HISTORY OF DAMS AND MILLS AT MILBURNIE, NC[1]

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The Neuse River: Facts & History

The Neuse River is estimated to be about 2 million years old, and archeological evidence indicates that people have lived along the Neuse for approximately 14,000 years. Early native American people who lived along the Neuse included the Tuscarora, the Coree, the Neusiok, and the Secotan tribes. In fact, the name "neuse" is said to come from the Neusiok language, meaning "peace" or "peaceful." None of the above tribes are accounted for after the early 1700s due to disease, dispersion, and wars among the tribes and with early European settlers.

The Neuse River is one of three rivers whose boundaries are located entirely within North Carolina. The river is formed northwest of Durham by the confluence of the Eno River from the west and the Flat River from the north. Following construction of the Falls Lake Dam in 1983, this junction is now located within the upper reaches of Falls of the Neuse Lake. The Neuse River watershed encompasses some 6200 square miles, with the Neuse River Basin draining 19 counties, and containing at least 17% of North Carolina's population.

The Neuse River meanders its way from its headwaters in Falls Lake some 240 miles toward Pamlico Sound. Passing east of Raleigh, it continues along a course that pretty much follows US Highway 70. The river courses past Clayton, Smithfield, Goldsboro, Kinston, and New Bern. At New Bern, the Trent River flows into the Neuse, and it becomes a much wider brackish estuary, which continues to widen as it approaches its mouth into Pamlico Sound near Oriental.

The mouth of the Neuse River, where it joins Pamlico Sound, is the widest river mouth in the Continental United States, measuring some 6.5 miles across. British ships used the lower Neuse to transport cargo to and from New Bern, the Capital of the Colony of North Carolina until 1776. The fact that British warships could easily bombard New Bern is the primary reason that the Capital of the newly formed State of North Carolina was quickly moved away from New Bern.

Summary of the Periods of Occupation

The earliest known occupation of the Milburnie area on both sides of the Neuse River was by Colonel John Hinton (1715-1784). During the mid to late 18th century, Col. Hinton acquired large tracts of land along the Neuse River. This land, which included the site of the Milburnie Dams, was inherited by his son, Major John Hinton in 1784. His descendants sold land that became Neuse Manufacturing Company in 1853, and subsequently Raleigh Ice & Electric Company from 1899 until 1916, when the property was acquired by Carolina Power & Light (CP&L). In 1934 CP&L sold the land to Samuel Warren Twiggs, who operated a gristmill at Milburnie until the early 1940s, when the mill shut down. Twiggs leased the Milburnie property to Solar Research Corporation in the 1970s for a modernized hydroelectric facility, known as the Milburnie Hydro Project that ended operation sometime in 2006.

Colonel John Hinton and Descendants (1760-1853)

One of the largest landowners in the early days of Wake County, which was then part of

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1 Much of the material presented here has been extracted and condensed from a 2014 Legacy Research Associates Report entitled *"Archaeological Resource Identification Report 9.15.1444,"* which was prepared as part of the Cultural Resource Investigations for the Milburnie Dam Mitigation Bank Project as commissioned by Restoration Systems LLC. For a more comprehensive history of Milburnie Dams and Mills, the reader is referred to that report.

Johnston County, was Col. John Hinton (1715-1784). During the eighteenth century, land grants could be purchased directly from one of the eight Lords Proprietors, who were assigned by King Charles II in the 1660s. The acquisition of land from a Lords Proprietor was known as a "Land Patent" or "Land Grant."

One of Col. Hinton's early grants (*ca.* 1743) was for 136 acres that are described in general terms as being located on the west bank of the Neuse River. Hinton's *ca.* 1743 land grant was followed by multiple land grants that eventually totaled some 22,000 acres. One is dated September 8, 1760, and describes the property as "700 acres on the Neuse River beginning at the hollow rocks below his mill." This reference is probably the earliest reference to the use of the falls at Milburnie for milling.

In 1784, Col. Hinton's land was inherited by his four sons, one of which was Major John Hinton. Late-eighteenth-century deed records are not clear on the specific division of Col. Hinton's land; or is there information about his *ca.* 1760 mill on the Neuse River. However, upon Major John Hinton's death in 1818, it appears that Col. John Hinton's mill seat was inherited by his son, Major John Hinton. Major Hinton's sons (William and John Jr.) and daughters (Grizzel and Elizabeth) inherited the property in 1818. Descriptions for these tracts refer to milldams, millponds, a bridge, and Tarborough Road. William received 1,280 acres of land on both sides of the Neuse River, including one tract of land on the east side below the mill dam that Major John Hinton was erecting on at the Falls above the bridge.

John Jr. received 1,875 acres that extended to the south side of William Hinton's millpond to "Tarborough road." Grizzel received 1,394 acres on both sides of the Neuse River. Elizabeth received 1,486 acres on the east side of the Neuse River, including the road leading by William Hinton's mill, to "Tarborough[2] Road, and then to just below the milldam that John Hinton Jr. was erecting at the Falls above the bridge.

The mention of a milldam that Major Hinton was building in 1818 indicates that more than one milldam was across the Neuse River at Milburnie during the 18th and 19th centuries. The milldam referred to above was most likely associated with a gristmill and possibly a sawmill, as it was preceded by the mill his father Col. Hinton owned in 1760.

Gristmills that were used to grind corn, wheat, and other grains into flour and meal were common in 18th- and 19th-century North Carolina. The first recorded North American gristmill was built in Jamestown, Virginia, in 1621. As settlers moved from the Jamestown area into what is now northeastern North Carolina, they carried their milling techniques with them and began building small mills to grind grain. Gristmills generally operated by guiding a stream of water into a waterwheel, which provided the power to rotate the series of huge millstones that crushed the grain into progressively smaller pieces. Most early North Carolina gristmills were situated along creeks for a source of waterpower, usually near natural falls. Many gristmills had saw mills attached so that waterpower could be used to grind flour and saw lumber. Power was increased by building dams.

A map dated 1833 depicts a bridge over the Neuse River that is identified as "Hinton's B." and an unnamed road that leads east and west that is very likely the historic "Tarboro Road." No mill is identified on this map. At that time, the Milburnie Dam property was owned by Elizabeth Hinton on the east side of the Neuse River and by William Hinton on the west side of the river.

Neuse Manufacturing Company (1853-1899)

2 "Tarborough" was the original spelling of this road, but more recently the term, "Tarboro," is used.

Beginning in 1853, the Milburnie property was acquired by Neuse Manufacturing Company for the purpose of building a water-powered paper mill. A description of the land acquisition for the Neuse Manufacturing Company had two sections that correspond with its location along the river, because land on the east side of the river had been conveyed to Neuse Manufacturing Company by Elizabeth Hinton, and the land on the west side of the river came indirectly from William Hinton's heirs.

In 1853, Elizabeth Hinton sold land on the east side of the Neuse River to the Neuse Manufacturing Company. The earliest conveyance from Elizabeth Hinton to the Neuse Manufacturing Company provided access to the road near Peachtree Branch for their workman's horses, carts, carriages, etc. for the construction of passageways and aqueducts for carrying water, and for the purpose of digging and taking stones and earth from the lands.

The following year (1854), Elizabeth sold another five acres on the east side of the river to the Neuse Manufacturing Company. Several years later, in 1859, Joshua Hinton, son of William Hinton, sold one additional acre of land directly to the Neuse Manufacturing Company. This land had been acquired by Joshua Hinton from his father, William Hinton, on March 15, 1836.

The earliest documented reference to the acquisition of land on the west side of the Neuse River by the Neuse Manufacturing Company is dated May 17, 1853. This land conveyance was from Sion Rogers and consisted of 210 acres known as part of the Hinton Mill Tract, including the gristmill, sawmill, and cotton gin. The chain of title for this land connects the property on the west side of the river with land that William Hinton inherited from his father in 1818. Upon William Hinton's death in 1835, this land was passed to his son, Addison Hinton, who sold it to his brother, Joshua. In 1839, Joshua sold the land to William Shauck, and within five years, the property was in the hands of George Haywood, who then sold it to the Neuse Manufacturing Company.

Neuse Manufacturing Company was an early Wake County paper mill, sometimes referred to as "Milburnie Paper Mill." Sion Rogers was the president of this mill; H. H. Husted was the treasurer; and James D. Royster was the mill superintendent. Construction on the Neuse Manufacturing Company paper mill at Milburnie began in 1853. The mill was in operation until it was burned by Union troops in 1865. The property continued to be owned by the Neuse Manufacturing Company until it was sold under court order in 1899, and was converted for use as a hydroelectric facility by Raleigh Ice & Electric Company to provide electric power to the City of Raleigh. Neuse Manufacturing Company and other early paper mills used rag stock since the era of pulp paper did not come until much later. Shortly after 1870, Neuse Manufacturing Company opened another plant and continued operation until 1897.

A summary of North Carolina's paper mill history reports that by 1896 North Carolina had ten water-powered paper mills, and all made paper from rags and cotton waste. Wake County had three paper mills: Raleigh Paper Mill (1808-65), Neuse Manufacturing Company (1853-65), and a mill at the Falls of Neuse (1870-96). The primary products of these mills were printing paper and wrapping paper, but some also manufactured writing, blotting, and Manila paper.

Additional references to Milburnie Paper Mill claimed that the mill was situated where a small stream came into the Neuse, because clear water is necessary for making paper. Cornelius B. Edwards, later co-owner of Edwards and Broughton printing company in Raleigh, started his career working at Milburnie Paper Mill around 1857. He described working twelve-hour shifts, six days a week starting at midnight on Sunday. Edwards reported that the Milburnie Paper Mill made paper for the North Carolina State papers and had a standing order with the New York Times. Recalling his experience working at the mill as a boy, Edwards claimed he had felt resentment toward an officer of Sherman's 14th Corps, who had come to Raleigh on Tarboro Road and started a fire that caused at least $200,000 worth of damage.

According to the 1860 US Industry Census, Neuse Manufacturing was the only paper mill in Wake County. Its annual product was listed as 520,000 pounds of paper that was produced from rags and bleaching material. Additional records indicate that by 1862, Milburnie Mills was providing paper to the Confederate Army to make paper cartridges. Paper cartridges were used in muzzle-loading firearms throughout the Civil War. The paper cartridge combined a pre-measured amount of powder with the ball in a sealed unit, which eliminated the need for measuring powder during loading.

A report from Company A Second Engineer Troops, the only unit of Confederate engineer troops in North Carolina, describes the Neuse River and the work at Milburnie. Every bridge on the Neuse had been washed away by repeated "freshets" or floods. Company A was ordered by General Joseph Johnston to Milburnie to build a substantial bridge for the passage of Johnston's artillery. However, just as the bridge was being completed on April 9, 1865, the Confederate troops were notified that General Sherman's Union forces were only seven miles away, approaching the bridge from the east along Tarboro Road.

Quickly, the focus of the Company A switched from bridge builders to bridge destroyers-hoping to slow down the advancing Union forces by not allowing the Union troops to use their newly constructed bridge. As it turned out, they did not have time to destroy the bridge because they were chased away by an advance cavalry charge of the 29th Mounted Missouri Unit. A few days later, Sherman's armies would cross the Neuse over that bridge on April 13, 1865. But before they left the river, they took the time to burn the paper mill at Milburnie. They then continued the six miles into Raleigh, where the Union forces marched through the city, being reviewed by General William Sherman.

While Union troops occupied Raleigh, surrender negotiations were conducted at Bennett Place near Durham Station. The final terms of General Johnston's surrender were virtually identical to those Lee received from Grant at Appomattox. Johnston's surrender was the largest of the war, involving almost 90,000 Confederate troops in the Carolinas, Georgia, and Florida.

According to some news reports of the time, the burned out Milburnie Mill stood vacant until December 1899, when the Neuse Manufacturing Company was purchased by Raleigh Ice & Electric. However, "Milburnie" appears in a Business Directory in 1867-68 as being operated as a gristmill that was owned by Neuse Manufacturing Company, and it continued to be listed in that publication as a gristmill through 1884. Furthermore, an 1874 handbill (Fig. 1) for the sale of the Neuse Manufacturing Company property, describes it as being on "the Tarboro Road, with 215 acres of land, its Mill Dam, Grist and Saw Mill, Store House, Eight Houses for operatives, two barns and stable, Blacksmith Shop, rock foundation upon which the old factory stood, and a stack fifty feet high built of brick." This handbill indicates that the original crib dam used by the paper mill was still intact in 1874, and that it was functioning at that time to power a gristmill and saw mill.

As early as 1883, advertisements for the sale of the waterpower at Milburnie appeared in the Raleigh News & Observer. In 1899, a state publication lamented that the dam's power was still not utilized except for running a dilapidated grist mill." An 1899 report describes the dam as an "open frame dam"[3] that was "8 feet high and 250 feet long, built on the site of the old dam which

3 An "open frame" dam would fit the description of a crib dam. Crib dams were a common type of construction in the 18th and 19th centuries. These dams were constructed of heavy timbers arranged in a series of interconnected cribs or boxes. Each crib was filled with stone, gravel and dirt, and the dam was built on a base of bedrock forming the bottom of the river. The downstream face of the dam was vertical, and the sloping, upstream face was typically covered with tightly placed planks to make it more watertight.

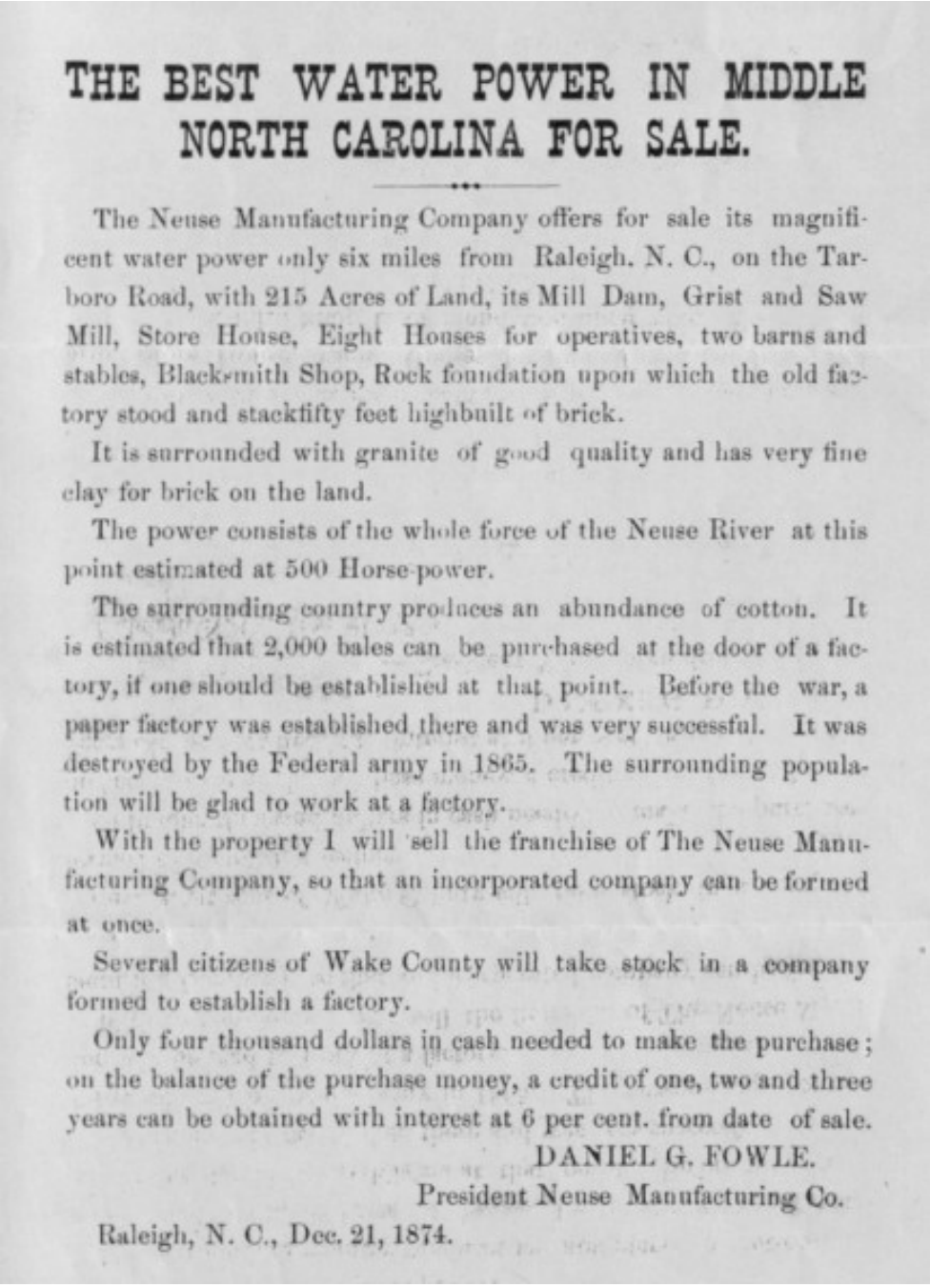
was constructed years ago in connection with the old paper mill."

On December 13, 1899, the Raleigh News & Observer announced that Raleigh Ice & Electric Company had purchased the waterpower at Milburnie and planned to construct a stone-and wood dam for a power plant that would transmit electricity to Raleigh by cable. The article reported that the old paper mill building furnished much of the stone needed for the new dam, which was planned to be placed just below the old dam.

Raleigh Ice & Electric (1899-1916)

The former Neuse Manufacturing Company was conveyed to T. L. Eberhardt on December 15, 1899. This conveyance states that it included the powerhouse, dams, buildings, and all machinery, appliances, tools, fixtures, belts, shaftings, boards, barges, and all personal property connected with the said Milburnie plant.

Work to prepare the property for the electric company began on January 1, 1900, with the construction of a sawmill that would provide the necessary lumber. By May 19, the old dam and mill were scheduled to be torn down and the new dam to be built. On October 15, 1901, The Farmer and Mechanic newspaper reported that a handsome residence has been built at Milburnie for the accommodation of the officers of the company. By January 1903, the new building for the power plant was nearly complete with anticipation that by mid-February the brickwork would be finished and the transformers would be in place. Power from the Raleigh Ice & Electric plant was used to run Raleigh's streetcars, and the transmission of this 6,600-volt line some 6 miles into Raleigh was an outstanding accomplishment for the day. Raleigh Ice & Electric provided power to Raleigh from 1903 until 1916, when it was purchased by CP&L.



THE BEST WATER POWER IN MIDDLE NORTH CAROLINA FOR SALE.

The Neuse Manufacturing Company offers for sale its magnificent water power only six miles from Raleigh, N. C., on the Tarboro Road, with 215 Acres of Land, its Mill Dam, Grist and Saw Mill, Store House, Eight Houses for operatives, two barns and stables, Blacksmith Shop, Rock foundation upon which the old factory stood and stackfifty feet highbuilt of brick.

It is surrounded with granite of good quality and has very fine clay for brick on the land.

The power consists of the whole force of the Neuse River at this point estimated at 500 Horse-power.

The surrounding country produces an abundance of cotton. It is estimated that 2,000 bales can be purchased at the door of a factory, if one should be established at that point. Before the war, a paper factory was established there and was very successful. It was destroyed by the Federal army in 1865. The surrounding population will be glad to work at a factory.

With the property I will sell the franchise of The Neuse Manufacturing Company, so that an incorporated company can be formed at once.

Several citizens of Wake County will take stock in a company formed to establish a factory.

Only four thousand dollars in cash needed to make the purchase; on the balance of the purchase money, a credit of one, two and three years can be obtained with interest at 6 per cent. from date of sale.

DANIEL G. FOWLE.
President Neuse Manufacturing Co.

Raleigh, N. C., Dec. 21, 1874.

Figure 1: An 1874 handbill for the sale of the Neuse Manufacturing Company property by Daniel G. Fowle, President of Neuse Manufacturing, describes it as being on "the Tarboro Road, with 215 acres of land, its Mill Dam, Grist and Saw Mill, Store House, Eight Houses for operatives, two barns and stable, Blacksmith Shop, rock foundation upon which the old factory stood, and a stack fifty feet high built of brick."

Development of waterpower on the Neuse River for generating electricity was during the era of large-scale electric power distribution that began on August 26, 1895, when water flowing over Niagara Falls was diverted through high-speed turbines that were coupled with generators to produce electricity. In the late 1800s and early 1900s, electricity was slowly making its way to North Carolina's cities and towns.

Carolina Power and Light (1916-1934)

On June 30, 1916, the Raleigh Ice & Electric Company hydroelectric facility at Milburnie was bought by CP&L. An undated photograph of the "Milburnie Development on Neuse River" shows the brick powerhouse (Fig. 2). Less than three years after purchasing the Raleigh Ice & Electric Company powerhouse and dam, CP&L dismantled the facility for use of the building as a gristmill. The CP&L gristmill building was used from 1919 to 1934, when it was bought by Samuel Warren Twiggs.

Figure 2: An undated photograph looking downstream from above the dam entitled: "View of Milburnie Development on Neuse River, No. 66" CP&L." (Photo: Courtesy of the State Archives of North Carolina).

Samuel Warren Twiggs and Descendants (1934-2017)

Samuel Warren Twiggs (1913-1990) bought the CP&L gristmill property in 1934 and continued the gristmill operation in the old brick powerhouse building until the early 1940s, when the mill was shut down. The mill building later burned and the only remains were millstones, mill pulleys, and brick walls.

Harold Twiggs, son of Samuel Twiggs, reported that he spent much of his youth on the river, playing around the dam, watching farmers bring their corn and wheat for grinding and enjoying the aroma of the warm, freshly ground meal. The mill produced "Milburnie Mill Meal," which competed for a time with Lassiter's Mill cornmeal.

People were allowed to fish below the dam for 25 cents a day, and an African-American church held its baptisms in the river. Other groups had social events there. Twiggs said people of both races used the area for fishing and recreation, and their kids played together. This was very unusual for the time, when blacks and whites did not typically socialize with one another. According to Howard Twiggs, the mill operated until about 1943 or 1944. The area below the dam earned the nickname "Raleigh Beach" and became a lovers' lane in addition to a popular place among college kids and others for recreation. Several people drowned in the waters below the dam and two Raleigh residents were accidentally shot there in 1972.

Solar Research Company (1984-2006)

In the late 1970s, the Milburnie property was leased to Solar Research Company that invested about $2 million to build a modern hydroelectric plant on the old powerhouse/gristmill foundation after the brick building was dismantled. The modern hydroelectric facility became operational in 1984, and it continued in operation until May 2006. In 1985, the Milburnie facility was described as being designed to operate three submersible Flynt turbines with a capacity of 640 kW, at a rated flow of 700 cfs. Sometime between May 2006 and September 2009, vandals stole wiring from the powerhouse causing the power plant to become inoperable.

There has been no productive activity associated with Milburnie Dam since the hydroelectric facility ended operation in 2006. Howard Twiggs died in March 2010, and ownership of the dam reverted to his sister Carolyn Fox, and to Howard’s four daughters, Ashley, Jennifer, Elizabeth, and Mary Catherine. Because the dam was of no value to them, and they considered it to be a liability, they were in favor of removing the dam. Before that could be accomplished, however, a permit issued by the US Army Corps of Engineers would be required. Figure 3 is a photograph I made of the dam on September 6, 2015.

Removal of Milburnie Dam by Restoration Systems, LLC

Restoration Systems is an environmental restoration and mitigation-banking firm with more than 50 mitigation banks and restoration sites in nine states. Based in Raleigh, NC, their restoration activities, which includes the removal of nonfunctional dams, are funded by the sale of compensatory ‘mitigation credits’ required by state and federal agencies that regulate development in sensitive areas.

Figure 3: Photograph of Milburnie Dam looking upstream from the Raleigh Greenway Bridge.

Milburnie Dam was the last dam on the Neuse River from Falls Lake Dam to Pamlico Sound. Because the dam had been essentially nonfunctional since the hydroelectric facility ended operation in 2006, it was targeted for removal by several federal and state governmental agencies, collectively known as the NC Dam Removal Task Force.

The initial prospectus submitted by Restoration Systems for removal of Milburnie Dam was submitted in February 2010. In a letter, dated May 20, 2010, Mr. Jamie Shern, Regulatory Specialist with the US Army Corps of Engineers (COE), notified Restoration Systems that their prospectus lacked sufficient information to be approved. In that letter, Mr. Shern listed seven areas that needed to be addressed for the COE to consider approval. In the interim between the initial submission in February and Mr. Shern's letter of May 20, numerous landowners along the affected upstream stretch of the river had submitted to the COE strong letters of opposition to the removal of Milburnie Dam.

In September 2011, Restoration Systems submitted a second, more comprehensive prospectus to the COE requesting approval for removing Milburnie Dam. Again, letters of opposition as well as letters of support were written in response to the 2011 prospectus. For the next six years, little information was circulated relative to the proposed removal of Milburnie Dam. The owners of the dam wanted it gone, but without COE approval, it could not be removed. The owners subsequently shifted ownership to a limited liability company they had formed, which was known as Milburnie Dam Associates, LLC.

Then in 2017, Restoration Systems received approval from the COE to move ahead with the

removal of Milburnie Dam. A Public Meeting was held in September 2017, during which most speakers spoke in favor of dam removal, and those who had been so strongly opposed to removal essentially accepted the fact that Milburnie Dam was coming down. Once the COE had granted a permit, there was little purpose in fighting the project. It was in fact a *"fait accompli."*

Restoration Systems began the process of removal in November 2017, by first diverting water and allowing it to bypass the dam through the discharge sluice associated with the power plant on the west side of the river. After dropping the water level by continued release, coupled with a minimal release from Falls Lake Dam, the upstream surface of the dam was exposed for the first time in 117 years.

The 1900 Milburnie dam was typically described as a "stone and masonry" structure, and that it was, but that is an incomplete description. Referring back to the historical record about how the dam was constructed, it is clear that timbers were also used in building this dam (see page 5). *"Work to prepare the property for the electric company began on January 1, 1900, with the construction of a sawmill that would provide the necessary lumber."* Lumber? No one seems to mention that much of the dam was not stone, but was made of timbers, just like the preceding crib dam that functioned to drive the 1853-1865 paper mill. Once the water level was dropped, the timbers used in the dam's construction became evident (Figs 4 & 5).

Figure 4: Upstream surface of Milburnie Dam after water level was dropped, November 2017. Note the inclined timbers forming a sloping upstream surface of the dam. These timbers had been submerged for 117 years. (Photo: Courtesy of Restoration Systems.)

Figure 5: Closer view of timbers shown in figure 4. These timbers, forming the upstream surface of the dam, had been submerged for 117 years. (Photo: Courtesy of Restoration Systems.)

Ms. Tiffani Bylow, with Restoration Systems, was kind enough to give me a section of one of these timbers, both as a memento, and for further examination. I cut the timber she provided into several shorter sections, and was able to study the freshly cut surface of each section. Figure 6 is a cross-section through the timber, which measured 7 inches by 9 inches.

Fortunately, this section included the center of the tree from which it was cut, and there were at least 53 tree rings included in the sample. The tightly packed inner rings indicate that this timber was made from the central core or "heart" of a southern yellow pine.[4] There are five species of southern yellow pine, but it is not possible, even with microscopic examination to distinguish them. The type of "heart pine" that was best suited for building bridges or dams would have been that of the Longleaf pine. Longleaf pine (*Pinus palustris*) is favored for this purpose because of its high resin content, which makes it most resistant to decay when used in water-related construction.

4 My interpretation was verified by Dr. Phil Mitchell, Associate Professor and Wood Products Extension Specialist, Wood Products Extension, Dept. of Forest Biomaterials, North Carolina State University.

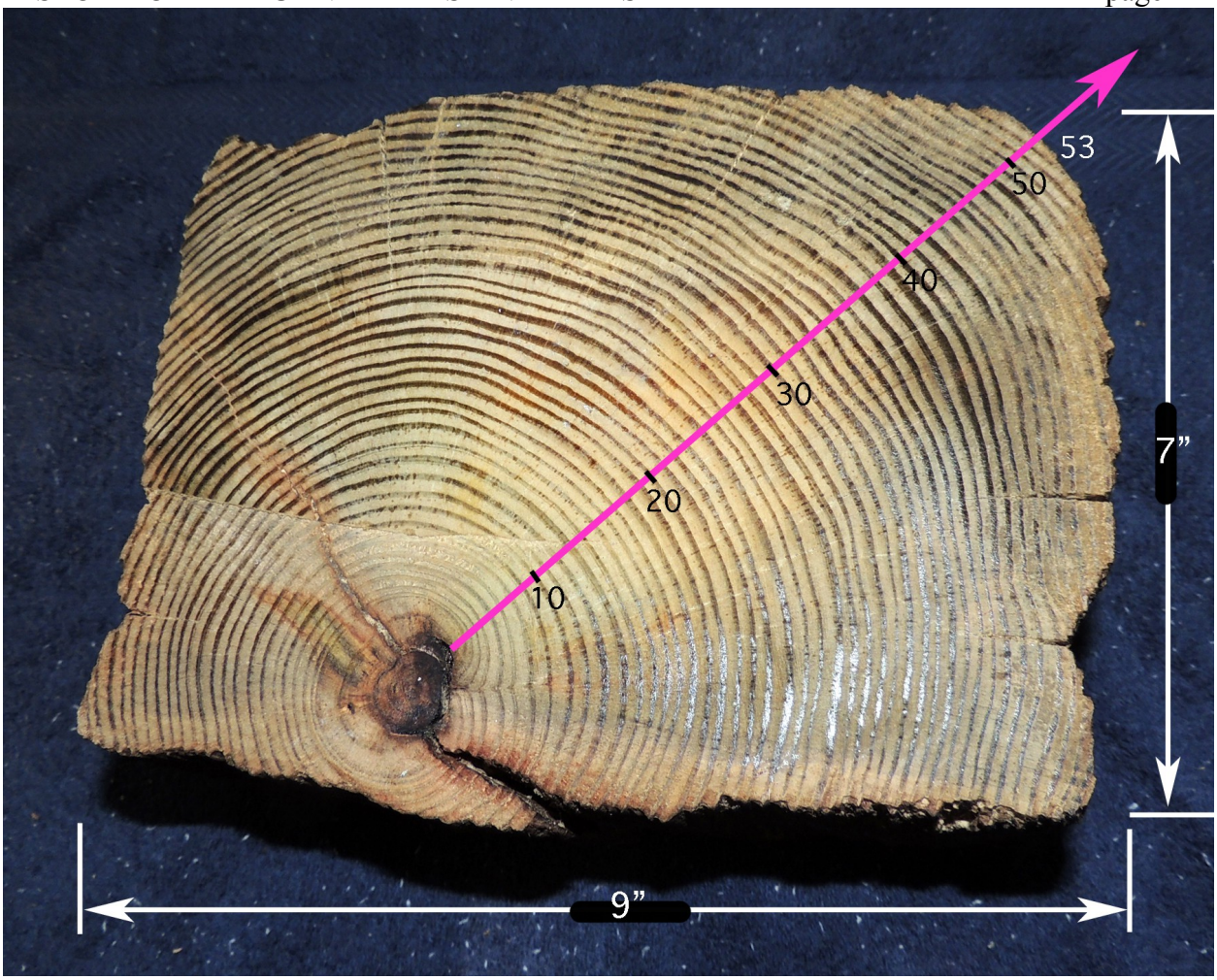


Figure 6: Cut surface of one of the timbers shown in figures 4 & 5. Note the tightly packed rings, of which there are at least 53 in this section. This would indicate the tree from which this timber was cut was at least 53 years old.

As noted in the caption of figure 6, the tree from which this timber was cut was at the very least 53 years old. However, we are seeing only at the very center of the tree, which would have been much larger at the time the timber was cut. It would be reasonable, and in fact conservative, to estimate that the actual age of this tree would have been at least 100 years old at the time it was harvested, meaning that it would date back to about 1800.

But just how old is the timber? Well that is a very good question. We know that a sawmill was constructed to supply timber for the 1900 dam so it is at least that old. However, it was the custom of the day to “reuse” available materials wherever practical. This is evidenced by the reuse of the stone from the old 1853 paper mill in the construction of the 1900 dam. Therefore, it would be reasonable to assume that some of the timbers used in the 1900 dam were in fact, recycled from the existing 1853 crib dam. If that is true, then the tree from which it came could possibly date back to about 1750. Bottom-line is that no one really knows for sure.