shad¹¹²).
2. A fish passage could be an aesthetic feature of the dam, e.g., a riffle run incorporating stone and other natural elements to create a heterogeneous water pattern that allows a great diversity of fish species and sizes to enter the Lake and upstream creek. These riffle runs could incorporate native wetland vegetation.
3. Incorporating a new aesthetic and ecological function into the dam itself, as part of a managed wetland option, also allows avenues for park users who have limited

¹¹² Per comment from Charles Smith, DPWES on 11/28/2023: Also consider American Shad as an alternative which may be more apt to migrate up Accotink Creek from Gunston Cove: <https://www.potomacriver.org/focus-areas/aquatic-life/fish/fish-in-tidal-fresh-potomac-estuary-and-anacostia/>

6. Options to Consider Other than Traditional Full Dredging

mobility – young families with strollers, users in wheelchairs or walkers, or those with mobility-limiting disabilities – to appreciate a lake-feature directly accessible from the lower parking lot without the need for a lengthy walk¹¹³.

I. A dam retrofit may also include changes to water level and depth, increasing the function and value of a managed wetland.

Per the WSP-Limnotech presentation, a modified dam could drop the Lake's level lower than it currently sits. This could result in wetland development along the shoreline (an area that otherwise does not have significant emergent wetland vegetation). This could allow a water control structure to allow water levels to fluctuate (similar to a primary aspect of the Huntley Meadows Wetlands Restoration project). According to the FCPA staff report, allowing a natural hydrological cycle to a managed wetland benefits wildlife and plant establishment – even during droughts or periods of extended high water. This could also allow the Lake to retain extra water as it fills back up to the current “full” capacity during storms. It could also enable it to interrupt the velocity of stormwater flowing over the dam into lower areas, potentially allowing the Lake to function as a stormwater management facility¹¹⁴.

J. Management of a wetland will be ongoing but is an affordable option.

Per the FCPA staff presentation, the Annual Wetland Management Plan at Huntley Meadows Park costs roughly \$50,000 annually, including staff time. Infrastructure associated with the wetland (e.g., dam retrofits, removal of woody debris, mowing/brush-hogging) would be an ongoing maintenance concern. However, it is to the County's advantage that the FCPA has deep expertise owing to their management at Huntley Meadows Park. While FCPA has experience at Huntley Meadows, the subcommittee finds that a simple duplication of that facility would be inappropriate for the environment, volume, velocity, and size of the Lake. Significant planning and engineering will be required to implement a sustainable wetland feature at Lake Accotink.

¹¹³ There are also ADA accessible spaces near the marina.

¹¹⁴ There are four documents that note Lake Accotink as an SWMF: (1) Alternatives Analysis Report, Lake Accotink Dredging Project, Arcadis Project # SD-000041-001, July 21, 2021, Appendix A, Technical Memorandum. (2) Lake Accotink Park General Management Plan, July 1992, p.1. (3) Parks and Recreation, Fairfax County Policy Plan, adopted August 6, 1990, p.1. (4) Lake Accotink Sustainability Plan, WSSI #22647.01 May 31, 2017. Charles Smith, DPWES, on 11/28/2023 noted that Analysis and modeling of flows through Lake Accotink indicate that it does not have the capacity to detain storm flows and reduce downstream velocities. As stated by LimnoTech staff, it is a run of the river dam, and flows out generally equal flows in.

6. Options to Consider Other than Traditional Full Dredging

K. Regardless of the County’s approach, we can expect ongoing requirements for managing non-native invasive species.

1. In its September 11, 2023, report, LimnoTech suggested that the County develop and execute an invasive species management plan. Invasive species threaten all County parks and degrade the ecological, functional, and aesthetic value for park users.
2. FCPA manages the Invasives Management Area (IMA) program, a volunteer-based program to target invasive plant removal in parks. In June 2023, The Fairfax County Park Foundation (FCPF) received a \$40,000 three-year grant as part of the Society for Ecological Restoration’s (SER) Standards-based Ecological Restoration in Action program to support the FCPA’s Invasive Management Area (IMA) projects at Lake Accotink Park. This work helps to protect existing plant communities in and around the Lake, and future IMA work can mitigate and manage the risk of invasive species as part of a managed wetland scenario.¹¹⁵

L. Community and Social Criteria.

A wetlands option, if implemented in conjunction with a smaller lake, would meet the equity advantages of the smaller lake option by continuing to provide a lake, and also providing a novel, nature-based recreational and educational entity within short travel distance for tens of thousands of lower-income and immigrant communities in the Springfield area, and create wonderful opportunities for people from various ethnic, educational, and economic backgrounds to gather in the same physical space, providing additional opportunities for personal growth.

1.17. GRASSLAND OPTION FOR LAKE ACCOTINK

A. Why This Option Works for Lake Accotink

Fairfax County has the unique opportunity to implement a strategic intervention that would help move the Lake toward a place that would prepare it for the long-term restoration of a fully supported and maintainable body of water. The Grassland option creates a feature built upon dredged spoils deposited within the Lake's footprint. The slightly elevated plateau would serve several purposes during the planning of the long-term restoration and execution of that plan. This intervention

¹¹⁵ <https://www.fairfaxcounty.gov/parks/park-news/2023/lake-accotink-invasive-grant>

6. Options to Consider Other than Traditional Full Dredging

ties in with a smaller lake option, which produces dredged spoils that require temporary storage. Creating a grassland provides protective cover for the spoils to prevent erosion, an area for natural on-site dewatering of dredged spoils, and reintroduces native grasses and plants to the region. As the grasses and plants on the plateau mature, they can serve as a contributing source of material for establishing other grassland acreage in the region and donate their seeds to ongoing grassland conservation projects in state, regional, and national parks, especially those in the



Figure 6-3: A grassland solution for dredging Lake Accotink word cloud as grasslands, biodiversity, educational communities, and ecological. The words illustrate some of the more important concepts discussed in the text. The bigger and bolder words are of most importance.

National Capital Region.¹¹⁶

B. Why Consider a Grassland as an Alternative or as a Complement to a Wetland?

During the past several years, scientists, environmental groups, environmental researchers, and non-profit organizations have begun to rediscover the significance of grasslands to the health of our ecosystems. The Southeastern Grasslands Institute, associated with the Austin Peay State University, has been one of the leaders in exploring what the lands of the Southeastern United States looked like before the changes brought on by European settlement within the region. In many cases, research has found that the description of a squirrel being able to travel from treetop to treetop from the Atlantic to the Mississippi was just a myth. In fact, vast sections of the Southeast were grassland. The Northern Virginia region experienced early settlement because the native grasslands were hospitable environments, often

¹¹⁶ Borowy, Dorothy, Ecologist and Integrated Pest Management (IPM) Coordinator, National Park Service, National Capital Region. *Re-Growing Southeastern Grasslands*, Published in *Natural Resource Quarterly*, Fall 2022.

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with deep, fertile soils. Of course, little evidence of those original grasslands still exists in our region. However, the establishment of the large Ravensworth Plantation demonstrates the existence of a historic grassland that disappeared as farm operations took its place. Fairfax County has current expertise in grassland management and establishment. FCPA has ongoing wet meadow management at Huntley Meadows Park, has established upland meadow grasslands (including rare-species reintroductions) through the Helping Our Lands Heal program, and has successfully restored small-scale meadows across moisture gradients at Fitzhugh Park in Annandale. The use of this natural infrastructure deserves thoughtful consideration¹¹⁷.

C. Evolution and Future of The Accotink Watershed

Like all natural features, Lake Accotink has undergone continued evolution. Human actions have significantly influenced changes to the Watershed, especially to the Lake, following the installation of the dam by the Army Corps of Engineers in 1943 to create a reservoir for Fort Belvoir. Since then, residential, commercial, and associated infrastructure development have impacted the Watershed. This infrastructure, in combination with resulting impervious surfaces and, since the early 1970s, an increasing number and severity of storm events, have contributed to more substantial volumes and velocities of stormwater runoff that ravage the stream banks of Accotink Creek, its tributaries, and other streams in the Watershed. In the intervening 80 years, more than half of the original 110-acre reservoir has silted in, thus developing wetland areas and forming a delta at the creek's entrance to Lake Accotink, which presents the current lake footprint of approximately 49 acres. Adding a grassland section would combine with the existing wetland and an open water feature of increased depth to create the most beneficial environment for a robust hybrid habit, leading to a degree of biodiversity more abundant than any of the single-purpose solutions offers. The combined characteristics of the wetland, grassland, and open water environments of this option provide the highest degree of variability that lends robustness to the Lake Accotink ecosystem and encourages plant, insect, and aquatic life, including fish, reptiles, and amphibians, nesting and migratory birds and animals. In addition, the hybrid environment satisfies a substantial number of objectives envisioned and expressed by respondents during public meetings about Lake Accotink Dredging projects from 2016-2018, the

¹¹⁷ <https://www.fairfaxcounty.gov/parks/nature/helping-our-land-heal#>

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summary of public comments on the County's Lake Accotink Dredging Alternatives Analysis compiled in November 2021,¹¹⁸ and the "Lake Accotink Dredging – Results from April 2023, Community Survey."¹¹⁹

D. The key to Lake Accotink's future health

The key to the conservation and protection of Lake Accotink is to preserve biodiversity while sustaining a healthy ecosystem. Native grasslands will fulfill these purposes based on evidence that these environments remain vitally important for their contributions to:

- 🌍 Water Quality,
- 🌍 Soil Health and Stabilization,
- 🌍 Carbon Sequestration,
- 🌍 Protection of the Park landscape and habitat in Drought, and
- 🌍 Habitats for Robust Biodiversity, which include communities of:
 - ✓ Native Plant Species
 - ✓ Pollinators
 - ✓ Beneficial Insects
 - ✓ Nesting and Migratory Birds
 - ✓ Beneficial Small Mammals
 - ✓ Native Raptors, including nesting Eagles, Hawks, and Osprey

E. Grasslands Defined

There is a multitude of defined grassland types. Three main types of grasslands deserve evaluation to achieve the best result in the Lake Accotink environment.

1. Savannas are a vital ecosystem with many ecological functions. They provide habitat for numerous species of grasses, trees, and animals, support nutrient cycling, contribute to carbon sequestration, and play a role in maintaining regional climates. Savannas are:
 - a. Historically, these large-patch or matrix communities range from one to dozens of square kilometers (with local smaller patches).

¹¹⁸ <https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/Assets/documents/projects/Lake-Accotink-Dredging-Alternatives-Analysis-Public-Comments-Summary.pdf>

¹¹⁹ https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/Assets/Documents/projects/lake-accotink-dredging_april-2023-survey-results.pdf

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- b. Dominated by two vegetation layers consisting of a sparse tree layer with 10-30% canopy coverage and a dense grass/herb layer with scattered clumps of low shrubs (0.5–3 m, 1.6-10 ft).
 - c. Deep and well-drained to hydric soils or a clay fragipan (underlayment).
 - d. Maintained historically by fire and grazing adaptation (i.e., Fire is a natural occurrence in the savanna and helps maintain balance).
 - e. Commonly associated with rolling to slightly hilly landforms of plains, plateau surfaces, broad ridges, foothills, basins, and wide valleys.
 - f. Supportive of a wide variety of plant and animal species. They can host diverse bird species and other wildlife.
 - g. Grasses are the predominant vegetation, often forming a dense and continuous cover.
2. River scours typically consist of eroded paths or channels created by the flow of water in rivers and streams. The scours form over time as the water carries sediment, eroding the underlying bedrock or sediments. Scours are also known as river channels or stream channels.

River Scours are:

- a. Linear small patch communities mostly less than 0.8 ha (2 ac).
- b. Dominated by low- to mid-statured perennial grasses and forbs, shrubs, and small saplings (0.5–3 m, 1.6-10 ft) represented by a mix of upland, wetland, and riparian species.
- c. Substrates formed of unconsolidated cobbles or boulders with sandy interstices or exposed bedrock.
- d. Soils consist primarily of sand, often limited to interstices or forming deep accumulations near the far edge of a flood zone.
- e. Hydro xeric (saturated winter to spring and after rain events, xeric summer to fall).
- f. Found on perched alluvial bars in entrenched river gorges, mostly along high-gradient streams.
- g. Providers of habitats for aquatic organisms, facilitate the movement of water and sediment, and impact the overall hydrology and geomorphology of river systems.
- h. Important to understanding water resource management, flood prevention, and enhancing ecosystem health. Their study provides insights into river dynamics, sediment transport, and overall watershed processes.

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3. Meadows are open, grassy areas characterized by a diverse collection of plants, grasses, and wildflowers. Meadows are valuable for their ecological functions as they provide habitat for diverse plants and animal species. They support pollination, help mitigate the impact of flooding and erosion, and promote nutrient cycling. Meadows are:
 - a. Small patches or linear communities. Original sizes are uncertain but likely ranged from several to dozens of hectares.
 - b. Dominated by mid- to tall-statured forbs, grasses, sedges, and shrub thickets 0.5–2 m tall (2-6.5 ft). They often form dense carpets of grass blades that range in height and texture.
 - c. Associated with floodplains of gently meandering small- to mid-sized streams of narrow valleys.
 - d. Soils that are deep and consist of gravelly or silty alluvium.
 - e. High water tables will control hydrology from associated streams, groundwater seepage, surface runoff from adjacent slope bases, and periodic short-duration floods following flash flood events.
 - f. Usually consists of rich wildflowers, forbs, and non-woody plants. These plants contribute to the biodiversity of the meadow and often provide a vibrant display of colors with their blooms, adding to their aesthetic quality.
 - g. Ecologically, meadows provide critical habitat for a variety of wildlife, including insects, birds, small mammals, and pollinators like bees and butterflies.
 - h. Prized as picturesque landscapes that offer beauty and tranquility.
 - i. Historically, they developed as part of the mosaic of beaver-created habitats that were common before French and Indian fur-trapping in the early 1700s and from Native American burning in valleys.¹²⁰

F. Determining the Optimal Grassland Composition for Lake Accotink

An estimation of the conditions that may exist when forming a plateau of dredged spoils reveals that a hybrid mix of grassland types may best assimilate to the Lake Accotink environment. The hybrid grassland can produce a more robust environment than a definition of singular focus since not all species prevalent in the above-defined grassland patches are suitable for the nutrients or water content of the resulting plateau created from the dredged material. At this point, determining the

¹²⁰ Estes, D., M. Brock, M. Homoya, and A. Dattilo. 2016. *A Guide to the Grasslands of the Mid-South*. Published by the Natural Resources Conservation Service, Tennessee Valley Authority, Austin Peay State University, and the Botanical Research Institute of Texas.

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specific native grasses, forbs, shrubs, and saplings best able to thrive in the dredged material requires further study. Among other planning considerations, recent research indicates grassland community composition (diversity and turnover) generated by site and year effects during establishment can promote beta diversity across landscapes dominated by carefully timed planting of native perennial species.¹²¹

G. Proposed Placement, Size, and Shape of the Accotink Grassland Option

The best placement of the proposed grassland option is in the northwest section of the Lake surrounding the large island formed in a previous dredging event. The Subcommittee used a 22.3-acre grassland for the purposes of calculating costs and assessing pros and cons. (There is no magic in this number; a different one could be chosen.) In this example, a plateau formed from dredged spoils from approximately 33.4 acres in the existing stream channel and the central portion of the Lake's footprint. Refer to Figure B.7, Lake Accotink Grassland Plateau & Dredge Proposed Locations map in the appendix.

H. Engineering and Construction

A notional concept for constructing the grassland plateau consists of filling the designated acreage with dredged spoils beginning at the furthest northwest point and working toward the Southeast. A steel sheet pile cofferdam, which would serve to retain the dredged spoils and hold them from flowing back into the dredged area of the Lake, would create the plateau. This plateau would, consequently, function as a natural dewatering area for the spoils placed in it. Installing properly selected plant species, possibly added by geotextile material, would also assist in dewatering the deposited spoils. A critical factor required to control the effects of continued siltation in the dredged lake is reducing the flow velocity, especially during storm events. Figure 6-6 includes the notional placement of horseshoe dams to slow and direct the flow entering the Lake from Accotink Creek.

¹²¹ Werner, Chhaya M., Truman P. Young, and Katharine L. Stuble. "Year Effects Drive Beta Diversity, but Unevenly across Plant Community Types." *Ecology*, October 25, 2023. <https://doi.org/10.1002/ecy.4188>.t Community Types." *Ecology*, October 25, 2023. <https://doi.org/10.1002/ecy.4188>.

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I. Soil Erosion and Sediment Control Parameters

All phases of the dredge and creation of the grassland plateau require proper soil erosion and sediment control parameters. Table 6:1 Soil Erosion and Sediment Control Parameters could, among other measures, include the following:

Table 6-1: Soil erosion and sediment control parameters

Soil Erosion and Sediment Control Parameters
Plan and delineate the site.
Establish protected areas and designated resources requiring protection.
Stabilize bare areas immediately with temporary vegetation where soil disturbance or excavation occurs.
Install principal basins to capture runoff from stormwater drains and steep slopes at the perimeter of the dredge site and plateau.
Install additional traps and barriers as needed during grading or excavation.
Install additional runoff control measures as required.
Stabilize the defined course of Accotink Creek as it enters the body of the lake.
Stabilize the defined perimeter of the grassland plateau.
Install selected plants and seeds to accomplish permanent stabilization immediately upon completion or significant delay in work.

This table contains information on how to plan for soil erosion and sediment control parameters. It identifies 9 parameters.

J. Analysis of Sustainability, Environmental, and Social Criteria of a Grassland Ecosystem Option for Lake Accotink

Analysis of Sustainability of a Grassland Ecosystem: The following provides general information on how the Grassland Option meets the criteria of sustainability as defined by the working group:

K. Cost Criteria

1. Detailed cost information for implementing this option is beyond the current scope of this analysis. However, as an example, the subcommittee has derived figures for dredging 33.3 acres and depositing the materials on-site at Lake Accotink from the DPWES provided estimate for the 41 and 22-acre smaller lake scenarios discussed earlier in this report. There are no dam maintenance costs

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expected or included in the Grassland Option. Table 6:2 Estimate of Dredged Volume and Cost for Grassland Option provides information on the cost estimate.

Table 6-2: Estimate of dredged volumes and cost for grassland

Estimate of Dredged Volume and Cost for Grassland Option	
Resulting Lake Area (FT ²) After Dredge	1,450,548
Resulting Lake Area (Acres) After Dredge	33.3
Average Water Depth (Based On 2021 Bathymetric Survey)	3.5
Average Excavation to Reach 8 FT Depth	4.5
Total Dredge (FT ³)	5,178,816
Total Dredge (YD ³)	295,482
Depth of Dredge Material Covering 22.2 Grassland Acres (FT)	6.75
Sediment Removal & Watering Cost (per YD ³)	\$54.00
Water Treatment & Dewatering Costs*	\$16,000,000
One-Time Cost to Dredge & Waste on Site*	\$26,357,632
NOTE:	
1. Data derived based on a model provided by FFX CO DPWES, subject to engineering review. ¹²²	
2. Estimate based on Arcadis dredge cost estimate updated January 2023.	
3. Estimate does not include the costs to clear land, conduct environmental assessments, or mitigate potential impacts.	
4. Estimate is for one dredging event and does not consider maintenance dredging frequency, quantities, necessary area to dispose of materials, or inflation.	
5. This estimate is for one dredging event and does not consider maintenance dredging frequency or quantities.	
*Note: The estimated Water Treatment & Dewatering cost is potentially less, based on the method selected for dewatering.	

This table provides estimates for dredged volumes and their associated costs. The table also lays out limitations and constraints with the estimates provided.

The estimated costs do not include:

- a. Engineering and construction of structures required for the formation of the plateau;

¹²² E-mail from the Department of Public Works and Environmental Services (Charles Smith) to Subcommittee Chair John Cook 9/1/2023.

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- b. Acquisition and installation of plant materials for establishing the grassland patch;
- c. Design, construction, or placement of horseshoe dams within the dredged stream channel.

G. Environmental Criteria

The following provides general information on assessing the ecological aspects of the Grassland Option. Several criteria and sub-criteria are critical to the environmental success of any option considered for the future of Lake Accotink. These criteria measure both the beneficial and deleterious impacts of an option.

1. Water Quality and Sediment

- b. Sediment Reduction Downstream: The Grassland Option would encompass a dredge of the incoming stream channel and approximately 33 acres of the Lake and should include methods to reduce the flow rate of the stream (such as stream horseshoe dams), especially during heavy storm events. These factors would temporarily reduce the downstream flow as the reduced speed of the silt-bearing water would allow heavier particles to drop out of suspension before continuing downstream over the dam. A conservative estimate of this benefit is at least five years and potentially longer, depending on the effectiveness of flow reduction measures.
- c. Nutrient Reduction Downstream: Nutrients are essential for plant growth, but the overabundance of nutrients in water can have many harmful health and environmental effects. An overabundance of nutrients—primarily nitrogen and phosphorus—in water starts a process called eutrophication. Algae feed on the nutrients, growing, spreading, and turning the water green. Algae blooms can smell bad, block sunlight, and even release toxins in some cases.¹²³ When the algae die, they decompose by bacteria—this process consumes the oxygen dissolved in the water, which fish and other aquatic life need to “breathe.” Without oxygen, the water can become hypoxic, with insufficient oxygen to sustain life, creating a “dead zone.” More research will have to be completed to determine whether the expected nutrient levels will increase due to the work required for the Grassland Option. This expectation

¹²³“Nutrients and Eutrophication | U.S. Geological Survey - USGS.gov”

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is based on the dredge depth not entering a zone where legacy nitrogen or phosphorus deposits under the lakebed would suffer disturbance¹²⁴. Steps to reduce these nutrients from entering the Lake should continue. Better control of sources, accomplished through programs in the communities surrounding the Lake and the entire watershed, reduces stormwater runoff that carries fertilizers, yard and pet waste, and certain soaps and detergents.

- d. Impact on Total Maximum Daily Load (TMDL): As discussed in IV.I.1.b., Sediment Reduction Downstream, the expected reduction of downstream sedimentation would likely not impact the TMDL downstream calculation.

2. Habitat

- a. Biodiversity: This criterion considers factors such as species richness, population stability, presence of keystone species, and potential threats to biodiversity. Sustainable grassland acreage historically demonstrates resilience and support of a variety of species of plants and animals.
- b. Grasslands Have a Positive Influence on Biodiversity (as do grasslands and wetlands): The combined characteristics of the wetland, grassland, and open water environments of this option provide the highest degree of variability that lends robustness to the Lake Accotink ecosystem and encourages plant, insect, and aquatic life including fish, reptiles and amphibians, nesting and migratory birds and animals.
- c. High Ecological Health Scores: Specifically, grasslands produce scores of high ecological health considering all impacting factors such as water quality, habitat diversity, and biological integrity. They help mitigate the impacts of pollution, habitat degradation, and invasive species. Grasslands significantly improve soil health, which is crucial for sustaining vegetation, growth, water filtration, and nutrient cycling within the ecosystem.
- d. Table 6:3 lists many of the Ecological Contributions Provided by the Grassland Option.

Table 6-3: Ecological contributions of grasslands¹²⁵

Ecological Contributions of Grasslands	
Disperse seeds	Mitigate drought and floods
Cycle and move nutrients	Detoxify and decompose waste
Control agricultural pests	Maintain biodiversity
Generate and preserve soils and renew their fertility	Protect watersheds and stream and river channels
Regulate disease-carrying organisms	Protect soil from erosion
Contribute to climate stability	Pollinate crops and natural vegetation
Provide aesthetic beauty	Provide wildlife habitat
Provide wetlands, play areas	Provide recreation
Provide research opportunities	

This table contains information on grassland contributions and benefits.

3. Topological Changes

- a. *Impact on the Dam:* The Grassland Option does not require alteration to the dam or its current use.
- b. *General Impact on Topology:* The Grassland Option would alter the topology of the Lake’s footprint. By necessity, the elevation of the grassland plateau would be higher in the designated perimeter than the existing lay of the land. The increase in elevation is due to the requirement to provide an offset for the dredge spoils and the need to have the grassland patch set above the

¹²⁵ <https://www.fs.usda.gov/managing-land/national-forests-grasslands/national-grasslands/ecoservices>

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surface of the final level of the Lake. Elevations within the plateau may vary to create small hills or depressions, creating a landscape of visual interest.

- c. *Other Topologic Considerations*: Slopes into the existing wetland, other low-elevation areas, and accommodation of stormwater drainage of surrounding communities are important engineering considerations that would likely alter additional topographic features.

4. Climate Changes

- a. *Carbon Sink Value and Sequestration*: According to research, grassland stores sequestered carbon reliably and safely. The substantial carbon stocks in temperate grassland ecosystems located below ground in roots and soil are 150% greater than those in temperate forests.¹²⁶ Typical grass root systems benefit from protection from fire, and there is evidence that storage capacity may increase further with global warming as temperatures rise. Ongoing global emissions augment the concentration of CO₂ in the atmosphere. Apart from wetlands and boreal forest ecosystems, temperate grasslands are notable as the largest store of soil carbon, and 97% of those stores are in the soil.¹²⁷
- b. *Impact of Larger and More Frequent Storm Events*: We estimate that the Grassland Option would not alter the overall ability of the Lake to maintain its present continuous flow from Accotink Creek. The downstream impacts of significant storm events would not change.
- c. *Flooding Potential*: There is no expectation in the change of likelihood for the potential for flooding in the Watershed due to the implementation of the Grassland Option.
- d. *Implications of Grassland with Wetland vs. Lake vs. Hybrid Combination*: As discussed earlier in this document, the combined characteristics of the wetland, grassland, and open water environments of this option provide the highest degree of variability that lends robustness to the Lake Accotink ecosystem and encourages plant, insect, and aquatic life including fish, reptiles and amphibians, and nesting and migratory birds and animals.

¹²⁶ From the report *Land Use, Land-Use Change, and Forestry*, The Intergovernmental Panel on Climate Change (IPCC), 2000 – Robert T. Watson, Ian R. Noble, Bert Bolin, N. H. Ravindranath, David J. Verardo, and David J. Dokken (Eds.) Cambridge University Press, UK. pp 375, cited at <https://blog.cabi.org/2020/06/25/the-climate-battleground-grassland-or-forest/>

¹²⁷ Ibid.

H. Analysis of Social interaction of a Grassland ecosystem

The following provides general information on assessing the social aspects of the grassland option and how well it meets the social criteria as defined by the workgroup:

2. Aesthetic Value

- a. The plethora of stunning photographs contributed to online Facebook and other internet sites speaks volumes for the beauty and wonders of nature found in Lake Accotink Park. The FCPA webpage about the Lake sums it up:

“It’s hard to believe that the beltway is less than a mile away when you’re standing on the tranquil and quiet shores of Lake Accotink Park. This 476-acre park provides excellent opportunities to relax, learn, and enjoy the natural resources of both Lake Accotink and Accotink Creek. In addition to trail systems and waterfront activities, Lake Accotink Park offers many family-friendly activities, including picnic areas, classes, camps, and special events.”¹²⁸

- b. Another online County resource begins with the description: “Lake Accotink Park is one of Fairfax County’s most beloved resources.”¹²⁹ The evidence clearly shows that Lake Accotink is a place where people enjoy the beauty of nature so close to their communities.

3. Recreational Options

Lake Accotink Park Recreational Offerings: The FCPA lists active and passive activities for all ages, as shown in Table 6:4, Lake Accotink Activities and Amenities.

¹²⁸ *Lake Accotink Park | Park Authority - Fairfax County*, <https://www.fairfaxcounty.gov/parks/lake-accotink>.

¹²⁹ *The Future of Lake Accotink Park*, <https://storymaps.arcgis.com/stories/b85512da45b8420085167291998d19af>

Antique Carousel	Dog Walking	Open Play & Athletics
Birdwatching	Dog Waste Bag Stations	Picnic Areas
Boating	Fishing	Playgrounds
Biking	Hiking	Pollinator Garden
Community Celebrations	History Tours and Talks	Solitude and Relaxation
Classes and Camps	Information Kiosks	Volunteering
Disabled Parking at Marina	Jogging	Wildlife Observation
	Miniature Golf	

This table contains a Fairfax County Park Authority list of both active and passive activities for all ages.

4. Other Social Criteria

Detailed Study of Social Criteria of the Future of Lake Accotink: Another subcommittee, “Value of Lake Accotink to Lake Accotink Park and to the County,” is conducting an in-depth study of the value of the Lake to Lake Accotink Park and Fairfax County. We defer to that group’s expertise and diligence to elaborate on these items.

- a. Fairfax County resident value (especially those who may not have access to natural areas and parks in their communities)
- b. Natural environment equity/justice and accessibility
- c. Impact on all the stakeholders
- d. Educational benefits from options implemented
- e. Revenue stream considerations (from recreation usage, “membership,” access, donation drives, tax levies)

I. Areas of Further Analysis for Full Implementation of the Grassland Option¹³⁰

The following provides general subcommittee findings on areas outside the scope and available time to the workgroup requiring further assessment.

2. Sustainability & Environmental Considerations

- a. Consider the water flow patterns and allocations to enhance storage capacity and retention of silt to prevent downstream damage.
- b. Evaluate the need to implement soil erosion control measures to prevent excessive sedimentation.
- c. Evaluate the impact of potential habitat loss and fragmentation on the biodiversity within a grassland ecosystem.
- d. Analyze the potential threats to habitat quality, including pollution, land use changes, and encroachment.
- e. Consider the health and fertility of the soil, including organic matter content, nutrient levels, and soil structure. Analyze management practices that may impact soil health, such as excessive fertilization or erosion.
- f. Consider the capacity of the grassland to retain and filter water while minimizing runoff and erosion. Evaluate the impact of changes in hydrology, such as altered precipitation patterns or drainage modifications.
- g. Examine the structure and composition of the grassland vegetation. Consider how soil properties influence the growth and resilience of the vegetation, nutrient cycling, and water retention within the grassland.
- h. Consider the presence of herbivores, carnivores, and avian species. One must evaluate the ecological interactions between the distinct species and their role in shaping the grassland ecosystem.
- i. Fire dynamics play an essential role in maintaining a native grassland. It is crucial to analyze the frequency, intensity, and seasonality of fires and their impact on the plant community, nutrient cycling, and habitat availability for wildlife.
- j. Establish defined, measurable, and realistic metrics for the success of conservation and management practices and discover sustainable

¹³⁰ Per clarification from Charles Smith, DPWES, on 11/28/2023: Note that as indicated by staff from LimnoTech, any filling of the lakebed that may result in conversion of wetlands to uplands may be very difficult to permit and require wetland mitigation elsewhere.

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development strategies. Human activity impacts can provide insight into their unique ecosystems' dynamics and potential threats.

- k. Consider analyzing issues such as water scarcity, altered watershed hydrology, reduced stream flow, and changes in seasonal water availability. Evaluate the implications for the overall health and functions of the Accotink Creek Watershed ecosystem.
- l. Ensure that water quality measures will account for pollution, nutrient runoff, and harmful chemicals or contaminants throughout the watershed.
- m. Establish and continually evaluate adaptation and mitigation measures to address climate-related challenges. Climate change can determine the vulnerability of native grasslands. As temperatures increase, altered precipitation patterns and extreme weather events may result.
- n. Consider how climate conditions influence vegetation growth, water availability, and overall ecosystem dynamics within the grassland acreage. Factors such as temperature ranges, precipitation patterns, and distinct seasons are critical to its ecology.
- o. Assess the acreage's hydrology to determine the water availability and flow within the grassland patch.
- p. Consider the abundance of insects, birds, mammals, and other organisms that depend on the ecosystem. Analyze how the vegetation composition, availability of food sources, and habitat characteristics support wildlife populations within the grassland.
- q. Establish an invasive species management program.

3. Social, Equity, Inclusion, and Justice Considerations

- a. Consider the interactions between the local communities and the grassland. Determine the positive and negative impacts on livelihoods, such as education, recreation, and tourism.
- b. Evaluate the extent to which different social groups can access and benefit from grassland acreage. Consider the equity for marginalized communities and inclusivity for patrons with developmental or physical challenges. Consider methods of promoting equitable and inclusive access to all who might have access to the grassland environment.
- c. In considering cultural considerations, analyze the social and cultural identity tied to native grassland. Assess the potential impacts of changes to the

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watershed and lake landscape and ecosystem dynamics on local communities' social fabric and identity.

- d. Consider the impact educational programs, community engagement, or nature interpretation initiatives will have in fostering public appreciation, awareness, stewardship, involvement in, and support for native grassland conservation.
- e. Consider whether local communities have a voice in shaping management practices, policies, or participation in conservation efforts. Analyze the effectiveness of community-based initiatives, partnerships, or co-management approaches for grassland ecosystems.
- f. Assess the distribution of benefits and burdens associated with grasslands when considering social equity and justice concerns, such as gender equality, access to resources, or marginalized communities.

1.18. HANDLING OF DREDGE MATERIALS ONSITE WITH A SMALLER LAKE

One of the most difficult aspects of maintaining the Lake is disposing of large quantities of dredge materials. Dredge material transportation and disposal are the largest cost at 36%¹³¹ of a full-dredge of Lake Accotink. Additionally, community members objected to the number of trucks that would travel through neighborhoods, parks, or already-congested roads, and the amount of forested land that would be cleared in Wakefield Park to support large dewatering operations, as well as impacts to the Cross-County Trail from a pipeline constructed between Lake Accotink and Wakefield Park. The carbon footprint that would be created by a full dredge and off-site sediment removal also caused community concern. A lake dredging project's variable and fixed costs are both directly tied to the amount of sediment that must leave the Park and be transported elsewhere. Sites to dewater and process the spoils within the study area were also evaluated for space requirements based on the volume of sediment and the daily throughput on a two-year work schedule¹³².

To reduce the total volume of material that must be dredged, processed, and transported offsite, the subcommittee considered the following options:

- A Smaller lake;
- Islands, wetlands, and grasslands within the Lake footprint;

¹³¹ Arcadis, "Dredge Program Cost," February 3, 2023, p.1.

https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/projects/2023-02_dredgeprogramcostsummary.pdf

¹³² Arcadis, Dewatering Method Area Calculations, page 6, within "Alternatives Analysis Report" Appendix B, page 146.

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- Other onsite beneficial uses or storage of dredge material; and
- Offsite processing and disposal for remainder of dredge material.

Figure 6-4: An islands solution to dredging Lake Accotink word cloud



This word cloud is a collage of words most associated with this section of the report, such as Lake Accotink alternatives, islands within the Lake, dewatering pads, water trails, and cofferdams. The words illustrate some of the more important concepts discussed in the text. The bigger and bolder words are of most importance.

A Smaller Lake

For the purposes of estimating sediment volume and removal options, the Subcommittee analyzed the projected impact of dredging the largest and smallest of the three proposed smaller open water lake sizes:¹³³

- 1) 41-acre lake (closest in size to Lake Mercer and Lake Royal),
- 2) 33-acre lake (5 acres smaller than Lake Royal), and
- 3) 22-acre lake (6 acres smaller than Lake Fairfax).

A full dredge of Lake Accotink is estimated to require removing 500,000 cubic yards of sediment. For a 41-acre lake, the estimated amount of sediment that would need to be removed is 331,031 cubic yards, 295,482 cubic yards for a 33-acre lake, and 144,104 cubic yards for a 22-

¹³³ A 33-acre lake was studied for analysis of the grassland option.

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acre lake¹³⁴. This assumes the same depth of 8 feet as proposed for a full-dredge to maintain the recreational uses of the Lake for a longer length of time between dredging.

These volumes represent an initial dredge only, not amounts that will continue accumulating. An analysis by WSSI showed that an average of 46,000 cubic yards of sediment flowed into the Lake from Accotink Creek each year from 2011 to 2015, with approximately 21,000 cubic yards retained per year, consistent with modeling reported by engineering firm HDR in 2002.¹³⁵ Projections show the rate of accumulation slows as the Lake approaches sediment capacity, with fine solids remaining suspended in the water and sent over the dam rather than settling to the bottom and scouring from the faster-flowing creek carrying sand, gravel, and rocks downstream to deposit in the Lake, forming a delta¹³⁶. It is estimated that only 9,400 cubic yards of sediment per year was captured between 2015 and 2020 and that “the lake is nearly filled with sediment.”¹³⁷ After a dredge, sediment will accumulate at higher rates once again. This cycle is expected in any scenario that features an open water area. A commitment to regular maintenance dredging should be considered in scenarios featuring a lake.

C. Islands within the Lake

Islands and wetlands provide views and glimpses of water into the distance, making the Lake appear more expansive than if it is encircled by land. Positioning the islands in a way that would support a “Water Trail” recreational experience could also provide additional recreational opportunities.

This alternative beneficially uses sediment dredged from open water areas to create vegetated islands within the Lake. This option is intended to keep the sediment in the system to the extent possible, while maintaining a lake that provides recreational and quality of life benefits to the community.

DPWES estimated that 10 acres of land would be required to store the dredge from a 41-acre lake and 4 acres for a 22-acre lake.¹³⁸ This assumes an 8ft lake depth, consistent with the full-dredge scenario, and a dredged material height of 20 feet. The actual land area required and

¹³⁴ E-mail from Department of Public Works and Environmental Services to Subcommittee Chair John Cook 9/1/2023.

¹³⁵ Wetlands Studies and Solutions, Inc. (WSSI), Lake Accotink Sustainability Plan, May 31, 2017, p. 2 (47% sediment trapping efficiency on average annually from 2011-2015).

<https://www.fairfaxcounty.gov/parks/sites/parks/files/assets/documents/plandev/lake-accotink/lap-sustainability-study.pdf>

¹³⁶ LimnoTech Consulting, Presentation to the Lake Accotink Task Force, September 11, 2023.

¹³⁷ Arcadis Technical Memorandum, July 9, 2021, page 1. “Alternatives Analysis Report,” Appendix A: Sedimentation Analysis, page 128. https://www.fairfaxcounty.gov/publicworks/sites/publicworks/files/assets/documents/projects/2021-07-29_alternative%20evaluation.pdf

¹³⁸ DPWES E-mail to subcommittee chair John Cook, 9/1/2023

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the volume of sediment would depend on a feasibility study and “mass/balance” calculations, according to LimnoTech.

In the October 2, 2023 presentation to the Lake Accotink Task Force, LimnoTech provided several “island infill” concepts based on a 2020 bathymetry study¹³⁹. Figure 6-5 shows vegetated islands in the upper areas of the Lake, where there is an existing island and heavier sediment deposits. In contrast, open water areas are closer to the marina and dam, where there are deeper pools. Islands are created from material dredged out of the open water area, shown in hatch marks.

Figure 6-5: Infill islands from the LimnoTech Presentation 10/2/2023



This is a conceptual drawing over a satellite image of Lake Accotink titled “Dredge & Build Islands.” It depicts Accotink Creek entering the Lake from the northwest, with two existing wetlands above the creek identified with diagonal lines and labeled as “Backwater Region.” A group of seven islands of various sizes are shown in the upper portion of the Lake and is labeled “Built Islands.” To the south, dash marks cover slightly less than half the Lake indicating the “Dredging Zone.”

LimnoTech stated that some islands could be created with an initial dredge and more added over time with successive maintenance dredges¹⁴⁰. The areas around the islands would not be dredged and would continue to become shallower. This presents more challenges for row boats

¹³⁹ Arcadis Alternatives Analysis Report, Figure 1.2, based on Bathymetry conducted by Waterways Surveys & Engineering, LTD on December 09, 2020.

¹⁴⁰ Per clarification from Charles Smith, DPWES on 11/28/2023: Note that as indicated by staff from LimnoTech, any filling of the lake bed that may result in conversion of wetlands to uplands may be very difficult to permit and require wetland mitigation elsewhere.

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and paddle boats that may attempt to navigate through the islands. Kayaking through the island area or designating a “water trail” feature could be viable for some time; however, it would eventually fill in without maintenance dredging, except for the natural channel(s) formed by Accotink Creek. If there are design considerations that could take advantage of natural processes to maintain kayaking pathways, that would be a more sustainable option. Jane’s Island, a State Park in Crisfield, Maryland in the Chesapeake Bay, has 50 miles of trails through naturally-occurring waterways in a tidal wetland. The Park maintains a canal and boat launch, and no dredging has occurred since 1962, with natural flows maintaining the water channels.

Figure 6-6: Infill Islands with "Horsehoes" from the LimnoTech Presentation 10/2/2023



This is a conceptual drawing layered over a satellite image of Lake Accotink titled “Dredge & Horseshoe Dams.” It depicts four constructed islands in the area where Accotink Creek enters the Lake labeled “Delta Region” and four structures in the central area of the Lake labeled “Horseshoe Dams.” The existing wetlands to the north of the creek are labeled as “Backwater Region” and the lower portion of the Lake to the south marked with dashes, is labeled “Dredging Zone.”

As shown in Figure 6-6, LimnoTech depicts four constructed islands. A LimnoTech proposed scenario would build a few islands with the initial dredging of the open water areas, along with “horseshoe” structures that slow down the water and provide places for incoming sediment and other materials to deposit. This eventually creates new islands naturally over time.

In addition to the concepts presented by LimnoTech, the subcommittee is interested in whether more sediment could be stored at higher elevations and vegetated with grasslands and native plant species, in combination with lower-height islands designed for periodic flooding, i.e., “high

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wetlands.” Wetlands are biodiversity “hot spots” and would greatly increase the ecological value of the Lake. However, at only 2-3 feet in elevation, the LimnoTech suggested grassland would not capture all the dredge materials, even from a smaller lake. A combination of island elevations and wetlands would allow for more dredged open water areas, for example, with deeper waters along the northeastern shoreline for fishing and boating while also providing habitat benefits in the low-lying areas.

D. Options from Previous Lake Accotink Studies Rejected by the Subcommittee

A previous WSSI study, “Option F – Single Thread Channel with Smaller Lake,”¹⁴¹ involved removing a portion of the dam to create a single-channel stream and constructing an embankment with imported fill-dirt to separate it from the flow of Accotink Creek. This was not recommended by LimnoTech when questioned during the October 2, 2023, presentation to the Task Force. Craig Taylor responded that a separate lake would be a “large stagnant body of water without circulation,” resulting in algae blooms, and be very expensive to manage, as it would be groundwater-fed. LimnoTech also stated that “...under no circumstances should fill-dirt be brought in” to Lake Accotink. The subcommittee concurs that this alternative should not be considered further.

Two options for processing or reusing the sediment in the Lake footprint are labeled as “Existing Island” and “Expanded Island” in the Arcadis Report. The Subcommittee does not recommend continued consideration of these proposals. The first option (“Existing Island”) would construct a permanent dewatering pad on the existing island. Equipment would be brought to the main island site on barges from the Marina after pre-dredging a pathway due to the amount of sediment in the Lake. Mechanical dredging and gravity dewatering would be used, with drying agents to speed up the drying process. Once dry, the material would be moved by barge and trucked elsewhere. After dredging, the containment pad and equipment would be removed, and the site would be left as a cleared gravel area for future dredging operations. Permanently clearing the island without revegetating it is aesthetically undesirable and does not support habitat. Islands that are planted/restored with grasslands or vegetated wetlands are a preferable outcome, with another dewatering location used for maintenance dredging.

The second option (“Expanded Island”) proposed constructing a 10-acre land bridge extending north of the existing island to the shoreline. Any dewatering operation could be used with this option. However, figure 6-8 of the Arcadis Report shows three dewatering sites and an access road in what is now open water, wetlands, and forested shoreline. Arcadis proposed reopening

¹⁴¹ Wetlands Studies and Solutions, Inc. (WSSI), Lake Accotink Sustainability Plan, May 31, 2017, page 13.

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a previously built service road from the corner of Hatteras Lane and Queensbury Avenue to access the site. In the Task Force meeting on October 2, 2023, Craig Taylor of LimnoTech said it is possible but inadvisable to place dredged material in this area. Noting that, since this plan would permanently fill in wetlands, it would likely require special permitting and some replacement of the filled-in wetland.

Constructing Islands

Cofferdams, turbidity curtains, perimeter stone dikes or rip-rap, geotextiles, vegetation, and erosion mats are some materials used to create islands. Managing water flow, containing sediment, and preventing erosion are primary considerations in the design and construction of islands.

Cofferdams are temporary enclosures built within a body of water to allow the construction to take place in a dry work environment. The Arcadis report stated that “Dredging in the dry was deemed infeasible.” However, this was with the assumption of a full dredge rather than island creation. While this may be possible with smaller projects, further clarification from DPWES confirms that dry dredging has consistently not been recommended over hydraulic dredging given the flashy nature of Accotink Creek. Turbidity curtains or silt barriers are placed in the water to control the dispersion of sediments. They are made of impermeable fabric and are designed to contain suspended particles, preventing them from spreading into the surrounding water.

Stone dikes or Rip-Rap may be used to create an initial containment system around the island's perimeter as a structural element to protect the slope of the island from erosion and undercutting. Stone can be barged to the site and placed by backhoe or crane.

Geotextiles can be used for shoreline protection and erosion control. They are permeable fabrics that allow water to pass through and can be placed over dredged materials to prevent erosion. Geotextile Tubes, in which dredge materials are pumped into large bags, can be “filled in-place and the sediment left in the geotextile tubes for bank stabilization and other land creation...”¹⁴² GeoTubes can be placed on stream banks or islands, covered with topsoil, and planted with vegetation, creating natural barriers that enhance the ecological value of the constructed island. These are sometimes used on island perimeters but are less structurally resilient. The Arcadis report states that: “Geotextile tubes assume use of hydraulic dredging and slurry transport to the dewatering area.”¹⁴³ In a full dredge scenario, 5 acres of cleared and flat-

¹⁴² Arcadis, p. 10

¹⁴³ Arcadis, Appendix B, p. 142

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graded land are required to process 950 cubic yards of sediment / day into GeoTubes. While Arcadis indicates that GeoTubes could be processed in place, this requires too much space within the Lake area.

Geogrids are another material used to build up land. These are used to maximize the amount of dredge material that can be heaped and shaped into the desired island form. Grid-like materials are placed within the dredged material to reinforce it, providing structural stability, and preventing erosion. Geogrids are used to create elevation variances to support different plant species and to allow for natural water flow and drainage.

E. Regulatory Considerations

All State waters that are not groundwater, including wetlands, rivers/streams, and lakes/ponds, are regulated by the Virginia Water Protection (VWP) permit program in the Virginia Department of Environmental Quality (DEQ). Their goals are: No net loss of wetland acreage, no net loss of surface water functions, protect in-stream flows, and protect beneficial uses of state water.

Understanding the regulatory boundaries is a key consideration in the design of any islands within Lake Accotink. Any new landforms created will need to avoid impacts to existing wetlands near the Lake's upper reaches. LimnoTech stated that the wetland-equivalent of a grassland concept at 2-3 feet high would be much easier to approve than creating dry islands, which remove wetlands from the floodplain. A higher hill or plateau area would maximize the amount of dredged material that could be stored within the Lake, so perhaps a combination of creating "net new" wetlands, along with elevated islands, could be considered by regulators.

The Army Corps of Engineers has been using a similar strategy in the Chesapeake Bay since the state of Maryland prohibited dumping dredge material in open water in 1998. To maintain a deep channel for navigation, 42 million cubic yards of dredged material were constructed into wetlands and dry areas to maximize dredge capacity and biodiversity¹⁴⁴. The once-abandoned Poplar Island is now a bird nesting habitat with guided education and visitor programs.

LimnoTech suggests the FCPA restart the Master Plan process with the community to explore the desired activities, experiences, and outcomes at Lake Accotink Park as a first step for the County to take at this time. Design and engineering for the location, size, and shape of landforms, including islands, wetlands, grasslands, and open water areas, would follow. Updating or replacing the existing Marina to include nature education space, in addition to

¹⁴⁴ Poplarislandrestoration.com; usace.army.mil "Poplar Island Recommended Plan" Chapter 6

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retaining existing amenities and food sales (hot dogs, ice cream, snacks, and drinks) along with a plan for park staffing and volunteer organization support, would greatly increase the overall value of the Park for the County.

A concern from the community is that further delays in continuing the Park's Master Plan process will narrow the options for Lake Accotink Park. Although sediment accumulation has slowed, it is essential to know how much time remains before options such as islands and open water areas are no longer feasible from a cost or construction perspective. The Master Plan process was halted years ago (in 2018) to await decisions related to dredging the Lake. FCPA should restart the Master Plan process, concentrating, for now, on the numerous activities and amenities outside the Park's waterfront features. No matter the final determination of dredging, no dredging, or a hybrid, the land-based aspects of the Park will still exist and must receive planning and maintenance considerations now. It is also imperative that the County make decisions about the future of the Lake soon, as advancing time will eliminate options beneficial to the community.

F. Onsite Dredge Material Processing/Storage Locations

With a smaller lake and the reuse of dredged materials within the Lake footprint, dewatering sites should be re-evaluated based on the reduced volume.

Mechanical Dredging and an Onsite "Drying Pit":

While mechanical dredging can be used in the initial creation of wetlands or islands, there are no obvious locations for onsite "drying pits" without impacting existing park amenities. Mechanical dredging uses excavation equipment mounted on a barge, with the removed sediment placed on another barge and moved to a contained area within the Lake for dewatering. For long-term maintenance dredging, mechanical dredging would deposit material into trucks and remove it to another location for decanting. Lake Barcroft uses this method and it requires direct access to the shoreline and a road.

Three access roads have direct access to the shoreline: Accotink Park Road and Heming Avenue, both of which access the shoreline at the Marina, and the purpose-built service road with its entrance on Hatteras Lane, which provides access to the upper end of the Lake for staging equipment and materials. Decanting the spoils in the vicinity of Heming Avenue would impact the upper parking lot, the picnic facility, or the open play area, and trucks would be routed through a narrow road in a neighborhood.

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From Lake Accotink Park Road, the locations nearby that could be used to decant the material on site would be the Marina area or the lower parking lot. The industrial park nearby could also be an option (see below for offsite locations). As with Heming Avenue, the trucks would be routed through a neighborhood when the material is eventually disposed of.

Per County staff, dredging would require construction activities to prepare locations for sediment stockpile and dredging operations, equipment staging, a pipeline to transport the slurry to a stockpile and drying location, and periodic maintenance dredging operations. Staging of equipment and materials in the vicinity of the Marina can occur through the Park and enter the Park via Accotink Park Road. Some smaller loads could come from the Heming Avenue entrance, but the narrow, steep road from that area down to the Marina would likely limit the load size. Staging equipment and materials in the upper end of the Lake can occur via the service road that enters the Park near the intersection of Queensberry Avenue and Hatteras Lane, used during the installation of the 54-inch sanitary sewer across the lakebed in 1967. This access route may require maintenance or repair to carry loads expected during dredging operations.

Upper Settling Basin:

The upper settling basin was used in 1985 to permanently store dredged materials from the Lake. One remaining “cell” of the original three is open closest to the Danbury Forest townhouses. This site is within the Park boundaries and directly adjacent to the Lake but at a significantly higher elevation, without direct access to the shoreline. Dredge material mechanically dredged would need to exit the Park from the Marina area and be trucked to the other side of the Lake via Rolling Road. Hydraulic dredging is more feasible for this location and would involve a relatively short pipeline to pump the slurry to the site for dewatering.

However, there are several drawbacks to this site, besides the roadway adequacy. A sinkhole is developing on the site from failing drainage. The Arcadis report states that the FCPA must repair this drainage issue, and using the basin presents an opportunity to do so. There are additional concerns that the berm may not support the weight of additional dredged materials, so this would require evaluation. There are known cultural resources in this area, as there are at the Wakefield Park locations. This site would not be desirable as a long-term dewatering and storage site, so the cost/expense for “one-and-done” dredge storage may be too high, especially as the forest has revegetated over the past decades, providing quality wildlife habitat that would again need to be reforested. The FCPA does not support the use of this site.

G. Offsite Dredge Material Processing/Storage Locations

Once a mass/balance analysis is performed to estimate sediment volumes of the various alternatives for the Lake, and depending on the alternative selected, there may be a need for an offsite location to process excess sediment or for maintenance dredging. Sites outside Lake Accotink Park and pipeline routes were analyzed in the Arcadis Report in section 7.2, “Combined Dewatering Sites and Pipeline Locations,” on pages 39-48.

While the subcommittee did not analyze the sites in detail, it did have these comments for consideration:

Wakefield Park Maintenance Facility:

The subcommittee is concerned that using the Wakefield Park maintenance facility for dredge processing would have significant negative impacts on parkland. Only one acre of the site is currently developed for the maintenance facility, while seven additional acres of healthy, mature forested parkland would be permanently cleared and graded to support dewatering operations, water treatment facilities, and truck circulation in a full-dredge scenario. An 8” pipeline would be buried a long distance, over 12,000 linear feet, along the Gerry Connolly Cross-County Trail (CCT). This section of the CCT was asphalted in recent years with Park bond funding, so construction/reconstruction of the trail would not benefit this asset, and trees along the entire route may need to be removed to accommodate construction equipment.

Industrial Sites:

The subcommittee recommends further considerations of a site identified after the publication of the 2021 Arcadis report.¹⁴⁵ It is located in the neighboring industrial park on Southern Drive, a thousand feet from the Lake Accotink Marina. This site is the closest location to the Lake, has a fully functional road, and is zoned I-5, heavy industrial. The Arcadis report indicates a “no” decision point when land the County does not own requires significant clearing. There is no distinction between land that is forested parkland and land that could be cleared by-right for uses permitted in the Zoning Ordinance. Clearing industrial land should not be a criterion for elimination from consideration. Under a full-dredge scenario, the number of trucks traveling through the Crestwood neighborhood has an excessive impact, but this should be further evaluated in a reduced-dredge scenario.

¹⁴⁵ Per clarification from Charles Smith, DPWES: Note that the Southern Drive site was deemed by Arcadis and County staff as being viable and was recommended for continued consideration along with the Wakefield Park Maintenance Area site.

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Finally, County leadership should approach Vulcan Industries to seek their reconsideration of hosting the processing operation at their site, with reduced space requirements.

H. Water Trails

“Water Trails” have been established throughout the United States to engage the public in education, conservation, and recreation on waterways. Most are on longer stretches of water, like the Potomac River. However, smaller examples in a lake setting have been voluntarily registered with the National Park Service, which tracks these for public benefit.¹⁴⁶ Establishing a water trail at Lake Accotink would require designing and constructing the islands, wetlands, or a combination, to allow for kayak passage and accounting for possible channel migration or siltation changes over time. Incorporating sustainability into the design is key to avoiding the need for maintenance dredging. Best practices for water trails include providing routine and long-term maintenance, signs or maps, education, and partnership agreements to ensure long-term commitment from the community.

1.19. EVALUATION OF CRITERIA FOR MIXED OPTIONS

This evaluation considers the range of options presented in this report, focusing on a smaller lake, and retaining sediment within the Park to the extent possible, with islands, wetlands, grasslands, or a combination of these options.

Sustainability: Retaining dredge materials within the Lake system is “high” for sustainability because it reuses the material onsite.

Cost: The cost of island construction requires more information for a fair comparison, but it is likely to be a high cost and would rank “medium” or “low.” In terms of miles traveled, this has the least mileage due to the volume of material used onsite and the least amount of transportation/trucking. Initial and subsequent dredging would be a lower variable cost for processing and disposal, which makes up over 1/3 of the costs of a full dredge. This alternative would be ranked “high” (less cost) for transportation costs.

Ecological: From an ecological standpoint, adding wetlands to Lake Accotink’s open water area would be rated as “high” as water quality would be improved, particularly as wetlands are “hot spots” for biodiversity, with 40% of all species living or breeding in wetlands. Island expansion rates lower in ecological value than wetlands in terms of environmental impact since they essentially “fill in the floodplain,” which could also be more difficult from a regulatory

¹⁴⁶ www.nps.gov/subjects/nationaltrailssystem/national-water-trails-system.htm.

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standpoint. The sediment in the Lake is not “new fill” added to the floodplain so that regulators might view it less negatively. In previous options presented by Arcadis, this option ranked “low” for the “restoration” subcategory because a permanent, cleared dewatering pad remained on the island.¹⁴⁷ The subcommittee envisioned restoration of in-lake islands, creating new wetlands or dry grasslands, and not permanently locating dredging operations within the Lake so that vegetated islands would rank “medium.” Placement of sediment in GeoTubes could be employed to restore stream banks and provide additional plantings on shorelines. This protects stream banks from wave action and bank scouring, and rates “high.”

Arcadis ranked expanding islands or shorelines also as “high” for sustainability and cost (meaning it would be less cost) and “low” for park management and community categories, stating: “The island expansion would result in limiting access to the area of expansion during dredge material placement and dewatering. The island expansion would convert a portion of the Lake to land, eliminating the possibility of aquatic recreation in this area.”¹⁴⁸ Arcadis also ranked bank stabilization as “medium” for the community category because it “limits park use of the bank restoration area during restoration.” As with stream restorations, there is very little expectation of access to the area during construction activities, so this rating may not be relevant to the long-term condition of the Lake. Keep in mind that the restrictions to access in construction areas are temporary and should be discounted from a long-term loss of recreation opportunities. A “low” ranking for aquatic recreation with a smaller lake is valid but has the potential to be “medium” if it is designed for water trails for kayaking, for example. These areas would likely require maintenance dredging over time, along with the deeper pools.

Other environmental criteria for retaining the sediment within the Lake system as islands, wetlands, grasslands, or a combination of these options are:

Water Quality - highest with wetlands, high for grasslands, and medium for islands.

Habitat – high for all scenarios designed to restore habitat to the Lake.

Biodiversity - highest with wetlands, high for grasslands, and medium for islands.

Fisheries - highest for providing deeper pools through dredging part of the Lake, benefiting fish who need a variety of water depths, especially deeper water in colder months. Also ranking high is any option allowing fish movement from below the dam, including dam

¹⁴⁷ Arcadis, Exhibits, Exhibit 3, Disposal Method Evaluation, page 1.

¹⁴⁸ Alternatives Analysis Report, Lake Accotink Dredging Project, Arcadis, Project # SD-000041-001, July 12, 2021, p. 14

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removal or fish ladders. Wetlands also support fisheries by providing places for hatching, food, and protection.

Aquatic vegetation - highest with wetlands.

Dam – Low. In any scenario where more sediment is stored within the Lake and an open area dredged, the Lake’s life is extended, according to LimnoTech, however, the infill becomes more challenging in the future. The surface area for islands runs out and annual maintenance dredging may be necessary, which could be expensive. In addition, at some point in the future, the dam will reach the end of its service life and it will be more challenging to remove a large amount of sediment from the Lake. This subcommittee’s report does not explore a more detailed review of dam removal.

Flooding potential – Medium. Landforms within Lake Accotink must demonstrate to regulators that they will not impact flooding, which may determine the size or extent of the islands.

Aesthetic value – Mixed. Maintaining Lake Accotink as a lake, even a smaller one, provides water views that are pleasing to people, so providing areas of open water is desirable. Using the surface area for additional islands could enhance the view if planted with a variety of pollinator species that bloom throughout the growing season. These areas will attract insects and birds and provide nesting areas for birds, providing additional aesthetic value to people. The aesthetic value of the existing lake or a smaller one with islands is very subjective. When the island from a previous dredge filled in with vegetation, the community responded with mixed opinions of whether it visually enhanced the Lake.

Recreation – Mixed. Maintaining Lake Accotink as a lake provides opportunities for boating, fishing, bird-watching, and photography, and provides a focal point that draws people in to walk, run, bicycle, picnic, and play games such as mini-golf and ride the carousel. A smaller open water area may reduce aquatic recreation; for example, there may not be enough room for paddleboats, but it could provide additional opportunities for kayaking.

Equity – High. Keeping as much sediment as possible within the Lake footprint without compromising the value of the Lake, reduces truckloads of sediment through communities. The Lake is an attraction to many nearby communities with higher poverty levels in the County. Continuing to involve these areas to learn their perspectives on alternatives is essential.

Educational Benefit - Reaching out to the elementary school community to provide opportunities for engagement, education, and fun should be a high priority for the FCPA and FCPS with expanded school-day programs and weekend family programs at Lake Accotink Park,

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especially to the nearby Crestwood, Lynbrook, North Springfield, Ravensworth, Kings Park, and King's Glenn Elementary Schools.

7. CONCLUSION

The Task Force was asked not to make recommendations, but to make findings for the Board of Supervisors, to inform the Board's decision regarding the future of Lake Accotink. The Task Force did not "vote" on whether we wanted the "full dredge" from 2019 or the "no dredge" recommendation from DPWES in 2023. Our report is an analysis of the value of the Lake to the community, the recommendation from staff to not proceed with the full dredge of the lake, and the options other than traditional dredging for the future of Lake Accotink.

The Task Force finds that Lake Accotink is an important community asset for all ages, abilities, and backgrounds, and provides health, well-being, and quality of life benefits to the broad community. Lake Accotink Park is at the center of a long green corridor connecting the county's habitat, stretching uninterrupted from the headwaters of Accotink Creek in Fairfax City to Pohick Bay and the Potomac River. Amenities and activities at Lake Accotink are not readily available at other parks nearby, which is especially important as it is surrounded by and serves communities with a high degree of cultural diversity experiencing economic disadvantages, unlike any other of the County's lakefront parks. The Task Force finds the community values this park's focus on nature and can build upon this with stewardship and nature education for children in the area, especially from nearby Title I schools.

Another key finding is that the quantity of sediment is the overarching factor driving the costs and impacts of dredging. Varying estimates of sedimentation rates in the upper watershed drive up/down the volume and frequency of dredging, and thus costs, considerably. A reduced volume of dredged material also affects the choice of suitable locations and number of acres needed for a dewatering site, as well as the trucking impacts on the community.

The Task Force finds that a binary choice, to have a full dredge of the lake or face its disappearance, is too limiting. When considering sustainable alternatives, a smaller lake is feasible as part of a stream/lake complex. Onsite reuse of dredged spoils to restore or create new habitat, such as wetlands/grasslands, is a viable option. However, a plan that includes maintenance dredging criteria with any lake option, and an invasive species management plan in all options, will be essential. The Lake Accotink dam is 80 years old and any solutions to the lake must take into account preserving future generations' options to replace or remove the dam. At the November 27, 2023 Task Force meeting, FCPA stated they are working with the State to conduct a study through the end of 2024 to determine whether the dam's classification as a high-hazard dam can be changed.

7. The Future of Lake Accotink

Lake Accotink Park's future is about People and Nature. The park is an inspiration to people and a respite from increasing urbanization. In short, the community loves this lake. However, the park's facilities are in need of attention and the larger issue of dredging stalled the Master Plan process. Identifying the experiences, amenities, and activities at Lake Accotink Park will inform the alternatives.

The Task Force wants the County to move forward quickly, as conditions on the ground continue to change and the Lake continues to fill in. The BOS needs to make a decision now about its general approach. This will allow the Master Planning process to move forward, with continued technical study of alternatives running in tandem. Finally, it is the finding of the Task force that the community be at the table during such discussions.

8. ADDENDUM

Findings for Dredging and Sustainable Management of Lake Accotink: Dewatering and Transportation Hub Opportunities at Robinson Terminal

By: Martin Shepherd

TASK FORCE ON THE FUTURE OF LAKE ACCOTINK

Findings for Dredging and Sustainable Management of Lake Accotink: Dewatering and Transportation Hub Opportunities at Robinson Terminal

December 5, 2023

Abstract: This paper provides findings that strongly support the potential of Robinson Terminal in Springfield, VA, as a strategic dewatering site and transportation hub for dredged material from Lake Accotink and the region. The study examines the significant mitigation of human and environmental community concerns achieved in developing Robinson Terminal for county use. The findings examine these impacts in addition to the technical and economic aspects of this proposed utilization, considering its potential benefits and challenges. The paper investigates the feasibility of dewatering and utilizing the collocated existing rail siding at Robinson Terminal to transport the dried dredge material to coal-producing regions of Virginia and adjoining states for the Abandoned Mine Land Reclamation Program. The paper provides the significance of reduced carbon footprint and transportation cost savings by employing rail capabilities at the site. The holistic framework integrates economic, environmental, and logistical considerations, positioning Robinson Terminal as a sustainable solution for preserving Lake Accotink's ecological health.

The development of these findings occurred outside of the three Task Force sub-committees and is an Addendum to the Report of Findings from the Task Force on the Future of Lake Accotink.

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Executive Summary: This comprehensive findings report addresses the immediate concerns of Lake Accotink's siltation issues and envisions a sustainable, cost-effective solution. The report emphasizes the benefits of Robinson Terminal's utilization for dredging operations and transportation of dried dredge material, presenting a strategic plan for consideration by the Fairfax County Board of Supervisors to ensure the future of Lake Accotink (the Lake). The research conducted for this finding revealed an absence of analysis by the County or its contractor. Despite this lack of due diligence, the County rejected Robinson Terminal and the use of rail resources as a dewatering and transportation option. County staff spoke to management at Robinson Terminal in the fall of 2021 and again in August 2023. However, the County pursued no formal correspondence with the property owner to provide specific terms or establish a negotiable posture for using the property. This opportunity demands further directed study. This finding highlights these benefits over other alternatives:

- ✓ Eliminates destruction of mature tree canopy along Accotink Creek and within Wakefield Park.
- ✓ Eliminates daily heavy truck traffic in residential neighborhoods.
- ✓ Reduces the carbon footprint of transporting dried dredge materials by 87.05%.
- ✓ Significant transportation cost reductions from optimized per-ton-per-mile savings.

1. Introduction: Lake Accotink, located in Springfield, VA, requires periodic dredging to maintain water quality and ecological balance. The Lake faces persistent siltation issues that demand an overarching tactical dredging strategy. This report aims to present a strategic plan that tackles the current issue and ensures the long-term health of the Lake ecosystem. If the County carefully coordinates processing and disposal management, the dredged material can be repurposed for environmental reclamation projects. This paper explores the feasibility of using Robinson Terminal as a dewatering site and transportation hub for dredged material. Lake Accotink's significance goes beyond its scenic beauty. The Lake provides water quality benefits of particular importance as potential credit toward meeting the County's regulatory requirements that may help offset implementation costs. Further, as a link in the environmental corridor between Little River Turnpike and Fort Belvoir, Lake Accotink is essential to meeting the objectives of the County's Comprehensive Policy Plan to use the park system in conjunction with the Environmental Quality Corridor system. This establishes an integrated network of greenways linking major resource areas and providing migration routes essential to biological diversity. DPWES now maintains that Lake Accotink is not a Stormwater Management Facility. However, according to four County documents, it serves as such for the Accotink Creek Watershed^{1,2,3,4}. There are opinions subject to debate on the sediment capture capabilities of the Lake and the point of siltation downstream of the Lake. Nonetheless, the escalating issue of sedimentation, as discussed in findings from the Subcommittee on Impacts and Issues with Staff

¹ [Alternatives Analysis Report, Lake Accotink Dredging Project, Arcadis Project # SD-000041-001, July 21, 2021, Appendix A, Technical Memorandum.](#)

² [Lake Accotink Park General Management Plan, July 1992, p.1.](#)

³ [Parks and Recreation, Fairfax County Policy Plan, adopted August 6, 1990, p.1.](#)

⁴ [Lake Accotink Sustainability Plan, WSSI #22647.01 May 31, 2017](#)

Recommendation not to Dredge, demands a holistic strategy that goes beyond mere dredging operations to ensure the Lake's enduring health and vitality.

The ecological advantages of choosing Robinson Terminal as a dewatering site are profound. Reduced loss of tree canopy, minimized truck traffic, and positive impact on the surrounding ecosystem underscore the environmental gains of this finding. Preserving Lake Accotink, the integrity of Wakefield Park and Accotink Creek aligns with the County's commitment to environmental conservation. Presented in the following sections are the details of this finding.

2. Robinson Terminal Opportunity: Robinson Terminal Warehouse, LLC is a warehouse and trucking depot 1.74 miles from the Lake Accotink Dam. It is a wholly-owned subsidiary and a neighbor of the Washington Post. They are the only tenants on Wimsatt Road, and both use this access with its dedicated traffic light on Backlick Road for their operations. More critically, for the Accotink sediment issue, the Terminal is located alongside Norfolk Southern tracks and has a dedicated siding and three spurs on the property available for rail shipment. The complexities involved in using Robinson Terminal for dewatering and sediment transport pale by comparison to the tortured plans offered in the Arcadis models. Using the property provides ecological benefits while avoiding Lake Accotink's devaluation of the no-dredge conclusion and recommendation proposed by County staff.

2.1. Investigating Robinson Terminal: Our journey into sustainable management of Lake Accotink dredging began with a field trip to Robinson Terminal in Springfield, VA, to explore potential dewatering sites. In mid-June, preceding the Task Force's initiation, we discovered that Robinson Terminal management planned a change to operations. This excursion led to conversations with key stakeholders, notably the site manager, the facility's General Manager, Mr. Robert Clutter, and subsequent discussions with Mr. Charles Smith, Project Coordinator, Watershed Projects, Implementation Branch – Central Stormwater Planning Division, Fairfax County Department of Public Works and Environmental Services (DPWES).

2.1.1. A serendipitous alignment occurred when we found that Robinson Terminal had suspended its warehouse operations, and Mr. Clutter confirmed they planned to lease the site. However, challenges emerged during an early August meeting when the County indicated that using the facility would necessitate demolishing existing structures and reconfiguring rail and truck access. Robinson Terminal management suggested that this use would be incompatible with their business model, which requires the continuous use of warehouse space and transportation infrastructure. County staff did not pursue further investigation of the site's use.

2.1.2. The strategic approach to overcoming these challenges will involve meticulous planning and collaboration. However, it is the key to successfully resolving a multitude of challenges facing Lake Accotink and its downstream environment. Engaging in discussions with Robinson Terminal's management and Washington Post Ownership, presenting a comprehensive plan that outlines the overwhelming benefits, and working in tandem to address operational concerns are the most critical elements of this finding. Indeed, in the end, if this opportunity is not exercised, there is little likelihood of a full

dredge, which was the primary objective envisioned and expressed by respondents during public meetings about Lake Accotink Dredging projects from 2016-2018, the summary of public comments on the County's Lake Accotink Dredging Alternatives Analysis compiled in November 2021, and the "Lake Accotink Dredging – Results from April 2023, Community Survey where 65% of respondents favored ." ^{5,6} The Lake's future ends in compromised, undesirable conditions or, worse, a no-dredge decision.

2.2. Previous Evaluations: Based on an extensive review of publicly available documents and those obtained via a Virginia Freedom of Information Act (VFOIA) request, the exploration of sediment transport by rail for Lake Accotink reveals a profound oversight in previous studies. This failure demonstrates critical inadequacies and questionable reliance on second-hand information. Despite the investigation conducted in 2018, the County has not engaged directly with Norfolk Southern or any rail company regarding the transportation of Lake Accotink sediment. Instead, the reports base their analysis on discussions with a former Wetland Studies and Solutions, Inc. (WSSI) client, identified as a business owner with rail transport experience. This indirect approach introduces uncertainties, and the correspondence essentially reiterates concerns about rail viability without directly assessing Robinson Terminal's rail capabilities. The WSSI analysis overlooks at least five Norfolk Southern rail sidings in the Springfield area for potential dewatering, and neither report mentions Robinson Terminal for this purpose. ^{7,8} Furthermore, subsequent correspondence reiterates the rejection of rail as a viable option, emphasizing challenges without delving into the specific rail capabilities of Robinson Terminal. This substantial omission continues in the Arcadis Alternatives Analysis Report, ignoring Robinson Terminal as a potential dewatering site and its rail capabilities in Exhibit 4, Dewatering Location Evaluation. ⁹ We find that the recurring lack of direct involvement and the omission of Robinson Terminal in multiple reports highlight the deficient analysis that continues to impede a thorough examination of viable transportation options, prompting serious concerns about the accuracy and completeness of previous assessments. Perhaps the key failure in the most recent analysis, other than allowing previous recommendations to stand without argument, is Arcadis's perpetuation in the decision tree developed to guide their dewatering location selection process, as shown in Figure-1. Arcadis Chart 6-1 – Dewatering Location Identification Flow Chart, which served to arbitrarily limit the selection of property that the County did not own.

⁵ [Lake Accotink Dredging Alternatives Analysis Public Comments Summary, compiled November 8, 2021](#)

⁶ [Lake Accotink Dredging, Results from Community Survey, Fairfax County DPWES, PowerPoint Presentation April 14, 2023](#)

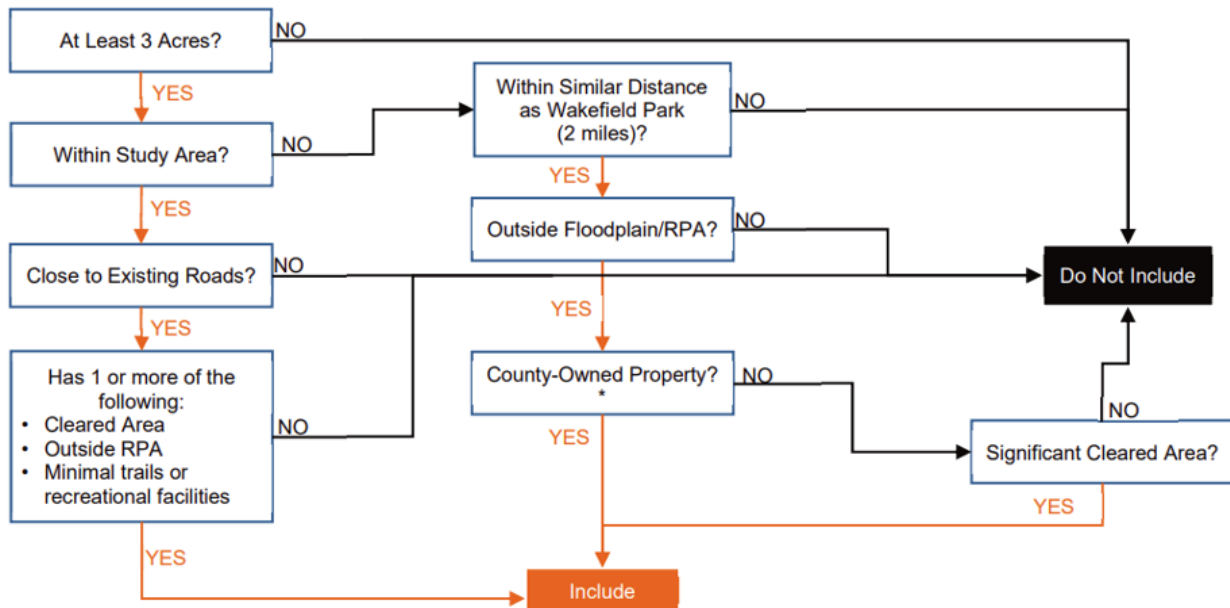
⁷ WSSI Lake Accotink Management Plan Summary and Recommendations, December 21, 2018, p.3.

⁸ WSSI Lake Accotink Management Plan Additional Study, December 21, 2018, pp.7-8.

⁹ [Alternatives Analysis Report, Lake Accotink Dredging Project Arcadis Project # SD-000041-0001 July 21, 2021, p.33.](#)

Figure-1. Arcadis Chart 6-1 – Dewatering Location Identification Flow Chart

Chart 6-1 – Dewatering Location Identification Flow Chart



This image displays the decision tree the County's contractor, Arcadis, used to determine the selection criteria for Lake Accotink dredging dewatering sites. Specific to this example, it demonstrates that one of the criteria for selection was the question "County-Owned Property?" and how if that answer was "NO" and further if there was not a "Significantly Cleared Area," then the site failed to meet criteria and did not receive further evaluation. This selection criteria removed Robinson terminal from further consideration as a dewatering site for Lake Accotink dredging operations.

2.3. Robinson Terminal – Strategic Capabilities: Robinson Terminal is strategically located with access to non-residential roadways and rail transportation, making it a potentially ideal location for dewatering operations. The site's proximity to Lake Accotink reduces transportation and environmental impacts and costs. Depending on the size and number of geotextile tubes or other methods deployed, the 11-acre parcel easily accommodates space requirements for dewatering operations ranging from 1.7 to 7.4 acres.¹⁰ The site's location provides an opportunity to transport the dried dredge material to coal-producing regions efficiently for use in abandoned mine reclamation projects. Rail capabilities include a sufficient length of siding for storing rail cars and three spurs on the property for loading. The average length of an open-top hopper (OTH) used in stone service is ~45 feet, while a coal car can be ~54 feet long. Robinson Terminal could theoretically store nine OTH cars or seven coal cars on the unloading track spur and more on the siding. Norfolk Southern is strategically located to partner with East Coast producers, receivers, agents, and brokers for shipments from and to coal-producing regions.

3. Movement of Dredged Spoils to Robinson Terminal Dewatering Site and Transportation Hub:

A pipeline along the same Norfolk Southern railroad right of way used during the 2005-2008 dredge would carry slurry from the dredging activity at the Lake to the Robinson Terminal

¹⁰ [Alternatives Analysis Report, Lake Accotink Dredging Project Arcadis Project # SD-000041-0001 July 21, 2021, pp.9-12, Exhibit 4 & Appendix B – Dewatering Area Sizing.](#)

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for dewatering and transportation. The new pipeline would be approximately 3,066 yards (1.74 miles) from Accotink Dam, 37.5% shorter than the 4,900-yard route previously followed to the Virginia Concrete plant (now Vulcan Materials) disposal site (see Figure-2.). Using the right of way provides the ecological benefit of eliminating the loss of mature tree canopy required by the proposed Wakefield Park dewatering location. Since Arcadis rejected the use of Robinson Terminal, they likewise omitted this option in Exhibit 5, Sediment Transport Pipeline Alignments Evaluation, in the same study.¹¹

Figure-2. Pipeline Route Accotink Dam to Robinson Terminal (1.74 Miles)



This image displays a map of the area encompassing the Lake Accotink Dam to the southwest and Robinson Terminal Warehouse, LLC to the northeast. It shows a notional pipeline route drawn along the Norfolk Southern railroad right of way for transporting dredged slurry from Lake Accotink to Robinson Terminal.

4. Dewatering Process: This section considers technologies, equipment, materials handling, and transportation concerning the dewatering process.

4.1. Technologies and Equipment: Evaluate the most suitable dewatering technologies and equipment for the Robinson Terminal site, including passive dewatering via geotextile tubes, passive dewatering via geotextile tubes with desanding, mechanical dewatering via filter presses, and gravity dewatering with the addition of a drying agent. Geotextile tubes provide a versatile and environmentally friendly solution for dewatering, allowing for effective sediment containment while facilitating water drainage. Gravity-based methods provide dewatering with simplicity and efficiency, relying on natural forces to separate water from the dredged material. Additionally, consider the use of chemicals as a potential enhancement to the dewatering process, ensuring a thorough examination of their environmental impact, efficiency, ability to produce the quantity of dried dredge according to production and shipping schedule, and cost-effectiveness.

4.2. Material Handling and Transportation: Develop a comprehensive plan for the handling and transporting of the dried dredge material within the collocated dewatering site and rail siding. Given the proximity of the dewatering pad to the rail hopper cars, utilize front-end

¹¹ [Alternatives Analysis Report, Lake Accotink Dredging Project Arcadis Project # SD-000041-0001 July 21, 2021, Exhibit 5.](#)

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loaders or other suitable equipment to efficiently move the dried dredge material from the dewatering pad directly to the rail hopper cars, ensuring a streamlined process that minimizes environmental impact and maximizes cost efficiency. Depending on loader size, the site may require the construction of loading ramps.

5. Economic Viability: Conducting a comprehensive economic viability assessment requires a thorough examination of financial considerations, encompassing initial setup costs, operational expenses, potential revenue from the sale of dried dredge material, and the potential requirement to purchase the Robinson Terminal property. Beyond expenses, the County should adopt a long-term view that the Dewatering and Transportation Hub can potentially generate revenue or at least cover operating expenses through the sale of dried dredged materials. Fairfax County has the opportunity to establish a facility that can serve the region.

5.1. Initial Setup Costs: Identify and quantify expenses related to establishing the dewatering facility at Robinson Terminal, factoring in potential costs related to property acquisition, potential costs associated with site preparation, demolition, infrastructure installation, and regulatory compliance. Ensure the creation of a detailed budget that encompasses all aspects of the setup phase. The County should prioritize allocating funds toward developing a state-of-the-art dewatering pad, installing geotextile bag systems, and acquiring and installing necessary machinery and equipment. This includes front-end loaders equipped with a road-rail adaptor or railcar mover to manage railcars on the siding.

5.2. Operational Expenses: Analyze ongoing operational costs associated with the day-to-day functioning of the dewatering facility, including staffing, equipment maintenance, utilities, and environmental monitoring. Ensure that operational expenses align with the long-term financial sustainability of the project, especially since it is likely that Lake Accotink will require some degree of maintenance dredging. Consider contracted services or sufficient budget for skilled personnel to operate and maintain dewatering equipment, conduct regular environmental monitoring, and manage transportation logistics efficiently while considering potential variations in operational costs based on property ownership. As defined by established tariffs, the County must consider the cost of rail transportation in implementing the plan. Considering the potential revenue when weighing the cost is crucial since achieving a proper balance between the two is a fiscal requirement.

5.3. Rail Transportation Cost Savings – Cost-effective Rail Transportation: Conversations with the Norfolk Southern Railroad Group Manager for Aggregates, under their Construction Industry Group produced a rough order of magnitude cost estimates for rail shipping based on known and notional parameters. Appendix A provides the email conversation. Table-1. lists the parameters used:

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Table-1. Parameters for Rail Shipping Cost Estimate.

Parameter Item	Value	Notes
Materials to be shipped	Sand & Clay (Dewatered Sediment)	STCC: 1441191 (SAND W CL WO GP)
Expected Daily Shipment	1,235 yds ³ @ 1080 lbs/yd ³ 666.9 tons daily	40 lbs/ft ³ was used for weight calculations.
Expected Grand Total Shipped	270,000 tons	Based on 500,000 yds ³ dredge
Origin	Robinson Terminal Spur, Springfield, VA	
Destination*	Big Stone Gap, VA	*Notional destination used due to its central location for coal mine reclamation activities in Virginia.
Estimated Rail Miles	425.2	This is a refined mileage from that provided in the Norfolk Southern Carbon Calculator, referenced in 6.2. below.
Railcar Provider	Norfolk Southern hoppers	Leased cars

This table lists the parameters used to develop the rail shipping estimate. It lists the following: 1. Materials to be shipped as Sand and Clay (Dewatered Sediment), STCC 1441191 (SAND W CL WO GP). 2. Expected Daily Shipment: 1,235 yds³ @ 1080 lbs/yd³ 666.9 tons daily (Assumed 40 lbs/ft³ was used for weight calculations. 3. Expected Grand Total Shipped: 270,000 tons, based on a 500,000 yds³ dredge. 4. Origin of rail shipment: Robinson Terminal Spur, Springfield, VA. 5. Destination: Big Stone Gap, VA, a notional destination used due to its central location for coal mine reclamation activities in Virginia. 6. Estimated Rail Miles: 425.2 (This is a refined mileage from that provided in the Norfolk Southern Carbon Calculator, referenced in 6.2. below. 6. Railcar Provider Norfolk Southern hoppers or eased railcars.

5.3.1 Resulting Rough Order of Magnitude Rail Cost Estimates: Norfolk Southern Railway provided estimated per railcar shipping costs of \$3,513.00 for the use of Norfolk Southern-owned rail cars and \$3,024.00 for the use of rail cars owned or leased by Fairfax County. Table-2. provides details of the estimate.

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Table-2. Rough Order of Magnitude Rail Cost Estimates

	Lane 1	Lane 2
Offered Rate:	\$3,513.00	\$3,024.00
STCC:	1441191 (SAND W CL WO GP)	1441191 (SAND W CL WO GP)
Origin:	NS SPRINGFIELD VA	NS SPRINGFIELD VA
Destination:	NS BIG STONE GAP VA	NS BIG STONE GAP VA
Route:	NS DIRECT	NS DIRECT
Car Type:	OPEN TOP HOPPER - COKE	OPEN TOP HOPPER - COKE
Car Owner:	Railroad Owned	Private
Est. Volume:		
Target Rate:		
Rate Basis:	Per Car	Per Car
Shipper:	ROBINSON TERMINALS	ROBINSON TERMINALS
Shipper Address:	7201 WIMSATT RD	7201 WIMSATT RD
Receiver:		
Receiver Address:		
ALK Fuel Miles:	425.2	425.2
Comments:	<u>Rates are subject to the following:</u> - NPO approval required prior to rate publication and shipping. - Rate includes NS factor only. - Rates are valid for 30 days. - NS mileage-based fuel surcharge.	

This Table provides details of the Norfolk Southern per carload rail shipping cost estimate. The per railcar shipping cost for using Norfolk Southern-owned rail cars is \$3,513.00 and is \$3,024.00 for using rail cars owned or leased by Fairfax County.

5.3.2. Please note: the following analysis uses the same formula (detailed in para. 5.3.3) to calculate the cost per-ton-per-mile to obtain a common denominator for comparison of transportation costs. The options analyzed differed in their definition of weight per cubic yard (yd³). Therefore, each option lists the truckload volume assumed and the associated weight. In summary, costs by method are:

Table-3. Summary of Transportation Cost Per-Ton-Per-Mile by Method and Source

Method	Cost Per-Ton-Per-Mile	Source/Notes
Rail	\$0.08	Norfolk Southern
Truck	\$0.07*	Arcadis *a low outlier for truck transportation
Truck	\$0.79	LATF Market survey 11/23 for this study
Truck	\$0.48	Lake Barcroft 2023 costs

This table summarizes the transportation cost per-ton-per-mile by method and source, described in the following paragraphs.

5.3.3. This estimate provides a rail shipment ton-per-mile rate of 0.08 according to the following calculation:

Cost per railcar (or truck) (at 100 tons per car) = \$3,513.00

Cost per ton (\$3,513.00 / 100) = \$35.13

Miles traveled = 425.2

Cost per-ton-per-mile (\$35.13 / 425.2 miles) = \$0.0826

5.3.4. For comparison, the estimate for transfer by truck from the considered Wakefield Park dewatering site to the Luck Ecosystems facility in Chantilly, VA, is an 18-mile trip. The opinion of probable construction cost provided by Arcadis uses an underloaded truck to carry 9 yds³ (13.5 tons, assuming 1.5 tons per yd³) for a cost of \$18.00, or \$0.07 per-ton-per-mile.¹² However, market research done for this analysis indicates that current local mileage rates range between \$6.32 to \$4.79, which, for a 7-ton (13 yds³, assuming 0.54 tons per yd³) load, would cost \$0.79 per-ton-per-mile, significantly higher than the January 31, 2023 Base Dredge Construction Costs estimate states.

5.3.5. Finally, real-world experience gained from Lake Barcroft estimates that their cost per 10 yds³ (12.5 tons) truckload to travel 50 miles is \$300.00, costing \$0.48 per-ton-per-mile.¹³

5.3.6. The cost of transportation is in constant flux and demands careful monitoring to ensure the best timing and pricing for the most cost-efficient movement of dried dredge material. Of the valid estimates examined, railway movement provides the best cost advantage. With its added value of carbon cost reduction, failure to consider the extensive use of rail is a failure of the County to fulfill its fiduciary responsibility to its residents.

5.4. Revenue from Dried Dredge Material: Thoroughly assess the potential revenue derived from the sale of dried dredge material for mine reclamation, taking a strategic approach to maximize returns. Explore market demand, delve into pricing structures, and establish robust partnerships with key stakeholders, including federal and state agencies and their contractors. This collaborative effort aims to secure consistent and diversified revenue streams. This multifaceted approach seeks to optimize revenue from the sale of dredge

¹² Memorandum: Subject Lake Accotink Dredging Project, Base Dredge Construction Costs. From: Michael Wooden, Arcadis; To: Charles Smith, Fairfax County DPWED, January 31, 2023

¹³ Phone conversation: Martin Shepherd and Davis Grant, General Manager, Lake Barcroft Watershed Improvement District, November 30, 2023, 10:06-10:38 AM

material and diversify income streams through fee-based services, ensuring the sustained economic viability of the Robinson Terminal utilization for dredging operations.

5.4.1. Determine the market value of dried dredge material through meticulous market research and analysis. Engage in negotiations with companies engaged in reclamation operations, ensuring the establishment of mutually beneficial agreements. Develop pricing structures that not only maximize revenue but also maintain competitiveness within the market.

5.4.2. Beyond revenue generated from direct sales from the Lake Accotink dredge, the County should consider implementing a fee-based utilization model for the facility as a transportation hub. This involves collecting and transporting dredged material from other Fairfax County lakes, extending this service to private lakes, exemplified by Lake Barcroft, and collaborating with entities across the Washington Metropolitan area engaged in activities that yield similar spoils.

5.5. Property Acquisition Considerations: Evaluate the financial implications of the probable requirement toward purchasing the Robinson Terminal property. Consider the current valuation of \$23 million and assess the willingness of key stakeholders, such as Chairman McKay, to support this significant initial investment for the long-term ecological health of Lake Accotink.¹⁴ Engage a professional commercial realtor for a comprehensive appraisal or broker's opinion to determine the true monetary value of Robinson Terminal. Keep in mind that the current I-6 heavy industrial zoning of the property subjects it to the highly competitive data center market. Consider the acquisition cost as an integral component when evaluating the project's overall economic viability, emphasizing that the value of the property transcends mere monetary considerations. Weigh this cost against broader objectives of fostering long-term community welfare and prosperity, ensuring the health and survival of the Lake Accotink ecosystem, and recognizing the County's, indeed, our global responsibility to the well-being of future generations. In this assessment, planners and decision-makers must realize that the worth of the property to the community, the preservation of Lake Accotink, the environment, and the legacy for future generations significantly outweigh a simple monetary evaluation.

5.6. Integrate Findings of Financial Analysis: By integrating these financial considerations, the economic viability analysis will provide decision-makers with a holistic understanding of the financial landscape associated with utilizing Robinson Terminal for dredging operations and the broader goals of preserving Lake Accotink's ecological health.

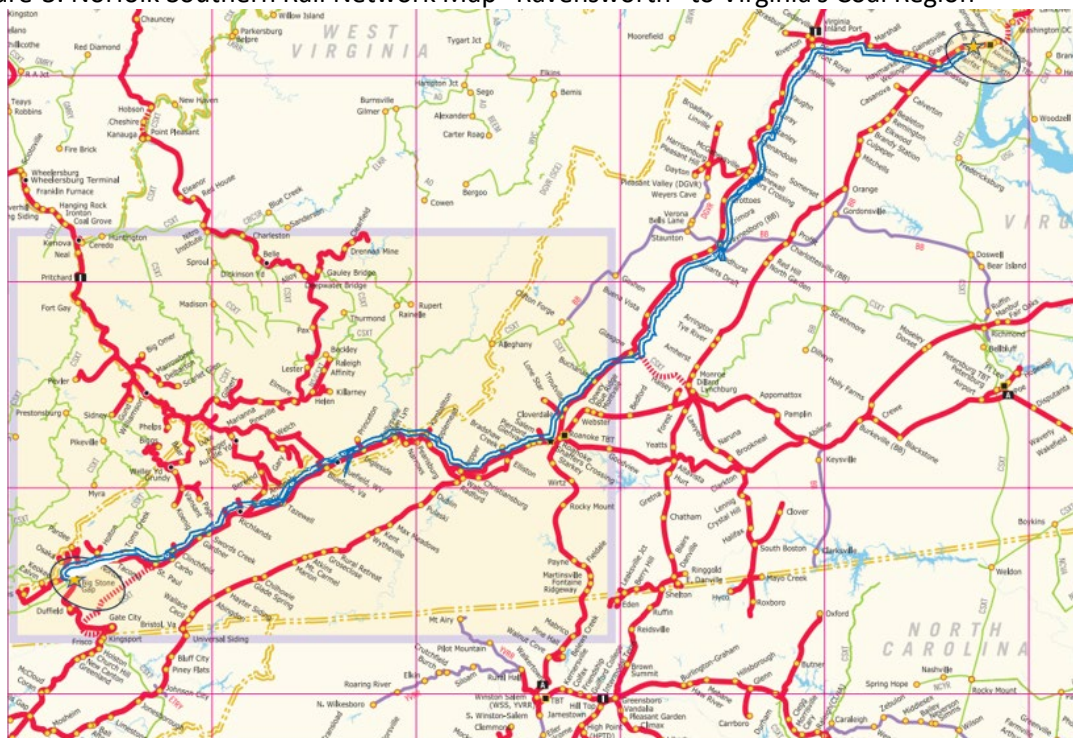
6. Environmental Impact Assessment: This finding provides an initial assessment of the environmental impact of the dewatering process, transportation, and reclamation activities, incorporating specific details on carbon reduction by rail. The major benefits of this finding are

¹⁴ [Lake Accotink Virtual Meeting 021523, minute 3:54.](#)

the elimination of mature tree canopy destruction and the reduction in greenhouse gas emissions.

6.1. Addressing Environmental Concerns: One community concern that the DPWES has used as a major reason to reject the dredging project (and to pit community members against one another) occurs in the use of Wakefield Park, a leading contender in dewatering site selection. Wakefield’s use for dewatering would cause the removal of significant acreage of mature tree canopy along Accotink Creek and in Wakefield Park. As detailed in paragraph 3., the pipeline to carry slurry from the Lake to Robinson Terminal would follow Norfolk Southern's right of way and would not require the removal of tree canopy, an element critical to the Watershed's health. At the same instance, retaining this natural resource promotes a goal of the Fairfax County Tree Action Plan to “Improve water quality and stormwater management through tree conservation.” in addition to Greenhouse Gas Reduction Goals.^{15,16}

Figure-3. Norfolk Southern Rail Network Map “Ravensworth” to Virginia’s Coal Region



This image displays a map of Norfolk Southern Railway routes throughout the Commonwealth of Virginia. It highlights a notional route used to transport dried dredged spoils from Springfield (“Ravensworth”), the location of Robinson terminal, to Big Stone Gap, Virginia.

6.2. Reduced Carbon Footprint for Transport by Rail: Another expressed concern was the tremendous load of greenhouse gases that trucking dredge spoils would generate. This finding is sensitive to that now global issue. For this finding, we developed annualized

¹⁵ [Fairfax County Tree Action Plan 2019, September 19, 2019, p.24](#)

¹⁶ [Fairfax County Greenhouse Gas Reduction Goals](#)

savings and savings equivalents using the Norfolk Southern Railway coal calculation tool.¹⁷ This analysis is based on estimates provided by Arcadis but adjusted to accommodate actual typical truck capacities for over-the-road hauls.¹⁸ (Note that County estimates have used a factor of 9 to 10 tons per truckload, a smaller truck than typically operates in the Northern Virginia region, thus deploying an underloaded truck.) The transportation of dried dredge material from Springfield, VA (Ravensworth”) to Big Stone Gap, VA, was notionally derived to represent delivery of dried dredged spoils to the geographic center of Southwestern Virginia’s coal-producing region. It assumes 95 truckloads daily, each carrying 13 cubic yards. With each cubic yard weighing 1,080 pounds, a truckload accounts for just over 7 tons, totaling 14,040 pounds.

6.2.1. The cost savings are based on the price of carbon, which is a monetary value placed on each metric ton of carbon emitted. For this example, we used the median Federal Social Cost of Carbon price of \$51 per metric ton.¹⁹ The infographic, Figure-3. Annualized Savings & Savings Equivalents provides details of the calculated differences, including metric tons of carbon and CO₂e²⁰. Shipping by rail reduces the carbon footprint and cost of moving dried dredge materials by 87.05% compared to truck travel between the same origin and destination.

6.2.2. Based on these calculations, shipping by rail significantly contributes to meeting the goals established by the County’s Community-wide Energy and Climate Action Plan (CECAP) to achieve carbon neutrality by 2050.²¹

¹⁷ [Norfolk Southern Carbon Calculator](#)

¹⁸ [Alternatives Analysis Report, Lake Accotink Dredging Project Arcadis Project # SD-000041-0001 July 21, 2021, pp.21.](#)

¹⁹ [Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990, February 2021](#)

²⁰ Carbon dioxide equivalent or CO₂e means the number of metric tons of CO₂ emissions with the same global warming potential as one metric ton of another greenhouse gas; calculated using Equation A-1 in 40 CFR Part 98.

²¹ [Fairfax County Community-wide Energy and Climate Action Plan](#)

Figure-3. Annualized Carbon Savings & Savings Equivalents



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The combined graphics in Figure-3. display annualized savings and savings equivalents comparing shipping of dried dredged spoils by truck or rail. The computation used for shipping 95 truckloads appears in the Arcadis Alternatives Analysis Report²² and, therefore, the number of loads of sand per day from Springfield, VA, to Big Gap, VA. This comparison used the federal value for the social cost of carbon, which is currently \$51.00 per metric ton. This scenario consists of 423.9 highway miles or 8 dray miles, plus 741.7 rail miles (later determined to be 425.2 rail miles by Norfolk Southern Group Manager for Aggregates). The transportation would create an estimated carbon footprint of 30,017.4 metric tons of CO₂e, a carbon cost equivalent to \$1,530,887 of CO₂e by truck. Rail would generate 3,887.6 metric tons of CO₂e, a carbon cost equivalent to \$198,268 of CO₂e, using the same beginning and end points. Rail reduces the carbon footprint of dredged spoils transportation by 26,129.8 metric tons of CO₂e and reduces the carbon cost by \$1,332,620. This represents an 87.05% savings. This is equivalent to:

2,566,778 gallons of diesel consumed per year,
34,675 trucks removed from the highway per year,
14,698,733 highway miles avoided per year,
5,680 cars removed from the highway per year,
Energy consumed by 3,148 households per year, and
Metric tons of CO₂ sequestered by 31,866 acres of U. S. forests per year.

7. Community Engagement: This finding strongly supports engagement with local communities, environmental groups, and relevant stakeholders in accordance with Fairfax County's public participation guidelines. Continue conducting public hearings, informational sessions, and workshops to gather input, distribute improved surveys²³, address concerns, and ensure transparency throughout the project development.

7.1. Addressing Community Impact Concerns: As discussed in the *Value of Lake Accotink to Lake Accotink Park and to the County* chapter of the Task Force Findings, the issue of significant daily heavy truck traffic through the heart of an already congested neighborhood challenged the use of an alternate dewatering site at Southern Drive. Community outrage and rejection were strong and unabated, fueling the DPWES no-dredge recommendation. Robinson Terminal's central location and accessibility via rail provide a logistical advantage that removes daily heavy truck traffic from residential neighborhoods. This reduction extends to local thoroughfares, including Backlick, Braddock, and Old Keene Mill Roads, and will avoid impact on the Springfield Revitalization District. As an added benefit, 95 or more heavy trucks will not bear upon major arteries, including the Springfield Interchange, the Beltway, and I-66. As discussed above, removing this traffic burden from already congested roadways results in a notable decrease in carbon emissions associated with truck transportation.

8. Regulatory Compliance: This finding includes the requirement to examine and ensure compliance with local, state, and federal regulations governing dredging, dewatering, and transportation of materials. Identify permits and approvals required for the proposed activities.

8.1. Dredging and Dewatering: Adhere to regulations set by the Virginia Department of Environmental Quality (VDEQ) and the U.S. Army Corps of Engineers for dredging and

²² [Alternatives Analysis Report, Lake Accotink Dredging Project Arcadis Project # SD-000041-0001 July 21, 2021, p.20.](#)

²³ Improved surveys include capabilities for more robust analysis and avoidance of aspects that have a negative effect on the outcome of the results. The survey must not sway respondents into answering a certain way or providing certain feedback. The survey must aim for the most authentic, genuine, and unbiased feedback from the study as this will be the most useful to inform decision-making. The survey must avoid sampling, non-response, acquiescence, social desirability, question order, and interviewer biases.

7. Addendum - Findings for Dredging and Sustainable Management of Lake Accotink: Dewatering and Transportation Hub Opportunities at Robinson Terminal

dewatering activities. Obtain all necessary permits for dredging operations in Lake Accotink, ensuring compliance with sediment and erosion control requirements. Coordinate closely with the Virginia Marine Resources Commission (VMRC) to address any ecological concerns related to dredging.

8.2. Rail Transportation: Coordinate with the Federal Railroad Administration (FRA) and Norfolk Southern Railway to ensure compliance with rail transportation regulations. Obtain necessary permits and approvals for the movement of dredged material by rail, considering safety, environmental, and operational requirements.

8.3. Environmental Impact Mitigation: Address environmental impact concerns in compliance with the National Environmental Policy Act (NEPA) and state environmental regulations. Conduct thorough environmental impact assessments to identify potential risks and implement mitigation measures.

9. Rail Transportation to Coal-Producing Regions: This section discusses using Robinson Terminal's rail capacities to transport dried dredge material to coal-producing regions for abandoned mine reclamation. The County should explore more markets for the reuse of dredged spoils. As discussed earlier, shipping by rail costs \$0.08 per ton-mile compared to \$0.48 per ton-mile for truck transportation, as reported by Lake Barcroft management.

9.1. Logistical and Economic Viability: Explore the logistics and economic viability of utilizing the rail siding at Robinson Terminal to transport the dried dredge material to coal-producing regions in Virginia and West Virginia for the reclamation of abandoned mines.^{24,25} As part of Federal requirements, Pennsylvania and Ohio also have Abandoned Mine Reclamation Programs. However, this analysis did not contact programs in those states for details. It would be to the County's advantage to expand research into markets for the reuse of dredged spoils.

9.2. Rail Car Availability: The Norfolk Southern railroad, with its availability of coal hopper cars returning empty from the northeast, presents an efficient and sustainable means of transporting dewatered dredge spoils to coal-producing regions for the reclamation of abandoned mines. If coal or other required hopper cars are unavailable from Norfolk Southern, the County may need to investigate the lease or purchase of a sufficient number of hopper cars for permanent use.

10. Conclusions – Benefits of Robinson Terminal Utilization: Despite the challenges inherent in the utilization of Robinson Terminal, it presents a compelling solution with a range of environmental and logistical advantages. The benefits include:

10.1. Environmental Impact Mitigation – Preservation of Tree Canopy: The strategic location of Robinson Terminal minimizes or eliminates the need to remove extensive tree canopy in the Watershed, along Accotink Creek, and in Wakefield Park. This preservation

²⁴ [Virginia Energy / Mine Land Repurposing / Abandoned Mine Land](#)

²⁵ ["Va. Energy seeks applicants for mine reclamation projects" appearing in Virginia Business, March 31, 2022](#)

aligns with the County's commitment to environmental conservation and contributes to the ecosystem's overall health.

10.2. Community Impact Mitigation – Reduction of Residential Truck Traffic: Robinson Terminal's central location and accessibility via rail provide a logistical advantage that drastically reduces heavy truck traffic in residential neighborhoods. This reduction extends to local thoroughfares, including Braddock or Backlick Roads, the Beltway, and I-66, resulting in a notable decrease in carbon emissions associated with truck transportation.

10.3. Logistical Efficiency – Reduction in Truck Traffic: Using Robinson Terminal as a dewatering site and transportation hub significantly reduces overall truck traffic during active dredge operations. This reduction is crucial for minimizing disturbances to residential neighborhoods and natural habitats along transportation routes.

10.4. Efficient Transportation Infrastructure – Utilization of Railroad Rights of Way: The location of a permanent dewatering site at Robinson Terminal utilizes railroad rights of way for pipeline setup, streamlining dredge slurry transportation to the dewatering site. This minimizes the need for extensive removal of tree-canopy and expedites the commencement of dredging and dewatering operations.

10.5. Centralized Collection and Distribution – Transportation Hub for Dredged Spoils Disposal: Robinson Terminal's role as a centralized dewatering site allows for the collection and distribution of dredged material not only from Lake Accotink but also from other Fairfax County lakes. This fee-based service extends to privately owned lakes such as Lake Barcroft and other local jurisdictions with spoils disposal requirements. This centralized approach optimizes logistics, reduces the environmental impact of requisite duplicative trucking, and eases the burden of searching for disposal destinations.

10.6. Rail Transportation Cost Savings – Cost-effective Rail Transportation: The use of coal hopper cars owned by Norfolk Southern Railway and their typical deadhead or empty backhauls to coal-producing regions offers potential cost savings for transporting dewatered dredge spoils. This enhances economic efficiency and aligns with sustainable transportation practices, reducing the project's overall carbon footprint.

10.7. Long-term Cost Efficiency – Strategic Property Purchase: Considering the potential purchase of Robinson Terminal at a valuation of \$23 million, the long-term cost efficiency of this strategic move becomes evident. Chairman McKay's willingness to support a significant initial dredging investment emphasizes the enduring value of securing Lake Accotink's ecological health through a permanent dewatering solution.

10.8. Conclusion – Summary: These benefits collectively position Robinson Terminal as a viable and environmentally sound solution for Lake Accotink's dredging operations. The advantages outlined underscore the project's commitment to environmental stewardship, community well-being, and long-term fiscal responsibility.

December 5, 2023

7. Addendum - Findings for Dredging and Sustainable Management of Lake Accotink: Dewatering and Transportation Hub Opportunities at Robinson Terminal

Appendix A – Email Correspondence between Martin Shepherd, Lake Accotink Task Force & David Williams (Norfolk Southern Group Manager for Aggregates

Martin Shepherd <dog.moon.abbey@gmail.com>



Request for information about ship by rail

3 messages

Martin Shepherd <dog.moon.abbey@gmail.com>

Wed, Nov 15, 2023 at 12:26 PM

To: david.williams2@nscorp.com

Dear Mr Williams,

Thank you for speaking with me Monday about the dredging project for Lake Accotink in Fairfax County, Virginia. Please confirm your receipt of this email.

Background: Lake Accotink is located in Springfield, VA, surrounded by established communities. The lake has been filling up with silt composed primarily of fine sand and clay that washed downstream from creeks, runs, and storm drains. We project that the dredge operation, over two or more years, will pull 500,000 cubic yards of sediment from the lake. We need to dewater these spoils and find a place to accept them. The coal mining regions in Southwest Virginia and West Virginia are conducting mine reclamation projects that apparently need fill dirt to accomplish their goals.

Our Task Force is currently looking at alternatives available to the dredging project. For this portion of our project, we are investigating how Norfolk Southern can help Fairfax County dispose of the fill dirt taken from the lake and support it's reuse in the reclamation program.

Norfolk Southern has a siding with three spurs on a property at 7201 Wimsatt Rd in Springfield, VA. We are looking at being able to use that property to dewater the dredged material and then load the dried fill dirt into coal cars for transport to the coal regions mentioned above. I imagine that the return trips from this area carry empty hoppers to load more coal. We'd like to take advantage of those returns to deliver fill dirt to locations that can use it.

We project that we will produce 1,235 cubic yards of material daily (1,333,800 pounds/666.9 tons daily). The sediment has been tested and found to be below all federally established thresholds for toxic substances and chemicals, so it is safe to transport.

For the purpose of our investigation and estimate, we would like to determine the cost of transporting the soil material from the location on Wimsatt Rd in Springfield, VA to a facility on Norfolk Southern line in Big Stone Gap, VA. This location is Central to the mining region and seems best to use as a target for the estimate. In the end, coordination with contractors doing the reclamation work will determine actual delivery locations. It would be helpful if you included the number of cars that you expect to be able to pick up at one time and add them to a train bound for the target site.

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As we discussed, Fairfax County does not own any rail cars of any nature. And we would hope as described above that the empty coal cars returning to the coal region can be utilized. We are still working out how the finances will work on this but we imagine that there would be a fee to the receiver to cover the cost of transporting, at least. In addition to your estimate for transport of our materials from Springfield to Big Stone Gap could you please provide an estimate on the cost of purchasing the number of cars that would be sufficient to handle our production load. I think I mentioned that there are three spurs on the property that we can use to hold empty and cars being filled.

There will be maintenance dredging of the lake after the initial 2-3 year initial dredge. In addition we envision that other lakes and projects in our area will take advantage of what we hope will become a transfer center for these materials. I know that there are also cold areas in Pennsylvania but I have not investigated their reclamation programs at this point in time. At some time in the future, delivering our fill dirt to locations in Pennsylvania may become a possibility if Norfolk Southern has tracks in that region.

Please call me if you have questions or need clarification. I look forward to your response so that I can include it in our report to the Fairfax County Board of Supervisors for their consideration. That report is due November 24. I am sorry for the delay in getting this information to you but I wanted to make sure I was providing the most accurate run down on what and how much we would be shipping.

Regards, Shep
Martin Shepherd
703-819-7086 Mobile
703-321-8777 Home

Williams, David A. <David.Williams2@nscorp.com>

Mon, Nov 27, 2023 at 5:36 PM

To: Martin Shepherd <dog.moon.abbey@gmail.com>

Shep,

It was great speaking with you this afternoon. We appreciate you bringing this opportunity to us, and I look forward to working with you towards making it a reality.

Per our conversation, we do not have aggregate cars that we can supply for this opportunity. Also, cars that are currently in use in coal service are in a closed loop; dedicated to their respective lanes.

Additionally, we would not be able to simultaneously use cars in both sand and coal service as this could be disruptive to either opportunity as one commodity could contaminate the other. That said, I've contacted our Equipment Planning team to inquire about the availability of any surplus coal hoppers.

Additionally, I've provided a list of rail car builders/lessors that you may want to use a reference if you would like to lease cars.

You advised that the planned origin for this lane would be Robinson Terminals in Springfield, VA. I

7. Addendum - Findings for Dredging and Sustainable Management of Lake Accotink: Dewatering and Transportation Hub Opportunities at Robinson Terminal

can confirm that we do service this facility today.

Based on the information provided we can presume the volume estimate for this opportunity is ~270,000 tons of material (2,700 carloads) that need to be shipped over 18-24 months. Please confirm.

Volume Estimate

1 cubic yard = 1,080 lbs.

500,000 cubic yards = 540,000,000 lbs. (500K x 1,080)

540,000,000 = 270,000 tons

270,000 = 2,700 carloads (~100 tons/car)

Lastly, I understand that the destinations have not yet been defined, however for the purposes of analysis you would like to use Big Stone Gap, VA as a tentative destination. Below I've provided a budgetary rate, however please note that this rate and mileage are subject to change as we will need to confirm the route. Accurate mileage will be needed to confirm fuel surcharge. I'm working with our NPO team to do that and will advise further once confirmation has been provided.

Request Details:

	Lane 1	Lane 2
Offered Rate:	\$3,513.00	\$3,024.00
STCC:	1441191 (SAND W CL WO GP)	1441191 (SAND W CL WO GP)
Origin:	NS SPRINGFIELD VA	NS SPRINGFIELD VA
Destination:	NS BIG STONE GAP VA	NS BIG STONE GAP VA
Route:	NS DIRECT	NS DIRECT
Car Type:	OPEN TOP HOPPER - COKE	OPEN TOP HOPPER - COKE
Car Owner:	Railroad Owned	Private
Est. Volume:		
Target Rate:		
Rate Basis:	Per Car	Per Car
Shipper:	ROBINSON TERMINALS	ROBINSON TERMINALS
Shipper Address:	7201 WIMSATT RD	7201 WIMSATT RD
Receiver:		
Receiver Address:		
ALK Fuel Miles:	425.2	425.2
Comments:	<p>Rates are subject to the following:</p> <ul style="list-style-type: none"> - NPO approval required prior to rate publication and shipping. - Rate includes NS factor only. - Rates are valid for 30 days. - NS mileage-based fuel surcharge. 	

All rates subject to Fuel Surcharge described below:

December 5, 2023

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Prices subject to Mileage-Based Fuel Program (exceeds \$2.50/gal.)

- Fuel surcharge will be adjusted on a monthly basis.
- The basis for the surcharge will be determined by the average monthly price of U.S. Diesel (On-Highway) published by the U.S. Energy Information Administration (www.eia.gov).
- In the event the average monthly price of OHD exceeds \$2.50 per gallon, the fuel surcharge per car will be \$0.01 per mile of the line-haul movement for every \$0.04 per gallon, or portion thereof, by which the OHD average price exceeds \$2.50 per gallon.
- The applicable fuel surcharge shall be applied to each shipment having a bill of lading dated on or after the first day of the second calendar month of a given OHD average price calculation. For example, the average reported OHD price for the month of November 2015 determines the fuel surcharge applied throughout the month of January 2016.



David



Equipment Leasing Guide.pdf

239K

Martin Shepherd <dog.moon.abbey@gmail.com>

Tue, Nov 28, 2023 at 3:14 PM

To: "Williams, David A." <David.Williams2@nscorp.com>

David,

Thank you for the information. Your weight calculations are correct.

In last night's meeting, the County's consultants provided several general costs. I have spent today trying to find the assumptions regarding actual trucking costs, which were lumped together under Material Handling, Transportation, and Disposal.

I have finally broken this out and come up with about \$1 per mile by truck to take the spoils 18 miles to a Luck Ecosystems facility in Chantilly, VA. Close to \$0.17

If I did the math correctly, using the Lane 1 column in your table, Cost per car (at 100 tons per car) = \$3513.00

Cost per ton (3513.00 / 100) = 35.13 Miles traveled = 425.2

Cost per ton-per-mile (\$35.13 / 425.2 miles) = \$0.0826. Does that sound right to you?

Regards,

Shep

Martin Shepherd

703-819-7086

"He is your friend, your partner, your defender, your dog. You are his life, his love, his leader. He will be yours, faithful and true, to the last beat of his heart. You owe it to him to be worthy of such devotion." --

Unknown

Appendix A:

Value of Lake Accotink to Lake Accotink Park and to the County

Contents

Appendix A.1: Compilation of Testimonials

Appendix A.2: Analysis of Lake Accotink Dredging Community Survey

Appendix A.3:

Appendix A.3.1: Table: Schools within Five Mile Radius of Lake Accotink

Appendix A.3.2: Lakefront in Fairfax, VA Map

Appendix A.1: Compilation of Testimonials

List of Testimonials	
Name	Representation
1. Sharon Bulova	Former Chairman of the Fairfax County Board of Supervisors, Former Braddock District Supervisor
2. John C. Cook	Former Braddock District Supervisor
3. Anonymous Saratoga resident	Saratoga Neighborhood in Springfield, VA
4. Delegate Vivian Watts	Member of the Virginia House of Delegates representing the 39 th District
5. Sandy Frieswyk	Local resident and member of Save Lake Accotink
6. Jamie Petrik	Realtor with Debbie Dogrul Realty and long-time Fairfax County resident
7. Janice Buckley	Realtor and long-time resident Springfield, VA
8. Susan Frieswyk	Local resident and member of Save Lake Accotink
9. Ed Morrissey	Head Coach/Coordinator for the Special Olympics Area 26, Alpine Ski and Snowboard Team
10. Julie Childers	Co-founder Trails for Youth
11. Shane Shroeder	Lifelong Springfield & Fairfax County resident
12. Martin "Shep" Shepherd	Original Ravensworth Farm resident and long-time Lake Accotink supporter
13. 61st Anniversary Celebration - <i>Why Do You Love Lake Accotink?</i>	Comments from folks about Lake Accotink
14. Springfield Town Center Fall Fest - <i>Why Do You Love Lake Accotink?</i>	Comments from folks about Lake Accotink

Sharon Bulova (former Chairman of the Fairfax County Board of Supervisors, Former Braddock District Supervisor):

“There isn’t a time in my life that hasn’t been touched by Lake Accotink. So many wonderful things happen there. As an elected official, the Cardboard Boat Regatta was my all time favorite annual event. Kids from all over the county lined the perimeter of the lake with some of the most hilarious home-built cardboard and duct-taped boats. I was a regular judge and I loved it so much! In 1995 I started Braddock Nights at Lake Accotink and have many fond memories of listening to the Kings Park Band play some great music while the sun slowly sank over the lake. Kids in the neighborhood have grown up remembering these magical evenings.

“But what has touched me most directly is personal”.

“I moved into a newly built Richmarr L-shaped rambler with a carport in Kings Park West in 1971. My son, David, was two years old. Nine months after moving in, my second child, Karin, was born. Kings Park West is about seven miles from Lake Accotink. It was the perfect place to visit with my young family. Feeding the ducks and tossing stones into the water didn’t cost any money and gave David and Karin a good hour or more of delight before we headed home for nap time.”

“Looking back, I can see David’s future written all over his childhood activities. He loved to dig in the dirt. I had to steer visitors to our house away from the enormous water-filled crater he created next to our carport. He spent hours digging next to a stream in the woods behind our house looking for evidence of the buried cannon full of gold that General Braddock was rumored to have stashed along an old alignment of Braddock Road. Whatever he did, it involved dirt and water.”

“Zoom ahead about 10 years and you would find David at Lake Accotink Park where he got his first “real” job. He came home every day during the summer full of stories about taking younger kids out in the canoe to give them a tour of the lake. The tour always included stories of the beavers that populated the lake during that time.”

“If you kept zooming ahead another couple of decades you would find David still involved with water and dirt. After graduating from William and Mary he went to work as a senior environmental planner specializing in storm water and Chesapeake Bay restoration. He was elected to the Northern Virginia Soil & Water Conservation District. In 2006 he was elected to the Virginia House of Delegates where he now serves on the Agriculture,

Chesapeake and Natural Resources, committees. He was appointed by the Speaker to serve on the Chesapeake Bay Commission and the State Water Commission. In the General Assembly, he is the “go-to” person when it comes to environmental issues.”

“We, our children and grandchildren are shaped by the world we experience as we grow into adulthood. As adults, it’s up to us to protect and nurture the things that matter”

John C. Cook (Former Braddock District Supervisor)

What Lake Accotink Means to Me

Lake Accotink is a gem both for the community at large and for the individuals who visit it.

I live in Kings Park, which borders Lake Accotink Park. I enjoy walking or biking the trail from Kings Glen Elementary School down to the marina. That was the first bike ride I took with some of my kids. My kids have also enjoyed the playground and the carousel and have attended many parties at the Park. The lake is beautiful and serene. You would not know that tens of thousands of people are within a couple miles of you when you are in the park. It’s a true get-away in nature.

Lake Accotink has provided the backdrop for the Braddock Nights concert series for years. On a summer night, the lake is the perfect location for a concert. I cannot image a concert at the Park without the Lake. What would be the point? I also love to see large extended families have picnics and parties at the park. What a great offering to the public to have this beautiful lake, with recreational amenities, as a location for a family reunion. I doubt very much these families would gather there without the lake.

We are a wealthy county with a high cost of living. It can cost hundreds of dollars to take your family almost anywhere. That’s a tough situation for people who are not wealthy. Having a beautiful park and lake where anyone can go without charge is the clearest example we have in the county for truly equitable recreation and social enjoyment.

We need to save the Lake.

Anonymous Saratoga resident at October 25, 2023 Save Lake Accotink Meeting

"When we moved here from the Philippines, we were very poor. Life was stressful, and we had few opportunities to relieve that stress. We couldn't afford to go anywhere or do anything. We relied on our trips to Lake Accotink to regain some breathing space and to keep my siblings and me out of trouble. I loved exploring the trails, but what I enjoyed most was sitting by the water. I needed the peace the lake brought me. I still need it. So many others like my family and me need Lake Accotink."

Delegate Vivian Watts:

From my farm upbringing to extensive backpacking, the outdoors is core for my sense of well-being. The ever-changing light from the sky and clouds reflected on Lake Accotink provides a rare chance to feel the vast unity of nature within reach of busy urban life.

Sandy Frieswyk (local resident and member of Save Lake Accotink)

The Grace of Lake Accotink



I enjoy so many things about Lake Accotink but none as much as what it gives to the older, solitary and or disabled citizens of the area. I often brought my mother here to enjoy lunch together in the beautiful surroundings. We parked in the Marina, having picked up sandwiches in nearby Springfield Plaza and had long talks and sometimes enjoyed each other's silent company as we took in the wildlife activity, sunsets, kids playing or pets enjoying their walks around the Lake. My mother passed away at the age of 99 years and 343 days. Had she reached that next milestone of 100 years, we would have likely spent much of that day at the lake.

Photo credit Sandy Frieswyk

The accessibility of Lake Accotink Park, and the lake itself, are unique in Fairfax County. There are four "Lakefront Parks" and six "Parks With Small Lakes" within the Fairfax County Park Authority (FCPA) system. Of those ten parks, Lake Accotink is the ONLY lake

that is accessible without traversing dirt, gravel, or roughly paved trails over a significant distance to view the water and wildlife. Unlike the marina in Lake Accotink Park, guests cannot view any lake from their personal vehicle in the nine other parks. On any given day, you can see several people parked in that Marina enjoying a meal or simply enjoying the view. Quite often, the people there appear to be enjoying exactly the same experience as I did with my mother. Additionally, you can see visitors with mobility challenges walking down the well-paved sidewalks to the water's edge and sitting on the very accessible benches to take in the view.

That kind of visit is what I observed on the day I met Grace.

Sitting in my car, I watched as two women, one middle aged and one older and in a wheelchair, exited their car and head down to the water's edge. They appeared to be mother, and daughter, and it made me think of my own mother and our visits there. I watched as the daughter sat her mother back against the black iron fencing and took pictures of her with the lake as a background. They were smiling and talking and looked to be having a very enjoyable visit. Thinking that they might enjoy a picture of the two of them together, I ventured down and offered to take a photo for them. They posed for a nice picture but explained that the younger woman was not her daughter but a caretaker and that they often visited the lake to enjoy the surroundings, the water, and the wildlife. The woman explained that she was originally from Maine, and I said that she must really know beautiful lakes then. She agreed.

I mentioned that it was a shame that the county intended to let this lake fill in and they were both surprised to hear that. They were very sad at the thought of losing this wonderful resource.

Grace is a perfect example of the people of Fairfax County who will be denied use of waterfront lake views and enjoyment of our parks if Lake Accotink is allowed to disappear. In these days of increased accessibility efforts, equity, and goals of "One Fairfax", I cannot fathom how the County can allow this loss to occur.

Jamie Petrik (realtor with Debbie Dogrul Realty and long-time Fairfax County resident):

"I feel compelled to write this letter about the decisions being made about the future of Lake Accotink. As a local resident and realtor who has lived in the Fairfax County area for a significant amount of time since 1993, I believe Lake Accotink is invaluable to the communities surrounding the lake. While I can examine numerous reasons why I feel keeping the lake intact is massively important (i.e. - decreased home values), I would like to focus on one specific area: how the lake relates to the mental health of our residents.

Since becoming part of the county park system back in the sixties, Lake Accotink quickly became an integral part of this community. Getting “away” to the Lake became a pastime for the locals - a great getaway from the hustle and bustle of those commuting and working in the stressful DC environment. It became a great place to relax without driving for hours. When I moved here, it became a location for me to let go, walk, hike, bike - to let off the steam of work. Recently, COVID left a major disruption into the normal numbers regarding depression. With not enough mental health counselors and psychologists, the need for outdoor space is critical. We need peaceful settings to calm our minds and to help keep us grounded. In Fairfax County, we have a limited amount of space for walking and exercising in water settings. Removing the serenity of Lake Accotink would take away a gemstone from our County Parks. Lake Accotink also abuts some lower income housing in Fairfax County. These residents rely on the close proximity of the lake for everything from individual fishing to family gatherings. This is a group that struggles financially, that can’t afford the OBX summer trips. To remove a phenomenal outlet for their mental wellness puts an additional stress on that overlooked population. I applaud the efforts of those trying to keep the “Lake” in Lake Accotink. It has served our community for years. We spend money and build efficient roads to bring people closer to work; I feel we are “missing the boat” by not reexamining the importance of the mental wellness of those families in this area in regards to Lake Accotink.”

Janice Buckley (realtor and long-time resident Springfield, VA):

“As a realtor and as a member of the community, I want to share with you my experiences and impressions of Lake Accotink Park. Just last week, my husband and I rode our bikes through Lake Accotink and the area was bustling with walkers, picnickers, children playing and most importantly all sorts of people out on the lake in canoes, kayaks and paddle boats. We frequently spend time at the park. As a realtor who sells largely in our Springfield community, Lake Accotink Park is always something that I highlight to potential buyers. I don't think I can emphasize enough how access to the park and the lake activities are critical to the vibrancy of the Springfield community. For those of us who have been around Springfield for a long time the park and the activities around the lake are a tradition. From the cardboard boat regatta to day camps and birthday parties and paddle boating, spending time at the lake has been part of our Springfield experience. Springfield needs Lake Accotink and I appreciate all your efforts in helping to preserve it.”

Susan Frieswyk - Impact of Losing Lake Accotink for Disabled Citizens of Fairfax County

“Multiple studies can be found that show that gazing at bodies of water can help lower your heart rate and blood pressure and increase feelings of relaxation. A USA Today study in 2017 describes exposure to water views as “an antidote to what we refer to as “red mind,” which is the anxious, over-connected and over-stimulated state that defines the new normal of modern life. Research has proven that spending time near the water is essential to achieving an elevated and sustained happiness. Vinay Saranga, MD; a psychiatrist and founder of Saranga Comprehensive Psychiatry in North Carolina states that “Living near water, whether it's the ocean or a small lake in your backyard, isn't just nice scenery; studies show there are many health benefits. It can lower blood pressure, decrease stress, bring on relaxation, improve creativity, and bring about a general sense of happiness ”

According to a 2019 study from the National Institute on Disability, Independent Living, and Rehabilitation Research, Fairfax County had a total of 1,131,851 residents, of whom 81,935, or 7.2% were classified as having a disability. You can only imagine that the described positive effects of water views are equally beneficial to all people, including those with disabilities.

In Fairfax County Parks, there are five “Parks with Small Lakes” and four “Waterfront Parks”. Of those nine places, only one offers the opportunity to enjoy water views to the segment of the county’s disabled citizens who do not have the ability to traverse paths whose conditions range from unpaved to covered with rough asphalt, either of which are impassable to many. Lake Accotink Park provides the opportunity to park a car within view of the water and provides paved sidewalks and benches for those who are able to exit their car and move a short distance to the water’s edge.

Parks with Small Lakes

- *Brookfield Pond – Not visible from parking area. Not mentioned on Brookfield Park website.*
- *Huntsman Lake – A few hundred yards from a parking area to the lake.*
- *Lake Mercer – Parking for 10 vehicles in a gravel lot then a four minute, 330 yard uphill hike on a mixed natural/paved path to get to the dam.*
- *Royal Lake – Two parking areas with trail access to lake.*
- *Woodglen Lake –No public parking.*

Waterfront Parks

- *Burke Lake Park – Not visible from any parking area.*
- *Lake Fairfax Park – Not visible from any parking area.*
- *Riverbend Park – Not visible from any parking area.*
- *Lake Accotink Park – Accessible parking with full lake view and traversable paths to benches.*

“My family has lived in Springfield since March of 1997. During that time, my mother experienced increasing mobility issues, eventually becoming wheelchair bound. It was often a great pleasure for us to get her in the car, pick up lunch from a local eatery, and drive to the marina parking at Lake Accotink Park. We would sit and watch the waterfowl, jumping fish, paddle boats and kayaks while we ate. We would also visit on some evenings to watch the sun go down over the water. Since my mother’s passing in 2021, I have developed mobility issues of my own, and my sister and I continue those visits to the Lake.”

“I find it disheartening and discriminating that Fairfax County cannot find its way to save the one Fairfax County Park Authority resource that provides this benefit to its disabled citizens. It is shameful and a huge loss for a significant population of the County.”

Ed Morrissey, Head Coach/Coordinator –

Lake Accotink provides a practice area for the Special Olympics Area 26, Alpine Ski and Snowboard Team

“The Special Olympics, Area 26, Alpine Ski and Snowboard Team uses Lake Accotink for training before the snow flies. Our athletes compete in three events - slalom, giant slalom, and super giant slalom - and the lake is the perfect spot for getting them in shape before we hit the slopes. The lake is also a great place for us to practice because we have limited funds and we're not charged for holding our practices at the park.”

“Practices begin in November, and the cold wind off the lake helps condition lungs, and gets us ready for the cold of the ski slopes. We use the slope of the dam to practice turns going down a slope. It's fun and useful for the athletes, and provides great views of the water. As part of the training regimen, athletes also run up the steps and then along the path at the top of the dam.

We've practiced at Lake Accotink for years, it's just perfect for the needs of our athletes, and serves an important role in preparing them for competition.”

Julie Childers Trails for Youth (co-founder):

I can tell you that due to uncertainty of Lake Accotink conditions we no longer provide opportunities to kayak and explore the natural area via kayaks. This experience had allowed our underserved youth in the community the opportunity to witness and experience nature from a unique and meaningful perspective that helped them to understand the importance of the Lake to the local fish and birds.

Shane Shroeder (Lifelong Springfield & Fairfax County resident)

The Schroeder Family (4 generations of regular visitors of Lake Accotink Park)

The Shroeder family first moved to Ravensworth Farm in 1971 when my grandparents John and Marjorie bought a home for their young family on Inverchapel Road. I grew up right down from the lake on Greeley Blvd in West Springfield. I remember crossing the train tracks long before there was a train bridge. I bought my home on Halleck Place in 2009, and now my wife (a transplant from southern Maryland, where she lived on the Chesapeake Bay) and our two daughters (ages 7 and 3) live here. Four generations of Shroeders have called this area and Lake Accotink home for over 52 years.

My uncles and father, my siblings and I, and my daughters enjoy winter activities at Lake Accotink. We all learned to fish from the shores of Lake Accotink. We celebrated my oldest daughter's first birthday at Lake Accotink in 2017, and for two summers she has attended summer camps at Lake Accotink. My wife and I kayak on Lake Accotink for dates, in lieu of expensive dinners and movies. Suffice it to say that we have been frequent users of our nearest Fairfax County Park for the half-century we've lived here.

Lake Accotink is not only a part of my family's history; it's the center of our neighborhood and our county's ecosystem. The birds that eat berries from the cherry tree in our backyard also eat fish from the lake. For two years now a mother fox has made a den for her kits on lake property that abuts our property; we hear them yipping in the night. The barred owls that keep our property free of mice also feast on the lake's sunfish. Without the lake, the birds and the owls lose half of their nutritional needs. Without the lake, the foxes lose their water source. Without this habitat connectivity, "processes like nutrient flow, gene flow, seasonal migration, pollination, and predator-prey relationships are significantly impeded or cannot occur." I cannot stand aside and watch the destruction of this important ecological habitat. Lake Accotink is our responsibility. When the lake was dammed by the War Department in 1918, the ecosystem of Springfield was irrevocably changed. That decision set in motion a permanent obligation for Fairfax County government to care for the lake, its inhabitants, and its visitors, including the Canadian geese, Cedar Waxwings, and Monarch butterflies who use Lake Accotink as a way station on their annual migrations.*

Lake Accotink is worthy of protection and preservation due to its distinct role as a precious natural and cultural resource. In fact, Lake Accotink could be considered Fairfax County's flagship park as it is accessible to numerous residents; gives a "complete park experience" with a playground, seasonal boating, fishing, walking, reservable party space, and animal- and bird-watching; and supports critical habitat connectivity. We should not be discussing if to maintain the lake, but how.*

*Thank you,
Shane Shroeder
Lifelong Springfield & Fairfax County resident*

Martin “Shep” Shepherd, Original Ravensworth Farm resident and long-time Lake Accotink supporter

Lake Accotink and the land surrounding it, even before it was a park, has been and is now an important part of my life. I was hooked since the first time in the late summer of 1960, my Dad showed my brother and me a place where we could "sneak" under the still standing perimeter fence and walk along the jeep trail that had been used to patrol the Fort Belvoir Reservoir. Many long summer days spent as kids, walking our dog in those woods and learning how to fish in the lake and skip stones across its surface. And I can't forget to mention playing "Army" amongst the civil war stone fences and other fortifications built to protect the railroad trestle. We used sticks for our "guns," that had fallen from the great Jack Pines that used to stand throughout the park before the woodlands evolved into the present deciduous forest. I remember working as a Scout on conservation projects, even back then, to stop soil erosion and make paths to points where one could take in the big picture and appreciate what we had for its gifts of beauty and serenity. These were the paths that later "improvements" widened and packed with gravel or paved, making a highway through the wilderness (not to mention, across the County) and a raceway for bicyclists.

In high school, having an English teacher who introduced Silent Spring and encouraged me to write about how Mr. Bell, Director of the Park Authority had to close the lake because it was contaminated with sewage from Fairfax City and the Town of Vienna, upstream. The summer that I spent exploring what I now know as the Accotink Watershed from the Lake upstream to Vienna and downstream to the Potomac before there were no paths except for the banks of the creek to follow. Learning more about erosion and silt and a new term "eutrophication," that has created dead spots in the lake that lack the oxygen to support aquatic life. I remember fondly these same fall that I shared a first kiss overlooking the lake in the light of a magnificent sunset streaming through the trees.

Along the way, I joined the Navy, and, of course saw the world. Lake Accotink was always on my mind. No matter what new vistas were there to enjoy, Lake Accotink was always the vista to which others were compared. More often than not, my thoughts returned home to my Lake.

And, after that all expenses paid world tour, I did return home. In fact, home to the same house where I grew up. I've walked more dogs and provided a home for many foster dogs who needed place to land on their way to a forever home. I've enjoyed more kisses in the glow of more sunsets.

And all this time, appreciating and working to save our lake. All these memories leading to this afternoon sitting with my wife to view its glittering waters bouncing through the few remaining leaves, enjoyed yet another kiss and our special gift of nature always there to enjoy. Lake Accotink is a life-long friend that I shall not abandon in its hour of such great need.

**Information below was provided by the advocacy group Save Lake Accotink, spelling as is.
Why Do You Love Lake Accotink? - Comments from folks about Lake Accotink (from two events):**

61st Anniversary Celebration

1. *I like to bike around the lake. It's really calming and great exercise.*
2. *I love all the nature that habitates the lake.*
3. *Boating interconnectedness.*
4. *Safe space to connect with community.*
5. *I like the mini-golf and the lake.*
6. *I get to spend time with my Dad.*
7. *It's a great place to go fish.*
8. *It's very fun and the lake is beautiful.*
9. *We bought our house in North Springfield and have stayed in North Springfield because of the lake.*
10. *I love Lake Accotink because I get to play with the fishies.*
11. *We love the park and lake to visit and have fun.*
12. *I love to see the geese land and take off.*
13. *Love to kayak here.*
14. *Catching fish is easy.*
15. *I love walking the lake, the beautiful dam, the amazing people, and the fun sideshows.
Whether it be paddle boating or sight seeing, I love the lake.*
16. *It's nature.*
17. *The geese are kind to me.*
18. *It's a great place to exercise and enjoy NATURE.*
19. *I love how calm I feel when I'm near the lake. Ahhhhh...*
20. *I love to fish.*
21. *I love to watch the reflection of a sunset on the lake.*
22. *I love the lake loop. Run it every week.*
23. *I use to come here as a baby. I'm 25. We love Lake Accotink.*
24. *My family and dogs have enjoyed the lake and paths for many years.*
25. *It's an amazing resource for the community. I've been coming since I was 3 and now I'm
49. A place of beauty and solace! Please save the lake!*
26. *Lake Accotink is awesome. :-)*
27. *A place for me to enjoy the nature.*
28. *I love watching the lake as I run past it every Saturday.*
29. *I love Lake Accotink because my parents have been taking me here since I was born. I now love taking my dog on the trails as well as kayaking.*

30. *I love seeing blue herons catching fish.*

Springfield Town Center Fall Fest

1. *So many fun moments with my kids there.*
2. *It is so cool.*
3. *Catching fish is easy.*
4. *We love pedal boating on the lake and cannot wait for the new playground.*
5. *Fairfax County – WAKE UP!!*
6. *Love to kayak here.*
7. *It was my first job – working at the boat house in high school.*
8. *I like to boat.*
9. *I love it is a beautiful lake.*
10. *Please save the lake. It is a beautiful place in the area.*
11. *Don't you touch our lake!!*
12. *I love the lake because it is bootiful.*
13. *It is so accessible and the only one of its kind! (If it dies, you can't get it back.)*
14. *My family (and dogs) have enjoyed the lake and paths for many years!*
15. *No fish anymore!! Why?*
16. *My family loves to go there for picnics on nice days.*
17. *Keep the lake.*
18. *I just love the lake.*
19. *I love to fish.*
20. *The lake is a refuge from stress.*
21. *I get to spend time with my dad and bike.*
22. *It is a great place to go, and fun.*
23. *Lakes are awesome!!*
24. *I love the lake because it's very pretty.*
25. *My childhood spot! Save my lake!*
26. *Boating. Interconnectedness.*
27. *I love playing mini golf, winning there.*
28. *The new playground.*
29. *The geese are kind to me.*
30. *I like to play football at the lake.*
31. *I like the mini-golf and the lake.*
32. *Lake Accotink is awesome. 😊*
33. *We love the park and lake to visit and have fun.*
34. *I used to come here as a baby. I'm 25. We love Lake Accotink.*

A Couple Related Articles in the Media

<https://annandaletoday.com/park-authority-inequities-harm-vulnerable-communities/>

Lake Accotink Task Force Findings Report
December 8, 2023

Article by FCPA Director Jai Cole [Overcoming Barriers to Park Equity | Feature | Parks & Recreation Magazine | NRPA](#)

Appendix A.2:

Analysis of Lake Accotink Dredging Community Survey

Overview and Background

The Subcommittee on the Value of Lake Accotink to Lake Accotink Park and to the County examined the Fairfax County Department of Public Works and Environmental Services (DPWES) community survey that was administered between February 16 and April 1, 2023 via *Engage Fairfax County* (engage.fairfaxcounty.gov). This website is “the official public participation portal that features select projects, surveys and opportunities to provide feedback as part of our commitment to inclusive community engagement.”

The survey consisted of six questions:

1. What is your Zip Code?
2. How familiar are you with the Lake Accotink Dredging Study?
 - a. Not Familiar
 - b. Somewhat Familiar
 - c. Very Familiar
3. Which best describes your (*sic*) where you live in relation to Lake Accotink?
 - a. I live close to the lake (0-¼ mile away)
 - b. I live nearby the lake (¼ to 1 mile away)
 - c. I live between 1 and 5 miles from the lake
 - d. I live more than 5 miles from the lake
4. How often do you visit Lake AccotinkPark?
 - a. Daily
 - b. Weekly
 - c. Monthly
 - d. Occasionally
 - e. Rarely
5. Please select the following activities that you enjoy at Lake Accotink Park. (Select all that apply)
 - a. Boating
 - b. Picnicking
 - c. Volunteering/Watershed Clean-Up Days
 - d. Hiking/Walking/Running
 - e. Dog Walking
 - f. Miniature Golf
 - g. Playground
 - h. Observing Natural Scenery
 - i. Time with Family and/or Friends
 - j. Fishing
 - k. Classes/Summer Camps
 - l. Community Events and Social Meetups
 - m. Biking
 - n. Volleyball
 - o. Carousel
 - p. Basketball/Paved Court
 - q. Bird Watching
6. Please share your opinion of the Fairfax County staff recommendation to not pursue the \$395 million full lake dredging effort or the offline lake option and instead reinstate the master planning process to develop a community vision for the future of the park. (Comments are limited to 2000 characters)

Before respondents took the survey on *Engage Fairfax County*, they had the option of clicking a link to *The Future of Lake Accotink Park (arcgis.com)*, which appeared above the survey questions. This website was developed in advance of the February 15, 2023 virtual meeting that kicked off the community input process following the announcement of staff's recommendation not to dredge Lake Accotink.

During the kickoff meeting, Chris Herrington, the Director of DPWES, announced the recommendation.

"I cannot recommend that we dredge Lake Accotink. To fund the nearly \$400 million cost to dredge and maintain the lake, the Board of Supervisors would have to raise taxes for all county residents. That is money that will not be available to reduce flood risk for the thousands of residents whose homes are already flooding today. That is money that will not be available for stream restoration projects or to build any other important project that the county would otherwise fund. To fully dredge Lake Accotink...we will have to permanently deforest a substantial amount of County parkland. To fully dredge Lake Accotink, we'll have to put 50,000 – 50,000 greenhouse-emitting trucks on the roads to haul away that sediment, and we'll have to do major maintenance dredging every five years that will be disruptive to the community. Dredging Lake Accotink, in my opinion, is not sustainable. It does not make Fairfax County more resilient. It does not make Fairfax County more safer, and, in my opinion, it is not efficient and effective government.


"[Regarding] an offline lake option...when it became increasingly apparent, as our analysis proceeded, that the impacts from the full lake dredge were going to be much larger than we had initially communicated to the Board and the community, I directed our consultant team to evaluate the feasibility of an offline lake to maintain a more permanent pool of water to determine if we can at least partly satisfy the community's expectations. Unfortunately...I do not believe the cost associated with the offline lake option, especially given the very high level of uncertainty that it would be a permanent solution, means that I also cannot recommend that we proceed with that option either.

"We've developed a robust story map, an interactive website that's online now with all of the facts and a description of how we got here. If you haven't visited yet, please, I encourage you to do so. It will be where we are communicating additional information and receiving feedback from you."

← https://engage.fairfaxcounty.gov/a7178

RESIDENTS BUSINESS GOVERNMENT FAIRFAX COUNTY VIRGINIA SERVICES CONNECT SEARCH Q

Engage Fairfax County > Lake Accotink Community Survey



Lake Accotink Community Survey

Lake Accotink is a beloved resource for many residents of Fairfax County and the region. When it became apparent in 2016 that the lake would need to be dredged in order to maintain an open, boatable resource, there were many unknowns and a different economy resulting in a cost estimate (\$30 million) which was too low and the idea was put forward that we could process spoils in the powerline easements in Wakefield Park to minimize project impacts. Analysis since 2021 has revealed that it would cost about \$95 million to conduct a base dredge, and an additional \$300 million over the first twenty years of maintenance dredging. Additionally, analysis has yielded that 43% more sediment would need to be removed resulting in 50,000 truck trips through neighborhood and area roads and seven acres of forested wetlands would need to be removed from Wakefield Park for spoils processing. More information about the project and detailed analysis can be learned at [The Future of Lake Accotink Park \(aragis.com\)](#)

Based on analysis, county staff recommend that Lake Accotink not be dredged due to these significant community and environmental impacts and excessive costs. Instead, county staff recommend that Lake Accotink Park master planning process resume in 2023 in order to create and implement an economically and environmentally sustainable vision for this valuable public space that provides enriching recreational, educational and quality of life opportunities for residents, allows for proactive management of the landscape over time, and improves the ecosystem and wildlife habitat. The purpose of this survey is to gain invaluable insight from the community and visitors about their vision for Lake Accotink Park.

With this as a backdrop, the subcommittee examined the community survey with three goals in mind:

1. To validate county staff's findings by conducting an independent analysis of the raw data
2. To evaluate the survey's design to see if it accurately captured community feedback that county staff
3. To measure for any bias (conscious or unconscious) that may have resulted from staff's repeated reference to the \$395 million cost estimation over a 25-year period, their repeated reference to the volume of trucks needed to transport spoils, and their repeated comparison of a wetland conversion of Lake Accotink to the restoration work done at Huntley Meadows.

Methodology

The subcommittee obtained masked raw survey data from DPWES. Responses for categorical variables were coded numerically, so they could be entered into a statistical program called JASP. JASP is an open-source software supported by the University of Amsterdam that uses R syntax to run its analyses. It has an interface very similar to IBM's SPSS statistical software.

Since Question 6 of the survey asked respondents to provide a written response and did not ask specific questions about whether respondents agree with the staff's recommendation or the lake should be dredged/saved, qualitative feedback needed to be converted to a quantitative format that was categorized into groupings. This made any analysis a somewhat subjective process where written feedback could be categorized differently depending on the reviewer.

Since this survey question asked about the opinion of staff's recommendation, the appropriate unit of analysis would be whether the respondent agreed with "staff's recommendation." The subcommittee's analysis focused on analyzing data and presenting findings with this frame of reference. Responses were coded as follows:

- 0 = Disagree with staff/Save the lake
- 1 = Agree with staff/Do not dredge
- 2 = Neutral
- 3 = Unclear
- 4 = Unclear - Likely supports saving the lake
- 5 = Unclear - Likely agrees with staff
- 6 = Disregard

If a response specifically stated that they disagreed with the staff's recommendation, that the lake should be dredged, that the lake should be saved, or that an offline lake option should be pursued, then it was coded as 0. If the response specifically stated that they agree with the staff's report, that the lake should not be dredged, or that the lake should return to nature, then it was coded as 1. Responses that provided reasons in favor of dredging but also referenced saving the County money or that stated they were neutral were coded as 2. When responses did not specifically reference whether they supported the staff's recommendation, they were considered "unclear" (coded as 3), but if an inference could be made based on the content of the comments, they were subsequently recoded as a 4 or 5 during a second review of the "unclear" responses. Responses were disregarded (coded as 6) if they were or "N/A" or had uninterpretable remarks like "asdf," "1," and "X."

Once the variables were coded, they were entered into JASP where descriptive statistics and crosstab/chi-squares analyses were conducted. Because of data limitations described in the sections that follow, the subcommittee was unable to conduct other robust tests such as independent sample t-tests or a regression analysis to measure statistical significance. The tests conducted for statistical significance were run twice, once using data filtered for only responses with a *definitive* agree or disagree response derived from Question 6 responses and a second time with the *Unclear - Likely supports saving the lake* and *Unclear - Likely agrees with staff* entries added to the respective agree/disagree responses.

In some cases, variable options were combined and recoded. One example is that familiarity with the Lake Accotink study. *Not Familiar* and *Somewhat Familiar*, originally coded 0 and 1, respectively, were recoded as 0 and label *Low Familiarity* in a new variable column within JASP. Similarly, *Very Familiar*, originally code as 2, was recoded as 1 with the label unchanged. This allowed for a dichotomy that consolidated the data for analysis.

The subcommittee also reviewed and analyzed the *The Future of Lake Accotink Park* (arcgis.com) story map website as context for the tests measuring for bias that may have been generated by the staff's efforts to promote their recommendation.

A 95% confidence interval was used for the analysis. The sections that follow include screenshots from the data output windows of the subcommittee’s independent analysis to provide evidence for the narratives that summarize the subcommittee’s findings.

The subcommittee was not able to determine specifically what the County’s survey methods were based on their survey report since they only described their methods as “standard social science analytical methods.”

How the open comment question responses were analyzed by County staff:

- All identifying information was deleted prior to analysis
- County staff used a standard social science analytical methods
- Each response was individually read and compared to a set of “codes”
- A second independent check of coded responses was performed
- Coded survey results were summarized as a percentage of all responses

County Staff’s Survey Report

Summary: Descriptive Statistics for Valid Surveys

There were 1,078 survey respondents, but 29 did not answer questions beyond the zip code question. The subcommittee’s analysis, therefore, analyzed data from the 1,049 usable survey responses.

Survey Responses with Data for Analysis

Descriptive Statistics

Count	
Valid	1049

Frequency Tables

Frequencies for Count

Count	Frequency	Percent	Valid Percent	Cumulative Percent
Survey Contained Data for Analysis	1049	100.000	100.000	100.000
Missing	0	0.000		
Total	1049	100.000		

Summary: Survey Respondents Providing an Opinion of the Staff’s Recommendation

Of the 1,049 responses analyzed, 850 contained responses to the question asking for respondents to share their opinion of the staff’s recommendation.”

Frequency Tables

Frequencies for Comments

Comments	Frequency	Percent	Valid Percent	Cumulative Percent
No	199	18.970	18.970	18.970
Yes	850	81.030	81.030	100.000
Missing	0	0.000		
Total	1049	100.000		

Summary: Descriptive Statistics for Qualitative Comments as Quantitative Data

Since the survey question asked about the opinion of staff's recommendation, the appropriate unit of analysis would be "agreement with staff's recommendation." The subcommittee's analysis looked at whether the respondent agrees or disagrees with the staff's recommendation.

- 318 respondents disagree with the staff's recommendation and/or specifically called for the lake to be saved (e.g. dredged, offline lake, etc.).
- 296 respondents agree with staff's recommendation and/or said the lake should not be dredged.
- 51 respondents had neutral responses that neither agree or disagree with the staff's recommendation.
- 11 responses were disregarded because they were or "N/A" or had incoherent remarks "asdf," "1," and "X", which reduced the number of usable comments down from 850 to 839 responses.
- Because of the qualitative to quantitative conversion that needed to be done to determine any kind of empirical measurement, there were 174 responses that were unclear whether they supported the staff's recommendation, but inferences could be made based on the content of the comments even if they did not specifically state they agree or disagree or whether the lake should be dredged/saved or not.
 - 115 of the "unclear" answers were determined to be unclear.
 - 47 inferred they disagree with staff/support saving the lake.
 - 12 inferred they likely agree with staff/do not want to dredge.
- When the inferred responses are added to the previous totals, the breakdown is as follows:
 - 365 respondents disagree with staff and/or specifically call for the lake to be saved (e.g. dredged, offline lake, etc.).
 - 308 respondents agree with staff and/or said the lake should not be dredged.
- There was a large shift in the percentage away from support for the staff's recommendation when the "likely" responses were added to the analysis.
 - Using the undelineated responses, the breakdown of total responses was 34.8% who agree with staff vs. 37.4% who disagree with staff.
 - Using the undelineated responses, the breakdown of total responses was 36.2% who agree with staff (a 1.4 percentage point increase) vs. 42.9% who disagree with staff (a 5.5 percentage point increase).

Frequency Tables

Frequencies for Agree

Agree	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree with staff/Save the lake	318	30.315	37.412	37.412
Agree with staff/Do not dredge	296	28.217	34.824	72.235
Neutral	51	4.862	6.000	78.235
Unclear	115	10.963	13.529	91.765
Unclear - Likely supports saving the lake	47	4.480	5.529	97.294
Unclear - Likely agrees with staff	12	1.144	1.412	98.706
Disregard	11	1.049	1.294	100.000
Missing	199	18.970		
Total	1049	100.000		

Unclear - Delineated

Frequency Tables

Frequencies for Agree2

Agree2	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree/Likely Disagree with staff/Save the lake	365	34.795	42.941	42.941
Agree/Likely Agree with staff/Do not dredge	308	29.361	36.235	79.176
Neutral	51	4.862	6.000	85.176
Unclear	115	10.963	13.529	98.706
Disregard	11	1.049	1.294	100.000
Missing	199	18.970		
Total	1049	100.000		

Unclear - Inferences added to likely response

The County staff's survey analysis used similar methods of quantifying qualitative data. Their breakdowns, however, did not follow the unit of analysis that would have been appropriate for the question they asked. The question asked survey takers to "share your opinion of the Fairfax County staff recommendation," but the staff's report summarized the content of the respondents comments. The note they included before their crosstab stated that County staff reported only if the comment *explicitly* referenced what they were reporting, thus making their overall numbers very different from the independent analysis of the subcommittee. The note also, in the opinion of the subcommittee, provided a difficult to understand explanation of the numbers they reported. In looking at the final bullet, "For example, only 53% of respondents expressed an explicit preference to dredge or not dredge. Of those expressing an explicit preference, only 26% of total respondents wanted to dredge the lake":

- 53% was based off of the sum of the 278 who *explicitly* referenced that they supported dredging + the 292 who *explicitly* referenced that they did not support dredging divided by the 1,078 survey respondents
 - $(278 + 292) / 1,078 = 53\%$
- 26% was based off of the 278 respondents who *explicitly* referenced that they supported dredging out of the total survey population of 1,078.
 - $278 / 1,078 = 26\%$
- 27% was based off of the 292 respondents who *explicitly* referenced that they did not support dredging out of the total survey population of 1,078.

- $292 / 1,078 = 27\%$

The County staff's statement used was inaccurate, therefore, since the second sentence of the note should have limited the percentage to "those expressing an explicit preference" as the population used to derive the percentage, not the total survey population.

A more accurate and clearer report would have stated, "Of the 1,078 total survey respondents, 570 (53%) expressed an explicit preference to dredge or not dredge. Of those expressing an explicit preference, only 49% of the total respondents wanted to dredge the lake."

- $(278 + 292) / 570 = 49\%$
- While the overall table provided a comparative percentage of those who did not support dredging, the narrative in this summary did not, thus giving readers the impression that there was only 26% support to dredge the lake when in reality it was closer to an even split between those who *explicitly* referenced dredging.

Notes on interpreting the results

- Each response was individually read twice; if any part of the response corresponded to any of the "codes," the row for that response was tagged accordingly
- This means that not all responses are tagged for each code, so results for any individual code will not equal 100%
- For example, only 53% of respondents expressed an explicit preference to dredge or not dredge. Of those expressing an explicit preference, only 26% of total respondents wanted to dredge the lake

County Staff's Report

Code	Yes	No	Both	% of Total Responded	% Yes of Total	% No of Total
Dredge the lake?	278	292		53%	26%	27%
Support offline lake option?	13	10		2%	1%	1%
Support transition to wetland?	130	26		14%	12%	2%
Concerned about a future “swamp”?	31	0		3%	3%	0%
Pace of the process (Y=rushed, N=too long)	16	23	2	4%	1%	2%
Concerned about env/ecol/wildlife impacts?	200	0		19%	19%	0%
Concerned about staff competency?	67	0		6%	6%	0%
Not enough info about alternatives or process?	175	0		16%	16%	0%
Need independent review?	9	0		1%	1%	0%
Concerned about costs?	215	14		21%	20%	1%
Cost estimates are questionable?	39	0		4%	4%	0%
Concerned about dredge impacts to neighborhood?	34	4		4%	3%	0%
Concerns about equity?	30	0		3%	3%	0%
Any interest in resuming park planning?	175	9		17%	16%	1%
Concerned about uncontrolled upstream dev?	72	0		7%	7%	0%
Concerned about downstream impacts w/o dredge?	47	0		4%	4%	0%

County Staff's Report

The tables below provide a side-by-side comparison between staff's report and the subcommittee's independent analysis. The totals in the County's analysis for "Disagree with Staff's Recommendation/Dredge the Lake/Support Offline Lake Option" was calculated by adding the "Yes" values for "Dredge the lake?" and "Support offline lake option" categories as well as the "No" values in the "Support transition to wetland?" category.

- 278 dredge–yes + 13 offline–yes + 26 wetlands–no

The totals in the County's analysis for "Agree with Staff Report/Transition to Wetland/Disagree with Dredging/Offline Lake" was calculated by adding the "No" values for "Dredge the lake?" and "Support offline lake option" categories as well as the "Yes" values in the "Support transition to wetland?" category.

- 292 dredge–no + 10 offline–no+ 130 wetlands–yes

The values for the subcommittee's analysis used the crosstab values reported previously in this section, reporting the percentage values as they appear with the "neutral," "unclear," and "disregard" percentages accounted for.

	Disagree with Staff's Recommendation/ Dredge the Lake/ Support Offline Lake Option		Agree with Staff Report/Transition to Wetland/Disagree with Dredging/Offline Lake	
County Staff's Analysis	317	42.3%	432	57.7%
Subcommittee's Analysis	318	37.4%	296	34.8%

	Disagree/Likely Disagree with Staff's Recommendation/ Dredge the Lake/ Support Offline Lake Option		Agree/Likely Agree with Staff Report/Transition to Wetland/Disagree with Dredging/Offline Lake	
County Staff's Analysis	317	42.3%	432	57.7%
Subcommittee's Analysis	365	42.9%	308	36.2%

Summary: Whether a Respondent's Zip Code is Within Lake Accotink's Borders

Of the 1,049 surveys analyzed, 14 did not list a zip code. Of the 1,035 remaining responses, 551 respondents or 53.2% lived in zip codes directly surrounding Lake Accotink as opposed to 484 respondents or 46.8% lived outside of Lake Accotink's boundaries.

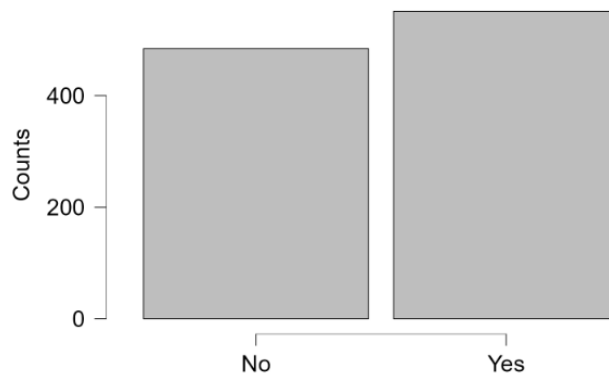
Frequency Tables

Frequencies for Zip2

Zip2	Frequency	Percent	Valid Percent	Cumulative Percent
No	484	46.139	46.763	46.763
Yes	551	52.526	53.237	100.000
Missing	14	1.335		
Total	1049	100.000		

Distribution Plots ▼

Zip2



Summary: Breakdown of Responses by Zip Code Relative to Lake Accotink's Borders

Of the 839 responses that could be used to argue whether or not the respondent supported the staff's recommendation, a total of 607 listed a zip code and responded whether they agree or disagree with the staff's recommendation. Of those, 325 respondents (53.5%) lived in zip codes directly bordering Lake Accotink:

- 22150 (Central Springfield): 59 responses
- 22151 (North Springfield, Ravensworth Farm, Kings Park): 167 responses
- 22152 (West Springfield): 99 responses

Conversely, 282 respondents (46.5%) lived in zip codes not directly surrounding Lake Accotink. The three most common zip codes were:

- 22003 (Annandale): 86 responses
- 22015 (Burke): 47 responses
- 22032 (Kings Park West): 31 responses

A total of 665 listed a zip code and responded whether they agree/likely agree or disagree/likely disagree with the staff recommendation. Of those, 356 respondents (53.5%) lived in zip codes directly bordering Lake Accotink:

- 22150 (Central Springfield): 65 responses
- 22151 (North Springfield, Ravensworth Farm, Kings Park): 184 responses
- 22152 (West Springfield): 107 responses

Conversely, 309 respondents (46.5%) lived in zip codes not directly surrounding Lake Accotink. The three most common zip codes were:

- 22003 (Annandale): 92 responses
- 22015 (Burke): 52 responses
- 22032 (Kings Park West): 35 responses

There was no change in the percentage breakdown of respondents by zip code directly bordering Lake Accotink between now the two analyses. The zip codes with the greatest number of respondents also remained unchanged.

**Respondents by Zip Code Bordering
Lake Accotink:
Agree vs. Disagree with Staff
Recommendation Only**

Contingency Tables ▼

Zip	Zip2		Total
	No	Yes	
20111	1	0	1
20120	2	0	2
20151	1	0	1
20171	2	0	2
20191	1	0	1
20715	1	0	1
22003	86	0	86
22015	47	0	47
22016	1	0	1
22030	8	0	8
22031	7	0	7
22032	31	0	31
22033	4	0	4
22035	2	0	2
22039	3	0	3
22041	1	0	1
22042	6	0	6
22044	2	0	2
22079	2	0	2
22124	3	0	3
22150	0	59	59
22151	0	167	167
22152	0	99	99
22153	19	0	19
22303	8	0	8
22307	1	0	1
22308	1	0	1
22310	17	0	17
22312	6	0	6
22315	17	0	17
23153	1	0	1
85711	1	0	1
Total	282	325	607

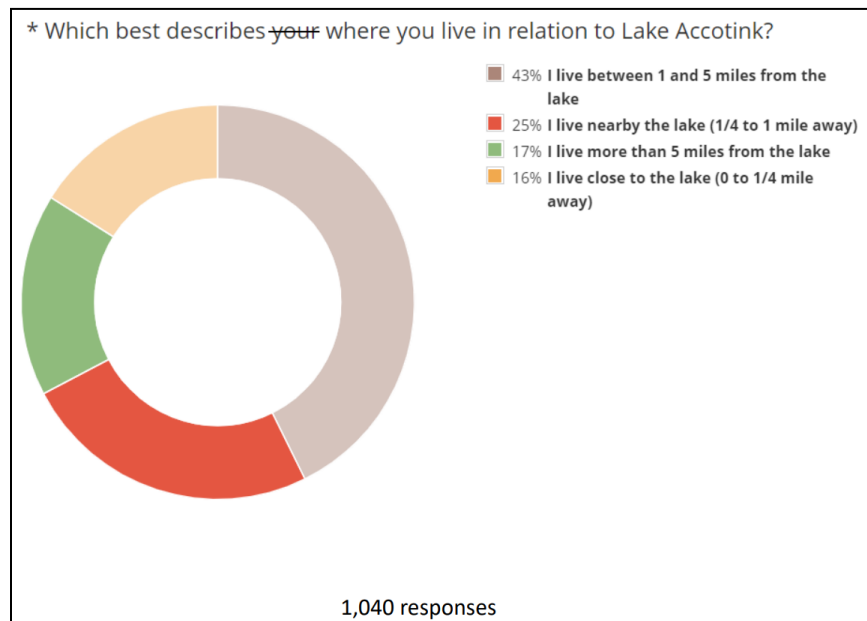
**Respondents by Zip Code Bordering
Lake Accotink:
Agree/Likely Agree vs. Disagree/Likely
Disagree with Staff Recommendation Only**

Contingency Tables

Zip	Zip2		Total
	No	Yes	
20111	1	0	1
20120	2	0	2
20151	1	0	1
20171	2	0	2
20191	1	0	1
20715	1	0	1
22003	92	0	92
22015	52	0	52
22016	1	0	1
22030	10	0	10
22031	8	0	8
22032	35	0	35
22033	5	0	5
22035	2	0	2
22039	3	0	3
22041	2	0	2
22042	6	0	6
22044	3	0	3
22066	1	0	1
22079	2	0	2
22124	3	0	3
22150	0	65	65
22151	0	184	184
22152	0	107	107
22153	20	0	20
22303	8	0	8
22307	1	0	1
22308	1	0	1
22310	18	0	18
22312	6	0	6
22315	19	0	19
23153	1	0	1
84121	1	0	1
85711	1	0	1
Total	309	356	665

Summary: Analysis of Agree/Disagree by Zip Code Relative to Lake Accotink's Borders

The subcommittee chose to use zip code instead of the "Where you live in relation to the lake" for data quality purposes. The zip code response was exact, whereas the options provided for distance from the lake had an overlap between the selections, thereby eliminating responses from being captured as an ordinal variable that could be used for statistical significance tests such as independent sample t-tests or a regression analysis. For example, a respondent who lives a quarter of a mile from the lake could select both the "close" and "nearby" options, and someone who lived a mile from the lake could select both "nearby" and "between 1-5 miles." This would skew the analysis depending on the option the respondent selected.



County Staff's Survey Report

Using a crosstab/chi-square analysis for statistical significance to measure support/likely support for the staff's recommendation broken down by zip code:

- 67.4% (219 respondents) disagree with the staff's recommendation vs. 32.6% (106 respondents) who agree in zip codes surrounding Lake Accotink.
- 34.4% (97 respondents) disagree with the staff's recommendation vs. 65.6% (282 respondents) who agree in zip codes outside of the Lake Accotink borders.
- In other words, those who live near Lake Accotink disagree with the staff's recommendation by a ratio of approximately 2:1 while the ratio is reversed for those living outside of Lake Accotink's borders.
- The difference between these values and the expected counts is statistically significant (p-value = ~.000).

When looking at the agree/likely agree vs. disagree/likely disagree figures, the results largely mirrored the previous analysis of those who *definitely* indicate they agree or disagree with the staff's recommendation, but there is a greater shift towards disagreeing with the staff's recommendation/saving the lake.

- 69.1% (246 respondents) disagree with the staff's recommendation vs. 30.9% (110 respondents) who agree in zip codes surrounding Lake Accotink.
- 37.9% (117 respondents) disagree with the staff's recommendation vs. 62.1% (192 respondents) who agree in zip codes outside of the Lake Accotink borders.
- In other words, those who live near Lake Accotink disagree with the staff's recommendation by a ratio of approximately 2:1 while the ratio is reversed for those living outside of Lake Accotink's borders.
- The difference between these values and the expected counts is statistically significant (p-value = $\sim .000$).

Agree vs. Disagree with Staff Recommendation Based on Zip Code Surrounding Lake Accotink

Contingency Tables

Agree		Zip2		Total
		No	Yes	
Disagree with staff/Save the lake	Count	97.000	219.000	316.000
	Expected count	146.807	169.193	316.000
Agree with staff/Do not dredge	Count	185.000	106.000	291.000
	Expected count	135.193	155.807	291.000
Total	Count	282.000	325.000	607.000
	Expected count	282.000	325.000	607.000

Chi-Squared Tests

	Value	df	p
X ²	65.832	1	< .001
N	607		

Agree/Likely Agree vs. Disagree/Likely Disagree with Staff Recommendation Based on Zip Code Surrounding Lake Accotink

Contingency Tables

Agree2		Zip2		Total
		No	Yes	
Disagree/Likely Disagree with staff/Save the lake	Count	117.000	246.000	363.000
	Expected count	168.672	194.328	363.000
Agree/Likely Agree with staff/Do not dredge	Count	192.000	110.000	302.000
	Expected count	140.328	161.672	302.000
Total	Count	309.000	356.000	665.000
	Expected count	309.000	356.000	665.000

Chi-Squared Tests

	Value	df	p
X ²	65.111	1	< .001
N	665		

Summary: Self-Reported Activities at Lake Accotink Park

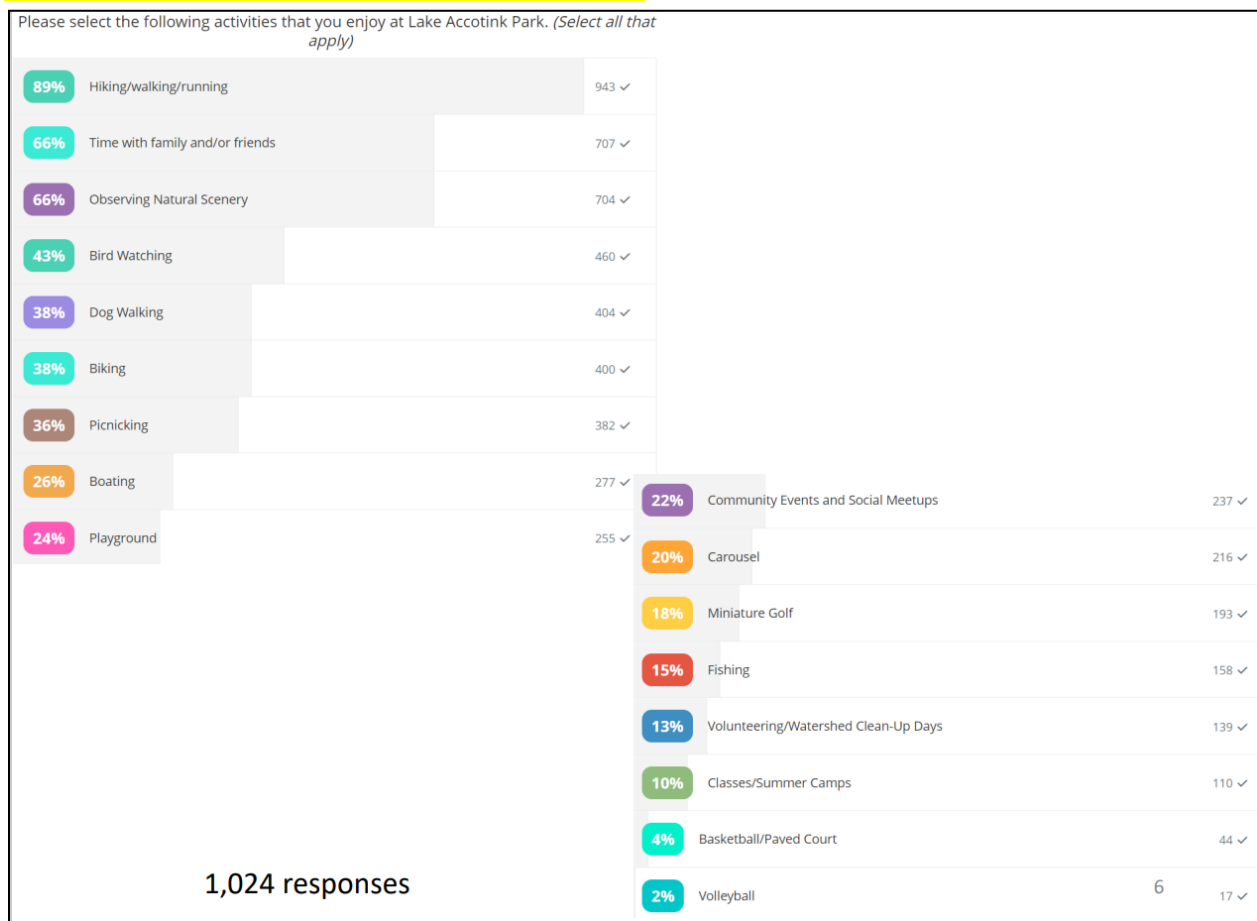
Across the board, more people did *not* do the activities asked about in the survey than those who did with the exceptions of hiking/walking/running, observing natural scenery, and spending time with family/friends. The subcommittee noted the majority of these activities involve Lake Accotink Park as a whole rather than the lake itself.

	Yes	No
Boating	262	816
Picnicking	368	710
Volunteering/Watershed Clean-Up Days	132	946
Hiking/Walking/Running	908	170
Dog Walking	388	690
Miniature Golf	187	891
Playground	247	831
Observing Natural Scenery	682	396
Time with Family and/or Friends	687	391
Fishing	148	930
Classes/Summer Camps	104	974
Community Events and Social Meetups	227	851

Biking	388	690
Volleyball	16	1,062
Carousel	207	871
Basketball/Paved Court	41	1,037
Bird Watching	444	634

Of the 1,078 total survey takers, 1,024 answered these questions. The County staff's numbers were higher in every category in their report. This could be attributed to a miscalculation when adding numbers since the raw output of the survey listed out responses to this question in one output field (i.e. as a string value) that needed to be separated either manually or using Excel's "split text to columns" feature using a semicolon as a delimiter.

NOTE: Need to go back and re-run subcommittee's numbers to see if there was a mistake in the semicolon delineation when the values were split.



County Staff's Survey Report

Please select the following activities that you enjoy at Lake Accotink Park. (Select all that apply) [#179358]
 Picnicking; Hiking/walking/running; Dog Walking; Observing Natural Scenery; Time with family and/or friends; Biking
 Hiking/walking/running; Dog Walking; Carousel; Playground; Observing Natural Scenery; Picnicking; Boating; Time with family and/or friends
 Boating; Picnicking; Community Events and Social Meetups; Hiking/walking/running; Time with family and/or friends

County Staff's Raw Data Output for the Activities Question

Summary: The Impact of Aquatic Recreation on Responses

The list of activities was combined as *aquatic* and *non-aquatic* to better separate lake-only activities from those more suitable for the park. The only aquatic activities from the list were “boating” and “fishing.” Overall, respondents do not engage in aquatic activities by a margin of 2.3:1 for the 607 responses that *definitely* indicate whether the respondent agrees or disagrees with the staff’s recommendation and by a slightly wider margin of 2.4:1 for the 665 agree/likely agree or disagree/likely disagree responses. Only the crosstab/chi-square for the agree/disagree analysis is statistically significant with their values greatly varying from their expected counts (p-value = ~.000).

Contingency Tables

		Aquatic		Total
		Yes	No	
Disagree with staff/Save the lake	Count	148.000	168.000	316.000
	Expected count	95.269	220.731	316.000
Agree with staff/Do not dredge	Count	35.000	256.000	291.000
	Expected count	87.731	203.269	291.000
Total	Count	183.000	424.000	607.000
	Expected count	183.000	424.000	607.000

Chi-Squared Tests

	Value	df	p
X ²	87.158	1	< .001
N	607		

Contingency Tables

Agree2		Aquatic		Total
		Yes	No	
Disagree/Likely Disagree with staff/Save the lake	Count	105.000	258.000	363.000
	Expected count	106.444	256.556	363.000
Agree/Likely Agree with staff/Do not dredge	Count	90.000	212.000	302.000
	Expected count	88.556	213.444	302.000
Total	Count	195.000	470.000	665.000
	Expected count	195.000	470.000	665.000

Chi-Squared Tests

	Value	df	p
X ²	0.061	1	0.805
N	665		

Summary: Familiarity with the Study

The percentage breakdown of the familiarity of respondents with the dredging plan was nearly identical when evaluating the disagree/agree dataset and the disagree/likely disagree or agree/likely agree dataset with approximately 7% not familiar, 60% familiar, and 30% very familiar.

The County’s analysis of the survey had similar numbers for “familiar” and “very familiar” (59% and 30% respectively), but “not familiar” was 4 percentage points higher (11%) for the County’s analysis since they reported all survey taker responses, regardless if the respondent provided an opinion on the staff’s recommendation to not proceed with dredging Lake Accotink or pursuing the offline lake option.

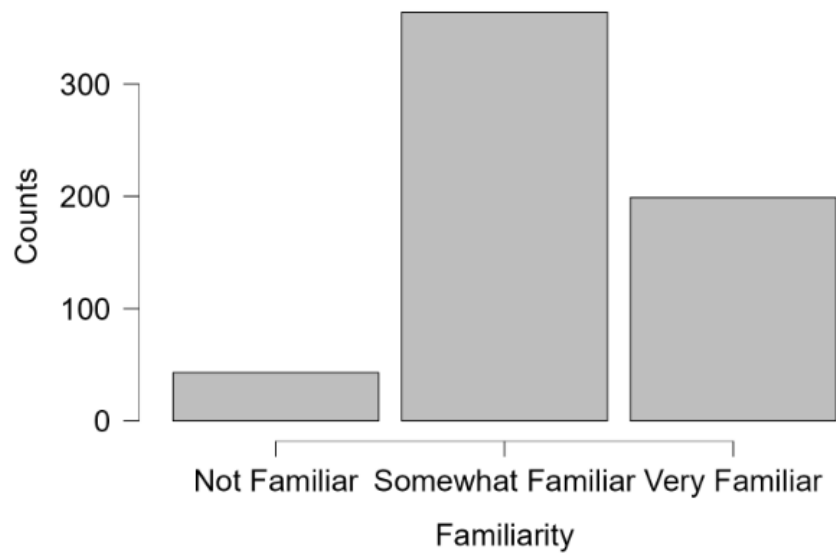
Frequency Tables

Frequencies for Familiarity

Familiarity	Frequency	Percent	Valid Percent	Cumulative Percent
Not Familiar	43	7.084	7.096	7.096
Somewhat Familiar	364	59.967	60.066	67.162
Very Familiar	199	32.784	32.838	100.000
Missing	1	0.165		
Total	607	100.000		

Distribution Plots

Familiarity

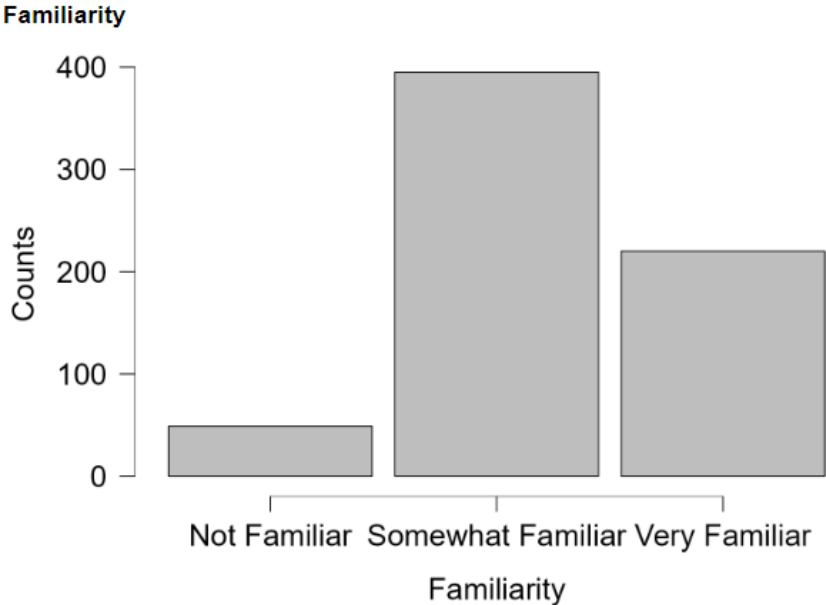


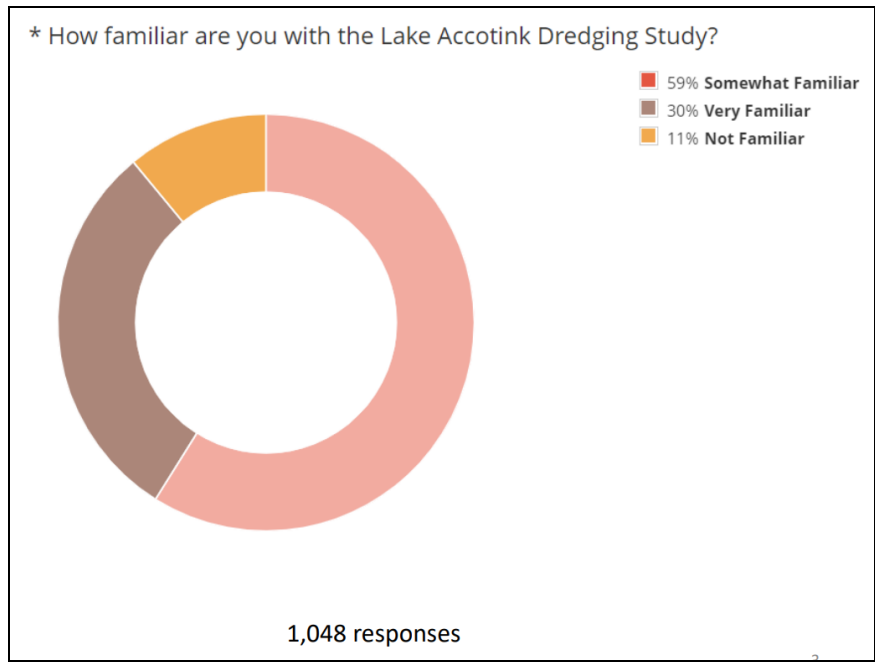
Frequency Tables

Frequencies for Familiarity

Familiarity	Frequency	Percent	Valid Percent	Cumulative Percent
Not Familiar	49	7.368	7.380	7.380
Somewhat Familiar	395	59.398	59.488	66.867
Very Familiar	220	33.083	33.133	100.000
Missing	1	0.150		
Total	665	100.000		

Distribution Plots





County Staff's Survey Report

Summary: Familiarity with the Study vs. Support for Staff's Recommendation

The overall number of survey takers in both the the disagree/agree dataset and the disagree/likely disagree or agree/likely agree dataset indicated that they had limited familiarity with the dredging study by a margin of 2:1. Among the 199 respondents who were very familiar with the study, 121 respondents (60.8%) disagreed with the staff's recommendation vs. 78 (39.2%) who agreed for the disagree/agree analysis. The 408 respondents with limited familiarity agreed more than disagreed with the staff's recommendation, but by a closer margin (195 or 47.8% who disagreed/likely disagreed vs. 213 or 52.% who agreed/likely agreed). This was statistically significant (p-value = .003)

For the disagree/likely disagree or agree/likely agree dataset, the responses mirrored the previous dataset for those who were familiar with the dredging study, but there was a 1.9 percentage point shift towards disagreeing with the staff's recommendation (138 respondents or 62.7% who disagree vs. 82 or 37.3% who agree). This congruency not only reflected in the disagree/likely disagree and agree/likely disagree dataset, but the opinion actually reserved, meaning there were more respondents who disagreed/likely disagreed with the staff's recommendation (225 respondents or 50.6%) vs. those agreed/likely agreed (213 or 49.4%). The statistical significance was exactly the same as the previous analysis (p-value = .003).

Contingency Tables

Agree		Familiarity2		Total
		Limited Familiarity	Very Familiar	
Disagree with staff/Save the lake	Count	195.000	121.000	316.000
	Expected count	212.402	103.598	316.000
Agree with staff/Do not dredge	Count	213.000	78.000	291.000
	Expected count	195.598	95.402	291.000
Total	Count	408.000	199.000	607.000
	Expected count	408.000	199.000	607.000

Chi-Squared Tests

	Value	df	p
X ²	9.071	1	0.003
N	607		

Contingency Tables

Agree2		Familiarity2		Total
		Limited Familiarity	Very Familiar	
Disagree/Likely Disagree with staff/Save the lake	Count	225.000	138.000	363.000
	Expected count	242.910	120.090	363.000
Agree/Likely Agree with staff/Do not dredge	Count	220.000	82.000	302.000
	Expected count	202.090	99.910	302.000
Total	Count	445.000	220.000	665.000
	Expected count	445.000	220.000	665.000

Chi-Squared Tests

	Value	df	p
X ²	8.789	1	0.003
N	665		

Summary: Frequency of Visiting Lake Accotink

The bulk of the values were between weekly, monthly, and occasionally for both the disagree/agree data set and the disagree/likely disagree or agree/likely agree dataset. Those three categories made up 86.1% and 85.4% of all responses, respectively. “Occasionally,” was the greatest response followed by “weekly.” For the disagree/agree dataset, the breakdown for these two categories was 202 or 33.3% (“Occasionally”) and 186 responses or 30.6% (“Weekly”). For the disagree/likely disagree or agree/likely agree dataset, the breakdown was 214 or 32.2% (“Occasionally”) and 201 responses or 30.2% (“Weekly”).

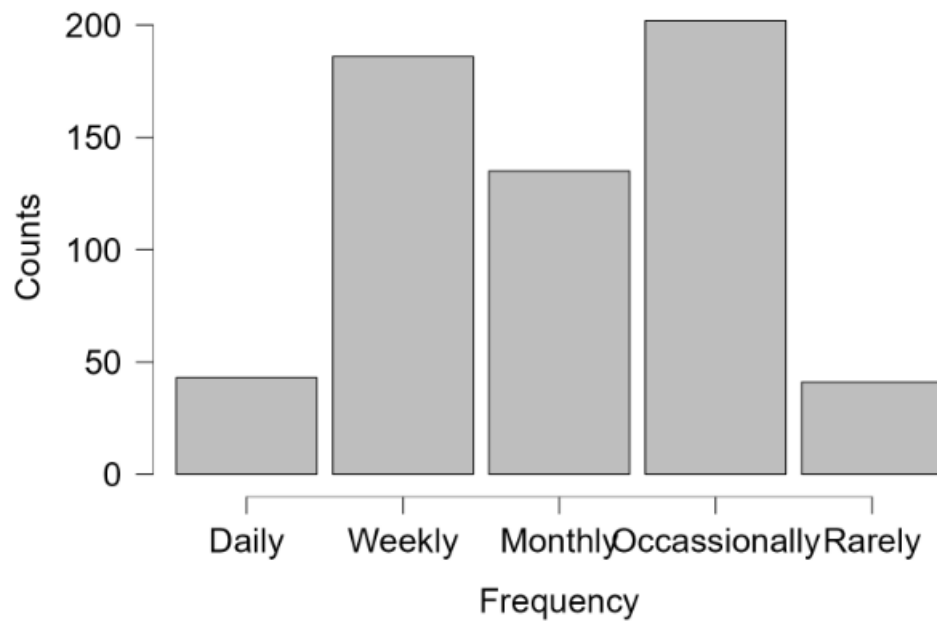
Frequency Tables

Frequencies for Frequency

Frequency	Frequency	Percent	Valid Percent	Cumulative Percent
Daily	43	7.084	7.084	7.084
Weekly	186	30.643	30.643	37.727
Monthly	135	22.241	22.241	59.967
Occasionally	202	33.278	33.278	93.245
Rarely	41	6.755	6.755	100.000
Missing	0	0.000		
Total	607	100.000		

Distribution Plots

Frequency



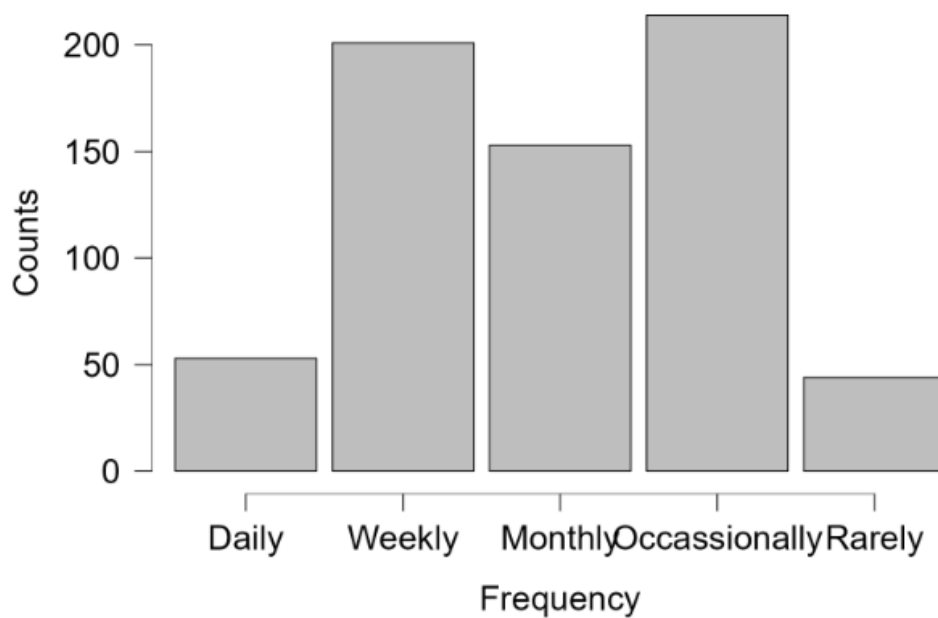
Frequency Tables

Frequencies for Frequency

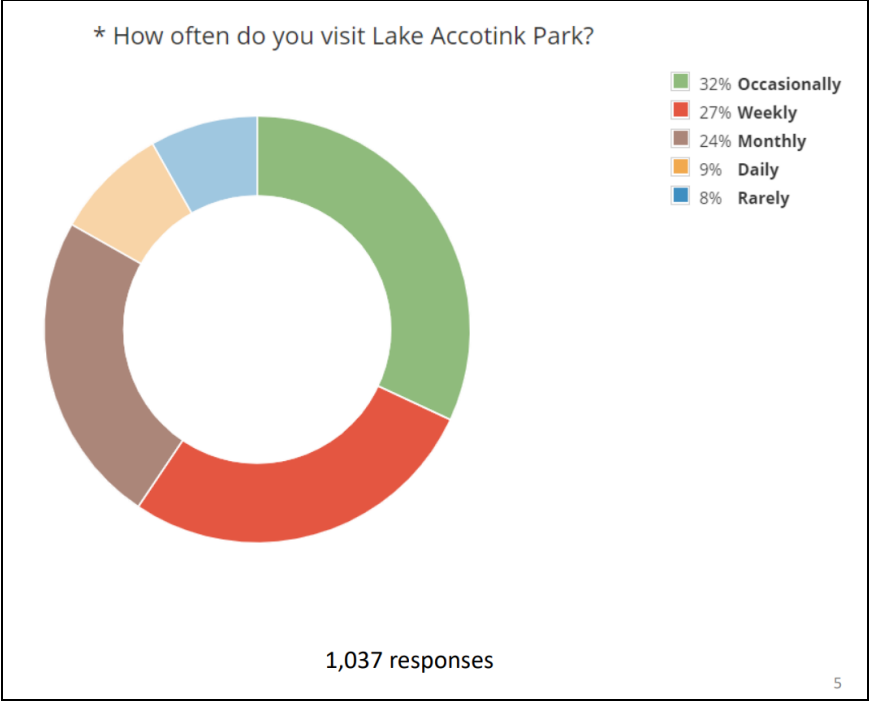
Frequency	Frequency	Percent	Valid Percent	Cumulative Percent
Daily	53	7.970	7.970	7.970
Weekly	201	30.226	30.226	38.195
Monthly	153	23.008	23.008	61.203
Occasionally	214	32.180	32.180	93.383
Rarely	44	6.617	6.617	100.000
Missing	0	0.000		
Total	665	100.000		

Distribution Plots

Frequency



The County staff's report similarly had discrepancies between the overall numbers since they reported on all survey takers regardless if the respondent provided an opinion on the staff's recommendation to not proceed with dredging Lake Accotink or pursuing the offline lake option.



County Staff's Survey Report

Summary: Frequency of Visiting Lake Accotink Recoded/Recategorized

Unlike “daily,” “weekly,” and “monthly” that are time bound, “occasionally,” and “rarely” are open to interpretation. As such, the subcommittee recategorized the values into a more ordinal fashion with “weekly” and a “daily” recoded to “high frequency,” “monthly” recoded/relabelled as “medium frequency,” and “occasionally” and “rarely” recoded as “low frequency.” This recoding resulted in a greater shift for “low frequency” vs. “high frequency” for the disagree/agree dataset and a more even distribution between the disagree/likely disagree or agree/likely agree dataset. “Medium frequency” was the lowest value for both datasets.

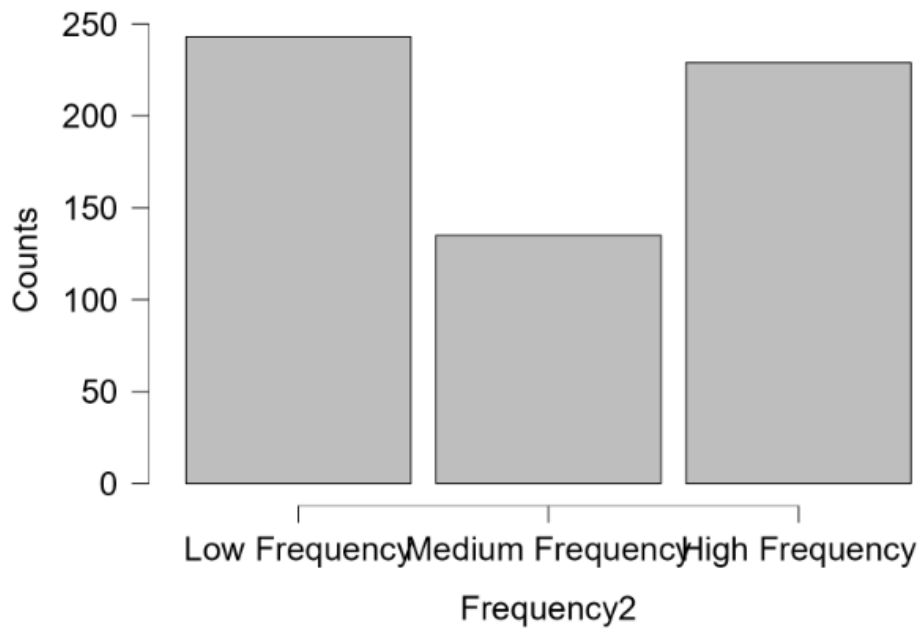
Frequency Tables

Frequencies for Frequency2

Frequency2	Frequency	Percent	Valid Percent	Cumulative Percent
Low Frequency	243	40.033	40.033	40.033
Medium Frequency	135	22.241	22.241	62.273
High Frequency	229	37.727	37.727	100.000
Missing	0	0.000		
Total	607	100.000		

Distribution Plots

Frequency2



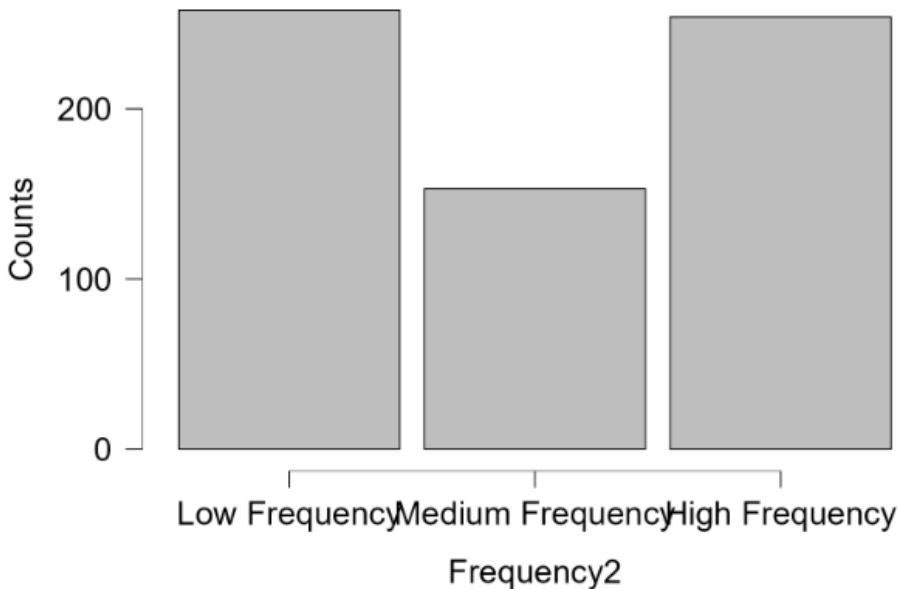
Frequency Tables

Frequencies for Frequency2

Frequency2	Frequency	Percent	Valid Percent	Cumulative Percent
Low Frequency	258	38.797	38.797	38.797
Medium Frequency	153	23.008	23.008	61.805
High Frequency	254	38.195	38.195	100.000
Missing	0	0.000		
Total	665	100.000		

Distribution Plots

Frequency2



Summary: Frequency of Visiting Lake Accotink vs. Agreement with Staff's Recommendation

While “low frequency” was the most common answer of Lake Accotink Park attendance, they were also the group with highest percentage – and the only group – who favored agreement with the staff’s recommendation. Both medium and high frequency groups for both datasets disagreed with the staff’s recommendation.

- “Low frequency” respondents agreed with the staff recommendation 68.7% vs. 31.3% disagree for the agree/disagree dataset and 65.9% vs. 34.1% for the agree/likely agree or disagree/likely disagree dataset.

- “Medium frequency” respondents disagreed with the staff recommendation 68.7% vs. 43.7% agree for the agree/disagree dataset and 71.6% vs. 28.4% for the agree/likely agree or disagree/likely disagree dataset.
- “High frequency” respondents disagreed with the staff recommendation 57.5% vs. 42.5% agree for the agree/disagree dataset and 73.6% vs. 26.4% for the agree/likely agree or disagree/likely disagree dataset.
- Both analyses were statistically significant (p-value = ~.000).
- The variance between each category widened when moving from the agree/disagree dataset to the agree/likely agree or disagree/likely disagree dataset.

Frequency x Agree vs. Disagree

Contingency Tables

Agree		Frequency2			Total
		Low Frequency	Medium Frequency	High Frequency	
Disagree with staff/Save the lake	Count	76.000	76.000	164.000	316.000
	Expected count	126.504	70.280	119.216	316.000
Agree with staff/Do not dredge	Count	167.000	59.000	65.000	291.000
	Expected count	116.496	64.720	109.784	291.000
Total	Count	243.000	135.000	229.000	607.000
	Expected count	243.000	135.000	229.000	607.000

Chi-Squared Tests

	Value	df	p
X ²	78.121	2	< .001
N	607		

Frequency of Park visit x Agree/Disagree with staff recommendation

Contingency Tables

Agree2		Frequency2			Total
		Low Frequency	Medium Frequency	High Frequency	
Disagree/Likely Disagree with staff/Save the lake	Count	88.000	88.000	187.000	363.000
	Expected count	140.833	83.517	138.650	363.000
Agree/Likely Agree with staff/Do not dredge	Count	170.000	65.000	67.000	302.000
	Expected count	117.167	69.483	115.350	302.000
Total	Count	258.000	153.000	254.000	665.000
	Expected count	258.000	153.000	254.000	665.000

Chi-Squared Tests

	Value	df	p
X ²	81.301	2	< .001
N	665		

Summary: Measuring for Potential Bias – Agree vs. Disagree Responses

The subcommittee also considered whether staff's continual reference to the \$395 million cost (that sometimes included the 25-year timeline and sometimes did not), their repeated comparison of Lake Accotink to Huntley Meadows, or their often cited hauling trucks going through community neighborhoods may have generated a bias among survey respondents. Of the 839 usable responses that could be used to argue whether the respondent supported the staff's recommendation or not, 59 responses (7.0%) referenced a *numeric* cost estimation (e.g. \$395 million, approximately \$400 million, hundreds of millions, etc.). This does not include responses that generically referenced "cost." When looking at the disagree/agree data alone. According to the crosstab/chi-square analysis:

- 23 of the responses disagree with staff's recommendation while 28 agree.
- The variance is not a statistically significant finding (p-value = .191)

For the Huntley Meadow variable, the crosstab/chi-square analysis for responses that disagree/agree alone:

- 10 of the responses disagree with the staff's recommendation while 37 agree.
- This variance is a statistically significant finding (p-value = ~.000)

For the trucks variable, the crosstab/chi-square analysis for responses that disagree/agree alone:

- 10 of the responses disagree with the staff's recommendation while 7 agree.
- This is not a statistically significant finding (p-value = .334)

Contingency Tables

Agree		Cost		Total
		No	Yes	
Disagree with staff/Save the lake	Count	295.000	23.000	318.000
	Expected count	295.638	22.362	318.000
Agree with staff/Do not dredge	Count	268.000	28.000	296.000
	Expected count	275.185	20.815	296.000
Neutral	Count	49.000	2.000	51.000
	Expected count	47.414	3.586	51.000
Unclear	Count	111.000	4.000	115.000
	Expected count	106.913	8.087	115.000
Unclear - Likely supports saving the lake	Count	46.000	1.000	47.000
	Expected count	43.695	3.305	47.000
Unclear - Likely agrees with staff	Count	11.000	1.000	12.000
	Expected count	11.156	0.844	12.000
Total	Count	780.000	59.000	839.000
	Expected count	780.000	59.000	839.000

Chi-Squared Tests ▼

	Value	df	p
X ²	7.424	5	0.191
N	839		

Contingency Tables ▼

Agree		Huntley Meadows		Total
		No	Yes	
Disagree with staff/Save the lake	Count	308.000	10.000	318.000
	Expected count	296.396	21.604	318.000
Agree with staff/Do not dredge	Count	259.000	37.000	296.000
	Expected count	275.890	20.110	296.000
Neutral	Count	48.000	3.000	51.000
	Expected count	47.535	3.465	51.000
Unclear	Count	109.000	6.000	115.000
	Expected count	107.187	7.813	115.000
Unclear - Likely supports saving the lake	Count	47.000	0.000	47.000
	Expected count	43.807	3.193	47.000
Unclear - Likely agrees with staff	Count	11.000	1.000	12.000
	Expected count	11.185	0.815	12.000
Total	Count	782.000	57.000	839.000
	Expected count	782.000	57.000	839.000

Chi-Squared Tests

	Value	df	p
X ²	25.897	5	< .001
N	839		

Contingency Tables ▼

Agree		Trucks		Total
		No	Yes	
Disagree with staff/Save the lake	Count	308.000	10.000	318.000
	Expected count	309.282	8.718	318.000
Agree with staff/Do not dredge	Count	289.000	7.000	296.000
	Expected count	287.886	8.114	296.000
Neutral	Count	50.000	1.000	51.000
	Expected count	49.602	1.398	51.000
Unclear	Count	114.000	1.000	115.000
	Expected count	111.847	3.153	115.000
Unclear - Likely supports saving the lake	Count	44.000	3.000	47.000
	Expected count	45.712	1.288	47.000
Unclear - Likely agrees with staff	Count	11.000	1.000	12.000
	Expected count	11.671	0.329	12.000
Total	Count	816.000	23.000	839.000
	Expected count	816.000	23.000	839.000

Chi-Squared Tests

	Value	df	p
X ²	5.724	5	0.334
N	839		

Summary: Measuring for Potential Bias – Agree/Likely Agree and Disagree/Likely Disagree Responses

Because very little counts were added to the total when combining agree/likely agree and disagree/likely disagree, the overall totals and statistical significance (p-values) followed the same trend as the straight agree/disagree analysis. Only the Huntley Meadows variable was statistically significant (p-value = ~.000).

Contingency Tables

Agree2		Huntley Meadows		
		No	Yes	Total
Disagree/Likely Disagree with staff/Save the lake	Count	355.000	10.000	365.000
	Expected count	340.203	24.797	365.000
Agree/Likely Agree with staff/Do not dredge	Count	270.000	38.000	308.000
	Expected count	287.075	20.925	308.000
Neutral	Count	48.000	3.000	51.000
	Expected count	47.535	3.465	51.000
Unclear	Count	109.000	6.000	115.000
	Expected count	107.187	7.813	115.000
Total	Count	782.000	57.000	839.000
	Expected count	782.000	57.000	839.000

Chi-Squared Tests

	Value	df	p
X ²	24.941	3	< .001
N	839		

Contingency Tables ▼

Agree2		Trucks		
		No	Yes	Total
Disagree/Likely Disagree with staff/Save the lake	Count	352.000	13.000	365.000
	Expected count	354.994	10.006	365.000
Agree/Likely Agree with staff/Do not dredge	Count	300.000	8.000	308.000
	Expected count	299.557	8.443	308.000
Neutral	Count	50.000	1.000	51.000
	Expected count	49.602	1.398	51.000
Unclear	Count	114.000	1.000	115.000
	Expected count	111.847	3.153	115.000
Total	Count	816.000	23.000	839.000
	Expected count	816.000	23.000	839.000

Chi-Squared Tests

	Value	df	p
X ²	2.573	3	0.462
N	839		

Potential Bias Resulting from *The Future of Lake Accotink Park (arcgis.com)* Story Map

The subcommittee believes the County staff's emphasis on *The Future of Lake Accotink Park (arcgis.com)* story map may have generated bias for the survey. As a reminder, before respondents took the survey on Engage Fairfax County, they had the option of clicking a link to *The Future of Lake Accotink Park (arcgis.com)* story map, which appeared above the survey questions. This website was developed in advance of the February 15, 2023 virtual meeting that

kicked off the community input process following the announcement of staff's recommendation not to dredge Lake Accotink.

From a visual perspective, the photo selection does not portray the vitality of Lake Accotink and Lake Accotink Park and instead paints an environmentally unfriendly picture of what dredging will mean. The website uses the same photo of deforestation three times and shows one of the "50,000 greenhouse-emitting trucks" not on a residential neighborhood road but on a highway in rush hour traffic (one picture used twice and a second photo used once). The truck photo is actually an iStock photo of a "busy Australian highway at peak hour" (stock photo ID: 510399253).



In the opinion of the subcommittee, the headings of the story map website also lead visitors towards adoption of the staff's recommendation with the following headers:

1. How We Got Here
2. The Challenges of Dredging
3. Reconsidering the Offline Lake
4. Reimagining Lake Accotink Park

The introductory section ends with a table that showed why the 2018 dredging plan was no longer feasible. The *How We Got Here* section shows aerial views of the lake deteriorating since the 2008 dredge and also included a photo of an empty lake.

The Challenge of Dredging section is a fairly objective section that explains the process of dredging, but it includes multiple photos of the deforestation and trucks images previously discussed. The body text used in this section is 19.2px size Noto Serif font but then transitions to 23px when it begins discussing the cost of dredging. The \$95 million and \$300 million figures are bolded. This larger font size continues into the conclusion of this section where it says, "County staff recommend that Lake Accotink not be dredged due to significant community and environmental impacts and excessive cost." The size also continues into the introduction portion of the *Reconsidering the Offline Lake* section. This section then discusses how even an offline lake would cause impacts like "truck traffic," "Recreational Facility/Trail Use Limitation,"

“Construction Noise,” “Tree Clearing,” “Wetland & Stream Disturbance,” and “Habitat Loss.” These impact boxes are in the smaller 19.2px Noto Serif font, but the size then increases, again, when discussing cost and the staff’s recommendation. There are no counterarguments presented on the benefits of dredging.

The screenshot displays a web browser window at the URL <https://storymaps.arcgis.com/stories/b85512da45b8420085167291998d19af>. The page title is "The Future of Lake Accotink Park". The main content area features a satellite map of Lake Accotink Park with several impact boxes overlaid. The first box, titled "Waterfield Park:", contains the text: "Permanent loss of forested wetland and upland forest for construction of dewatering pad for use during base dredging and maintenance dredging events." The second box, titled "Southern Drive:", contains the text: "Potential for permanent loss of wetlands and temporary stream impacts for construction of dewatering pad for use during base dredging and maintenance dredging events." The third box, titled "Cross-County Trail:", contains the text: "Wetland and stream impacts during pipeline installation; disturbed wetlands and stream banks would be restored." An accessibility inspector is open over the first box, showing details for the paragraph element, including its bounding box (371.2 x 190.85), color (#304E4E), font (19.2px 'Noto Serif', serif), and role (paragraph). The developer tools are also open, showing the HTML structure of the page and the CSS styles for the content area.

Waterfield Park:
Permanent loss of forested wetland and upland forest for construction of dewatering pad for use during base dredging and maintenance dredging events.

Southern Drive:
Potential for permanent loss of wetlands and temporary stream impacts for construction of dewatering pad for use during base dredging and maintenance dredging events.

Cross-County Trail:
Wetland and stream impacts during pipeline installation; disturbed wetlands and stream banks would be restored.

Challenges of Dredging

Reconsidering the Offline Lake

Reimagi

The cost of dredging is estimated at \$95 million, which is more than 3x higher than what was anticipated in 2016. An additional \$300 million would be required for maintenance dredging over the first 20 years after completion of the initial dredging project. Refer to the [Lake Accotink Dredging Project Page](#) for more information.

Many Factors Impact Project Cost

43% Increase in Required Sediment Removal Volume

Inflation / Supply Chain Impacts (>15% Consumer Price Index Increase Over Last 3 Years)

Sediment Properties Limit Onsite Reuse/Disposal

In the final section, *Reimagining Lake Accotink Park*, the paragraph headings then shift to a more optimistic tone, such as “Adaptive Management for Community Benefit” and “A Pivotal Moment in the Master Planning Process.” There is a pull quote that says that “Preserving and capitalizing on the natural processes and resources of the park and bringing environmental restoration to the forefront” can be accomplished with the transition to a wetland. The photos then show vibrant wildlife, lush greenery, artist-rendered structures not currently at Lake Accotink Park, and people actively using facilities.

Conclusion

The subcommittee believes that the survey had flawed methodology in the data collection resulting from a poor design. The open-ended questions measured qualitative data that needed to be converted into quantitative data. This led to nearly a quarter of survey takers not responding to the single question pertaining to agreement with the staff’s recommendations to not dredge Lake Accotink or to pursue an offline lake option. The responses were ambiguous with subjective interpretation of data, and the County staff’s survey report did not align with the subcommittee’s independent analysis in many areas.

Since the questions did not use a Likert scale (e.g. a scale of 1-5) for a more thorough data capture, the subcommittee could not perform a more robust analysis such as independent samples t-tests or multiple linear regression to see if there are additional correlations across variables. The survey could not be analyzed enough to build different data models that demonstrate which variables have greater explanatory power in how a survey taker responded to questions.

The County's survey report was misleading in that it fundamentally reported on data that did not respond to the unit of analysis that should have been reported on: The survey taker's agreement or disagreement with the staff's recommendation. The strict interpretation of what constituted support for dredging Lake Accotink or an offline lake option was dependent on whether a respondent *explicitly* mentioned keywords in their survey, so County staff did not account for the merits of the comments holistically. The reported figures were not clearly communicated to the reader of the report, and what was reported was misleading (e.g. 26% of *total* survey respondents supporting a lake dredge when the note indicated the figure being discussed should have been the percentage of the 53% of survey takers who responded to the question asking their opinion of staff's recommendation).

Additionally, since the survey failed to ask specifically whether the respondents agreed or disagreed with staff's recommendation, there was no exact measurement that could be done to empirically capture data objectively and consistently like even a simple yes or no question could.

There were other data collection efforts that the survey captured that were either flawed, irrelevant to staff's recommendation in the opinion of the subcommittee, or not included in the County staff's survey report. Understanding where survey takers live in relation to the park was skewed since the options overlapped datapoints. Capturing activities that survey takers do at the lake was useful, but it focused more on the park instead of the lake. When there were opportunities to try to determine correlations based on the limited quality data available, the County staff's survey report did not reference any of these correlations.

Finally, the subcommittee found that staff may have generated bias (intentional or unintentional) by continually referencing Huntley Meadows as a comparative project. The subcommittee's independent analysis, however, did not find significant results when accounting for the need for "50,000 greenhouse-emitting trucks" to haul away spoils. While it also did not find evidence to support the presence of bias with regard to the undelineated \$395 million figure that did not always include the timeline for the expenditure, the subcommittee's analysis did not include general references to "cost" that were found in several of the survey responses. As such, the subcommittee does not want to rule out the presence of this bias since it was not possible to determine a numeric value of "cost" in those responses.

Overall, the subcommittee does *not* believe the survey administered by the County is a fully reliable source since:

1. Low data quality does not provide irrefutable empirical data for analysis
2. There is not a robust data analysis conducted that demonstrates correlations between variables
3. There are inconsistent methods for reporting analytical findings that are not centered around the proper unit of analysis investigated by the survey.

Appendix A.3:

A.3.1: Schools within Five Mile Radius of Lake Accotink

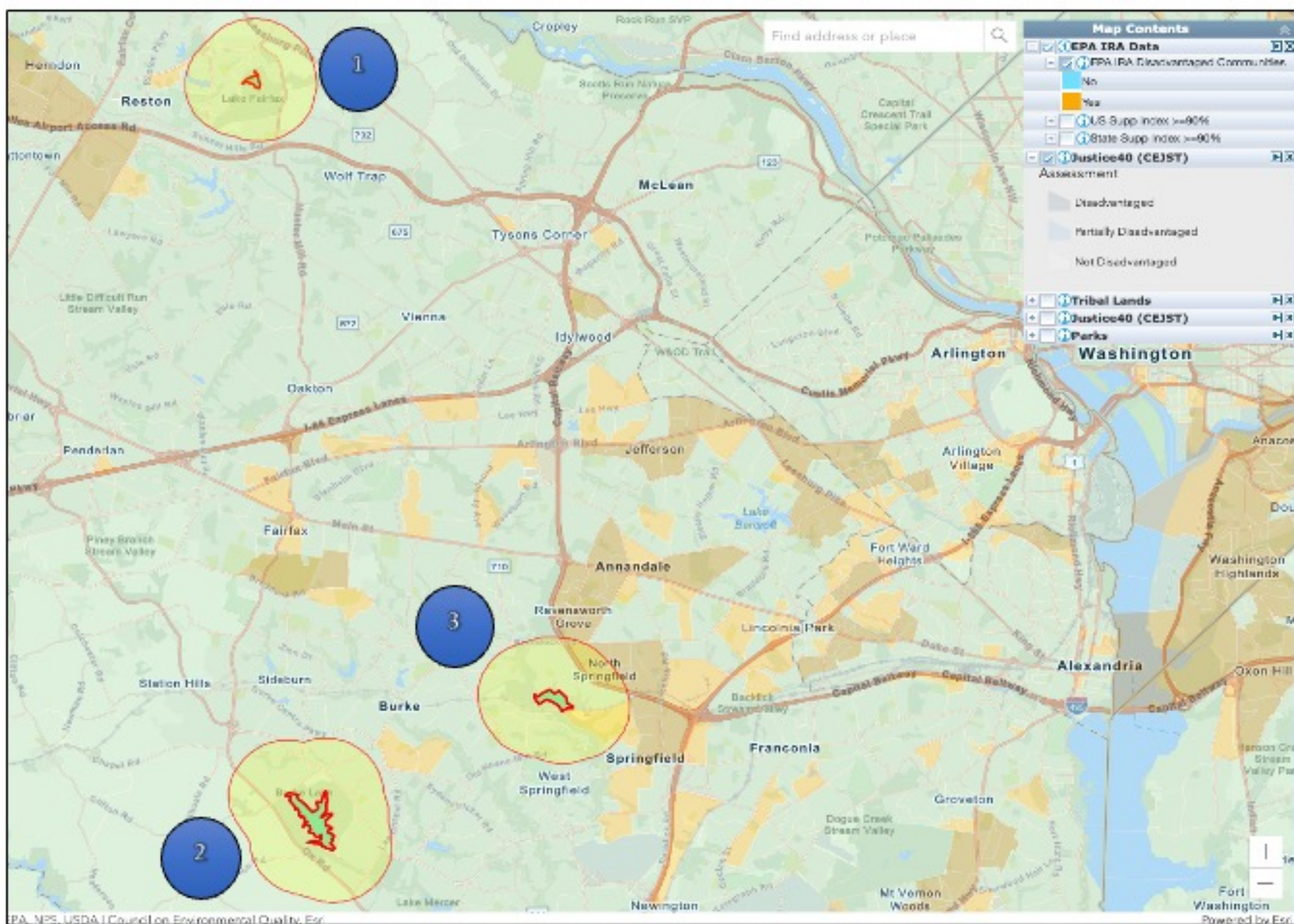
A.3.2: Lakefront in Fairfax, VA Map

Title 1 Schools	CEP	School	0.75-mile 15 minute walk	1-mile	3-miles	5-miles <30 minute drive
X	X	Annandale Terrace Elem			x	x
X	X	Braddock Elem			x	x
X	X	crestwood elem				x
X	X	Forestdale Elem				x
X	X	Garfield Elem			x	x
X	X	Glasgow Middle				x
X	X	Lynbrook Elem			x	x
X	X	Parklawn Elem				x
X	X	Pine Spring Elem				x
X	X	Poe Middle			x	x
X	X	Sleepy Hollow Elem				x
X	X	Westlawn Elem				x
X	X	Weyanoke Elem				x
X		Belvedere Elem				x
X		Camelot Elem				x
X		Mason Crest Elem				x
X		Woodburn Elem				x
	X	Annandale High			x	x
	X	Key Middle				x
	X	Lewis High			x	x
		Alc at Burke			x	x
		Alc at Montrose				x
		Bonnie Brae Elem				x
		bush hill elem				x
		Canterbury Woods Elem			x	x
		Cardinal Forest Elem		x	x	x
		Cherry Run Elem				x
		Columbia Elem				x
		Community Based Education				x

Title 1 Schools	CEP	School	0.75-mile 15 minute walk	1-mile	3-miles	5-miles <30 minute drive
		Edison High Acadmey High				X
		Falls Church Governor's Health Sciences Academy				X
		Farhill Elem				X
		Franconia Elem				X
		Frost Middle				X
		Hayfield Secondary				X
		Hunt Valley Elem			X	X
		Irving Middle		X	X	X
		Island Creek Elem				X
		Jackson Middle				X
		Keene Mill Elem		X	X	X
		King Glen Elem	X	X	X	X
		Kings Park Elem		X	X	X
		Lake Braddock Secondary			X	X
		Lane Elem				X
		Laurel Ridge Elem				X
		Little Run Elem			X	X
		Mantua Elem				X
		Newington Forest Elem				X
		North Springfield Elem	X	X	X	X
		Northern VA Tr Ctr EP				X
		Oak View Elem				X
		Orange Hunt Elem			X	X
		Plum Center for Lifelong Learning			X	X
		Ravensworth Elem	X	X	X	X
		Robinson Secondary				X
		Rolling Valley Elem			X	X
		Samuel W. Tucker Elem				X

Title 1 Schools	CEP	School	0.75-mile 15 minute walk	1-mile	3-miles	5-miles <30 minute drive
		Sangster Elem				x
		Saratoga Elem				x
		Springfield Estates Elem			x	x
		Terra Centre Elem				x
		Thomas Jefferson High			x	x
		Wake Forest Elem			x	x
		West Springfield Elem			x	x
		West Springfield Elem				x
		West Springfield High		x	x	x
		White Oaks Elem			x	x
		Woodson High				x
		Washington Irving Middle		x	x	x
		Bren Mar ParkElem				x
17	16		3	9	29	70

Source: EPA EJScreen



1. Lake Fairfax Park
2. Burke Lake Park
3. Lake Accotink Park

Lakefront Parks in Fairfax, Virginia

Appendix B:

Options to Consider Other than Traditional Full Dredging

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Picture B.7: Lake Accotink grassland plateau and dredge proposed locations

Appendix B.1:

Table B.1: Small lake alternatives

Table B.2: 33 acre lake scenario

Table B.1: Small lake alternatives

Smaller Lake Scenario	Lake Area in Square Feet	Lake Area in Acres	Average Water Depth Based on 2021 Bathymetric Survey	Average Excavation to Reach 8 ft Depth	Total Dredge in Cubic Feet	Total Dredge in Cubic Yards	Areas in Acres Needed to Store Dredge Material at 50 foot Height	Areas in Acres Needed to Store Dredge Material at 20 foot Height	Sediment Removal & Dewatering Cost per Cubic Yard	Water Treatment and Dewatering Costs	One Time Cost to Dredge and Waste On Site
1	1,787,569	41	3	5	8,937,845	331,031	4	10	\$54	\$16,000,000	\$33,875,689
2	972,703	22	4	4	3,890,813	144,104	2	4	\$54	\$16,000,000	\$23,781,626

- Notes:
1. These estimates are based on Arcadis dredge cost estimate updated January 2023.
 2. This estimate does not include costs to clear land, conduct environmental assessments, or mitigate potential impacts.
 3. This estimate is for one dredging event and does not take into account maintenance dredging frequency, quantities, necessary area to dispose of materials or inflation.
 4. It is assumed that maintenance dredging would need to occur at least once every five years and no costs are included for those maintenance dredging events.

SOURCE: Fairfax County Department of Public Works and Environmental Services, September 2023.

This table shows the estimated cost on Arcadis dredge cost estimated that were updated on January of 2023. It provides two lake scenarios: one of 41 acres and one of 22 acres

Lake Accotink Task Force Findings Report
 December 8, 2023

Table B.2: 33 acre lake scenario

33 acre lake scenario											
	Grassland	Option	Cost	Scenario							
Lake Area in Square Feet	Lake Area in Acres	Average Water Depth Based on 2021 Bathymetric Survey	Average Excavation to Reach 8 ft Depth	Total Dredge in Cubic Feet	Total Dredge in Cubic Yards	Areas in Acres Needed to Store Dredge Material at 50 foot Height	Areas in Acres Needed to Store Dredge Material at 20 foot Height	Height of dredged material (in feet) in a 22.2-acre site.	Sediment Removal & Dewatering Cost per Cubic Yard	Water Treatment and Dewatering Costs	One Time Cost to Dredge and Waste On Site
1,150,848	33.3	3.5	4.5	5,178,816	295,482		8.25	6.75	\$54	\$16,000,000	\$31,956,028

1. These estimates are based on Arcadis dredge cost estimate updated January 2023.
2. This estimate does not include costs to clear land, conduct environmental assessments, or mitigate potential impacts.
3. This estimate is for one dredging event and does not take into account maintenance dredging frequency, quantities, necessary area to dispose of materials or inflation.
4. It is assumed that maintenance dredging would need to occur at least once every five years and no costs are included for those maintenance dredging events.

4,840	cubic yards in a cubic acre	33.3	acres to dredge	dredge cost - dewatering	#REF!	41 acres
34,560	cubic feet in a cubic acre	4.5	depth to dredge (ft)	\$15,956,028		22 acres
22.2	acres for grassland site	5,178,816	estimated cubic feet of dredge	#REF!		33.3 acres
767,232	cubic feet in grassland site					
5,178,816	estimated cubic feet of dredge					
6.75	estimated height of dredge in grassland site					

COST CRITERA: Detailed cost information for implementing this option is beyond the current scope of this analysis. However, the Fairfax County Department of Public Works and Environmental Services provided Information on two smaller lake dredging scenarios. (See table, "Small Lake Alternatives.") The Advisory Committee used county staff estimates for dredging a 41-acre lake and a 22-acre lake to estimate similar information for a 33.3-acre lake described in this section on Grassland Ecosystem Option for Lake Accotink.

This table provides costs for a 33 acres lake scenario.

Appendix B.2:

Picture B.1 : Smaller lake footprint scenario 1

Picture B.2: Smaller lake footprint scenario 1 with surface scenario calculations

Picture B.3: Smaller lake footprint scenario 2

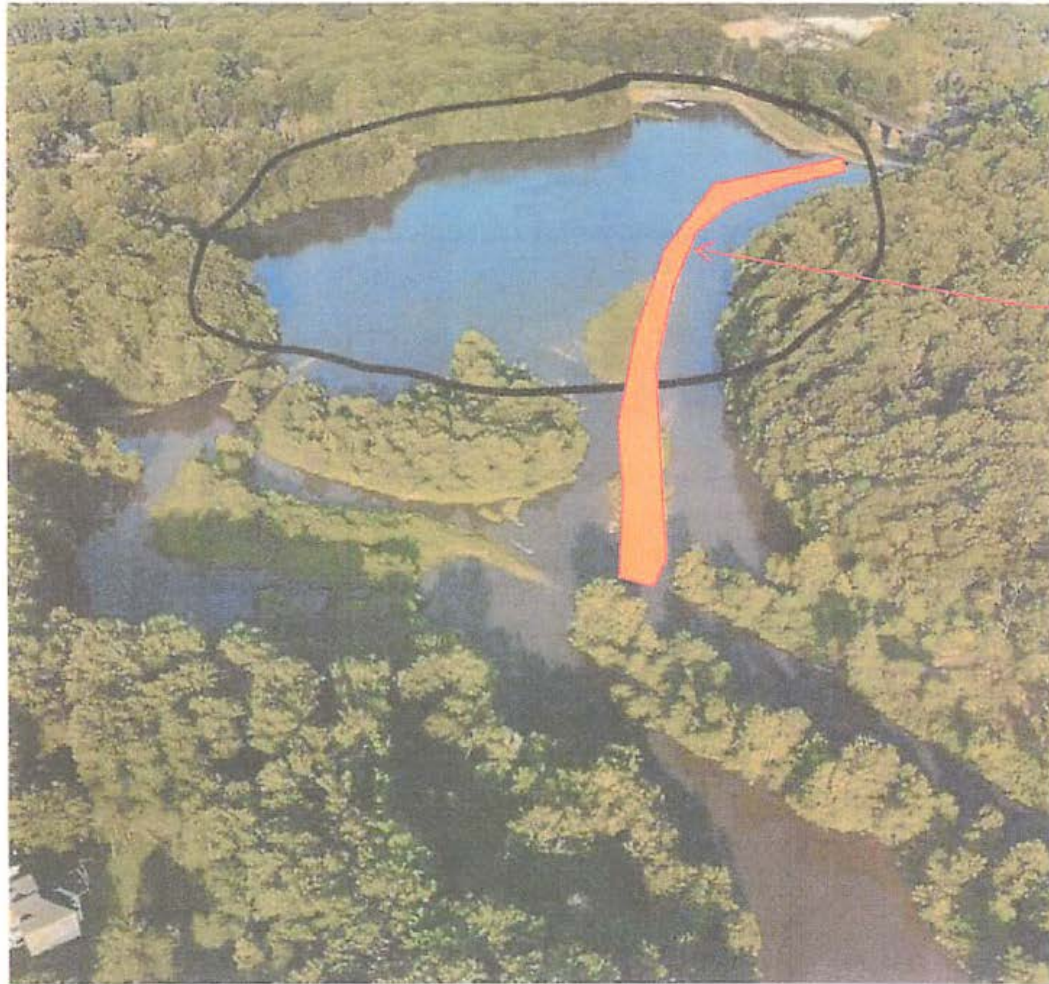
Picture B.4: Smaller lake footprint scenario 2 with surface scenario calculations

Picture B.5: 2021 Bathymetric survey lower lake

Picture B.6: 2021 Bathymetric survey upper lake

Picture B.7: Lake Accotink grassland plateau and dredge proposed locations

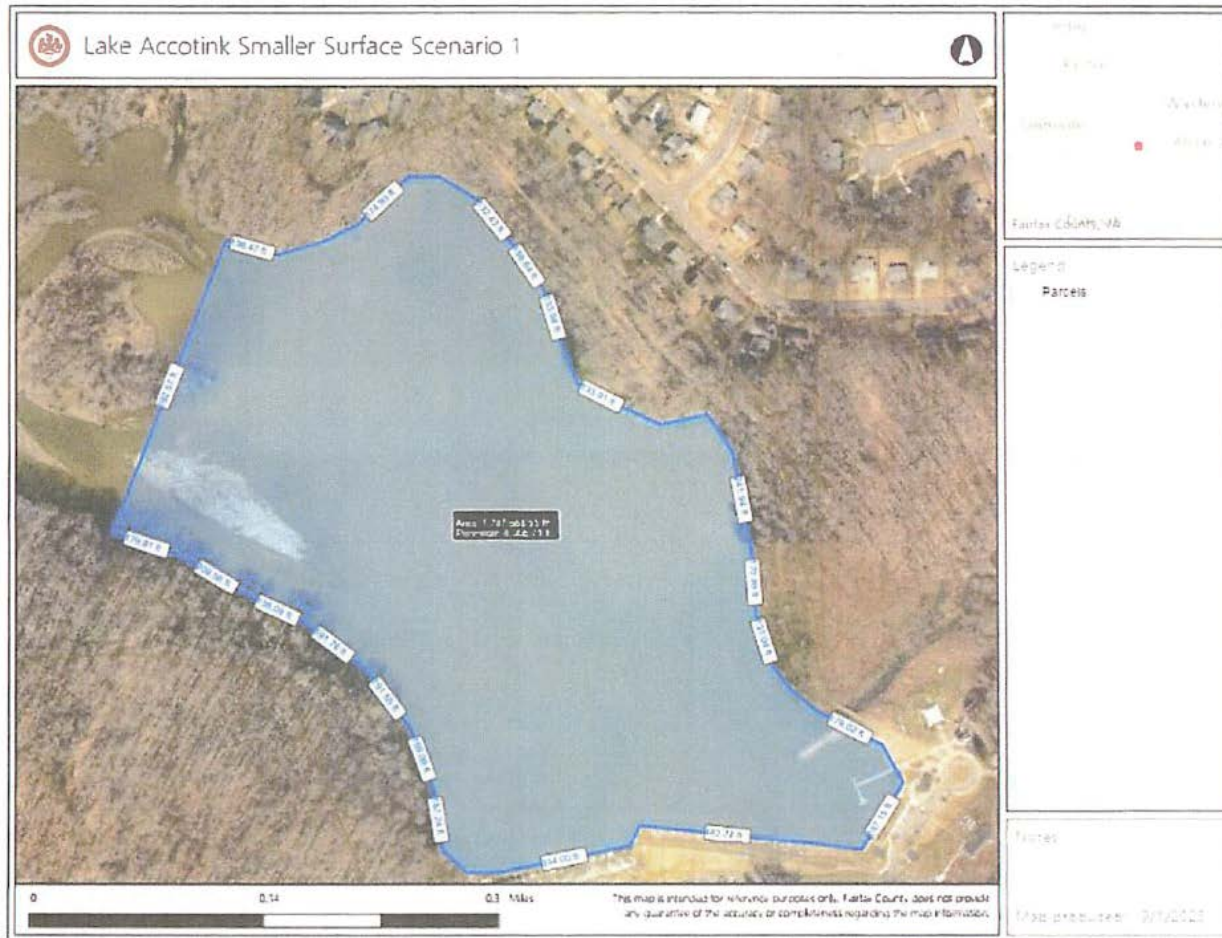
Picture B.1: Smaller lake footprint scenario 1



Example alignment of linear islands to separate lake from the flow of Accotink Creek in order to prevent rapid lake fill in.

This is an arial shot of the Lake that includes an example alignment of linear islands to separate the current lake from the flow of Accotink Creek in order to prevent rapid lake fill in.

Picture B.2: Smaller Lake footprint scenario 1 with surface scenario calculations



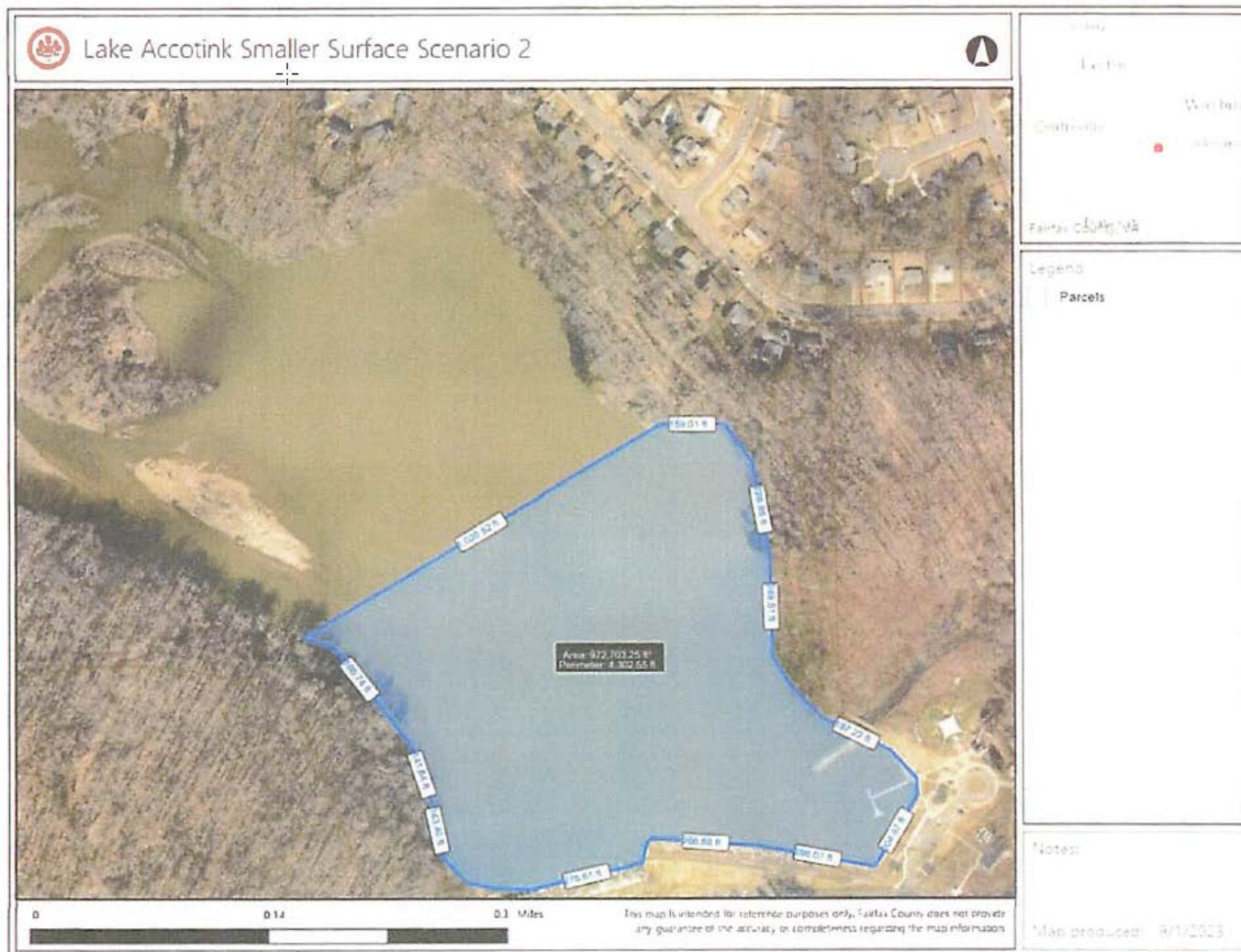
This aerial shot of the Lake shows calculations of the surface area for scenario 1.

Picture B.3: Smaller Lake footprint scenario 2



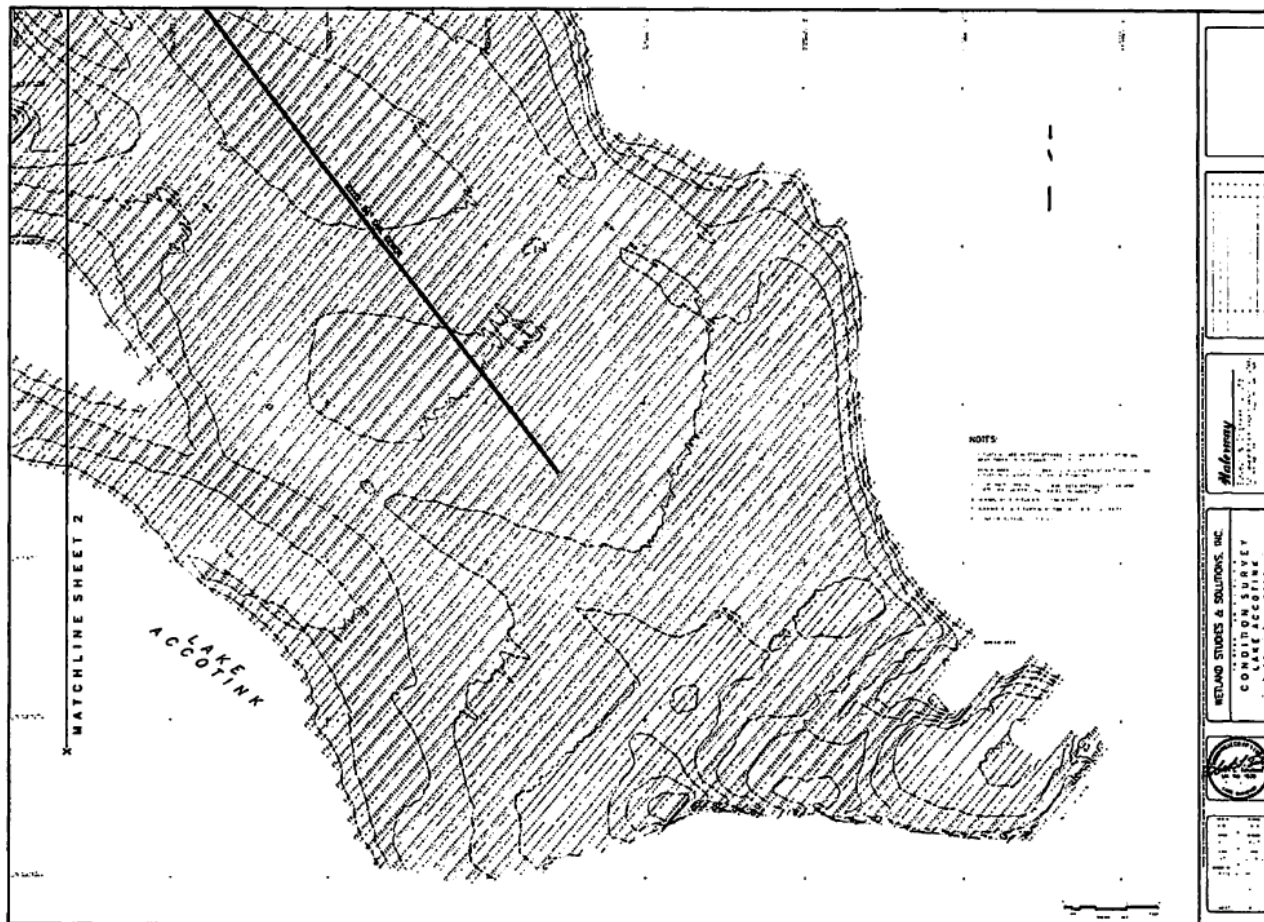
This aerial shot of the lake includes a circled area of where the smaller lake footprint could be located.

Picture B.4: Smaller Lake footprint scenario 2 with surface area calculations



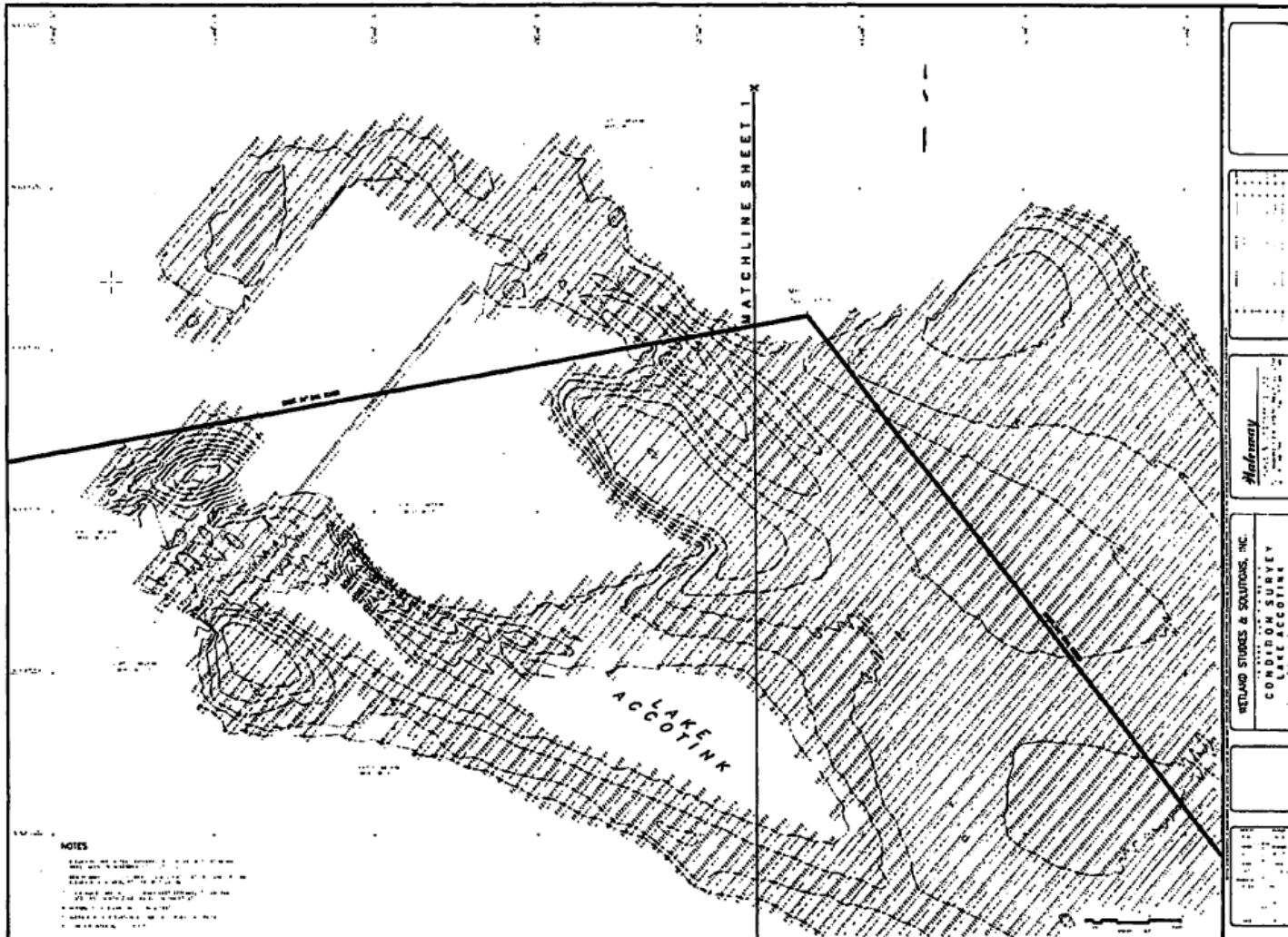
This aerial shot of the Lake shows calculations of the surface area for scenario 2.

Picture B.5: 2021 Bathymetric survey lower lake



This picture shows the bathymetric survey results of the lower lake, completed in 2021.

Picture B.6: 2021 Bathymetric survey upper lake



This picture shows the bathymetric survey results of the upper lake, completed in 2021.

Picture B.7: Lake Accotink grassland plateau and dredge proposed locations



This is an aerial shot which contains a green outline depicting the Grassland of +/- 22.acres along with a blue outline depicting the proposed dredge area +/- 33.2 acres which includes specific locations highlighted with orange shaped horseshoes