

Following the River: An Exploration of the VA Southern Watersheds/ Pasquotank River Basin Final Report

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Project Summary:

Over half of Virginia Beach is part of the Albemarle-Pamlico Sound watershed. There is a real need for quality programs and information on what is referred to as the “Southern Watersheds” in Virginia Beach and as the Pasquotank River Basin in North Carolina. Going forth, we will refer to this joint area as the VA Southern Watershed/Pasquotank River Basin. In the city’s school system, the emphasis is on the Chesapeake Bay, and very little is mentioned about the watersheds that drain into North Carolina. LRNow’s goal with this grant was to create a resource guide and lesson plans for Virginia and North Carolina educators about the headwaters of the Albemarle Pamlico Sound. To accomplish this, we developed and ran two unique immersive teacher training courses in the months of June and July.

For the first training, we took a cohort of five 9-12th grade teachers on a 6-day sail/motor down the watershed to learn all about the habitats, history, economics, land use, and problems that this watershed faces. At several cities, we stopped and invite experts to join us or got off and visited historical or natural history sites. The trip began with an exploration of Elizabeth City. From there, we joined the sailboat in Coinjock. The boat took us across the Albemarle Sound to Dowry Creek/Bellhaven area, down to Hatteras Island, across the Pamlico to Roanoke Island, back up to Coinjock, then into the North Landing River, through the locks to the Elizabeth River and ended in Norfolk. As they followed the river on the voyage of discovery, the teachers became more familiar with the rich resources that are in North Carolina and met many people who enriched the experience with firsthand stories about the area.

The second training was a 2-day workshop for five K-12 teachers (two of whom had also done the sailing trip) to learn about the history and natural history of the North Landing River and Back Bay sub-watersheds. The first part of the day was spent in Back Bay NWR exploring from the bay to the ocean. We boarded a tram and traveled to False Cape State Park. Using kayaks, we explored the marshes and shoreline of the bay, learned about the people and culture of this area and saw the ghost forests. The next day, we explored the land portion of False Cape and learned more about the history and cultural history of the area.

In August, the two groups of teachers joined together at False Cape State Park and Back Bay NWR and worked for three days to create lesson plans for Virginia and North Carolina educators on the VA Southern Watersheds/Pasquotank River Basin. Each day, they were exposed to activities, speakers, and field experience opportunities that they could bring back to their classrooms and integrate into their lesson plans.

Project Scope of Work:

1. Provide a hands-on environmental education training opportunity in the VA Southern Watershed/Pasquotank River Basin for up to 10 K-12 teachers from various disciplines that include water quality, aquatic vegetation, and coastal habitats.
2. Expose these teachers to activities, speakers, and field experiences that would help broaden their understanding of the watershed; the flora and fauna, the history and cultural history, and the threats it now faces.

3. Guide the teachers and give them the time and opportunity to take what they have learned and craft hands-on meaningful lesson plans and resources to share with their students and peers going forth.

Overview of the Day-to-Day Activities and Lessons:

Part 1: Sailing the Watershed (June 19-26, 2022)

Day 1. Four of the five teachers met at Kellam HS. My intern, an Oceanography teacher drove us, via a van, down through the North Landing Watershed to Elizabeth City. While there, we toured the city and visited some of the landmarks. Both history and natural history lessons were received. In the late afternoon, we drove to Coinjock to meet the boat.

Activities:

- Tour with George Jackson: George Jackson, a local resident, and expert on the history of the area, rode with us in the van and gave us a tour of Elizabeth City. He highlighted the Pasquotank River and its role in the development of industry along its banks.
- Tour of the Museum of the Albemarle: The curator met us and toured us around the museum. We saw exhibits on the indigenous people, and the growth of the waterway, including the building of the Albemarle-Chesapeake canal, and discovered the close relationships between Virginia and North Carolina throughout the ages.
- Plankton lesson at Port Discover: Dana Parker gave us an introduction to the plankton that we might find in the river. We then went down to the river and collected data on turbidity with a Secchi disk, light levels, and salinity. We grabbed a water sample and headed back to the building. With high-powered microscopes, the teachers scanned the samples for plankton. This was a good introduction for the non-science teachers since every day we were going to be doing water quality data collection with some of the same tools. Dana also discussed with the teachers, ideas that they could share with their students. We had an unexpected visitor that told us the fascinating story of the town of Buffalo and how the inhabitants survived the closing of the mill.
- Touring the Historic alleys: The city has done a great job of preserving several of the historic alleys, including Pailin's Alley. We walked around and read the interpretive signs to get a better idea of the industries that once used those buildings and how they were dependent on the river.
- Board the Sea Weasel in Coinjock: We were originally supposed to board the *Sea Weasel*, a 40 ft Morgan sailboat, and our home for the next 6 days, in Elizabeth City. However, due to mechanical issues, she was unable to make it to the docks in time for us to board and get underway before dark. We switched plans and drove to Coinjock and boarded her there. We got a short lesson on the parts of the boat, how to cook, how the bathrooms worked, etc. We were now officially the crew of the boat. The crew that brought her to Coinjock, was driven back to Virginia Beach by my intern.
- We anchored in Broad Creek for the night among the frogs and biting flies. That evening, we spent our first night cooking and sleeping aboard our new home.

Day 2. We crossed the Albemarle and passed through the Alligator River bridge. So many new experiences for teachers. They learned to drive the boat, put up the jib, and tie knots. We spotted dolphins off the starboard side in Dowry Creek and a coyote was spotted along the Alligator Pongo River Canal. We welcomed our last teacher onboard at the Dowry Creek Marina.

Activities:

- Sailing the boat: The teachers learned to work as a crew to get the sails up, control the sails, and then reef (put away) them.
- Talk with the Marina Owner: The Owner of the Dowry Creek Marina provided boating maps for us to use as we navigated the rest of our trip. He talked to us about the land and size of the watershed around the Pungo River and how that causes the salinity to fluctuate greatly, depending on rainfall. He said that he has even seen alligators in the river. We were surprised when we saw the dolphins on our way into the marina.
- Shipboard lessons on the Long Leaf Pine and all the ways it has influenced the culture, economics, and development of NC and VA. We also discussed the term “Shifting Baselines” and related it to the fishing industry and the view that people have of the health of the environment.

Day 3. We were able to get under sail with all three sails as we crossed the Pamlico Sound and headed to Hatteras Island. It was all about changes. Changes in the sky, changes in scenery, changes in the people who use the river, changes in attitudes, changes in us.

Activities:

- Barbara from the Frisco Native American Museum: She joined us aboard the ship and gave a very heartfelt presentation about the relationships between the settlers and the tribes that occupied this land for so long. She also shared artifacts that we made by the Miami tribe.
- Hatteras Island Ocean Center: We rounded out the day with a kayak adventure on the marshes behind the center. One of the guides was working for a small aquaculture business. He took us to the docks and showed us how they raised the baby oyster and gave us a lesson in oyster aquaculture. We came back to the center and toured their exhibits and learned about their sea turtle nesting program.

Day 4. Sailed along the Inner Coastal Waterway as we made our way north to the Roanoke Sound.

Activities:

- John McCord of the Coastal Studies Institute: John demonstrated their Ocean Energy Program that is offered to teachers. He gave us tinker toys, duct tape, a magnet, and a coil of wire and asked us to build something that would harness the power of the waves to create energy.

Day 5. Today's classroom was the brackish marsh on Festival Island in Manteo. We listened to soundscapes, explored the waterway, and visited the museum and replica ship. They even knew who we were. We are making waves in Manteo by word of mouth. On board the boat, we continued our lessons on observation using the “I notice, I wonder, It reminds me of” inquiry-based techniques to discover new ways of looking at everyday objects.

Day 6. Erik Moore came aboard in Coinjock and was our guide as we traveled up the North Landing River and into the Elizabeth River. We saw Eagles, learned about the great Albemarle/Chesapeake Canal system, heard stories about the amazing variety of plants and animals in the North Landing River and witnessed the changes that have happened in both waterways. We went from wilderness to industrial in a matter of hours. Landed at Waterside and bid farewell to the *Sea Weasel*.

Part 2: Kayaking from Back Bay National Wildlife Refuge to False Cape State Park (July 18-19, 2022)

Eight teachers participated in this portion of the program. Due to high winds, we had to change the agenda of this trip. Instead of kayaking to False Cape, we spent the morning in Back Bay NWR and learned about the habitats, unique flora, and fauna and some of the problems this area faces. We then boarded the tram and traveled to False Cape along the impoundment roads. This gave us a unique perspective on the priorities and goals at the Wildlife Refuge (managed for wildlife and people/recreation is a by-product) and the State Park (managed for people/recreation and wildlife management is done with that goal in mind).

We loaded the teachers into kayaks, and we took a short kayak trip around the edges of the bay stopping to view an eagle nest and learn about ghost forests. We also explored a floating duck blind and learned about the history of this area as a hunting club.

In the evening we walked to Wash Woods, which was once a thriving town with stores and churches. Now all that is left are graves and the steeple of one of the churches.

The next day we did yoga on the beach as the sun came up, then back to the lodge to learn more about the State Park from the Park Manager, Cameron Swain. In the afternoon we did a hike on the trails in the park and learned about the flora and fauna of the area, as well as viewed evidence of past inhabitants.

Part 3: Writing Lesson Plans (Aug 2, 4, 10)

All the teachers were required to attend two of the three all-day writing sessions held at False Cape State Park. During these sessions we had a guest speaker, then broke out into teams to work on lesson plans. After lunch, we typically took a walk and then got back to writing plans. At the end of the first day, we collected all the work on a thumb drive. The second session was run the same, except we did a short write-up of each lesson plan on a large sheet of paper and posted them around the room. Each of the teachers was asked to read through the lesson plan and add ideas, comments, or suggestions. These were later given to the teachers to use as they finalized their plans. For each writing session, they attended they got a raffle ticket for a boat tour of the North Landing River with Erik Moore. Five teachers won this opportunity to see up close the small creeks and marshes in the North Landing River watershed.

Due to the diversity of the subjects the teachers taught, we ended up with lesson plans that used the AP watershed information to teach Social and Emotional Learning, note-taking skills, writing, art, and Citizenship, as well as several different science disciplines. The lesson plans that were completed can be found [here](#). So far only the 3rd-grade lesson on sand dunes has been completed, due to the pacing schedule in the Virginia Beach Schools. Most of the teachers plan to test and evaluate their lesson plans in the Spring. They will then be tweaked and made available through the LRNow website to teachers in VB and NC.

We could not have done this incredible adventure without funding from this grant and the support of our many partners. In addition to supporting staff time, this grant funding allowed us to offer these two unique experiences and offer stipends to the teachers that participated. A Story Map has been created for the entire program. Follow this link, <https://storymaps.arcgis.com/stories/63acff0dad6d4639a592ff47051dc09e> to view the map and photos. We also created a “stockpile” of links to many aspects of the watershed. Each topic is divided into links that are websites, videos/power points, lesson plans and tools, and related literature; as well as images and maps and organizations working in the AP Watershed. Follow this link, https://docs.google.com/document/d/1FqfOPI4JA5ch5Lc9tuen_72iH-8Bjo3mZ6nQBBpJtVY/edit to access the Stockpile. The teachers felt that this would be more useful to teachers than a resource guide to the watershed. This will be a living document with new resources being added by partners and teachers throughout the school year. Eventually, the Stockpile will live on the LRNow website.

Results and Discussion:

At first, we had difficulty getting teachers to sign up for the two sessions. We ended up allowing teachers to participate in both adventures if they chose. 10 teachers participated in one or both adventures. Those that participated in both said that they were happy that they did because it gave them a chance to explore the watershed from the water and then to take the time to see it up close on the land excursions. “I feel I have truly experienced this watershed from both land and water inside and outside. Hiking in Back Bay showed me the diversity of the ecosystem... to experience something so entirely is the greatest way to allow for it to be taught to others (Macoul)”.

The sailing trip exceeded our expectations, despite a few changes in the plans. The crew bonded quickly and spent a lot of time-sharing ideas with each other as we moved from port to port. The experts and excursions that we lined up at each of the ports were amazing. The teachers wrote in their journals that the most meaningful part of the adventure was these first-person interactions. “I have gained such incredible knowledge from the hosts and specialists on this trip (Schwartz)”.

Although due to the weather, we were unable to kayak from Back Bay to False Cape, we were still able to get a kayak trip in at False Cape. That experience allowed the teachers to really become immersed in the watershed, both literally and figuratively. Many of these teachers had never been to this part of their watershed. “As an educator, I am amazed at how much I don’t/didn’t know about the southern watershed and what a wealth of knowledge and beauty is literally right in my backyard. This 2-day experience has really opened my eyes and I am taking away a newfound appreciation of the diverse and extremely unique area we live in (Miller)”. Although some of the speakers had to cancel at the last minute, we were able to get their presentations and notes. The teachers received a broad perspective of this area and learned about research and legislation that is happening in their watershed, as well as learning about the flora and fauna.

Although a lot of video footage was shot, the person who we contracted to create some short videos had to bow out due to health issues. We will continue to look for a student to make at least one video. In the end, one teacher decided to leave the school system, so did not participate in the writing session and another was promoted to a professional development position. Although, no longer a classroom teacher, she chose to attend the writing sessions and assist the other teachers in developing their lesson plans.

At the end of the program, we had the teachers fill out a reflection and a short assessment. Results from the assessment can be found at https://docs.google.com/document/d/1zYdCsxUUDJi6vcmEEVCS-Ds0q475-SWJGPvOYfEP_to/edit. The most telling result of the assessment was the difference between

the answers to the question “On a scale of 1-10, what was your comfort level teaching about watersheds and especially the Southern Watersheds before the training?” and the question “After completing your entire adventure, what is your comfort level now teaching about the watershed, especially the Southern Watersheds?”. Most of the teachers started out at a comfort level of 0-1 and ended up at a 7-10.

The last question was “On a scale of 1-10 (10 being Will Include), after completing your adventure and the writing sessions, what is the likelihood that you will teach watershed education and include the Southern Watersheds?” All the classroom teachers circled 10 or Will Include. What a great start in getting the schools to teach about this incredible watershed across the disciplines and a testament to the power of experiential learning.

In-Kind Services and Volunteer Hours:

US Fish and Wildlife Service- Back Bay NWR

- Erica Ryder gave many hours in planning the second experience
- Lead hikes at the refuge
- Provided space for the last writing session
- Gave a presentation about the importance of weather in firefighting
- Free access to the refuge and Tram transport (\$250)

Virginia Department of Conservation and Recreation- False Cape State Park

- Cameron Swain gave many hours in planning the second experience
- Lead hikes at FCSP (\$75)
- Allowed us to use the Wash Woods lodge for free for 4 days (\$338)
- Lead a free kayak adventure (\$450)
- Gave multiple presentations and hikes during the second experience and writing sessions
- Provided AV equipment for writing sessions

Museum of the Albemarle

- Provided a free guided tour of the museum

George Jackson

- Provided a guided van tour of Elizabeth City and donated the book Albemarle Memories to LRNow (\$45.00)

Frisco Native American Museum & Natural History Center

- Provided a free talk to the teachers aboard the sailboat (\$50.00)

Hatteras Ocean Island Center

- Provided a free kayak trip for the teachers (\$200.00)

Coastal Studies Institute

- Provided transportation to and from the Institute (\$50)

Weasel Creek Watershed Expeditions

- 60 hours of volunteer time helping to develop and teach the programs aboard the boat (\$1800)

CCMP Goals, Outcomes, Objectives and Actions Addressed:

D1.1: Communicate the importance of stewardship and offer opportunities for volunteering to further APNEP's mission.

When we were at Back Bay NWR and False Cape State Park, the rangers talked to the teachers about opportunities to do stewardship projects that help repair erosion, restore damaged habitats, increase pollinators, and help to keep our waters clean.

LRNow also has tree planting projects all over the city in 2022, that are open to volunteers of all ages. We also talked about projects that addresses problems on the school grounds or nearby neighborhoods.

D2.1: Provide and Promote opportunities for outdoor experiences that connect individuals with the Albemarle-Pamlico ecosystem.

This program gave teachers first-hand knowledge of the watershed that they will now convey to their students through activities, field work, and direct instruction. Having their own first-hand immersive experience will make the lessons they develop and their teaching so much richer and more authentic. Kayaking, motor boating or sailing through the watershed formed a connection no typical workshop could.

D2.2: Provide environmental education training opportunities for educators in the region

As the teachers prepared for the either the sailing excursion or the 2-day adventure, they learned not only about the natural history of the area, but also the cultural history and economic drivers for the area. They became familiar with and experienced how people traveled the waters before roads and railroads were developed in this river basin. At the end of the project, the teachers will be teaching lesson plans for their classrooms and their schools that will be available for other teachers to use. We built and Stockpile with reference materials and activities dealing with the Virginia side of the watershed that will be available to share with North Carolina teachers.