

Stream & Wetland Mitigation Feasibility Analysis Lake Surf at Woodlake Country Club, Vass NC

**Prepared for: Restore Woodlake Committee
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4 October 2019

INTRODUCTION - This report addresses the feasibility of using the currently drained bed of Lake Surf at Woodlake Country Club for a stream and wetland mitigation project site, in the event that rebuilding a new spillway to restore the lake is not feasible due to technical or cost factors. Stream and wetland mitigation credits are required under Clean Water Act Section 404/1 permits to offset unavoidable impacts (loss) of streams and wetlands due to public or private construction projects. NC-Department of Transportation (NCDOT) through the NC Division of Mitigation Services (NC DMS) is the largest buyer of mitigation credits, but other state and local governments agencies, utility companies, railroads, private and institutional developers also need to buy credits to offset impacts to similar resources (jurisdictional streams and wetlands) in the same watershed.

A mitigation project could either be developed as a “Full Delivery” project for the NC Division of Mitigation Services (DMS) or operated as a private “entrepreneurial” mitigation bank.

FULL-DELIVERY MITIGATION - With a Full-Delivery mitigation project, the project provider prepares a proposal to be submitted to the NC DMS in response to a Request for Proposal (RFP) and competes with other companies to get awarded a state contract. If successful, the provider receives a series of milestone payments over seven years, as project development and annual monitoring tasks are met. Post-construction management and maintenance may be needed, including replanting areas with low tree survival, treating invasive exotics species, and repairing unstable stream banks. The mitigation site is permanently protected by a conservation easement be held by a land conservancy or the NC State Property Office. NC DMS then uses the credits to offset impacts of state construction projects and sells credits to other public and private developers with mitigation requirements for their Section 404 permits through their In-Lieu Fee program:

<https://deq.nc.gov/about/divisions/mitigation-services/about-dms/dms-programs>

The geographic service area (credit sale area) for a Full-Delivery mitigation project in the Lake Surf watershed (Cape Fear 03030004) includes portions of Moore, Hoke, Cumberland, Harnett, Lee, Chatham, and Wake Counties. The current DMS in-lieu fee value for credits in Cape Fear 03030004 is \$52,274 per credit (acre) of wetland and \$525 per credit (linear foot) of stream.

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DMS purchases Full Delivery projects from providers by issuing an RFP for specified quantities of stream and wetland credits by watershed. Submitted bids are evaluated using a competitive bid process based on the total cost and credits generated. The number of project credits are based on several factors including the degree of existing degradation to the streams and wetlands and the level of work required to restore them, the linear footage of streams or acres of wetlands involved. Full restoration from a severely degraded condition will yield a 1:1 restoration credit ratio. Partial restoration or enhancement of less degraded streams and wetlands may yield a 2:1 or 3:1 enhancement credit ratio while preserving fully-functioning streams and wetlands ranges from 5:1 to 10:1 preservation credit ratio. For purposes of this preliminary analysis we will use the current NC DMS prices for stream and wetland mitigation values.

ENTREPRENEURIAL MITIGATION BANK - For private entrepreneurial mitigation banks, the bank owner (known as the Bank Sponsor) develops the project and is in control of selling the stream and wetland credits, either to state agencies like the DMS or other public and private project developers. A group of state and federal agencies known as the Inter-Agency Review Team (aka IRT) includes U.S. Army Corps of Engineers, NC DEQ-Division of Water Resources, U.S. Fish and Wildlife Service, US EPA and others reviews the project site and monitoring reports annually, and releases an agreed upon number of stream and wetland credits each year provided that the site is meeting success criteria. If not, then an Adaptive Management Plan (AMP) must be submitted and approved to release the mitigation credits for sale. Credits are sold on an open market basis. Both the NC DEQ-DWR and the U.S. Army Corps of Engineers (Corps) through websites provides a directory of all mitigation banks by watershed and available credits.

There is no guarantee of when credits will sell, but private mitigation banks can charge higher rates than DMS in-lieu fee rates, depending on supply, market demand, and site-specific project costs to achieve successful mitigation. A detailed market analysis (not included in this preliminary feasibility study) for a new bank project should include projected mitigation credit needs (from state agencies, local governments, and private projects) and a review of existing and planned mitigation banks and credit prices in the watershed. The bank service area is the same as for a Full-Delivery project. The permanent conservation easement is often deeded to a non-profit land conservation trust. A brief pro forma is included in this report with several key conservative assumptions for planning purposes only. We estimate that 25 to 35 percent of the 270 acres (corridor to be proposed for mitigation) in the main section of the lake bed (below the golf cart bridge) may have soils suitable for wetland restoration. Using 30%, we estimate the potential wetland mitigation credits could total up to 100. Conservatively, assuming a 3:1 credit ratio for both streams and wetlands, the project could generate 5,760 stream credits worth \$3,000,000, and 81 riparian wetland credits worth at least \$4,200,000 million dollars, based on DMS in-lieu fee rates. Four small tributaries flowing across the lakebed are probably too small to provide sufficient flow for stream restoration but could be useful in conveying water to restored wetlands.

A full detailed feasibility study with market & competition analysis is highly recommended before deciding on developing a mitigation bank.

EXISTING CONDITIONS AND MITIGATION POTENTIAL - A team of four MMI environmental scientists visited the lakebed area on January 10, 2018 to collect data on streams,

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wetlands, vegetation, and elevations in the lakebed, as needed to prepare a preliminary stream and wetland mitigation project feasibility study.

As measured on 2017 aerial photography, the main stem of Crane Creek in the drained lakebed includes approximately 5,500 linear feet of stream channel from McLaughlin Road downstream to the golf cart bridge (NE of the clubhouse), and approximately 16,500 linear feet of stream channel from the golf cart bridge downstream to the dam. The Crane Creek drainage basin area is 81 sq. mi. at the golf cart bridge and 95 sq. mi. at the dam. Most of the difference comes from Cypress Creek's 11 sq. mi drainage basin, which enters the north end of the lake and joins Crane Creek 1,500 feet east of the golf cart bridge. Approximate stream bed elevations in Crane Creek are 215 ft at the golf cart bridge, 214 ft at the confluence with Cypress Creek, and 209 ft at the dam breach. The stream gradient is nearly flat below the confluence with Cypress Creek, dropping only 5 ft along 15,000 ft of channel length (slope = .00033).

Between the golf cart bridge and the dam, most of Crane Creek has retained its pre-impoundment meandering pattern, although its cross-sectional area has likely been reduced by sediment deposition since it was impounded in 1973. This reach could be restored by excavating sediment from the channel to restore the appropriate depth and width dimensions relative to its watershed area, slope, and floodplain elevation, and adding coarse gravel and cobble in selected areas to create a geomorphically stable sequence of riffles, runs, and pools. In-stream stabilization structures such as logs and root-wads would be anchored into the toe of the bank at meander bends and areas subject to high erosive forces. Due to the low slope, stream channel runs (long flat stretches) and pools would comprise the majority of stream length, with a minor component of short riffles. During construction, stream flow will be bypassed using cofferdams segment-by-segment as the work proceeds. The restored stream banks would be reinforced with jute erosion control matting, planted with live stakes of willow and dogwood, and seeded with temporary ground cover. The stream-side zone beyond top-of-bank (50 to 200 ft wide) would be planted with native trees and shrubs.

Crane Creek upstream of the golf cart bridge and Cypress Creek no longer have a natural stream pattern, and will require more intensive earth-moving work if they are included in the restoration project. A new relocated stream channel pattern would be designed using geomorphic data from stable stream reaches upstream of the lake. Flow bypass will not be required except at points where the new constructed channel intersects the existing channel. Flow will be diverted from the existing channel into the new channel after construction is completed and the stream banks are stabilized. Appropriate channel widths, depths, channel features, structural reinforcement, and plantings will be designed in a similar manner to the process described above.

We did not conduct an extensive evaluation of hydric soils in the lakebed, and the lake predates the Moore County Soil Survey (1995). Therefore, it is difficult at this time to assess the area with hydric soils suitable for wetland restoration. Based on the extent of mapped hydric soils (Bibb, Roanoke, Wehadkee), and other floodplain soils with hydric inclusions (Chewacla, Johns, Tillery) along Crane Creek upstream and downstream of the lake we estimate the potential of approximately 100 riparian wetland mitigation credits. To be conservative we are using 81 riparian wetland credits in the pro forma.

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Riparian wetlands (with a hydrologic connection to a stream or river) are usually in greater demand than non-riparian wetlands; the mitigation plan should therefore focus on restoring wetlands close to the stream. Most, if not all, of the wetland credits that could be generated by this project will be riparian. This strategy will leave peripheral areas of the lakebed available for other uses, possibly including smaller impoundments and/or excavated lakes. Excess sand and soil could be mined and sold for construction (with a mining permit). The value of these collateral commodities is not included in the pro forma financial analysis.

The attached preliminary concept plan illustrates a restoration project corridor ranging from 700 to 1100 feet wide and 12,000 feet long from the north end of the lake to the dam. Within this 270-acre corridor is the potential for restoring, enhancing and/or preserving approximately 16,500 feet of Crane Creek, 800 feet of Cypress Creek, and an estimated 270 acres of riparian wetlands. If we can justify a higher mitigation credit ratio, which is probable at least in some areas, the potential value will increase accordingly. Expanding the project to include the reach of Crane Creek upstream of the golf cart bridge, and/or additional restorable wetlands beyond the corridor shown could also generate additional value.

The restored wetlands and adjacent non-wetland areas in the project corridor could be planted with attractive flowering natives (buttonbush, cardinal flower, dogwood, pawpaw, magnolia, gordonia, beautyberry, redbay, winterberry holly, viburnum, etc.) in addition to the forest canopy trees (oaks, ash, cypress, maple, tupelo gum, musclewood, mulberry, walnut, hickory, birch, sycamore, hackberry, etc.). Boardwalks, observation platforms, hiking, and mountain bike trails could be incorporated in the design. The site would be useable for passive recreation such as hiking, bird-watching, and small boating, but no timber cutting or development other than trails to access the site.

MITIGATION PROJECT DEVELOPMENT COSTS – For the attached pro forma we have used some assumptions gained from previous project experience. For the land costs we are only including legal and easement holder costs (endowment) and not the land value as it is already paid for. For the purposes of this study the land value will be considered “sunk costs”. The primary costs included in the pro forma: Prospectus, Mitigation Banking Instrument and/or other enabling documentation, permits, mitigation design costs, survey, legal, construction (planting and earthwork), performance bonds, annual monitoring and maintenance. We assume no fencing costs or other items such as peripheral lakes, trails, boardwalks, signage etc. is included. For more cost information refer to the attached pro forma.

PRELIMINARY MITIGATION MARKET ANALYSIS – This preliminary market analysis is solely based on checking the NCDEQ-DWR and US Army Corps websites for existing mitigation banks. It does not include any predictions on NC DMS RFP’s as they are based on continually changing variables.

There are two proposed and one existing mitigation bank in your service area. These include the existing Barra Farms Mitigation Bank owned by Barra Farms, LLC which is a large mitigation bank site. This bank has sold 27 of its 80 released non-riparian wetland credits and has another 1133 non-riparian wetland credits expected to be released in the coming years. As the Woodlake mitigation site will yield mainly stream and riparian wetland credits, the Barra Farms bank does

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not pose significant competition. The first proposed bank is the Middle Cape Fear UMBI – Daniels Site owned by Wildlands Engineering and the second is RES Cape Fear 04 UMBI – Blackstar Site owned by Resource Environmental Solutions. Both of these are what is known as umbrella banks and can add future sites if they sell out of the credits for the initial sites. The Daniels site has a potential of 12 riparian wetlands, 2 non-riparian wetlands and 12,000 stream credits. The Blackstar Site has the potential for 16 riparian wetlands. Although this doesn't seem like a great deal of competition, the fact that two of the major mitigation banking companies have proposed umbrella banks in this service area is a bit concerning. Again, prior to deciding on mitigation bank development a detailed market and competition analysis should be completed.

RIBITS: The USACE Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS) maintains a database of approved and pending DMS In-Lieu Fee sites and private mitigation bank sites. The “pending” sites are those for which a mitigation plan has been submitted; there may be other sites in early planning stages that are not include in the RIBITS database.

NC DMS - The DMS In-Lieu Fee mitigation sites in CFR-04 include five sold-out sites that will not have more credits available, one active approved site, and six pending sites. The approved site, DMS Arabia Bay Mitigation Site, has only Non-Riparian Wetland credits. The six DMS pending sites -- Jumping Run Creek, UT Jumping Run Creek, Sandhills Area Land Trust, Blue, Little River, and Wildcat Branch Mitigation do not have expected credit types and quantities listed on the RIBITS website, but appear to have a mix of Stream, Riparian Wetland, and Non-Riparian Wetland credits based on their locations. By state law the DMS can't compete with private mitigation banks so they should not be considered as competition.

BUSINESS STRATEGIES - The Restore Woodlake Committee could establish an LLC corporation to serve as the mitigation bank sponsor/owner, with a technical partner such as MMI to design, build, and monitor the project. Or a mitigation banking firm such as Wildlands or RES could purchase the conservation easement from Woodlake and serve as the mitigation bank sponsor/owner.

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PAST CORRESPONDENCE =====

Email from Rich Mogensen to Ingolf Box & Julie Watson:

Rich Mogensen <rich@mogensenmitigation.com> schrieb am Mi. 24 Jan 2018 um 21:16:

Hello Ingolf & Julie – We visited the site recently (Jan 10, 2018) and spent a good deal of time examining the lakebed and dam area. The good news is that the site has very good potential for stream and wetland mitigation opportunities, but I don't think it is prudent to pursue a "Full-Delivery" proposal to NC-DMS at this time. We really don't have enough time to complete the technical information required for a DMS mitigation proposal, and the outstanding legal issues may prevent this effort.

Another way to use the site for mitigation and generate revenues would be a private mitigation bank. We could avoid the areas near homes as much as possible, so that WCC could create lakes/ponds along the periphery to restore waterfront views. As I mentioned before, a mitigation bank would be a much larger project with greater potential revenue and ROI. My preliminary estimate is about \$20,000,000.00 in gross revenue (based on 150 wetland credits x \$70,000 each and 25,000 stream credits x \$400 each) over seven to ten years with development expenses of about \$1,500,000. These are very preliminary numbers. There are many ways we could work this out but the more risk and capital you take on the more profit/ROI. If you don't want the risk or capital requirements, I think I may be able to locate development funding to do a mitigation bank. If you would like me to put together a pro forma and feasibility study for a formal mitigation bank I would be happy to do that but there is a small fee (\$2,500). If you would sign an option with my company to use the parts of the lakebed we would need (stream channels & adjacent wet areas) I would wave that fee and do the study at no cost.

A few words of caution, if you do nothing for the next few years, much of the site will begin to turn into a forested wetland naturally and this is bad for two reasons. First, if you wait too long and then decide to rebuild the dam you will have mitigation requirements which can be very costly. This issue almost killed the Hope Mills Dam repair for the Town of Hope Mills, NC. My company worked successfully to save that project but it almost died due to mitigation costs which may have exceeded the dam construction costs. The second issue is that you will lose your opportunity to use the site for mitigation as it will revert to wetlands naturally. You may be able to get away with nothing for about 1 more year but then it becomes uncertain after that. The second year growing season will cover that site with tree seedlings, and mitigation potential will drop significantly.

Please let me know if/how you would like to proceed.

Richard K. Mogensen

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