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2023

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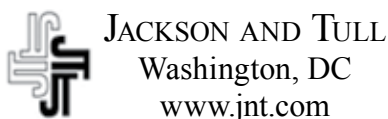
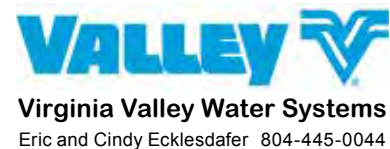
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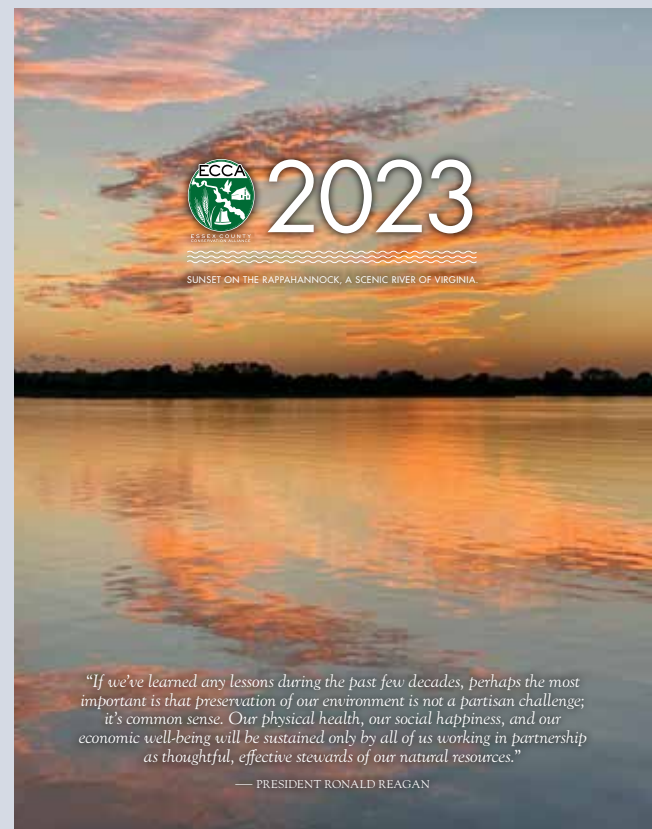
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ON THE COVER

Highly acclaimed for its unspoiled scenic vistas, its ecological importance, and cultural significance, the 79 mile stretch of the lower Rappahannock running from the Route 3 bridge at Fredericksburg to the downriver boundaries of Essex and Richmond counties was officially designated by statute as a Virginia Scenic River on July 1, 2021.* Cover photo by Hill Wellford, Jr.

*ECCA 2021 annual magazine, "Scenic River Designation Update," essexcca.com



"If we've learned any lessons during the past few decades, perhaps the most important is that preservation of our environment is not a partisan challenge; it's common sense. Our physical health, our social happiness, and our economic well-being will be sustained only by all of us working in partnership as thoughtful, effective stewards of our natural resources."

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ESSEX COUNTY CONSERVATION ALLIANCE:

OUR MISSION

Dear Friends and Supporters,

Warm greetings from the Essex County Conservation Alliance! As we embark on another exciting year of environmental stewardship, we are thrilled to present the latest edition of our annual magazine. Within its pages, you will find invaluable insights into our ongoing initiatives, as well as the critical challenges we face in safeguarding the natural splendor of our county.

At the heart of our mission lies the protection and preservation of our beautiful county, but we cannot ignore the challenges that persist. Essex County and our neighboring counties continue to grapple with the ever-encroaching threat of urban sprawl. As our population grows, the demand for development intensifies, placing immense pressure on our delicate ecosystems and cherished natural landscapes. However, through collaboration and strategic planning, we aim to strike a balance between progress and conservation.

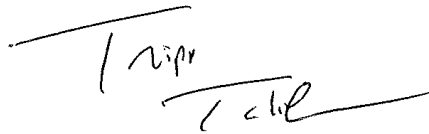
One concerning development that requires our immediate attention is the proposal for Caroline County to extract 13 million gallons of water a day from the Rappahannock River to support development along the I-95 corridor. Water is a precious resource, and any endeavor that puts its sustainability at risk demands thorough examination. Our alliance is committed to closely monitoring this situation and advocating for responsible water management practices that safeguard the health of the Rappahannock River ecosystem.

In the face of these challenges, we are delighted to share news of a recent milestone achieved through the utilization of conservation tax credits. These credits have proven to be invaluable tools in preserving rural land in our county. By incentivizing landowners to protect their properties, we can ensure the preservation of vital habitats, safeguard water quality, and maintain the character of our rural landscapes. We will continue to promote and advocate for the expansion of these tax credits as a means of fostering long-term conservation and sustainable development.

Our annual magazine serves as a platform for sharing stories of success, knowledge, and inspiration. We showcase the remarkable work of our dedicated volunteers, highlight the positive impact of our conservation initiatives, and delve into important environmental issues affecting our region. Through thought-provoking articles, captivating photographs, and engaging features, we hope to inform, inspire, and galvanize our community to take action.

None of this would be possible without your unwavering support and commitment. We are immensely grateful for the continued dedication and generosity of our members, sponsors, and partners. Your contributions enable us to advocate for the preservation of our natural heritage, implement vital conservation projects, and educate future generations about the importance of environmental sustainability.

Together, let us forge ahead on this crucial journey, united in our shared vision for a thriving community that harmonizes progress and environmental stewardship. We invite you to immerse yourself in the pages of our annual magazine, to connect with our stories, and to join us in safeguarding the irreplaceable treasures that define our home. Thank you for your unwavering support.



Tripp Taliaferro, a native of Essex County, has always had a deep connection to his hometown. After completing his Bachelor of Business Administration at the University of North Carolina at Chapel Hill, Tripp furthered his education through an international business program at Maastricht University.

With over 22 years of experience in the investment industry, Tripp currently holds the position of Director and Head of Private Investments at Spider Management Company. Prior to joining Spider, he served as the President and Chief Investment Officer of a single-family office specializing in opportunistic investments across public and private markets. Tripp's expertise extends further as he previously worked as a Partner at Private Advisors, where he actively participated as a board member in various private companies spanning software, industrials, and consumer goods industries. His career also includes valuable contributions at Quad-C Management, Wachovia Capital Partners, and Wachovia Securities.



Tripp Taliaferro

While Tripp resides in Richmond with his wife and three children, his roots in Essex County remain strong. He frequently returns to his hometown, spending weekends and cherishing the beauty and tranquility of Essex County.

Tripp's knowledge of finance and investments, coupled with his deep appreciation for Essex County's natural splendor, positions him as a dedicated advocate for the preservation and sustainable development of his beloved community.

A Tribute to PETER CHARLES BANCE



By Frances Ellis and Julie Strock, Photos by Susan Bance

The Essex County Countryside Alliance, now named Essex County Conservation Alliance, was created in 2006 when Peter Bance, co-owner of Wheatland in Essex County, brought together a group interested in preserving the rural character of the region. Concerned by trends he had witnessed in other areas of Virginia, Peter realized that systematic steps were needed to promote responsible choices for preservation of farms, forests, waterways, and wildlife habitat.

Peter's heart is in Essex County. He spent childhood summers at Wheatland, his mother's ancestral family home. Beside the shores of the Rappahannock, he watched the ebb and flow of the tides, the geese and ducks landing in the marshes, and the herds of deer on the edge of the fields at twilight. Peter loves this land; he loves Wheatland. He and his wife, Susan, have opened its doors many times to the whole community not only for ECCA but for RCC, Garden Clubs, and other conservation groups.

Peter's foresight and vision leads him to the right people, helping him network with all levels of government from governors to town councils. Peter makes it a priority to get to know leaders in the community. He is a gatherer of information, cultivating relationships with people and groups with a lot to offer. Peter is a fighter and knows the issues that threaten Essex County. He has led the effort to preserve the county's land use policy, promoted conservation easements, and led ECCA in fighting fracking on

farmlands. Thanks to Peter and Hill Wellford, ECCA fought the residential development of Fones Cliffs, a pristine watershed and eagle sanctuary. Under Peter's leadership, ECCA also prepared and published articles challenging the solar industry's efforts to convert farms and forest acreage into solar industrial sites, warning that this would destroy the rural and scenic image of our county. Many of Peter's inspirations were carried out by Hylah Boyd, a special friend to Peter and all of us. He appreciates all people and looks for ways to be inclusive.

Peter loves to have a good time, enjoying good food and drink with good friends. As his friend, Jimmy Wheat says, "Peter does not let facts get in the way of a good story!" Susan and Peter are known for their hospitality.

Hill has been on the ECCA journey with Peter from the beginning, and these two men form a formidable team. Peter, you are stepping down from your role as president but remaining on the board to continue the amazing work you began. We thank you not only for ourselves, but for the future generations, for our children's children, who will benefit from your vision and your work.

We also take this opportunity to give special recognition to Susan Bance, who throughout Peter's term as ECCA president, has spent countless hours hosting ECCA events, dinners, and social gatherings at Wheatland. Thank you, Susan, for all you have done to ensure ECCA's success.



Meet ECCA's New President: Tripp Taliaferro



By Marty Taylor

It is easy to understand why the ECCA selected Tripp Taliaferro as its new president. Tripp is a proven leader with a successful track record in business and finance and an intimate knowledge of the rural, scenic, and historic characteristics of Essex County that ECCA has worked so hard to protect since it was founded in 2006.

It would be hard to find any family with roots in our Tidewater region of Virginia that run deeper than the Taliaferro family. Historians report that the first Taliaferro to settle in the Colony of Virginia was Robert Taliaferro, who immigrated from England in the 1640s. Robert died in 1671 in Gloucester County, but not before Robert and his wife, Katherine, produced seven children, one of whom was Francis Taliaferro who served as a justice of the peace in Essex County from 1690 to 1700. If we advance the time clock about 280 years to 1979, Tripp, the son of Patsy and Spottswood Taliaferro, emerges in the Taliaferro family history.

Tripp will tell you that his love of Essex and the Rappahannock River have their origin in the fact that he spent much of his youth growing up in a farmhouse built by his great-grandfather, Harry Hudnall Ware, at Wares Wharf near Dunnsville. An avid outdoorsman who was raised on the banks of the Rappahannock, Tripp was educated at Aylett Country Day School, then St.

Christopher's School in Richmond. He is a graduate of UNC Chapel Hill, with a BS in Business Administration, a degree that serves him well as he directs investments at Spider Management Company, LLC, an investment firm owned by the University of Richmond that offers services to nonaffiliated endowments and foundations. Spider Management oversees what many graduates consider to be phenomenal growth of the endowment at the University of Richmond.

With wife Susan and children Madeline, Woods, and Ware, Tripp lives in Richmond but returns most weekends to Essex. "I love being on the water in any kind of boat or, in fall, being in a duck blind," Tripp acknowledges. His love of Essex County underlies his concept for its future: "I want to see Essex continue to advance. Change is inevitable, but it has to be thoughtful change done with a longer-term, strategic vision."

ECCA welcomes Tripp in his new role as our leader and looks forward to realizing his vision of maintaining the "God-given attributes of the county by conserving open spaces, wildlife, pristine water, and scenic views, yet also ensuring we have the educational systems, amenities, and jobs to attract residents and tourists."

Marty Glenn Taylor is a retired educator who lived on Benton Point Road in Tappahannock before moving to Richmond three years ago. She is the author of four books: *The River Me*; *From Some Full Heart*; *Place of Rising and Falling Water*; *Benton Point Moments*. The latter is a book of poetry that was illustrated by members of the Tappahannock Artists Guild.





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Friends of the Rappahannock (FOR) works with landowners and partners to implement stream and wetland restoration practices.

Depending on where you live, there are numerous programs available to you!

Do you live on or near a river or stream?

The **Virginia Cost-Share Assistance Program (VCAP)** provides financial, technical and educational assistance to property owners installing eligible Best Management Practices (BMPs) in Virginia's participating Soil and Water Conservation Districts (SWCDs). This includes installation of **living shorelines** and **forest buffers**.



Do you own agricultural land?

A partnership between the Virginia Department of Conservation and Recreation (DCR) and Virginia's SWCDs, the **Virginia Agricultural Cost-Share (VACS)** program provides up to \$300,000 in assistance for BMP implementation on farmland.

Would you like to see more wetland habitat?

Through the National Resources Conservation Service (NRCS), the **Wetland Reserve Easement (WRE)** program provides technical and financial assistance to private landowners for the **creation, reestablishment or enhancement of wetlands**.



Interested in enrolling in a program to directly help restore and protect a natural habitat on your property?

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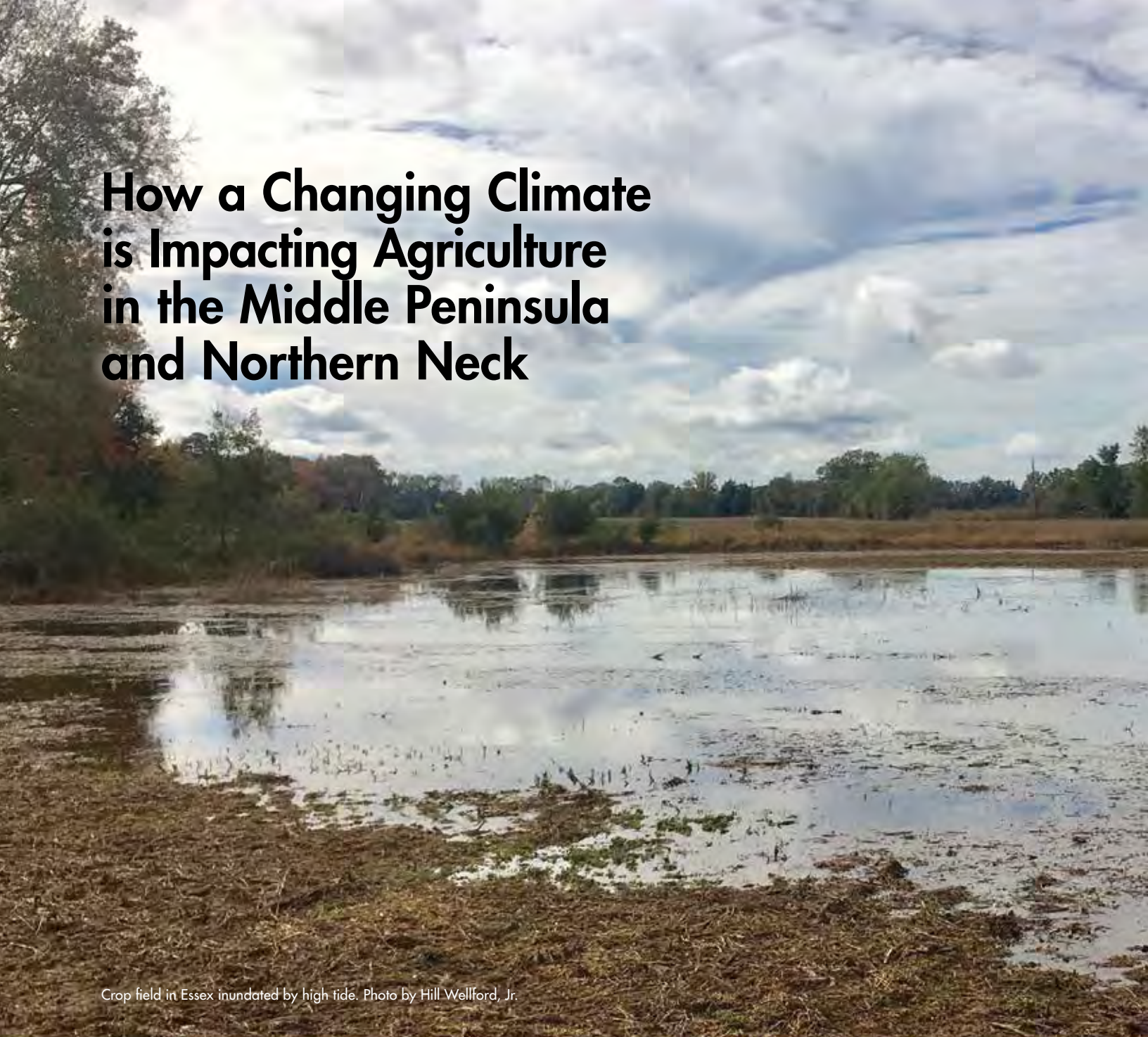
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How a Changing Climate is Impacting Agriculture in the Middle Peninsula and Northern Neck



Crop field in Essex inundated by high tide. Photo by Hill Wellford, Jr.

By Dr. Julie Shortridge, Assistant Professor and Extension Specialist, Biological Systems Engineering, Virginia Tech; Dr. Zachary M. Easton, Professor and Extension Specialist, Biological Systems Engineering, Virginia Tech; Robbie Longest, Essex County Agriculture and Natural Resource Extension Agent

Imagine a warm 80°F day in mid-February with daffodils blooming, trees budding, and birds chirping. Or a hot July afternoon thunderstorm that brings hail, gusty winds, and 3 inches of rainfall in just one hour, flooding local roadways. Chances are if you live in the Middle Peninsula or the Northern Neck, in recent years, these exceptions to what most of us perceive as “historically normal” weather for a particular time of year have been all too evident.

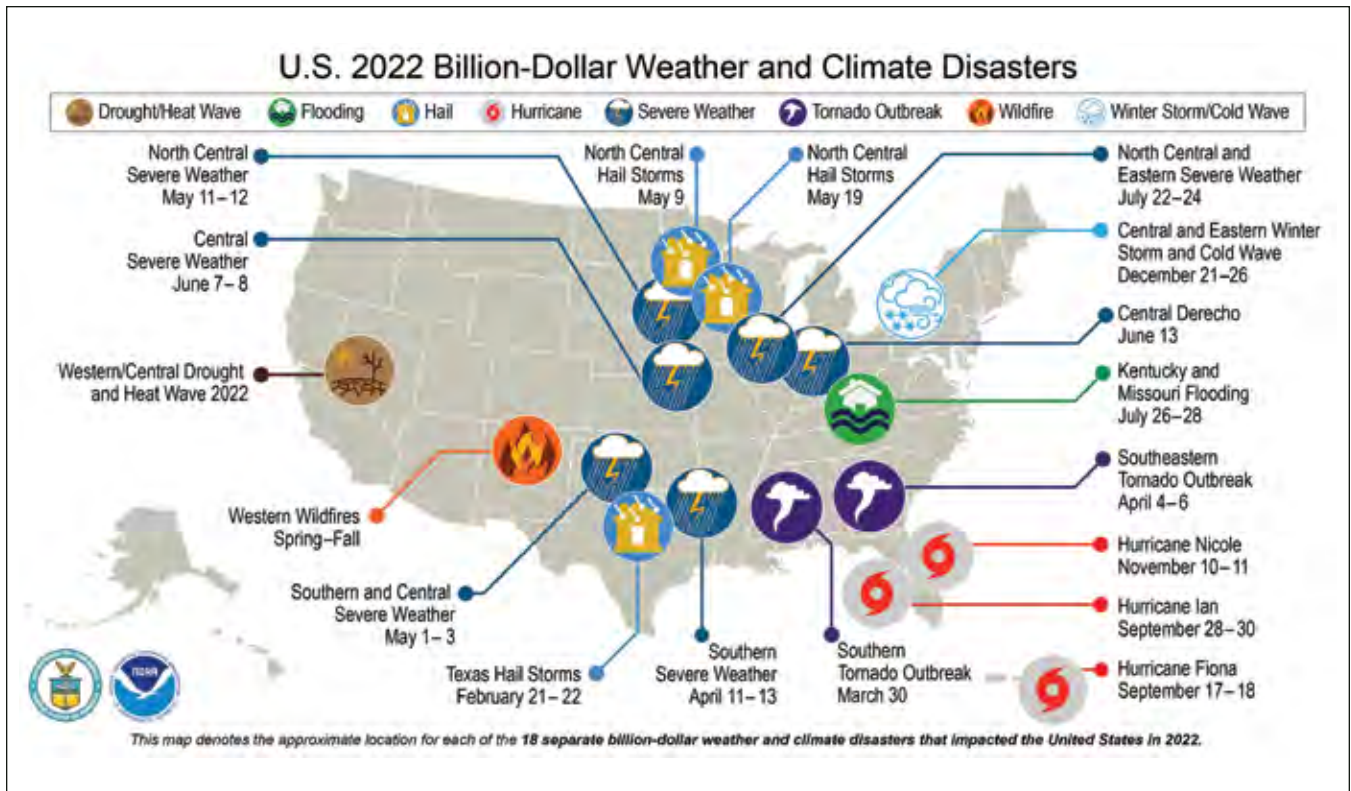
When it comes to agriculture and farming, weather is often a go-to topic of general conversation among producers at the local store, restaurant, or church, or in the fields. It is the one variable in agricultural systems that cannot be controlled. Some familiar comments may say “Unusual weather we’re having,” or “What happened to spring?” and “It wasn’t like this years ago.” Are these extremes and changing weather patterns what we will have to manage moving forward? What is causing this and how can we know what to expect in the future? In short, there may not be any single answer to these questions as weather remains a complex thing to predict. Ultimately only Mother Nature knows what’s in store. However, significant scientific and meteorological data exists, and long-term

research and monitoring may help to explain some of what we continue to experience. This can help provide insight into how to better predict and adapt to these shifting climate changes in agricultural and natural resource systems.

Recent years have demonstrated the vulnerability of our production systems to a changing climate and weather extremes. For example, 2012 was one of the most expensive years on record for crop damage (\$15.7 billion) due to weather-related disasters. This included the historic drought that gripped much of the Midwest and eastern United States that caused extensive crop damage and resulted in the largest-ever government crop insurance payout. According to the National Oceanic and Atmospheric Administration (NOAA) National Centers for

Environmental Information, 2022 had a record-breaking eighteen climate-related disasters that exceeded \$1 billion each. The sixteen warmest years on record globally (out of the last 135 years) occurred between 1998 and 2022. Local examples are also plentiful to showcase the power of weather and climate, including the EF-3 tornado event in February of 2016 that struck Essex and Richmond counties with winds reaching 140 mph, damaging homes, buildings, trees, and cropland, and injuring dozens of local residents. Another vivid recent memory among farmers in Virginia is the late spring freeze of 2020. It was Mother’s Day weekend, May 9–10, 2020, and local producers had planted their corn, vegetables, and other crops. These could be seen growing throughout the area.

Map of recorded billion-dollar weather and climate disasters in the U.S. in 2022. Each of these 18 weather related events resulted in more than \$1 billion each in damages as a result of the event. (Photo Credit: NOAA National Centers for Environmental Information, <https://www.ncei.noaa.gov/access/billions/>)



Wheat and barley fields were headed and pollinating to begin producing grain, and fruit trees were initiating fruit production. On the night of May 10, temperatures dipped down to below freezing and into the 20s (°F), causing significant crop damage to susceptible small grain, emerged corn, and specialty crops such as fruit and vegetables. Many small grain fields sustained damages of more than 80 percent yield loss from freeze damage, resulting in estimated yields of less than 20 bushels per acre in severely affected locations.

According to NOAA National Weather Service data, the historical average last-frost date from 1950–2000 for eastern Virginia was April 12. For the period of 2000–2023, this average date has been April 9. Historically, according to NOAA data there had not been a documented freeze as late as the May 10, 2020, event since May 11, 1966. Looking at fall first-freeze date data from the same time periods, it has shifted about one week from an average date of October 23

(1950–2000) to October 30 (2000–2023), meaning that temperatures are staying warmer longer into the fall and early winter. Variability in growing seasons through extremes in temperatures and precipitation have also been experienced. Extreme summertime heat, intense rainfall events, strong winds, and localized flooding and drought are just a few examples that have plagued agriculture locally. NOAA data for the Richmond, Virginia, area reports that four of the wettest years on record since 1872 have occurred since 2000, with 2018, 2020, 2003, and 2004 being the second, third, fourth, and seventh highest annual precipitation years, respectively. In 2018 and 2020, we received approximately 63 inches of precipitation each year, compared to the 45.5-inch annual average. Several locations in Essex County received nearly 75 total inches of precipitation in 2018, nearly double the yearly average. This resulted in coastal flooding along the Rappahannock River, cropland flooding, expedited soil

erosion on sloped sites, and nutrient leaching and runoff, significantly costing producers financially.

Assessing these local and national examples, how might these extreme and changing weather and climate parameters impact Virginia moving forward? What changes should we expect to experience? And what can we do to prepare? A closer look into ongoing research and monitoring efforts of shifting climates provides insight that documents numerous effects that may be of concern to agricultural and natural resource systems, and how future adaptations can help to manage and understand these changes.

Weird Weather or Climate Change?

Unusual and extreme weather has always been something that farmers have to contend with. However, many of the strange weather events we've experienced over the past few years are consistent with what we expect to occur more often as our climate and weather patterns change. The Industrial Revolution in the

Freeze/frost damage to emerged corn resulting from the May 2020 late spring freeze event. Damaged plants (foreground) show wilted and brown leaves, while some green undamaged tissue can be seen on a few plants (background). Due to the growing point still being below the soil level, most of these plants recovered with new leaf growth, however growth was delayed. Photo by Robbie Longest.





Tide swamps farm road and extends into Essex agricultural field. Photo by Hill Wellford, Jr.

mid-1700s led to new manufacturing processes that obtained energy by burning fossil fuels such as coal and oil. These advancements led to many of the technologies we rely on today, such as heat for our homes and fuel for our cars and equipment. However, burning fossil fuels releases greenhouse gases, such as carbon dioxide and methane, into the Earth's atmosphere. These substances are referred to as greenhouse gases because they trap energy in the Earth's atmosphere and lead to warmer temperatures across the globe, similar to how temperatures increase inside a greenhouse in winter.

The average amount of carbon dioxide in the atmosphere was roughly 280 parts per million (ppm) before the Industrial Revolution.

In 2018, the average amount had reached roughly 407 ppm. This is greater than it has been in more than 400,000 years according to the US Environmental Protection Agency.

Higher levels of carbon dioxide on their own could help plants grow by increasing plant respiration rates. As part of the carbon cycle, plants use energy from the sun to photosynthesize carbohydrates from carbon dioxide, and greater carbon dioxide concentrations can result in greater carbohydrate production. As a result, increasing carbon dioxide could benefit certain crops, depending on the availability of water and nutrients. However, rising levels of greenhouse gases in the atmosphere cause many other changes, many of which will present

challenges for production systems and our natural resources that they rely on.

Milder Winter, Warmer Spring, and Hotter Summer

The most well-known impact of recent changes in the Earth's climate is an increase in the Earth's temperature. The Earth's temperature has always naturally varied, leading to periods where the planet was cooler (ice ages) or warmer. However, the change in temperature over the past 100 years, a 1.2-degree Fahrenheit increase, has occurred much faster than it has historically. Scientists have investigated other possible reasons for this warming, including factors like changing radiation from the sun or variations in the orbit and tilt of the Earth. Research consistently indicates that current warming can be explained by higher levels of greenhouse gases in the atmosphere. As greenhouse gas concentrations continue to rise in the atmosphere, temperatures in Virginia and worldwide will likely continue to rise as well. While changes in temperature of just a few degrees may sound minor, these can have a large impact on the day-to-day temperatures that we experience. For example, research suggests that the average temperature in Richmond in the 2050s will be 4.3° higher than it was historically. This would lead to the number of extreme heat days per year (over 90°) increasing from thirty-two to seventy-eight.

Increased extreme heat days can have negative impacts on agriculture. More frequent heat waves could result in livestock heat stress, which can inhibit fertility, reduce weight gain, and decrease milk production. Warm temperatures in



From top: Drought stressed corn can be observed in the top photo, with decreased ear fill due to poor pollination and kernel abortion resulting from limited moisture due to lack of rain and excessive heat. Middle photo: Healthy corn is exhibited with vibrant green plant tissue, and larger ear size with complete kernel development as a result of adequate soil moisture. Bottom photo: Soybean field with a center-pivot irrigation system used to deliver water to the crop during periods of drought and hot weather. All photos by Robbie Longest.

late February and early March may result in “early spring” or a “false spring,” terms used by ornithologists to describe a seasonal condition in which plants are induced to jump-start their spring growth, resulting in a seasonal mismatch in which the peak insect hatch occurs prior to the normal arrival of migrating birds that help to contain them. This can be a confusing time for farmers who look for the earliest opportunity to plant their spring crops, although a potential freezing cold snap might still be on the horizon. Warmer temperatures may make many crops grow more quickly, but could also consequently reduce yields of some crops. Crops tend to grow faster in warmer conditions, but for some crops, such as grains, rapid growth reduces the seed maturity and nutrition and can ultimately reduce yields. Extreme heat during and following pollination can also lead to inhibited or reduced pollination and aborted grain, fruit, or produce. A lengthening growing season might allow producers an opportunity to adopt different varieties and crops that are currently only grown in warmer regions, or to double and even triple crop, producing multiple crops in a single production year. However, it will also likely lead to increased weed, pest, and disease pressure, and, as a result, increased management and cost to producers. Pests that once were unable to survive in our climate may be able to expand their range and become a problem in the future if changing climates support their expansion.

Higher temperatures will also lead to more relatively warm, frost-free days in the winter. Warming winters could result in both inadequate dormancy and vernalization periods for some perennial crops,

such as apples and pears, as well as annual crops such as small grains like wheat. An example of this would be the later average frost date in the fall (2000–2023) as reflected in the NOAA weather data for eastern Virginia, which can lead to more growth and growing degree day (GDD) accumulation for small grains such as wheat planted in the fall, expediting growth and development, making plants more susceptible to spring freeze damage.

One of the most surprising potential impacts of climate change is that it may actually be increasing the frequency of unusually cold weather events. Normally, the frigid air in the Arctic is contained by the polar vortex and polar jet stream, a set of strong winds that circle the Earth at the North Pole. However, temperatures at the poles are not only increasing, but they're increasing faster than temperatures at other parts of the Earth. Some research indicates that these higher temperatures are destabilizing the polar vortex, allowing these winds to dip, stretch, and meander farther south than they normally do. This brings cold polar air down to areas of North America that rarely experience it, and is responsible for many periods of extreme cold such as the Mother's Day Frost of 2020 and the historic cold we experienced in December 2022. Scientists are still trying to understand if these changes in the polar vortex are due to climate change or natural variability in the Earth's climate system and cycles.

Rising Sea-level and Saltier Water

One of the most important consequences of higher temperatures worldwide is rising sea levels. When liquids are warm, they expand to

take up more volume. This expansion, combined with melting ice from glaciers and ice sheets as the global temperatures increase, is leading to rising sea levels in the ocean. Virginia has one of the fastest rates of local sea level rise in the entire United States. This is due to the prevailing ocean currents along the Atlantic coast, natural land subsidence (sinking) that has occurred since the last ice age, and groundwater depletion in underground aquifers. Analyses from the Virginia Institute of Marine Science show that average tidal levels in coastal Virginia have risen about 10 inches over the past fifty years. Even minor changes in sea level can lead to large increases in coastal flooding. For example, minor flood events in coastal Virginia are occurring 33 percent more often now than they were twenty years ago. While rarely damaging, minor flooding can lead to notable disruptions affecting quality of life, such as school closures, infrastructure shutdowns, and difficulty accessing community services. Sea level rise also increases

the risks and potential impacts from larger floods, including those produced from tropical storms and hurricanes.

As sea levels rise, this leads to many impacts on coastal farms, communities, and ecology. High tides and storms will lead to flooded low-lying land more often, making land that has been in production historically no longer feasible to farm due to poor drainage and frequent flooding. Flooding and standing water can be damaging to crops, decreasing oxygen availability to roots of submerged plants. This may also increase salt levels in the soil after flooding along salt or brackish coastal areas, making production of most crops more challenging and harming coastal forests. Coastal rivers used for water supply and irrigation will also become saltier. A study conducted by Virginia Cooperative Extension found that in certain locations in the Rappahannock River north of Tappahannock, salinity levels already regularly exceed concentrations recommended for irrigation

Southbound lanes of Route 17 north of Tappahannock are covered by rising tide from Mt. Landing creek. Photo by Hill Wellford, Jr.



of crops such as soybeans and vegetables during periods of dry weather. Rising sea levels also impact groundwater. Wells used for drinking water and irrigation may experience saltwater intrusion, and flooded septic tanks can lead to increased water pollution of local waterways and nearby wells.

Changing Storm and Precipitation Patterns

Warmer air can hold more water. This is why the air often feels so dry in the wintertime and so humid in the summer. Because a warm atmosphere holds more water, the amount of moisture that can accumulate prior to rainfall increases, leading to heavier rainstorms. The frequency of high-intensity precipitation events has increased substantially in Virginia over the past decades, with the greatest increases seen in the most extreme events (days with a total of at least 2 inches of rainfall). Projections of future climate show that these extreme precipitation events will increase further in the coming decades. By the mid-twenty-first century, coastal Virginia could experience twice as many extreme rainfall events compared to a historical average of two to three per year. High-intensity rain can result in more erosion of topsoil and removal of nutrients from farm fields, increasing risks for downstream water quality and impacting agricultural crop yields and quality. In addition to predicted heavier rainfall generally, we are also likely to experience more frequent intense storms, accompanied by high winds, hail, and floods that can damage agricultural crops, forests, and farm infrastructure.

Apart from changes in frequency of extreme rainfall and storms,

changes in the Earth's climate will likely impact the day-to-day rainfall that we experience as well. In the United States, a northward shift in storm tracks is expected to lead to decreased precipitation in areas such as the southwest United States but increases in many areas to the north and east, including Virginia. However, greater rainfall overall doesn't necessarily mean that there will be greater water available for agriculture. A study of long-term rainfall records across the United States showed that rainfall in the mid-Atlantic has become more variable over the past fifty years. This means that even if the total amount of rainfall we receive is unchanged, more of that rain is coming from heavy storms with longer dry spells in between. This can create problems for agriculture, because more of the rainfall is lost to runoff or drainage below the root zone, making it unavailable for plants if it is not absorbed by the soil. Higher temperatures result in more evapotranspiration, drying soils more rapidly and raising the humidity of the atmosphere, which can decrease crop water uptake and increase plant stress. Because of this, climate change means that growers may have to deal with both too much rainfall and too little, even within a single growing season. Crops rely on water uptake to supply essential nutrients such as nitrogen, phosphorus, and potassium, so anything that decreases water uptake will need to be considered for its consequences on crop productivity.

Overall, scientists, policymakers, and farmers generally agree that a rapidly changing climate will have far more negative consequences on our production systems than positive outcomes. The supply and

cost of food may change as farmers and the food industry adapt to new climate patterns. For warming of more than a few degrees, the effects are expected to become increasingly negative, especially for crops located near the warm end of their suitable temperature range already. Fortunately, agricultural producers have a long record of successful adaptation to a host of pressures and challenges. Even though changes in climate from what we are used to may seem a more daunting challenge, or one that cannot be addressed on a single farm in a single season, agriculture holds the keys to address and adapt to these changes in the future.

How Can We Adapt and Respond?

There are several ways to adapt management in response to a changing climate and weather challenges in natural resource systems, and Virginia's agricultural landscape offers many opportunities to mitigate potential and realized effects. Farms offer incredible potential to mitigate these changes, by acting as a carbon sink, sequestering carbon in soil and plant matter that would otherwise be atmospheric carbon dioxide (CO₂), the primary greenhouse gas responsible for climate change. According to the US Department of Agriculture, soil organic matter increases soil moisture and nutrient-holding capacity while improving soil structure. These soil attributes are well-known positive agronomic properties and are generally strongly correlated to higher crop productivity. Increasing soil organic matter will also serve as a CO₂ sink, meaning that increasing soil organic matter in a field will actually sequester CO₂ from the atmosphere, reducing a farm's carbon footprint.



Farms offer incredible potential to mitigate changing climate and weather challenges, by acting as a carbon sink.

This may also help increase a farm's productivity and help to mitigate the impacts of changing climates, making those systems more resilient. Two of the most widely adapted practices to increase organic matter in soils are no-till and cover cropping, practices that also have many other documented agronomic benefits such as nutrient scavenging, weed suppression, and improved soil moisture retention during drought. Native forests, timber production, woodlots, and grasslands can also provide several benefits to producers while reducing a farm's carbon emissions. Trees can remove substantial amounts of CO₂ from the atmosphere, incorporating it into woody biomass and root systems as a renew-

able resource. Trees can also provide shade and shelter, reducing heat stress on livestock and increasing productivity by creating less stressful conditions. They moderate soil moisture, drawing water up from deep in the soil, thereby increasing soil water availability for less-deep-rooted plants such as grass, which also sequesters carbon. Trees can also reduce wind stress on adjacent crops and buildings, which can cut energy requirements for heating and cooling.

In order for our agricultural and natural resource-based systems to remain productive and resilient to extreme weather events and changing climates in the future while maintaining environmental

stewardship, ongoing adaptations such as changes in practices, management, and mindset will most likely be necessary in the future. Producers are equipped with many great resources to gradually help mitigate the challenges addressed in this article, through advancements made in equipment and technology, breeding and genetics, and ongoing research and educational efforts, many of which are already adopted. Conservation practices and precision management, coupled with a systems approach to risk management will hopefully help agricultural producers be able to continue to provide the food, fuel, and fiber that we so desperately depend on as a growing population,

while simultaneously, preserving our natural resources that provide those services and mitigating the effects that a future changing climate may pose. For more information on this subject, readers are encour-

aged to refer to several Virginia Cooperative Extension publications including *Climate Change Adaptation for Agriculture: Mitigating Short- and Long-Term Impacts of Climate on Crop Production (BSE-109P)*, *Understanding*

Climate Change Projections in Virginia (BSE-342P), *Understanding Salinity in Tidal Waters: Information for Irrigators (BSE-349P)*, and *Managing Climate Risks and Extreme Weather in Agriculture (BSE-226)*.



Dr. Easton

Dr. Shortridge

Robbie Longest

Dr. Zachary M. Easton is a professor and extension specialist in Virginia Tech's Department of Biological Systems Engineering. His work seeks to improve our understanding of physical, chemical, and biological processes in agricultural ecosystems. His labs' ongoing core research, teaching, and extension programs focus on synergies between soil and water resources, environmental change, biophysics, and sustainable land use. This is done using high level computational approaches, data analytics and simulation modeling, physical studies, and systems level analysis. The work is interdisciplinary in nature and supported by lab members with backgrounds in hydrology, biology, atmospheric science, computer science, and engineering along with collaborators who work in fields from animal science to agricultural economics to robotics. Dr. Zachary Easton's work spans scales ranging from soil pore to major river basin and includes projects throughout the United States and the world.

Dr. Julie Shortridge is an Assistant Professor and Extension Specialist in Biological Systems Engineering at Virginia Tech. Her research and extension work aims to better understand how climate and extreme weather impacts agricultural and water supply systems. She also works to design strategies to make our water and food supplies more sustainable and resilient in the face of these challenges.

Robbie Longest serves as the Essex County Agriculture and Natural Resource Extension Agent working for Virginia Cooperative Extension. He graduated from Virginia Tech in 2015 with a Bachelor's of Science Degree, and 2017 earning a Master's of Science degree majoring in Crop and Soil Environmental Science with a concentration in agronomy. He has served as the Essex ANR County Agent since June 2018 working with area agricultural producers in the focus areas of grain, forage, livestock, and specialty crop production, providing producers and landowners with educational resources and trainings. Robbie also works with the Essex County 4-H Livestock Club as their agent advisor.

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FONES CLIFFS:

A Conservation Dream Realized

By Hill Wellford, Jr.

Many articles have been written regarding Fones Cliffs, detailing its unique ecological importance, its cultural and historical significance, and the struggle of conservation organizations and private citizens who opposed the development threats that have loomed over Fones Cliffs for the past fifteen years.

Majestic view of the four-mile stretch of Fones Cliffs extending southward from its highest peak on its northern end. Photo by Hill Wellford, Jr.

For conservation advocates, the low points in this struggle came in 2012 when Richmond County approved the rezoning of 252 acres to authorize the Rappahannock Cliffs Subdivision consisting of forty-five home sites overlooking the river, and again in 2015 when the county approved Diatomite Corporation's request to rezone 964 acres for a proposed hotel, golf resort and massive housing complex of more than 700 residential units. At that point in the Fones Cliffs saga, the conservation dream of preserving Fones Cliffs from development seemed to be lost, but the conservation network that sought to protect Fones Cliffs never gave up hope.

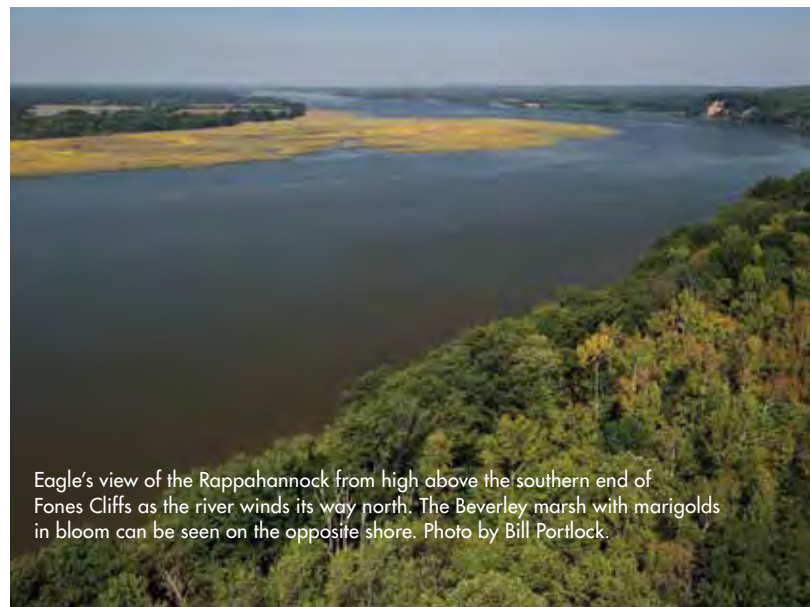
No one could have predicted the milestone events that took place over the next seven years that literally snatched victory from apparent defeat. Today, the entire four-mile stretch of the Fones Cliffs riverfront acreage is protected from development. The Conservation Fund holds title to the 964 acres previously owned by Diatomite Corporation and later owned by Virginia True Corporation, the US Fish and Wildlife Service holds title to the 252 acres previously owned by Rappahannock Cliffs Subdivision, and the Rappahannock Tribe now owns the remaining 465 acres of river frontage at the southern end of Fones Cliffs that was previously owned by the Northern Neck Lumber Company. This is a

conservation dream realized against what seemed for many years to be insurmountable odds.

For the readers of this article who are new to the Fones Cliffs saga, a brief description of the unique conservation and cultural attributes of Fones Cliffs is necessary to explain why the passion to preserve the Fones Cliffs stretch of the river has run so high.

Ecological Value and Historical Importance

Towering high above the Rappahannock, Fones Cliffs is the centerpiece of a rare and delicate ecosystem. It



Eagle's view of the Rappahannock from high above the southern end of Fones Cliffs as the river winds its way north. The Beverley marsh with marigolds in bloom can be seen on the opposite shore. Photo by Bill Portlock.



Top: Tundra swan and Canada geese shelter in the Beverley marsh. Photo by Hill Wellford, Jr.



Right: The Fones Cliffs stretch of the Rappahannock is one of the most important sites for bald eagle conservation in eastern North America. Photos by Hill Wellford, Jr.

stands sentinel over a relatively narrow four-mile stretch of brackish water bounded on the opposite side by extensive freshwater marshes, forests, and farmland protected by conservation easements held by The Nature Conservancy and the Virginia Outdoors Foundation. The marshes host such a high diversity of plant and animal life, including the existence of rare and protected species, that biologists have described them as being among Virginia's most important freshwater wetlands. The Fones Cliffs stretch of the river is a spawning area for anadromous fish, including sturgeon, striped bass, alewife, blueback herring, and American and hickory shad. It is also a migration staging and nesting area for hundreds of species of birds that migrate to Fones Cliffs each spring and summer from distances as far south as Colombia and as far north as the Arctic, and a wintering destination for protected waterfowl, including tundra swan, Canada geese, black ducks, pintails, teal, mallards, and other species.

Fones Cliffs' conservation importance, however, is most often associated with the American bald eagle, a national symbol of our country, which was on the endangered species list until 2007. The Cliffs' role in helping to restore the population of bald eagles to the point that they could be delisted as endangered and reclassified as a protected species should not be understated. Today Fones Cliffs and its surrounding landscape are home to one of the largest concentrations of bald eagles in the continental United States and have been listed by Virginia's Center for Conservation Biology, which monitors eagle nesting and migration, as



one of the most important sites for eagle conservation throughout the Chesapeake Bay region and eastern North America. The National Audubon Society has also recognized the immense conservation importance of this site by designating it an Important Bird Area of Global Significance.

In addition to its ecological value, Fones Cliffs is a site of great cultural and historical importance. It is a prominent geological feature in the heart of the ancestral lands of the Rappahannock tribe and the historic site of three Rappahannock tribal towns documented in the diary of John Smith as he explored the Rappahannock river in August 1608. Fones Cliffs is also the recorded site of one of the first hostile encounters between English explorers and Native Americans. John Smith's diary describes how warriors from the Rappahannock tribe concealed themselves on the cliffs and in the marshes on the other side of the river to unleash arrows aimed at Smith and his crew as they sailed and rowed their shallop through

this narrow stretch of the Rappahannock. Smith's violent encounter with the tribe has made Fones Cliffs a prominent feature of the Captain John Smith Chesapeake National Historic Trail. Fones Cliffs is also a featured designation on National Geographic's map of Treasured Landscapes of the Chesapeake Bay where the tribe's ambush of Smith is described along with recognition that the Fones Cliffs stretch of the river helps shelter the mid-Atlantic's largest population of bald eagles.

National Geographic has designated Fones Cliffs as a "Treasured Landscape" on its map of the Chesapeake Bay. Image credit to *National Geographic* and Chesapeake Conservancy.



This photograph was taken of the 2007 reenactment voyage of John Smith's shallop as it sails near the site of Smith's encounter with the Rappahannock tribe in August 1608. Photo by Hill Wellford, Jr.



3 The Rappahannock: Home of Eagles

This deep, powerful river shelters the mid-Atlantic's largest population of bald eagles. Among their favorite roosts is Fones Cliffs (above), where they keep an eagle eye out for bountiful shad and herring. It was from these sandstone heights that Rappahannock Indians ambushed Smith and his men as they rowed their 28-foot,

oak-timbered *Discovery Barge* upriver in August of 1608. Hails of arrows flew from both sides of the river but met stout shields the crew had erected atop *Discovery's* gunwales. The Indians did not pursue the vessel, which was soon safely out of range. Today the river's shoreline remains relatively undeveloped and unspoiled.



The immense ecological value and historical importance of Fones Cliffs have long been recognized in numerous articles published by the leading conservation organizations in eastern Virginia, including the US Fish and Wildlife Service, the Chesapeake Conservancy, the Rappahannock tribe, the Chesapeake Bay Foundation, The Center for Conservation Biology, the Bay Journal, The Nature Conservancy, the National Audubon Society, the Virginia Institute of Marine Science, and in publications by regional organizations such as Friends of the Rappahannock and the ECCA.

All too often in our nation's history, areas of immense ecological and historical significance have been sacrificed by stewards of property for the illusory promise of short-term economic gain. Faced with the decision whether to preserve Fones Cliffs or exploit it, in 2012 and again in 2015, Richmond County's Board of Supervisors chose the latter course by approving the rezoning petitions and development projects proposed by out-of-state developers. This display of indifference to the ecological and cultural importance of Fones Cliffs was challenged to no avail at every stage of the county's lengthy development approval process by conservation organizations and private citizens over a seven-year period. The only bright spot for conservationists during this time occurred in March 2014 when the owner of the Rappahannock Cliffs Subdivision sought approval from the Virginia Marine Resources Commission for a massive community mooring pier designed to extend 255 feet into the waters of the Rappahannock with a T-head 552 feet long and wetslips for 46 boats. Richmond County had no jurisdiction to approve the proposed mooring pier because it extended beyond the tidal low water mark into the territorial waters of the state. At

a public hearing on March 25, 2014, attended by an overflow crowd of concerned citizens and conservation organizations, the VMRC, in a unanimous decision, after considering extensive witness testimony and documentary evidence and evaluating the ecological importance of the Fones Cliffs stretch of the river, rejected the developer's permit request for a mooring pier of any length or size. Instead, the VMRC restricted the Rappahannock Cliffs Subdivision to a single tending pier for day use only with no T-head and no wetslips.

The decision of the VMRC served notice to the developers, and to the conservation organizations and the many private citizens who sought to protect Fones Cliffs, that development activities impacting the territorial waters of Virginia would require environmental compliance and regulatory hurdles in the future beyond the jurisdiction of Richmond County.

How Fones Cliffs was Rescued From Development

The rescue of Fones Cliffs from development is a complicated story and testament to the tenacity and commitment of conservation organizations and private citizens who never ceased their efforts to preserve this unique stretch of the Rappahannock. The milestone events leading to the rescue of Fones Cliffs can be summarized here.

On April 27, 2017, Diatomite Corporation sold its 964 acres to Virginia True Corporation. The development proposed by Diatomite was then taken over and pursued by Virginia True. However, in November 2017, an event occurred on the Virginia True site that would diminish Richmond County's enthusiasm for the project. Virginia True was discovered to have illegally cut trees and

Photos of erosion and sediment flow into the Rappahannock following Virginia True's illegal cutting of trees on Fones Cliffs. Photos by Hill Wellford, Jr.



cleared land on thirteen acres of the site and failed to control runoff from a major storm, resulting in substantial erosion and sediment flow into the Rappahannock. When Virginia True had repeatedly failed to adequately address this situation by October 2018, the Attorney General of Virginia filed suit against Virginia True alleging various violations of environmental law and seeking injunctive relief and the maximum amount of statutory damages, \$32,500 for each day of the violations. A stop work order by the county was also issued which effectively put a temporary halt on the project.

The Attorney General's suit was not the only legal claim Virginia True's owners faced related to their acquisition of the Fones Cliffs property from Diatomite. Diatomite claimed that Virginia True had paid it less than half of the \$12,000,000 purchase price, and two shareholders of Virginia True, Anthony and Domenick Cipollone, who had advanced \$5,000,000 to Virginia True to be used in the purchase of the property, claimed that their promissory note for the amount they invested had not been paid. Faced with multiple claims and having insufficient assets to resolve them, Virginia True filed for Chapter 11 bankruptcy in May 2019.

In September 2018, the owner of the Rappahannock Cliffs Subdivision property decided to abandon his development plans for Fones Cliffs and accepted a purchase offer from The Conservation Fund. The sale of the Rappahannock Cliffs property closed in December 2018. Thereafter, The Conservation Fund sold the property to the US Fish and Wildlife Service which added it to its Rappahannock River Valley National Wildlife Refuge assets.

The next significant milestone took place when the Benjamin Morris family, owners of Northern Neck Lumber, initiated discussions with the Rappahannock tribe regarding the potential sale of the southern section of Fones Cliffs. This thoughtful act by the Morris family was applauded by the Chesapeake Conservancy and other conservation organizations that supported the tribe's goal of regaining ancestral property on Fones Cliffs. In March 2022, these discussions led to the purchase of 465 acres of river frontage by the Chesapeake Conservancy, which then donated a conservation easement on the property, prohibiting its development, to the US Fish and Wildlife Service, before transferring title to the property, encumbered by the easement, to the Rappahannock tribe. The tribe renamed the property *Pissacoack*, the traditional name used for the property by the Rappahannocks as recorded in the journals of John Smith. The Chesapeake



Pictured left to right: Richard Remmer, Member of the Angle family, U.S. Secretary of the Interior, Deb Haaland, Dr. Carol Remmer Angle, Chief Anne Richardson, Rappahannock Tribe, and Joel Dunn, President and CEO, Chesapeake Conservancy. Photo by Tami Heilemann, DOI.

Conservancy was able to make these donations due to the generosity of the family of Dr. Carol Remmer Angle and William Dodge Angle, MD. This marked the Rappahannock tribe's return to the river after 350 years and was cause for celebration at an event sponsored by the tribe on April 1, 2022. Among the speakers who addressed the large number of guests in attendance at this historic event were US Secretary of the Interior, Deb Haaland; Dr. Carol Remmer Angle; Chief Anne Richardson of the Rappahannock tribe; and Joel Dunn, President and CEO of the Chesapeake Conservancy. (A full account of the Rappahannock tribe's historic return to the river celebration is contained in an article by John Page Williams printed in the ECCA's 2022 report.)

The final milestone in the Fones Cliffs saga took place in December 2022. The bankruptcy petition that Virginia True filed in May 2019 finally resulted in a court-supervised auction of the 964-acre Fones Cliffs tract held by Virginia True. The Conservation Fund once again stepped up to protect Fones Cliffs by submitting the highest bid for the property, which after due deliberations was approved by the US bankruptcy court. On December 9, 2022, The Conservation Fund announced that it had obtained title to the property. The property is now completely out of the hands of its prior owners and free of any claims by Virginia True or its creditors. It is contemplated that the property will now be placed under a conservation easement with the US Fish and Wildlife Service and at a later date transferred to the Rappahannock tribe.

At long last, those who stood up for the protection of Fones Cliffs can finally breathe a sigh of relief. This has been an amazing journey on a long and arduous route where the ultimate destination was by no means

certain. While work still needs to be done, we now can take comfort in the knowledge that this “Treasured Landscape” of the Chesapeake, which has been described by conservationists as the “crown jewel” of the Rappahannock, will not be defaced by development. To fully appreciate the magnitude of this conservation achievement, one need only take a boat ride up the

Rappahannock to the Fones Cliffs stretch of the river where you can enjoy a remarkable vista with eagles soaring in the air over four miles of unspoiled natural resource habitat. This is a scene evocative of the view John Smith and the Rappahannock tribe witnessed more than 400 years ago.

December 9, 2022

The Conservation Fund Acquires Largest Unconserved Portion of Fones Cliffs, Halting Development Threats

Partnership with Rappahannock Tribe and U.S. Fish and Wildlife Service will protect site's natural resources and cultural importance

RICHMOND COUNTY, Va. — Building on its earlier work to protect Virginia's historic Fones Cliffs, The Conservation Fund today announced its acquisition of an additional 964 acres along the Rappahannock River. This land, which was for years under threat of significant commercial and residential development, represents the largest unconserved portion of Fones Cliffs.

The Fund's purchase, finalized Dec. 8, is an interim step in protecting the property. In the months ahead, the Fund will work with its partners at the U.S. Fish and Wildlife Service (USFWS) and the Rappahannock Tribe to permanently conserve the property and protect the site's natural resources and cultural importance. Ultimately, the USFWS will purchase a conservation easement on the land, using federal funding from the Land and Water Conservation Fund (LWCF), and then the Fund intends to transfer the encumbered land to the tribe during the latter half of 2023.

“Years of tracking this property through multiple owners and a complex bankruptcy proceeding has finally brought us to this acquisition,” said Heather Richards, the Fund's Mid-Atlantic regional director. “We're thrilled that we were able to seize our chance to purchase the property and work with our partners to protect this significant place for future generations. Working with the Tribe and the USFWS over the next year, we will ensure that the wildlife habitat and cultural importance of this remarkable property is protected in perpetuity.”

Excerpt from press release by The Conservation Fund, 12/9/2022.



Living in a Hallmark Town



By Kendall Quinn

I thought I would miss falling asleep to the sound of sirens and taxi cabs in motion on the streets below my bedroom window. The city had always been my home. I loved how new and innovative restaurants were ubiquitous; there was always something going on, somewhere to be, and someone to go with. Where one lives is more than a home: it's an experience. I loved hearing my city's name on the TV news: it made me feel important, it made my life seem significant. I thought I would miss the majesty. But now a new love has replaced the city.

I had grown up in bustling Washington, DC, my first fourteen years a city kid. The house stood in a cul-de-sac, four identical homes surrounding. Our backyard—if you can even call it one—was a patch of manicured grass with perfectly planted flowers matching the crimson brick color of the house. My daily routine consisted of school, homework, dinner, and bed. I rarely got time to see my parents, who were away from 9:00 a.m. until 7:00 p.m. I thought this was how life was supposed to be. Parents go to work. Kids go to school. We get a little trophy time on weekends. I was content with the standards society imposes on family.

On weekends and other occasions, we would venture out into greater Virginia, exploring the Rappahannock watershed and other areas. This was the best part of our family life. We piled in three kids, two dogs, and overnight bags, and drove to paradise. As we passed the sign announcing the Northern Neck, a new scene spread out before us. The first thing I noticed was crab décor, everywhere. Next, I saw townspeople visiting on the streets, no one a stranger.

Tidewater was so different from our home in the city. There was something about it that warmed the heart. Maybe it was our cabin, with only one gas station

nearby. Maybe it was a backyard with no fence, and acres of green, rolling down to a spreading river's bank. Maybe it was the locals' love for the place they live in. In DC, there was always someone complaining about how much they hated where they lived. The rent was too high, or the roads were too congested, the people were pushy, their work somehow meaningless. When we were in Tidewater Virginia, even for just a weekend, I felt a love for home and community, and a passion to preserve and protect such treasures. The locals weren't driven to redecorate or "remodel" their homes; they understood, implicitly, the charm and value of small-town stability and rural tradition.

When COVID-19 policies turned the life I had upside down, my parents started talking about moving. The congested city felt more like a Petri dish than a home. My dad suggested we move down to the river, at least just for a couple of months. I resisted the disruption of my routine. I still wanted to live in the city: all my friends were there—and all my favorite places. My parents promised me a better life; I wasn't sure I believed them.

We packed our belongings, sold my childhood home, and drove down to the river. We passed all the scenery I knew from our weekend trips: crab décor, friendly strangers, and the southern sun over a sparkling Virginia river. But I was suddenly reluctant to adopt the new environment, now that the move was permanent. Half of my heart was still in the city.

As summer slid by, my reluctance evaporated. Every morning I woke up to the river, where I could kayak, paddleboard, and boat, to my heart's content; and each day ended with the sweet music of the river just outside my window: lapping waves, cicadas singing, as I drifted off to sleep. As the time passed, I gradually forgot about the city and its impulses. My parents had kept their promise. Country life was a better life.

As my love for Tidewater Virginia grew, my love for her people did too. More than anything, I wanted to become a local. I used the summer to learn about Tappahannock, my new town. I learned to appreciate the quiet dignity of such historic buildings as the Old Customs House. I appreciated the hip new haunts like NN Burger. I found myself almost infatuated with the place I had resisted settling in. I broke free from the "city mindset" and began to prefer living in a small town, where everyone recognizes me. I no longer found the bubbled alienation of urban life alluring; it suddenly seemed unhealthily cold and lifeless. Tappahannock people aren't cold and distant: they are refreshingly

engaged in each other's lives and in the goings-on of the town. Their engagement is positive and encouraging, moreover, and the default demeanor is not distance: it is a smile.

Our little town on the river—it's mine now too!—changed my perspective on life. A girl who had grown up in the city, and loved it, had dreaded the commitment of permanence elsewhere; but that same girl had gotten to know the people in the weekend scenery, fallen in love with small-town charm, discovered the nurture of genuine community, and changed her mindset. Tappahannock had become a part of her very identity. At first I thought I might miss falling asleep to the sound of sirens and taxis; now, I fall asleep to the sound of our great Rappahannock, as its rhythmic waves fall gently, endlessly, against its ancient banks. Now, each morning, I awaken to the promise of a new day in Tidewater Virginia, with the sun glittering on the water.

“Every morning I woke up to the river, where I could kayak, paddleboard, and boat, to my heart's content; and each day ended with the sweet music of the river just outside my window: lapping waves, cicadas singing, as I drifted off to sleep.”



Kendall Quinn, a Junior at St. Margaret's School, spent summers in Tappahannock, Virginia, until the COVID lockdown, when her family became full-time Tidewater residents. Kendall fell in love with Tidewater life and enjoys sharing a teen come-here's perspective on the town she now calls home.

**The Restoration and Revitalization
of an Icon in
Tappahannock's Historic District:**

EMERSON'S ORDINARY



Story by Karin Andrews

Emerson's Ordinary photos from the Historic American Buildings Survey
(Library of Congress) Front of Ordinary facing Water Lane. Photo post 1933.

Last year a fire that decimated part of the Historic District of Tappahannock thankfully did not consume several historic structures of profound importance to our local history and identity. One of these beloved structures is Emerson's Ordinary, which has become a springboard and catalyst for the revitalization that is currently taking place in the Historic District of Tappahannock.

This immense undertaking spearheaded by Greg and Jennifer Huff, the owners and proprietors of the Essex Inn, is returning Emerson's Ordinary to its original use as a tavern. In partnership with Tappahannock Main Street and the Town of Tappahannock, they have been awarded numerous grants to assist with this undertaking.

A lesser-known part of The Ordinary's restoration story is that none of this would have been possible without George Jennings and his dear friend Jimmy Balderson. George's investment of time, treasure, and at times tears stabilized The Ordinary, rescuing her from collapse under her own weight. In the words of its current steward, Greg Huff, "without George there would be no Ordinary."

Ironically, Greg and Jennifer, whom I met while representing my friend George Booker Jennings III in the offering and sale of this very special property, closed on their purchase of Emerson's Ordinary almost 256 years to the day that the Sons of Liberty organized and marched on the home of Archibald Ritchie, in

Tappahannock. This band of patriots often attributed to the northern colonies was in fact born on February 27, 1766, across the Rappahannock River at Leedstown. The movement was solidified as a force to be reckoned with in Tappahannock, which served to fan the flames of what would eventually become the American Revolution. "The Ordinary," as she is affectionately known in these parts, was at the center of it all.

It is doubtful that any of us living today can fully appreciate the sacrifices made in the colonies and in Essex County from the time that our nation was little more than an idea. At Leedstown, as in Tappahannock, a handful of courageous and audacious souls dared to call out the ruling elites back in England, for taxation without representation and a host of other perceived offenses. On the heels of hardships exacerbated by England's tariffs and tax policies, these bold men (and, yes, women) from all walks of life risked all to become known as the "Sons and Daughters of Liberty." It is here that our story about Emerson's Ordinary in Tappahannock begins.



The 1710 Ordinary, also known as Emerson's Ordinary, will soon be opening and returned to its colonial era use as an upscale tavern in the Tappahannock Historic District, directly across from the Essex Inn.

An Ordinary Story

Although no one knows the exact date, it is surmised from historical records and on-site research that Emerson's Ordinary was probably built around 1710, with its first major alteration around 1718. The original structure was most likely a hall and parlor plan that featured a center chimney. Later alterations and additions to the structure included the two tavern rooms flanking a center hall, with two massive fireplaces and hearths whose openings measured a whopping five and a half feet wide.

As Tappahannock was a major port of call and shipping hub in colonial Virginia, taverns were an absolute necessity. As such, like everything else at the time they were highly regulated. A Bill of Fare from 1731 was discovered decades ago in the Essex County archives which specified fixed prices for various services, food, and spirits by edict of the governing bodies of the day.

In 1757, The Ordinary was purchased by the Emersons, who operated a tavern on-site from 1750 to 1802. Since

that time their name has been forever associated with this venerable historic treasure. The surrounding land also owned by the Emersons would have been utilized for a host of purposes, including the production of food, raising of livestock, and the stabling of horses. A host of suppliers would also have been utilized as well for items that they did not produce on-site. Archeological digs currently taking place on Ordinary grounds have yielded a treasure trove of artifacts, which will be on display when the 1710 Tavern opens for business, this summer.

A forty-three-foot-long panoramic mural, which I completed in 2006 in the conference room of the Ritchie House (formerly the home of Archibald Ritchie) features my depiction of what Emerson's Ordinary and her associated lands may have looked like. Old insurance records dating back to the colonial era provided much information, along with written eyewitness accounts and historic sketches on record.



Above: My depiction, in this mural, was influenced and obtained from historic documents and from old colonial era insurance records. These documents and accounts revealed what Emerson's Ordinary, and the Port of Tappahannock may have looked like. Jimmy Balderson is memorialized in this mural as the foreman sitting down surrounded by period tools, near a corner featuring mortise and tenon joinery like that at Emerson's Ordinary.

Below: Emerson's Ordinary photos from the Historic American Buildings Survey (Library of Congress). This side shows the Summer Kitchen which was removed by George Jennings. It was not original to the Ordinary itself but added much later. New additions have been made by the Huffs to accommodate a commercial kitchen at the 1710 Tavern which will be opening soon.



In the years that followed the American Revolution and the War of 1812—a story for another day—Emerson's Ordinary would eventually become the home of several families who would leave their mark on this grand old place, for better or for worse. As is often the case, architectural trends give way to alterations and additions that are not always beneficial. By the beginning of the early twentieth century, Emerson's Ordinary was owned by Doctor Henley, who is credited with the addition of porches, and imparting a more Victorian appearance on the Water Lane side of the house. A screened porch was also added as well. How fortunate we are to have these photos from the Historic American Buildings Survey, established by an Act of Congress in 1933, which employed architects and photographers

during the Great Depression. This ambitious and practical mandate of Congress documented structures of every type throughout the nation and has proved to be an invaluable tool benefiting the cause of historic preservation in our region and beyond. In Essex County fourteen properties were documented, with Emerson's Ordinary being one of them. In later years the structural integrity of The Ordinary was compromised to the point that the house was sitting on top of the ground, with numerous roof leaks, termite issues, and a basement foundation that had been significantly compromised.

An Unlikely Champion Emerges

In 2002, George Booker Jennings, AIA, a graduate of Clemson University and a practical visionary /-problem solver on staff at George Mason University, was considering the purchase of a small river house in White Stone, Virginia, where he could enjoy leisurely weekends that included fishing and relaxation. George, an accomplished architect, and fine artist at heart, had been involved in the restoration of the Ritchie House (circa 1706) in Tappahannock, along with subsequent additions. The

last thing George was looking for was another project. But alas, The Ordinary had her way with him and George Jennings, a descendant of one of the Sons of Liberty, purchased Emerson's Ordinary, to save her.

Peeling Back the Onion

George, armed with decades of architectural knowledge and a love of historic preservation, quickly realized that the restoration of The Ordinary would be a monumental undertaking. Aided by longtime friend Jimmy Balderson, who had been instrumental in the restoration and renovation of the Ritchie House, they began the long work of removing what needed to be removed and rebuilding what had been destroyed by water, termites, and damage caused by the weight of the structure itself. They rebuilt basement foundations where needed and lifted The Ordinary onto those foundations. Together George and Jimmy formed a team that peeled back layers that needed to be removed, revealing original pegged mortise and tenon construction. It was a painstaking process, like peeling back the layers of an onion.

Photo showing the original roof, summer kitchen, which was removed by Jennings and The Ordinary literally sitting on the ground. George is shown here with a group of interested individuals as he discusses the monumental work that he was undertaking to rescue this important historic icon, which figured prominently in the history of our region and the founding of our nation, during the colonial era and beyond.





Tavern fireplaces being restored and reclaimed. Work done by the Preferred Masonry – historic chimney specialists



The 1710 Tavern taking shape as she nears her completion and grand opening. Historic masonry and joinery are protected behind plexi-glass.



Tavern Fireplaces and original structure uncovered by George Jennings and Jimmy Balderson.



Fireplace and wall facing St. Margaret's taking shape. Original floors will soon be cleaned and readied just prior to the 1710 Tavern's grand opening.



Third fireplace reclaimed by Jennings and Balderson with the help of Preferred Masonry. Note old door to the left of the fireplace Which now leads to a state-of-the-art kitchen, and prep areas.



The old door to the summer kitchen now leads to a state-of-the-art commercial kitchen. Floors were leveled, and period items were utilized as much as possible. On old keg in the back corner came from Indian Banks circa 1699.



Tavern fireplace with rebuilt foundation in the Tavern room facing St. Margaret's School. Original brick was repointed in all the fireplaces, chimneys and hearths.



An artful restoration. Original hand-hewn beams at The Ordinary were found to contain the original roman numeral carpenter markings from ages past.

All totaled, they removed four layers of poorly maintained, water-damaged shingles, replacing the shingled roof with a standing seam metal roof. The exterior was also re-sided with beaded cypress to match the original siding. Original windows were reglazed, with the original hand-blown windowpanes mostly intact.

Over time they removed three layers of various wall types including the original plaster, revealing the issues that were unseen to the eye. In later years, with the help of historic chimney experts, multiple layers of brick fireplace renovations were removed to reveal and reclaim the massive five-foot-six-inch-wide cooking hearths that we see today.

Jimmy Balderson was a tremendous friend, teacher, and restoration partner who was loved by all who knew him. In George's own words he felt that Jimmy was a guardian angel to him and The Ordinary. When Jimmy passed away in July 2014 part of George died with him, which precipitated George's decision to find a new steward going forward to complete the work that he and Jimmy had started in 2002.

I learned a great deal myself from Jimmy, who spent countless hours talking with me and teaching me about ancient framing techniques. With my background as an architectural illustrator and detailer, his knowledge was fascinating to me. In 2006 I painted a small portrait of Jimmy Balderson as if he was back in 1760 erecting a building across the street from Emerson's Ordinary.

In Closing

Emerson's Ordinary, as it has been known in ages past, is a blessed place that has come full circle at least twice that I am aware of. There is something to be said for the old places that occupy our imaginations, which are inhabited by the essence of those who have left their mark in the past. If we listen carefully, we can hear their voices and hear what their lives, lived long ago, have to say to us. May we all embrace the lessons they teach.

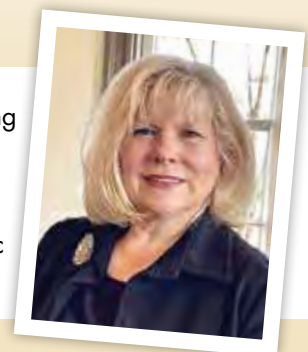


For those of us who knew Jimmy, the only thing missing from this depiction was a cup of coffee. If anyone ever needed to find Jimmy, he would either be at The Ordinary, at the Ritchie House or at 7-Eleven which he was known to frequent for his love of coffee. It was his office so to speak. Jimmy Balderson was uniquely himself, a skilled historic trades artisan and humble genius.

With full circles in mind, how is it that a direct descendant of one of the Sons of Liberty would be drawn to a property with such a personal provenance that compelled him to save it for future generations? Or that Greg and Jennifer Huff would relocate to Tappahannock as the owners of the Essex Inn and pick up the baton that George passed on to them, on their closing day, February 25, 2022? They are now forever connected and have taken this 1710 structure to a new level, with the help of many, including George. Whether you are a history buff, a hopeless romantic, or both, the coincidences are at the very least intriguing to ponder.

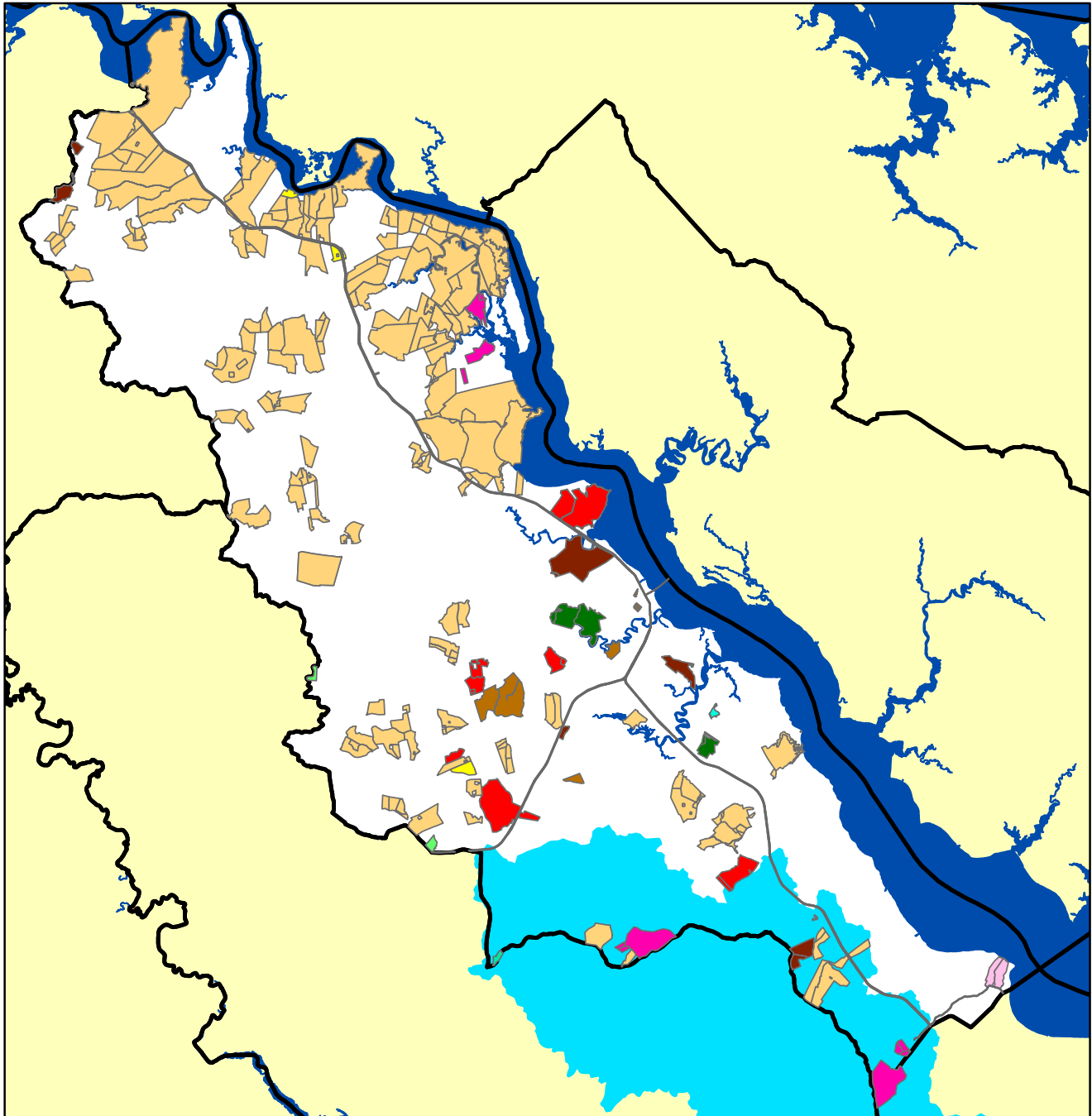
Standing the test of time, The Ordinary has entered a newly revitalized phase of her life as the 1710 Tavern ... an anchor for all that is yet to come in the Tappahannock Historic District. With a nod to the past and a nod to the man who saved her, The Ordinary is once again a bright light and gathering place for all.

Karin Andrews is passionate about and inspired by old homes and gardens, by breathtaking water views, rolling pastoral landscapes, towering trees and ancient boxwood. Karin is married to Essex County native, William Forrest Andrews, who is her partner in life and in Real Estate. They reside in Upper Essex County, at Oakland Farm and have two grown daughters, ages 33 and 21 and one sweet grandson. She is a lifelong advocate of historic preservation, land conservation and all things Essex.

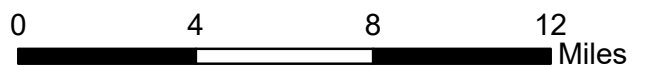


Protected Lands as of January 2023

Essex County, Virginia



Although this data has been used by the Middle Peninsula Planning District Commission (MPPDC), no warranty, expressed or implied is made by the MPPDC as to the accuracy or application of the database and related materials, nor shall the fact of distribution constitute any such warranty, and no responsibility is assumed by the MPPDC in connection herewith.



Virginia Counties with the Highest Percentage of Acres in Easement

County	Acres under Easement	Total Acres	% in Easement
Clarke	26,678.47	113,036.62	23.60
Fauquier	95,868.52	449,699.00	21.32
Albemarle	94,398.25	462,469.68	20.41

Non Tidal Counties

County	Acres under Easement	Total Acres	% in Easement
Fauquier	95,868.52	449,699.00	21.32
Albemarle	94,398.25	462,469.68	20.41
Rappahannock	32,709.03	170,604.53	19.17
Orange	35,181.93	204,425.72	17.21
Greene	10,095.18	97,920.00	10.31
Madison	15,898.73	204,937.78	7.76
Culpeper	19,987.45	238,692.00	8.37
Warren	9,503.50	139,514.66	6.81
Stafford	5,356.98	177,280.00	3.02
Page	4,098.27	193,306.00	2.12
Rockingham	7,518.05	543,360.00	1.38

Tidal Counties

County	Acres under Easement	Total Acres	% in Easement
Essex	32,107.10	165,120.00	19.44*
King and Queen	25,820.41	202,406.08	12.74
King George	8,022.35	115,199.82	6.96
Richmond	7,218.27	122,534.21	5.89
Westmoreland	12,221.67	146,674.97	7.88
Northumberland	7,498.27	123,071.81	6.09
Lancaster	3,472.75	85,208.47	4.08
Middlesex	4,208.60	83,391.87	5.05
City of Fredericksburg	254.80	6,711.00	3.80
Spotsylvania	7,078.43	263,180.83	2.52

*Essex data supplied by Thomas Blackwell, Commissioner of Revenue for Essex County. Remaining data supplied in 2022 by the Virginia Department of Conservation & Recreation.

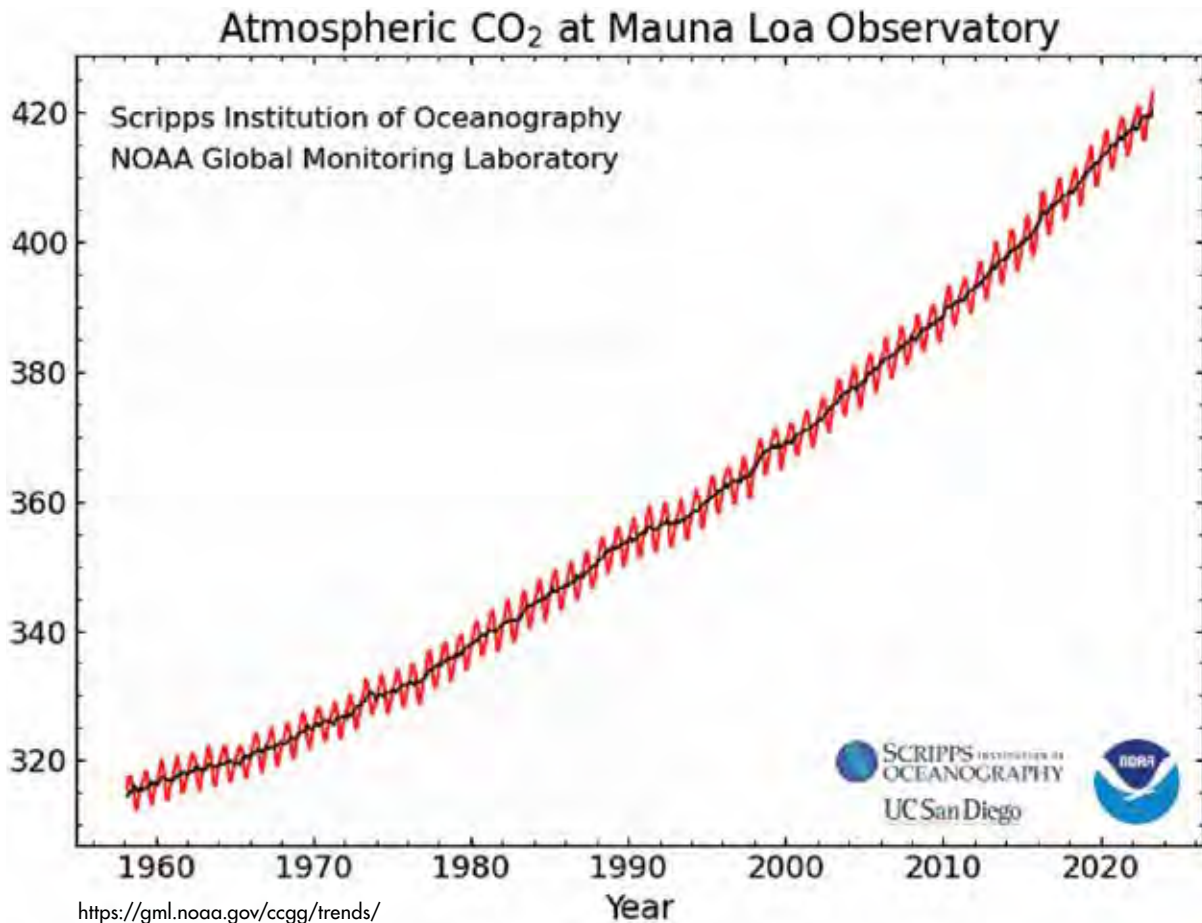
The Good News About Carbon

By Gam Rose

Carbon, the sixth element in the periodic table, is the backbone of life, i.e., human biology and everything we eat. Each time you exhale, you feed the world's plants, including all food crops, which cannot grow without carbon dioxide (CO₂).

CO₂ Trends

Earth exhibits a homeostatic equilibrium with CO₂ in the same way that it manages water in the hydrologic cycle: the more of either available in the atmosphere, the more available for reabsorption. This salutary negative feedback loop allows providentially for balance and long-term stability. It also allows for fluctuation. Here is one example of a widely available data plot for recent atmospheric carbon loads:



The above plot appears to document a system in disequilibrium, but we note two dimensions of scalar myopia:

1. The vertical carbon axis does not begin at zero, whereby vertical displacement is visually magnified.
2. The horizontal time axis starts two centuries after the dawn of the Industrial Age, whereby a longer view might give us better insight into actual trend.

Finding a less myopic data plot on the internet is surprisingly difficult, partly because actual temperature data are not available anywhere much before AD 1850, and not provably representative of total system energetics even today.

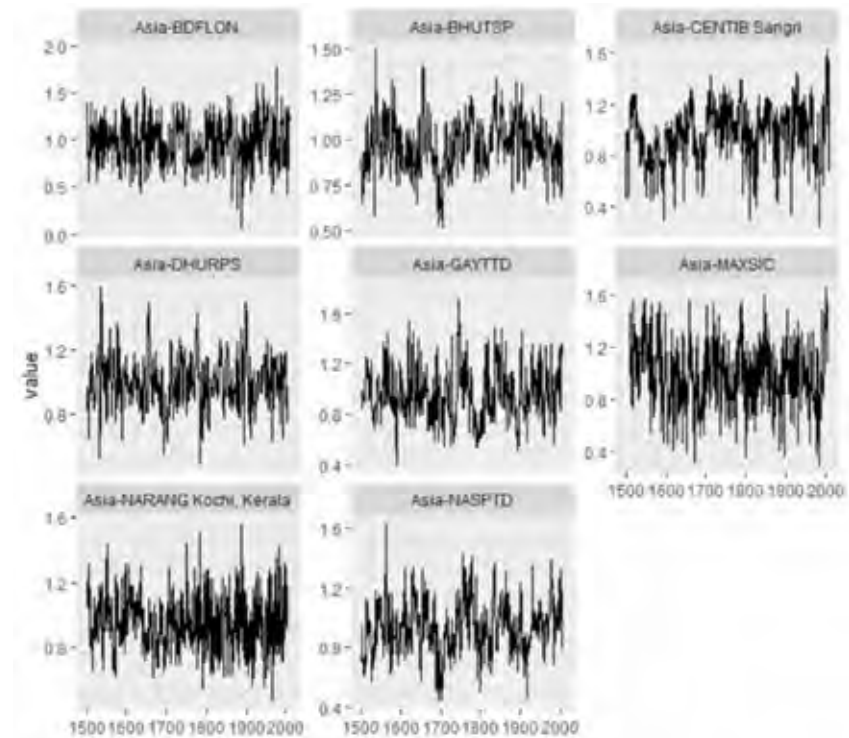
Tree Ring Exemplars:

We therefore rely on proxies, such as tree ring and ocean core measurements, to obtain a longer view.

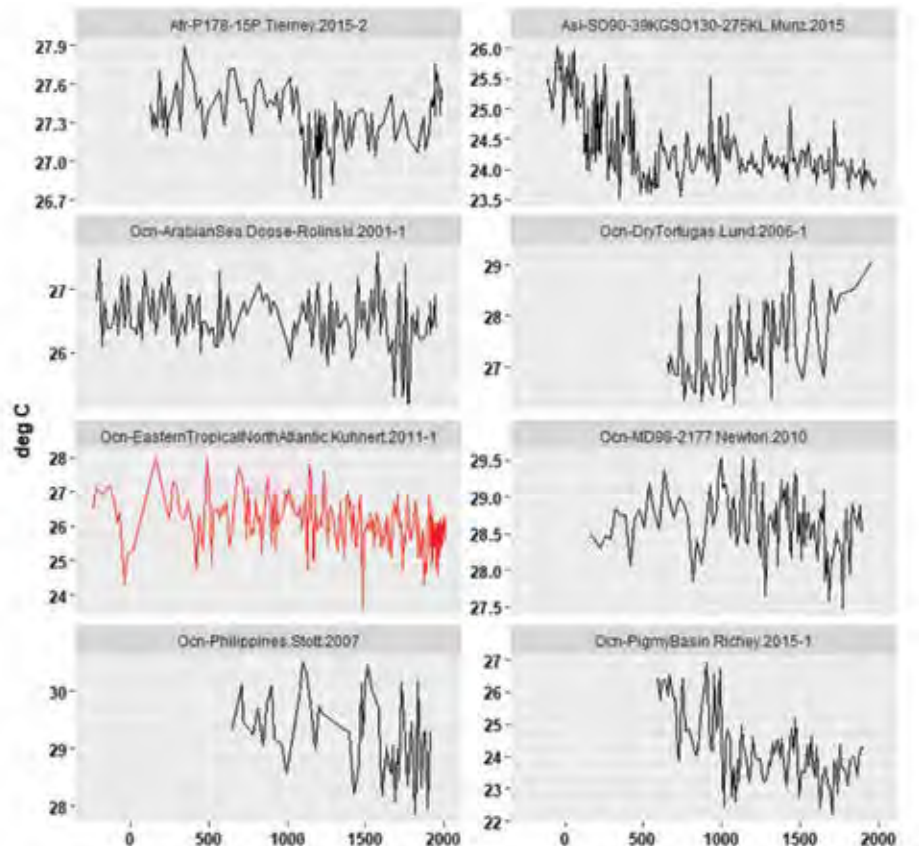
While we gain a much longer view from the added information above, we note two important caveats:

1. The vertical axes are still mostly truncated, if only to make tiny fluctuations more visible. Most of the series here exhibit zero positive trend, but we need to remember that any such trend is visually exaggerated against a truncated vertical axis.
2. Proxies are chosen on a presumption of near-correlation with the unavailable data sought. When multiple proxies fit the underlying missing data, they should exhibit some correlation with one another. The low apparent interseries correlation above suggests the limitation of our longer-view estimations of climate condition.

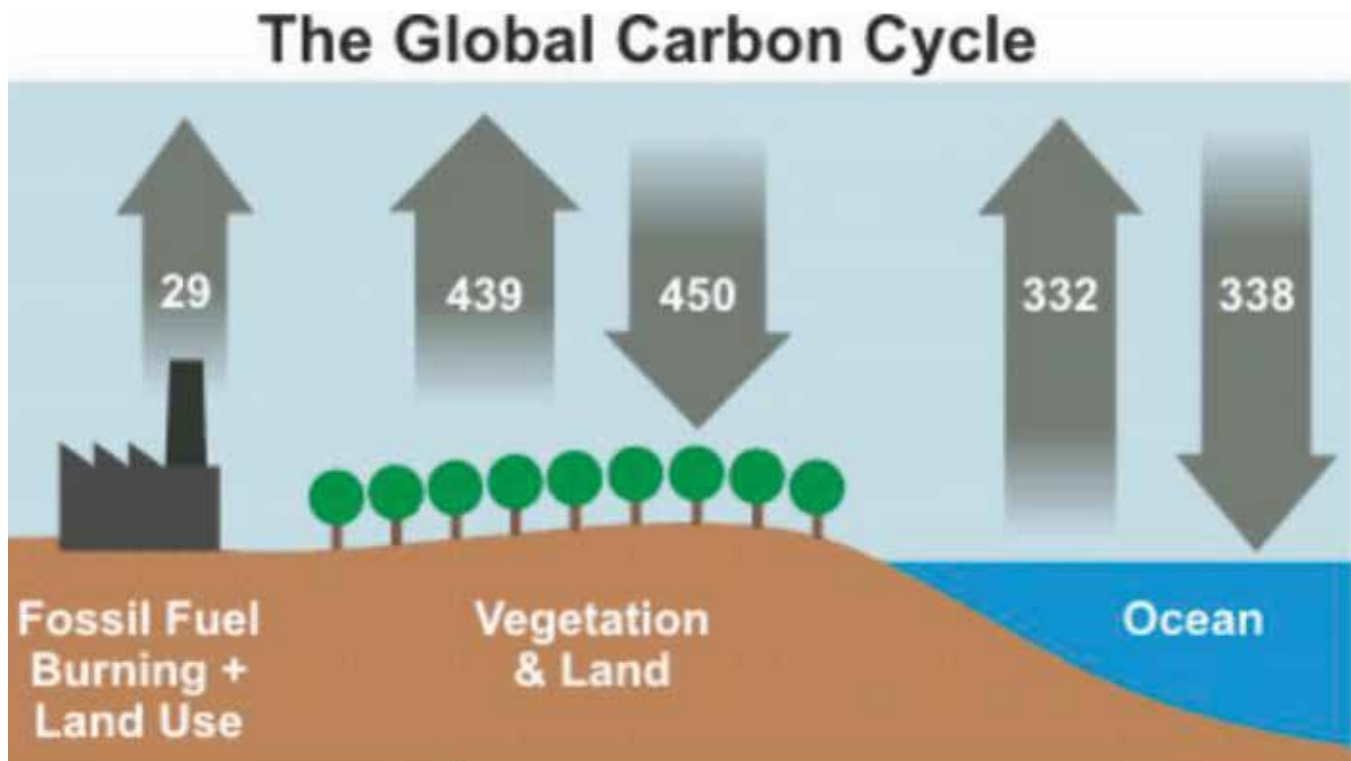
Given the above, however, we can see a present-day rebound in atmospheric CO₂ from longer-term minima. Such rebounding is normal and known to statisticians as “regression to the mean”; systematically, moreover, it is the hallmark of any dynamic system in equilibrium. But we’re not out of the woods yet.



Ocean Core Exemplars: <https://climateaudit.org/>



The Problem of Anthropogenic Carbon Release is Depicted Here:



<https://skepticalscience.com/human-co2-smaller-than-natural-emissions-basic.htm>

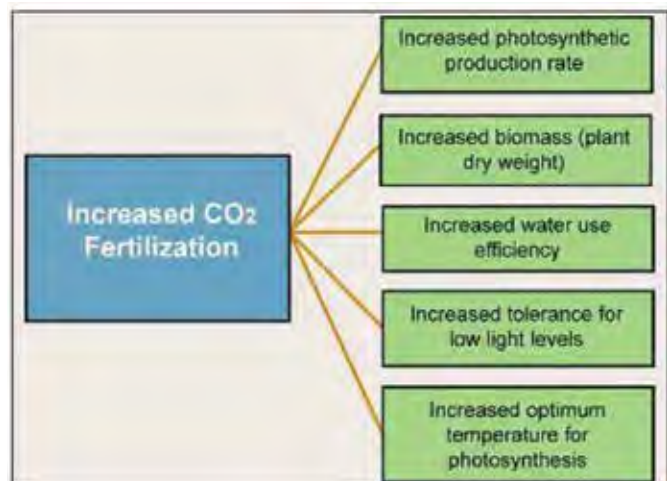
Notice, above, that our forests/pastures and oceans absorb more carbon than they contribute. Combining the net 11 (450 minus 439) gigatons absorbed by land with the net six (338 minus 332) gigatons absorbed by sea, the nonhuman atmospheric carbon reduction is 17 gigatons per year; but the human contribution is 29 gigatons, or 12 gigatons more than the land and sea remove each year!

This is the bad news.

Good News

The good news comes in two parts. First, atmospheric CO₂ buildup may contribute to atmospheric warming, but it also stimulates plant growth. And the stimulus is massive. While CO₂ currently represents only 421 parts per million, or 0.04 percent (four hundredths of a percent) of our atmosphere, changes in atmospheric CO₂ have a striking effect on the speed with which plants assimilate CO₂ and grow, whereby Earth appears miraculously agile in its equilibrating capability.

This Speed is the Result of Several Biological Mechanisms Working Together:

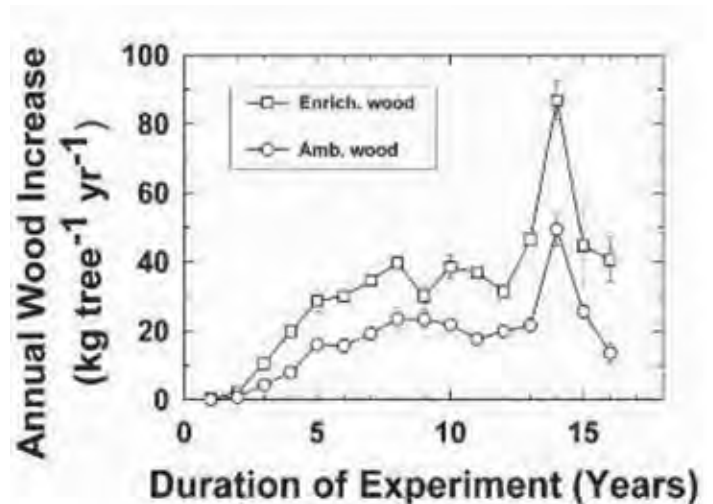


<https://climate-woodlands.extension.org/plant-response-to-rising-carbon-dioxide/>

In One Experiment, the Combined Effect of Enriched CO₂ Results in the Following Data Plot:

This effect is so powerful that it appears almost perfectly designed to result in long-term CO₂ equilibrium: while CO₂ levels in the atmosphere have risen by 30 percent since the 1950s, plant growth has also accelerated, massively. In a large metastudy, Idso, et al., find that:

Comprehensive reviews of the plant science literature indicate that a 300 part per million (ppm) increase in atmospheric carbon dioxide (CO₂) concentration generally increases plant growth by approximately 30%.



<https://www.sciencedirect.com/science/article/abs/pii/S0167880987900235>

And as Nature puts it:

While a great deal of media and public attention has focused on the effects that such higher concentrations of CO₂ are likely to have on global climate, rising CO₂ concentrations are also likely to have profound direct effects on the growth, physiology, and chemistry of plants, independent of any effects on climate (Ziska 2008). These effects result from the central importance of CO₂ to plant metabolism. As photosynthetic organisms, plants take up atmospheric CO₂, chemically reducing the carbon. This represents not only an acquisition of stored chemical energy for the plant, but also provides the carbon skeletons for the organic molecules that make up a plants' [sic] structure. Overall, the carbon, hydrogen and oxygen assimilated into organic molecules by photosynthesis make up ~96% of the total dry mass of a typical plant (Marschner 1995). Photosynthesis is therefore at the heart of the nutritional metabolism of plants, and increasing the availability of CO₂ for photosynthesis can have profound effects on plant growth and many aspects of plant physiology.

<https://www.nature.com/scitable/knowledge/library/effects-of-rising-atmospheric-concentrations-of-carbon-13254108/>

The second bit of good news about atmospheric CO₂ buildup is “news you can use”: if you own agricultural or timber property, you can sell the carbon your property sequesters to net CO₂ emission sources.

How much is your sequestration worth? As with any commodity, carbon credit prices fluctuate, but current rules permit the international transfer of carbon credits, so the world is your buyer! In 2023 carbon credits are trading between \$40 and \$60 per metric ton of carbon dioxide sequestered. With the spread of zero-carbon commitments by companies throughout the world, moreover, this price is expected to rise as much as tenfold. Since rural property carbon capture can range from 0.5 to over five tons per acre/year, your property's carbon credits could be worth as much as \$1,000 per acre/year by 2030!

To sell (or buy) carbon credits, you will need to submit to third-party verification, and you will need to choose an intermediary. One such intermediary, which I do not necessarily endorse, is LandGate, at <https://landgate.com/news/2023/04/18/what-are-carbon-credits-and-how-do-they-work/>. But look for “carbon credits” on the internet and find the intermediary that works for you.

Carbon is more an essential element than a pollutant, but human ingenuity is also stepping in with useful market innovations to help keep our contribution to atmospheric CO₂ in balance. And you can take that news to the bank.

Gam Rose is a data scientist employed by our federal government since 1999. His public service focuses on using data more effectively to inform public policy and foster a culture of human flourishing. He and his wife Kendall husband heritage breeds on their farm in lower Essex County.





HISTORIC TAPPAHANNOCK THEATRE RENOVATION WILL BRING THE ARTS TO TAPPAHANNOCK

By Randy Shuford

As many have noticed, The DAW Theatre had a façade makeover in late 2022. That work is just a taste of things to come as The DAW Theatre Foundation embarks on a major fundraising campaign. The complete renovation will be funded by a combination of historic tax credits, corporate sponsors, local business sponsors, and individuals.

The newly formed board of directors has been hard at work for the last two years on a plan to restore The DAW to its former star status of one of the best, if not

the best, theatres in the region. During the height of its popularity, the 500-seat Art Deco-style theatre drew audiences from all across the Tidewater.

The DAW Theatre went out of its way to not only bring the best films as soon after their release as possible, but also worked to include a variety of live performances as well as a good number of “community service” engagements (fashion shows, eye screenings, chest x-rays, and women’s club meetings).

On August 27, 1949, The DAW was nearly gutted by

fire, believed to have been started by someone smoking during a radio performance on stage. The theatre was quickly restored and reopened to the public less than three months later, on November 16, 1949.

Air-conditioning was added in the 1950s and that became, for years, an added benefit of seeing shows at The DAW—in cool comfort. Even the newspaper advertisements showcased it! In the 1970s, The DAW was chosen as the first small-town theatre in Virginia to show *The Godfather* and *Jaws*.

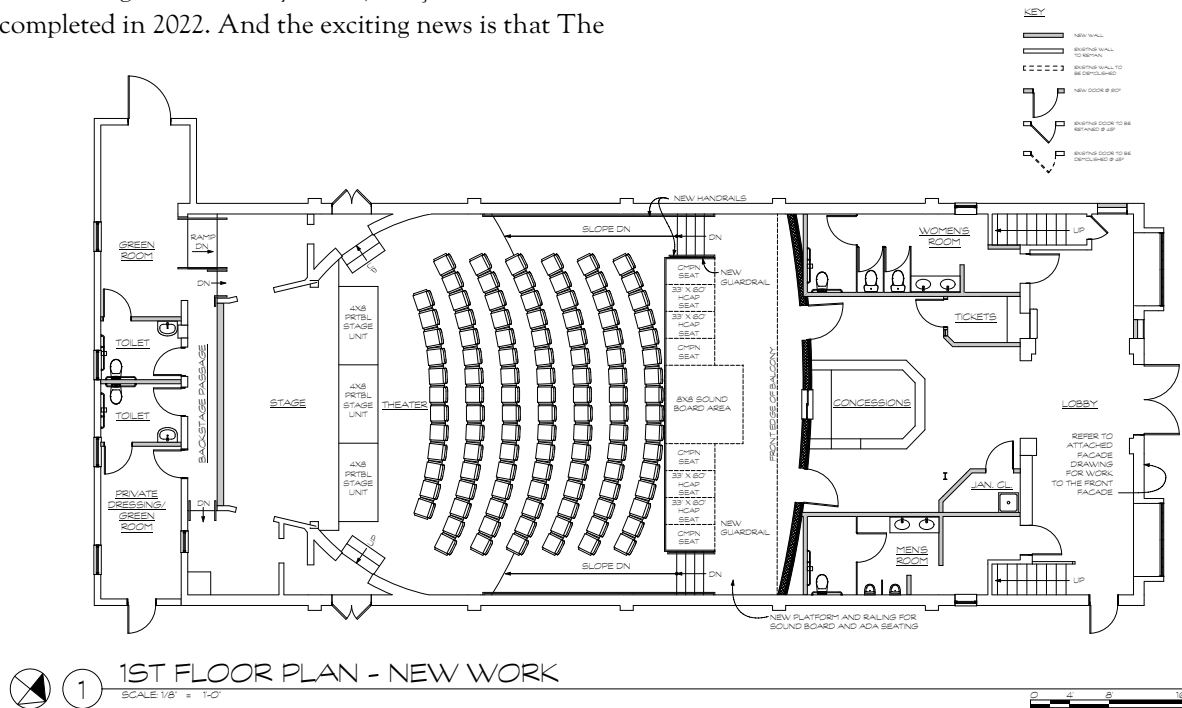
In 1982, The DAW was completely renovated and served as the community’s movie theatre until the doors were shut permanently in the late 1990s. The building then changed ownership a few times without any completion of a new theatre. The building was gutted in a previous renovation start, but remained in that state until now.

After raising the necessary funds, a façade makeover was completed in 2022. And the exciting news is that The

DAW Theatre Foundation was able to secure a historic designation status for the building. The designation opens up opportunities for historic funding opportunities that were previously out of reach.

Wishneff & Associates in Roanoke, Virginia have been contracted to secure the investors for Federal, State and New Market Tax Credits.

The DAW Theatre will be a mixed-use performing arts venue. Live theatre, concerts, youth theatre and workshops, film festivals, livestream theatrical performances, and more. This project will secure a place for the arts in Tappahannock, the Middle Peninsula, and the Northern Neck. It opens the curtain for opportunity and growth in the downtown district of Tappahannock, while cultivating a love for the arts for future generations.



8/15/22



DAW THEATER
TAPPAHANNOCK, VIRGINIA

Randy Shuford is a native of Atlanta, Georgia. He and his wife, Betsy Ellis Shuford, moved to Champlain in 2018 upon retirement. He was an IT Project Manager most of his career. Woodworking, repurposing, restoration of furniture and music are his hobbies. Randy is the Vice President of the DAW Foundation, Secretary of Tappahannock Main Street, serves on the Town Revitalization Committee and is a member of ECCA.



How to Help Wetlands Help YOU!

By Libby Bieri



Why wetlands are important, the history of their degradation, and how we are working to restore them in the Rappahannock River watershed and beyond.

Historical unrecognized of the many ecological, cultural, economic, and personal benefits of wetlands to humans has led to the loss of more than 40 percent of Virginia’s wetlands. The Rappahannock Wetlands Team—a partnership between Friends of the Rappahannock, The Nature Conservancy, Ducks Unlimited, the US Fish and Wildlife Service, Natural Resources Conservation Service, Northern Neck Land Conservancy, and the Virginia Department of Wildlife Resources—is working to accelerate nontidal, voluntary wetland restoration in the Rappahannock River watershed.

What is a Wetland?

A “wetland” is an area of land that is regularly flooded by water at some point during the year, either permanently or seasonally. These “wet” conditions influence the soil and local plant community, creating unique habitats. Many types of wetlands exist across the landscape, including forested swamps, wet meadows, marshes, mangroves, and many more. Wetlands can be tidal, located in coastal areas that are regularly inundated by tides, or nontidal, located inland and receiving groundwater and/or precipitation. Most wetlands within the United States are nontidal and it is estimated that Virginia has just over 1 million acres of wetlands today.

Why are Wetlands Important?

Wetlands offer many benefits to humans and wild-life. In fact, they are probably benefiting you in some way every day!

Do You Live on or Near a River or Stream?

These natural filters may be protecting your property from erosion and flood damage! Wetlands are critical to combating erosion, thus reducing sediment loads and other forms of pollution from reaching our waterways. Wetlands help to significantly reduce flooding by temporarily storing stormwater and slowly releasing it, therefore reducing the intensity of downstream flooding and erosion.

Do You Enjoy Being Out in Nature?

Wetlands provide aesthetically pleasing views and host abundant wildlife for you to appreciate! They provide resting, feeding, and nesting areas for many waterfowl and other migratory bird species. Fish and crab populations also depend on coastal wetlands for food, habitat, and breeding locations during some part of their life cycle. Wetlands are among some of the most productive ecosystems in the world, up there with coral reefs and tropical rainforests! Wetland plants provide long-term storage of carbon dioxide in below-ground biomass by means of photosynthesis and sediment deposition. This is called carbon sequestration, a process that helps to reduce greenhouse gas emissions and combat climate change.

The Agricultural Conservation Easement Program (ACEP) helps landowners, land trusts, American Indian tribes and other entities keep working farms in agriculture and restore and protect degraded wetlands by removing them from production. For additional information, go to <https://www.nrcs.usda.gov/programs-initiatives/acep-agricultural-conservation-easement-program/virginia/agricultural>

TURN YOUR
UNPRODUCTIVE LAND
INTO **INCOME** AND
WILDLIFE HABITAT.



The Nature Conservancy



USDA

DUCKS
UNLIMITED



Do You Like to Bird, Hunt, or Fish?

Wetlands support an abundance of fish and wildlife species and provide a space for these and other types of recreational activities. They allow for tourism, education, and research, too! Wetlands benefit surrounding communities both economically and culturally. Hunting, birding, and fishing within these ecosystems act as significant sources of recreational revenue. Due to their unique combination of physical and chemical processes and terrestrial and aquatic life, wetlands also provide special educational and research opportunities.

If Wetlands are so Beneficial, Why Haven't They Always Been Protected?

Unfortunately, we did not always understand the many benefits that wetlands provide. In fact, American society had an objectively negative view toward wetlands for hundreds of years. In general, wetlands were viewed as unsanitary, unproductive lands that impeded agriculture, travel, and development. Historical wetland loss can be accredited to colonization, technological innovations, and drainage for agricultural land use. By the 1920s, 70 percent of original wetland acreage within the contiguous United States had been modified, much of which was supported by the federal government. Federal incentive programs aimed at increasing agricultural production accounted for over half a million acres of wetland loss annually from the 1950s into the 1970s. In Virginia, it is estimated that more than 40 percent of wetland habitats have been lost since colonial settlement.

Awareness about the environmental functions of wetlands has been increasing since the environmental movement of the 1960s and '70s, when people started to take note of the severe flooding events and poor water quality resulting from widespread wetland destruction. The result was federal policy changes, such as the reorganization and expansion of the Clean Water Act, that curtailed wetland loss. By the mid-1970s and '80s, although these policy changes cut the acreage lost per year in half (about 300,000 acres), much work was still necessary. The need to make significant strides prompted restoration work throughout the United States, including in the Chesapeake Bay region. Although we now have many federal, state, and local laws protecting most wetlands from development and impact, there is currently a strong need to identify lost areas and restore wetland acreage and function for the benefit of Virginia residents and to support the health of Chesapeake Bay ecosystems.

What is Wetland Restoration?

Wetland restoration is the physical, biological, or chemical manipulation of an ecosystem to return natural functions to a former or degraded wetland. Restoration practices can include (1) reestablishment, where a former wetland is rebuilt; (2) rehabilitation, where the functions of a degraded wetland are repaired; or (3) creation, where a wetland is created in a formerly upland or dry area. Wetland restoration strategies include, but are not limited to, invasive species control, planting wetland vegetation and trees, beaver dam analogs and the manipulation of water flow by plugging ditches, breaching dams, and reconnecting streams to floodplains.

What's Happening in the Chesapeake Bay?

In 2014 the Chesapeake Bay Watershed Agreement was created with a vision of an environmentally and economically sustainable watershed with clean water, conserved lands, and a diversity of engaged citizens and stakeholders. Under this agreement, a Wetlands Goal to create or reestablish 85,000 acres of wetlands by 2025 was generated.

Considering that the Chesapeake Bay watershed has 1 million acres of potentially restorable wetlands, this goal should be relatively attainable. However, as of 2017, only 11 percent of the 85,000 acres of wetlands had been restored. In an effort to make significant progress toward meeting this goal, many organizations, including those within the Rappahannock Wetlands Team, are working to accelerate voluntary—that is, not required by regulation—nontidal wetland restoration in the Bay watershed.

So, Why is the Rappahannock River Watershed Considered a Key Area for Wetland Restoration?

Not only does this region contain the lowest percentage of shoreline with intact vegetated riparian buffers, but it also has the second-highest percentage of agricultural land area. This makes the Rappahannock River watershed a priority area for reducing sediment loads to the Bay. This region also provides a great opportunity to protect and restore wetlands for American black duck habitat, a migratory species that spends its winters in the Chesapeake Bay. Historically, more than 200,000 black ducks wintered in the Chesapeake Bay. Today, this number has dwindled to about 52,000.

In the Rappahannock River watershed alone, there

are more than 200,000 acres of wetland restoration opportunities. Yet, the state of Virginia has only met 2 percent of its restoration goal. Under the Rappahannock Wetlands Team, The Nature Conservancy is partnering with Friends of the Rappahannock to provide restoration program outreach to landowners in the Northern Neck and Middle Peninsula regions of the lower Rappahannock River watershed.

How Can You Help Implement Wetland Restoration?

Support wildlife on your property, improve water quality, and earn up to \$16,000 per acre.* Through the National Resources Conservation Service (NRCS), the Wetland Reserve Easement (WRE) program provides technical and financial assistance to landowners for the

creation, reestablishment, and enhancement of wetlands. Eligible WRE participants include property owners and Native American tribes who own farmed or prior converted wetlands that can be successfully and cost-effectively restored.

Are you a landowner in the lower Rappahannock River watershed interested in finding out more about this type of program that directly helps protect, restore, and enhance wetland habitats and the benefits they provide? Please reach out to Friends of the Rappahannock's Tidal Programs Manager Brent Hunsinger at brent.hunsinger@riverfriends.org. Thank you for helping wetlands help us all!

*per acre rates vary by location

SOURCES:

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Libby Bieri is a Virginia native and has always been fascinated by Chesapeake Bay ecosystems. She spent only a few short years outside of the Bay watershed earning her BS in Marine Biology from the College of Charleston before returning to Virginia to study oyster reef restoration and ecology on Virginia's Eastern Shore as part of her MS in Environmental Sciences from the University of Virginia. Libby worked as the River Steward of the Friends of the Rappahannock to actively protect and restore wetland, forest and oyster habitat in the tidal portion of the Rappahannock River.





S.T.R.E.A.M.

By Larry Foulk, St. Margaret's School Dean of Faculty

“Tradition has it that the gentlemen of the Board, when seeking a suitable location for the school, happened to look over the present site (on the shore of the Rappahannock River) one evening as the moon was rising over the river, and the sheer beauty of the scene so enchanted them that their decision to locate on the western bank in Tappahannock was spontaneous.”

From the very beginning, St. Margaret's School (SMS) and the Rappahannock River have been synonymous. Therefore, that the Rappahannock River has always occupied a special place in the life of the school is no great mystery. In the early twentieth century those gentlemen worked hard to find an appropriate location for an all-girls Episcopal school in the Middle Peninsula-Northern Neck area of Virginia. Whether the school's location sprung from the hearts and minds of the gentlemen or whether, as Anne Norvell Rice Gray ('65) stated more recently, it was “no accident that St. Margaret's sits on the banks of a great river, rising from Chester Gap in the hills of Rappahannock County, and flowing 184 miles to the Chesapeake Bay,” it makes all the sense in the world that for the next 100-plus years of her existence, SMS did not simply exist as a school along the river, inviting her people to reflect for themselves what the river means to them, but that she embraced her identity as a school whose river has something to teach the sisterhood.

A number of special students and faculty have dreamed of the potential for the river's lessons to help inform the school's academic, athletic, and residential programs and offerings. Now, thanks to the forward-

thinking and well-seasoned leadership and planning of Colley Bell, head of school, and Cupper Dickinson, dean of school, SMS has launched a most unique STEM-based vision that will be nurtured and developed by other members of the administrative team who have been hired to make the vision a reality. This vision, of course, is called S.T.R.E.A.M., and it makes perfectly clear the centrality of the presence of the Rappahannock River's lessons in the life of SMS.

As concerns an academic vision, S.T.R.E.A.M. stands for Science, Technology, River, Engineering, Art, Math. Under the leadership of Dean of Academics Susan Foulk and Dean of Faculty Larry Foulk, intentional and deliberate steps are being taken to ensure that the teaching-learning culture embodies and personifies the best that private, independent education has to offer both faculty and students as the work they come together to do is imbued with a certain curricular mission. To this end, the mission of S.T.R.E.A.M. is further expressed by the words “to practice higher-order thinking skills and to develop necessary research, design, production, and communication skills to create and to employ solutions to real world problems in order to benefit the here and now with the promise to have a

positive impact in the broader world beyond the banks of our Rappahannock River.”

New courses like Engineering, River Studies, and Humanities & the River are being offered to students and taught by faculty who are true content-knowledge experts in these fields. Additionally, faculty teaching required courses are executing assignments centered around S.T.R.E.A.M. topics. The weekly schedule was reconfigured for the 2022–2023 school year to allow faculty time to brainstorm and collaborate by divisions and departments as well as on a one-to-one basis. Visionary leadership in the academic arena has contributed to the opportunity to welcome Friends of the Rappahannock (FOR) to use their very own office space on the SMS campus. This partnership is spawning opportunities like Lobby Day (January 30, 2023) in which a select group of upper-level students studied local interests of groups like the Garden Club of the Middle Peninsula in the context of law-making in order to be prepared to speak with representatives of the Virginia General Assembly in the capitol in Richmond.

S.T.R.E.A.M. is, however, more than just an academic model for the twenty-first century. SMS is committed to serving her students ... mind, body, and spirit. To this end the acronym also stands for Stewardship, Teamwork, Reverence, Equity, Agility, Mindfulness. Life lessons associated with these words are as crucial to a student’s learning as are the academic ones. SMS appreciates now more than ever that character development is paramount for her students. S.T.R.E.A.M. in this case is “a model for the development of character among the Sisterhood centered around the example of St. Margaret and the needs of the world today and informed by our environment, especially the presence of the Rappahannock River in our lives ... past, present and future.” Just as the word River helps center SMS to her river-inspired identity, here the word Reverence helps center SMS to her Episcopal identity.

Athletic programming and residential offerings help round out SMS’s efforts to provide a holistic experience

that honors both her historic and traditional values but does so with the needs of students of the twenty-first century in mind. From yoga on the school beach to the reinvigoration of a crew program, Dean of Athletics Cornelius Snead is applying his years of experience cultivating winning athletic sports teams to the business of forging character of a good and purposeful kind. Only then will students as team-players know the true meaning of success. Residentially, Dean of School Cupper Dickinson ensures students have the opportunity to participate in clubs and weekend activities that teach them the value of caring for God’s creation and serving others. They have the opportunity to learn just how agile one’s reaction time must be to harness the powers of the wind and the tide. Students discover the relevance of being mindful of the steps that must be taken to be good stewards of the environment by routinely doing the work to support a recycling program.

Again, the words of Anne Norvell Rice Gray may reflect the truth of matters best: “Heraclitus said that you can never step in the same river twice. When we come back to gather on those banks, we see that we are still the same girls we were on the first go-round, but that the petty foolishness of youth has evaporated, and we have the arcs of our lives to share. The past, the present, and the future are one.” S.T.R.E.A.M. is a new curricular vision serving the needs of new students and their families for a new century, and SMS maintains its mission and its identity as an all-girls, Episcopal boarding school, always believing that “As we grow in age, may we grow in grace.”

From the very beginning, St. Margaret’s School (SMS) and the Rappahannock River have been synonymous. From the head of school to her deans on to her students, all are just beginning to experience the transformative power of S.T.R.E.A.M. It makes all the sense in the world that for the next 100 years, SMS will lead the educational community in both academic and character development of young girls as she did for the last hundred years!

Larry Foulk As Dean of Faculty at St. Margaret’s School, Larry Foulk oversees the school’s teaching staff and the development of academic curricula. He also teaches AP US History, other history courses, and independent studies. He is involved in St. Margaret’s River Program, aptly named S.T.R.E.A.M. (a curriculum combining Science, Technology, River, Engineering, Arts, and Math). He lives on the St. Margaret’s School campus with his family.

Photo credit: Edwina Bell



RAPPAHANNOCK IN THE CROSSHAIRS:

Counties Compete for Surface Water Rights

By Hill Wellford, Jr.



It is a good bet that most people in the Middle Peninsula and the Northern Neck know very little about the laws of Virginia that govern water rights to our tidal rivers. This is a subject that is likely to be hotly debated in the days ahead as counties to the north of Essex seek permits from Virginia's Department of Environmental Quality (DEQ) and the U.S. Army Corps of Engineers to install water intake structures that would withdraw millions of gallons of water from the Rappahannock for development purposes.

ECCA first learned about this issue when one of our members called to ask what we knew about development proposals in Caroline County and King George County that would require large withdrawals of water from the Rappahannock. The proposal in Caroline, currently pending in a joint permit application before DEQ and the Virginia Marine Resources Commission (VMRC), calls for a water intake structure to be placed in the Rappahannock near Olney Corner that on a continuous daily basis would initially withdraw up to 7.9 million gallons, increasing to 13.9 million gallons by 2035, to meet Caroline's future residential and economic projections. Caroline's plan is to pump water from the Rappahannock through pipelines to a new water treatment plant near the Carmel Church/Ladysmith Water System near Interstate 95.

In King George County, the water intake issue pertains to a data center proposal by Birchwood Power

Partners (Birchwood), owners of the old Birchwood Power site on the Rappahannock. In October 2022, Birchwood submitted a rezoning proposal to the King George Board of Supervisors to authorize construction of a data center campus at its old power site location. Data centers produce a high amount of heat and typically require millions of gallons of water to cool their servers, as well as needing power from large solar fields. They also utilize giant fans and diesel generators that create a high noise level that can be heard in the surrounding area day and night. Birchwood's rezoning proposal was temporarily withdrawn in late November 2022 following a dispute between Birchwood and Green Energy Ventures, an energy services group. However, Birchwood's plan for a data center campus on the banks of the Rappahannock has not been abandoned and, as of the date of this article, remains an active issue in King George. In January 2023, King George's supervisors authorized The Berkley Group to look at zoning regulations for data centers, battery storage facilities, and solar farms. The Berkley report is anticipated sometime in the summer of 2023. For an understanding of the conservation threat data centers present to the Rappahannock, ECCA urges our readers to review the following articles by the *Virginia Mercury*: <https://www.virginiamercury.com/2022/12/09/virginia-has-a-data-center-problem/> and the June edition of the *Bay Journal*: https://www.bayjournal.com/eedition/page-01/page_dfcd4bbc-5672-5c7f-a5b1-3b5815901dfa.html.

ECCA does not purport to be a legal expert on water rights. We are knowledgeable, however, about how unique and ecologically important the Rappahannock is and the ongoing need to protect it and the species of fish, such as herring, shad, striped bass, and sturgeon, that spawn in its waters. Caroline County's permit submission can be reviewed on the VMRC website for JPA # 20200514: <https://webapps.mrc.virginia.gov/public/habitat/additionaldocs.php?id=20200514>.

Continuous withdrawal on a daily basis of millions of gallons of water from a water intake structure, as proposed by Caroline, presents a chronic mortality

threat to vulnerable fish eggs and larvae. Caroline's permit application makes no provision for a hiatus in the operation of the water intake during the peak spawning season, nor does it provide for independent monitoring of mortality and mitigation. Other issues include the cumulative impact of Caroline's water intake structure with other permitted or proposed water intake structures in the Rappahannock River Basin, interbasin transfers of treated water and wastewater, alternative means to address Caroline's water requirements, the factual basis for Caroline's projection of future water needs versus its present needs, the water needs of other counties that border the Rappahannock during the same multiyear period, and the impact of global warming, sea level rise, and increases in salinity.

To help ECCA's members understand the decision process that DEQ and VMRC use when a tidal surface water permit is filed, ECCA requested that Friends of the Rappahannock explain the process to our members. The following article by Brent Hunsinger, Tidal Programs Manager of Friends of the Rappahannock, describes the permitting process and the public's opportunity to be heard. Mr. Hunsinger also comments on the challenges the Rappahannock and its conservation advocates face as residential and industrial developments expand into the Rappahannock watershed.

We hope all residents of the counties that border the Rappahannock, and the local supervisors who represent them, share ECCA's understanding of how rare and relatively unspoiled the Rappahannock is. It is the common feature of the Middle Peninsula and the Northern Neck that has defined our counties for generations. It is one of the primary characteristics of our region that attracts people who relocate to our tidewater communities from congested population centers in their pursuit of a better quality of life. It is a Scenic River of our state, a river to be cherished and protected, not exploited.

Hill Wellford and his wife, Alice, are long term members of the ECCA. Since Hill retired from the practice of law in 2013, Hill and Alice spend most of their time at Kendale farm in Essex where they maintain wildlife habitat areas and actively support the conservation efforts of ECCA, Friends of the Rappahannock, the Chesapeake Conservancy, and other regional non-profit organizations. Hill is an avid wildlife photographer.



VIRGINIA'S PERMITTING PROCESS FOR A TIDAL RIVER WATER INTAKE STRUCTURE

By Brent Hunsinger

For centuries the Rappahannock River (River) has remained a mostly rural watershed with villages and towns along its banks. It has experienced comparatively little industrial development or intensive residential development compared to neighboring watersheds like the James and the Potomac. But in the past few years this has begun to change and will continue into the future.

As new land uses and industries (such as data centers and power generation facilities) begin to expand into the Rappahannock watershed and populations grow, the river and its localities will experience new opportunities and challenges. New industry and rising populations will require new water sources and expanded water use. Due to declining groundwater levels in the Eastern Virginia Groundwater Management Area east of Interstate 95, the Virginia Department of Environmental Quality (DEQ) is encouraging localities to reduce their reliance on groundwater wells. Accordingly, more localities are looking to surface water withdrawals to meet anticipated future water needs. New regional water supply planning regulations stemming from HB542, which are currently under review by the Youngkin administration, will require increased cooperation among localities but will not address a need for comprehensive river basin-wide planning to properly understand the effects that all water withdrawals have on a river system. The new regulations include five different planning areas for the Rappahannock River watershed. Surface water withdrawals are not new but, as the demand for surface water use increases, the impacts to the river's ecology will increase. There must be a balance regarding the beneficial use of the river's water resources. The beneficial uses include not only domestic, agricultural, commercial, and industrial but also protection of fish and wildlife habitat, recreation, navigation, and cultural and aesthetic views.

Localities and industries that want to build surface water intakes and pump water from the Rappahannock River must submit a Joint Permit Application (JPA) to DEQ. DEQ then coordinates the review of a JPA with the Virginia Marine Resources Commission and the U.S. Army Corps of Engineers. As new water withdrawal applications for municipal and industrial uses are submitted, they are evaluated for a variety of impacts, including impacts to wetlands, fish populations, and salinity. Localities must also provide justification for the amounts of water they propose to withdraw from the river. If it is deemed that the application meets the required standards, a draft permit is issued.

During the JPA process, localities would benefit from conducting comprehensive and transparent public participation processes with residents and relevant stakeholders before draft permits are issued. When a draft permit is issued it triggers a 30-day public comment period. New state regulations do not require DEQ to hold an in-person public hearing on water withdrawal applications if it deems that it has addressed the public's concerns raised through the required public comment period. A final permit is then issued to the applicant.

Any water intake infrastructure that impacts the riverbed also needs a permit from VMRC and this is a separate process that can require a public hearing if the permit application is contested. This public hearing would take place before the VMRC board in Fort Monroe, Virginia, not in the local area where an application is being proposed.

As the Rappahannock River watershed changes and more surface water withdrawal applications are submitted, we must make sure that government agencies and localities are doing their due diligence to protect existing residents and businesses.

Brent Hunsinger is the Friends of the Rappahannock Tidal Programs Manager. Based out of FOR's tidal office in Tappahannock, Brent helps to carry out FOR's restoration, education, and advocacy programs in the lower river basin. Brent lives near Fredericksburg with his wife Beth, stepson Jackson, and dog Layla. He enjoys paddling, waterfowl watching, and exploring the marshes and forests during the winter months.





COWS CAN CARBON CAPTURE

By Joel Salatin

Our Shenandoah Valley farm is at the headwaters of Middle River, which flows into the Shenandoah, which flows into the Potomac, which flows into the Chesapeake Bay. When our family arrived in 1961, it was a gullied rockpile of eroded soil (some say depleted by five feet) and sparse vegetation.

Our Shenandoah Valley farm is at the headwaters of Middle River, which flows into the Shenandoah, which flows into the Potomac, which flows into the Chesapeake Bay. When our family arrived in 1961, it was a gullied rockpile of eroded soil (some say depleted by five feet) and sparse vegetation.

When colonial Governor Spotswood sent his Knights of the Golden Horseshoe into the Valley in the early half of the 1700s, they spent a couple of weeks and reported that everywhere they went, they could tie the grass in a knot above the horses' saddles. It was a magnificent silvopasture—grassland punctuated with widely spaced cathedral trees. Meticulous management by the Native Americans included strategic burning to control trees and aggressive hunting to complement their crudely cultivated squash, corn, and beans.

European settlers stopped the burning, yanked out the trees, and plowed these magnificent grasslands to

plant grain and tobacco. Grain was the holy grail—and still is for the most part—but required tillage to destroy the grasslands. With draft power and high organic matter (up to 8 percent) virgin soil, settlers initially enjoyed robust crops and high fertility.

But this was not Germany or Ireland or England, where gentle, dependable rains and temperate conditions created peat and forgiving arable soils. Our Valley is known for summer storms that pelt down in violent bursts. Exposed soil is no match for raindrop bombs followed by intense summer sun, baking the exposed soil. Within decades, these productive soils washed to the Chesapeake Bay, inspiring the call to “go west, young man, go west” in search of new fertility.

Exposed rocks and gullies made Valley farmland look like skeletons rather than fleshy fertile fields by the time the transcontinental railroad opened the Midwest to be exploited a century later. The Valley transitioned into a livestock region by 1900 because barren hillsides could no longer grow annual crops. Our family came into this barrenness, wanting to heal the land, build soil, and make a living on a small farm.

My dad sought both public and private counsel: “How do I make a living here?” Every piece of advice was the same: “Plow, plant corn, build silos, buy chemical fertilizers, graze the woodlots.” My grandfather was

a charter subscriber to Rodale's *Organic Farming and Gardening* in 1942, transferring a love of compost and carbon-based soil development to my dad. He knew the supposedly expert agricultural advice he received was not right and sought alternative viewpoints. One of those led to André Voisin, godfather of modern management intensive grazing.

Voisin's 1950 book *Grass Productivity* is the iconic foundation for biomimicry in grass-based livestock farming. To say this is different from conventional livestock production would be the understatement of the century. Developed by Voisin in France but based on historical patterns of herbivore, predator, and avian movement, this system viewed the animals as the masseuses of soil ecology.

We now know that 500 years ago, North America produced more food than it does today. Millions of bison, some 200 million beavers, flocks of birds that blocked out the sun for a day, 2 million wolves—the sheer production eclipses today's hybrids, chemicals, and confinement agriculture. And all of this production built soil rather than depleting it. Creeks and waterfronts enjoyed clear water. How could this be?

Grass is a solar collector. In fact, it's a more efficient solar collector than trees or shrubs because it has such a high metabolism. The deepest soils on the planet that have sequestered the most carbon are not found under forests or shrubs; they are under prairies where megafauna, predators, and birds ranged. In these historic settings, the herbivores expressed three primary activities: moving, mobbing, mowing.

The largest herds on the planet today are the wildebeests in the Serengeti and they still exhibit these principles. They move based on forage, seasons, predation, and insect infestation. They don't stay in the same place. They're mobbed up rather than scattered, primarily for predator protection. And they mow, also known as grazing, but I prefer the term *pruning* because that more perfectly describes the action.

The constant movement gives vacated areas time to regrow before being pruned again. Because grass grows in an S curve, starting slowly, then growing rapidly before declining in senescence, the fastest carbon development occurs between the start and finish. The plant sloughs off root mass after being pruned, to concentrate stored carbohydrates in the crown and send forth new shoots. If the plant is repruned (regrazed) prior to restoring that energy in the root reserves, the plant weakens. The plant maintains bilateral symmetry

between biomass above ground and below ground; short plants have short roots. Short roots have no reserves and no ability to access deep moisture in the summer.

Mobbing creates a primal grazing aggression that makes the animals eat plants they wouldn't normally eat. Lack of pressure makes the animals lazy on the pasture buffet and they eat only what they want. Mobbing encourages them to eat with more reckless abandon, including many plants considered undesirable. You could call this equal opportunity grazing.

Finally, mowing is what the mobile four-legged sauerkraut vat does. With multiple stomachs, the herbivore converts cellulose that humans can't eat into nutrient-dense meat and milk. Herbivores don't eat grain, manure, or carrion. The mowing, or pruning, is what restarts the rapid growth cycle in the grass S curve, just like pruning stimulates fresh growth in a vineyard.

Any time domestic herbivores deviate from nature's pattern of moving, mobbing, and mowing, they become an ecological liability. When they are managed with biomimicry in mind, they build soil, sequester carbon, and stimulate hydration just like their wild ancestors. Today, not 5 percent of domestic livestock adhere to the moving, mobbing, mowing protocol and therefore are rightly demonized as planetary liabilities. But the culprit is not the cow; it's the cow's manager.

On our farm, we move the herd daily using high-tech portable electric fencing. This can mean 500 cows on four acres for one day. Tomorrow they move to another four acres, creating a variegated quilt pattern of vegetation recently pruned, growing fast, and blooming toward senescence. In drone pictures, this appears identical to wild herds on the Serengeti.

In half a century the bare shale rock scabs in our pastures are now covered with a foot of soil. We didn't haul it in; it grew up from the edges just like new skin gradually grows under a scab. In half a century, our farm's organic matter went from 1 percent to more than 8 percent. Every 1 percent increase in organic matter holds 20,000 gallons of water per acre; 7 percentage points means we now hold 140,000 more gallons per acre than we could when we arrived at this barren place.

Furthermore, methanotrophic bacteria that eat methane exist in biologically active soils under perennial grasses. These bacteria don't live under grain fields, forests, or pavement. In healthy grassland soils, these active bacteria metabolize the methane generated from 1,000 cows per acre. Nobody has 1,000 cows on an acre. Nature provides. Remember, 500 years ago North

America had more pounds of animals than it does today, even when we include humans and their pets. If animals were an ecological scourge, the planet would have succumbed long ago.

The truth is that the management of domestic livestock in a fashion consistent with nature's choreography is the most efficacious way to restore soils, increase hydrology, and sequester carbon. If grass-based livestock generally and grass-finished herbivores (cows, sheep, goats) specifically were the holy grail instead of livestock fed annual grains, we'd see healthier soils, cleaner waters, and a more robust Chesapeake Bay.

What about winter? This management enables us to take the herd much further into winter without hay, feeding what's known as stockpiled forage. This is forage we defer grazing until late in the season so the herd can eat it like standing hay. When that runs out, we feed under a roof to protect soluble and volatile manure and urine from winter rains. We bed with carbon—wood chips, sawdust, leaves, old hay, straw, corn fodder—to absorb these nutrients and hold them until spring. We call it the carbonaceous diaper.

Due to the heavy cow impaction, the bedding is anaerobic; it ferments. As we add carbon throughout the hay-feeding period, we add whole shelled corn too, which also ferments. When the cows go back to grazing in the spring, we put in pigs. They seek the fermented, embedded corn and aerate the bedding, turning it into a massive aerobic compost pile that we spread on the fields as fertilizer.

When Virginia began cost-sharing manure lagoons on cattle operations decades ago, I pleaded for composting instead. Virginia has thousands of acres of low-grade scrub trees and crowded forests that should be upgraded and thinned. On our farm, our fertilizer budget goes to the labor and equipment to chip this low-grade woody material to create an authentic carbon economy through large-scale composting with pigs doing the aerating (pigaerators).

At the time, the government agent running the cost-share program told me more manure had gone into the Chesapeake Bay because of manure lagoons than went in beforehand. But land grant agronomists and agriculture experts did not know about compost or believe in it. Instead, the foresters held conferences lamenting no market for low-value trees. Cattle farmers lamented the exorbitant cost of fertilizer. I encouraged integration rather than segregation to solve both issues with a carbon economy. It didn't go anywhere.

Today, our farm moves cows every day using high-tech electric fencing. A 10-mile network of buried water lines from permaculture-style high-elevation ponds delivers clean gravity-pressure water over the entire acreage. Portable shelters provide shade. Production averages at least three times the county average. This is not bragging; it is humbly expressing the magic and majesty of a design that built soil wealth long before settlers destroyed it.

We can go back. We have the knowledge, infrastructure, and resources. Livestock can be a scourge or savior depending on how it's managed. I invite dubious readers to come to our farm, Polyface, for a visit. We have a 24/7/365 open-door policy for anyone in the world to come from anywhere, anytime, and see anything unannounced. That's our commitment to transparency and our confidence that seeing is believing.

I'm blessed every day to be able to caress our ecological womb and see it respond with unprecedented abundance. Our farm that couldn't support 10 cows now supports 100. That means we've built soil, built fertility, increased earthworms, increased pollinators, increased wildlife, rejuvenated the water, and set it on a path to restoration. I hope you'll catch this vision and embrace the mission for the good of all, extending to the shores and waters of the Chesapeake Bay. Thank you for caring.

Joel Salatin, 65, is as comfortable moving cows in a pasture as addressing CEOs in a Wall Street business conference. His family's Polyface Farm in Swoope, Virginia, feeds thousands and was featured in the *New York Times* bestseller *Omnivore's Dilemma* and in the award-winning documentary *Food Inc.* As a leader in the regenerative grass farming movement, Salatin has authored 15 successful books and is a frequent radio and podcast guest.



An aerial photograph of a coastal wetland. The foreground and middle ground are dominated by a dense field of tall, thin, brown stalks, likely dead or dormant marsh grasses, interspersed with patches of green vegetation. A narrow, winding waterway or stream flows through the marsh. In the background, a line of trees marks the edge of the wetland, beyond which is a flat, open landscape under a clear sky.

Rural Areas will Bear the Brunt of U.S. Sea-level Rise

by David Malmquist

Ghost forests—areas of trees recently killed by rising saltwater—are a clear sign of sea-level rise and marsh migration into rural land. Photo by Dr. Matt Kirwan/VIMS.

It's hotly debated whether coastal wetlands can survive sea-level rise by migrating inland. A new analysis using highly detailed elevation maps of the Chesapeake Bay region shows that—contrary to previous studies—human barriers will do little to slow this marsh migration. Instead, extensive areas of low-lying rural land will allow coastal marshes to persist and perhaps even expand as salty water creeps upward into what are now forests and farmland.

Lead author on the study is Grace Molino, a Ph.D. student at William & Mary's Virginia Institute of Marine Science. Lead author Grace Molino, a Ph.D. student at William & Mary's Virginia Institute of Marine Science, says "The numbers are striking. Baywide, we expect more than 600 square miles of inundated land in the Chesapeake region by 2100." That is four times the area that has converted to marshland in the Bay region since historical observations began in the 1840s, and more than 75% will be rural—mainly forests, forested wetlands, and farm fields.

Joining Molino on the study, which appears in the latest issue of *Limnology and Oceanography Letters*, are VIMS professor Dr. Matt Kirwan along with U.S. Geological Survey researchers Dr. Joel Carr of the Eastern Ecological Science Center and Dr. Neil Ganju of the Woods Hole Science Center. The study was made possible with funding from the USGS and collaboration between VIMS and the two USGS Science Centers.

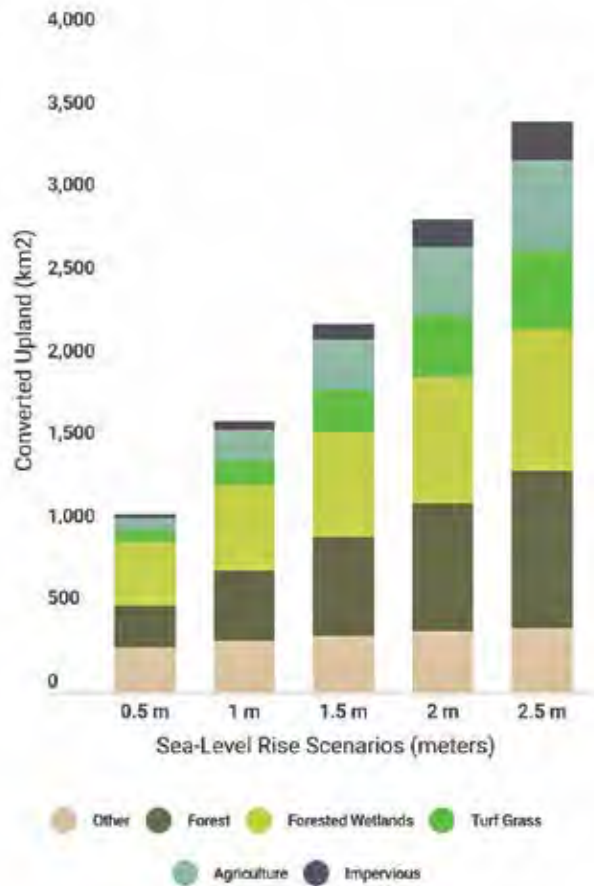
"As far as I know, this is the first projection of inundated land in the Bay area, and one of the few and most high-resolution predictions in the U.S." says Kirwan. "Our analysis shows that marsh migration is constrained more by natural topography than by human development."

The authors stress that their findings apply not just to the mid-Atlantic region, as similar land-use patterns occur all along the U.S. coastline. "Our data suggests that rural coasts will bear the brunt of sea-level rise nationwide," says Kirwan.

The team's study paints the Chesapeake Bay and North American coastal plain as global outliers in terms of saltmarsh resilience to sea-level rise, with the more urbanized coasts of Europe and Asia more likely to

experience “coastal squeeze.” This is the loss of coastal wetlands as rising saltwater floods and erodes their seaward edge while natural or human barriers block their landward migration.

Says Kirwan, “Despite a perception that urban centers will block marsh migration, our predictions suggest that the most vulnerable land in the Chesapeake Bay remains largely undeveloped, even in what are typically thought of as urban watersheds.”



Rural uplands such as farm fields, forests, and forested farmlands will bear the brunt of sea-level rise (SLR) under all scenarios.

“We found that developed lands generally occupy less than 10% of predicted migration areas within individual watersheds even under our high scenarios of sea-level rise,” adds Molino, “despite more extensive development in the watershed overall.”

For example, the Elizabeth River is one of the most highly developed watersheds in the Chesapeake Bay and the U.S., with its three branches cutting through the metropolitan areas of Norfolk and Portsmouth in southeast Virginia. Yet developed surfaces occupy only 16% of the potential marsh-migration area under 1 meter



The Elizabeth River is one of the most highly developed watersheds in the Chesapeake Bay and U.S.; yet developed surfaces occupy only 16% of the potential marsh-migration area under 1 meter of sea-level rise. Photo by D. Malmquist/VIMS.

of sea-level rise, compared to 31% of developed land across the entire watershed.

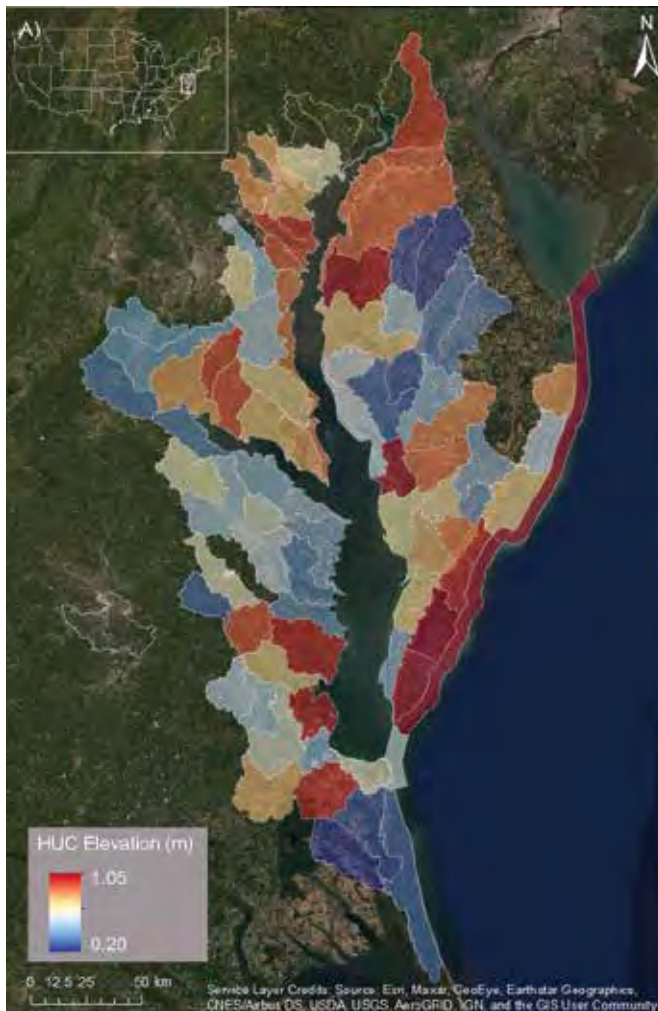
The Bay’s other major urban areas—Hampton, Virginia; Annapolis, Maryland; and Baltimore, Maryland—lie in more elevated watersheds with only small areas of potential marsh migration.

The good news from the study is that the abundance of low-lying forests and farmland in the Chesapeake Bay area and North America more generally will largely preclude coastal squeeze expected to curtail saltmarsh area in other, more urbanized regions of the world’s coast.

The challenge for North American landowners and governments will be to equitably manage the conversion of what is now mostly privately owned, income-producing rural uplands into coastal wetland habitats whose value lies mainly in providing publicly valued ecosystem services such as flood protection and the nurture of fish and bird populations.

Analysis

The team began their analysis by using more than 200,000 GIS data points to map the present-day boundary between forest and marsh around the Bay. They then recorded the height of each point relative to sea level using an extremely detailed elevation model from the U.S. Geological Survey. Their next step was to use these data points to calculate a median “threshold



The research team analyzed marsh migration within these 81 watersheds surrounding the Chesapeake Bay. The colors show the median elevation of each watershed in meters.

elevation” for each of 81 watersheds surrounding Chesapeake Bay.

The research team analyzed marsh migration within these 81 watersheds surrounding the Chesapeake Bay. The colors show the median elevation of each watershed

in meters. Akin to a bathtub ring, the threshold elevation integrates the mix of tidal range and salinity that has advanced the marsh-migration front to its current height and lateral position within each watershed segment. These threshold elevations vary by a factor of 5 across the 81 watersheds, from 0.2 to 1.05 meters (0.65-3.4 feet). The boundary extends farthest inland in low-lying watersheds bordered by salty waters with a high tidal range. Regular inundation by saltwater is the main factor that converts farmlands and forests into saltmarsh.

Using the same high-resolution USGS map, the team then added increments of sea-level rise out to 2100 based on projections by the National Oceanic and Atmospheric Administration—including a low (0.5 m or 1.6 feet), intermediate (1 m or 3.3 ft), and high (2.5 m or 8.2 ft) scenario. They then measured the area of land within each watershed that would be flooded under each sea-level-rise scenario, and determined whether it is currently covered by forest, forested wetlands, turf grass, farm fields, or developed surfaces such as roads, parking lots, and buildings.

As expected, these “potential marsh migration areas” will increase over the coming decades and with the magnitude of sea-level rise, from 405 square miles by 2100 under their low scenario to 1,447 square miles under their high scenario.

What was unexpected within the increasingly developed Chesapeake Bay watershed is that the marsh-migration areas are dominated by upland and wetland forests, not urban or suburban land.

Molino, G.D., Carr J.A., Ganju, N.K., and Kirwan, M.L. 2022. Variability in marsh migration potential determined by topographic rather than anthropogenic constraints in the Chesapeake Bay region. *Limnology and Oceanography Letters*. <https://doi.org/10.1002/lol2.10262>

David Malmquist directs the office of News & Media Services at the Virginia Institute of Marine Science (VIMS), William & Mary. He has been at VIMS since 2001. He has a Ph.D. in Earth Science from the University of California and began his career in science communications with an AAAS Mass Media Science and Engineering Fellowship at the Dallas Morning News. Before coming to VIMS, David was Science Communications Manager for the Risk Prediction Initiative, a partnership between climate scientists and (re)insurers at the Bermuda Institute of Ocean Science. Before that he developed earth-science software for K-12 classrooms through Paramount’s Computer Curriculum Corporation, now Pearson, Inc.



Luke and his dog, Pete, experience incoming high tide at the bottom of Prince Street. Photo by Hill Wellford, Jr.



THE OLD WHITE BARN AT DOVETAIL FARM

Story by Leslie Rennolds, Photography by Betsy Shuford

AN ESSEX COUNTY BARN REHABILITATED AND REPURPOSED



Century-old barns are an important part of the agricultural heritage of Essex County. Yet sadly, these hallmarks of a bygone lifestyle are losing the battle against, time, neglect and the elements. Many are collapsed or gone altogether.

Many of the farms in Essex County have remained in the same families for generations. The barns that occupy these “heritage” farms were designed and built for specific uses, meaning that no two were exactly alike. Such is the case of the Old White Barn at Dovetail Farm on Lloyds Road.

Now the home of Betsy and Randy Shuford, the farm and its structures have stories to tell of the people that built and inhabited them. Betsy’s grandfather, William Franklin Ellis, Sr. contracted A. F. Gischel to construct the barn in 1938.



A. F. Gischel’s signature can be seen on interior boards.





Dovetail Farm, as it is now called, was known as Smithfield Farm at the time Gischel set to work on the barn. The Old White Barn was tasked with serving many purposes. The primary design was as a crib barn, used to dry and store seed grain, as well as apples and peaches, which grew in the orchard between the barn and main house. The Dutch style roof afforded an expansive hayloft to store bedding and food for the horses that also lived in the barn.

Fortunately, Gischel's specification of heavy oak beams to supply the bulk of the structural support is responsible for the longevity and integrity of the building. The shiplap walls in the cribs became handy places to write out customer orders. There are notations of bushels for Sanford Thomas as well as the church.

Betsy's parents, Margaret and W. Franklin Ellis, Jr. took ownership of 52 acres of Smithfield Farm, which was romantically renamed as FraMar Farm (using the first three letters of each of their names). The barn continued to be used to dry and store seed crops, as well as other supplies and necessities. Eventually it became nothing more than a storage building for, well, just about everything.

Renovation on Betsy's parents' house began in 2016, while the Shufords were living in Atlanta. The couple blended acreage from both FraMar and Smithfield Farms, and, in keeping with family tradition, and their love for joinery and woodworking, changed the name to Dovetail Farm. Using their innate sense of style, bolstered by Betsy's skills as an interior designer and

BEFORE YOU TAKE ON A PROJECT, CONSIDER THIS

DO YOUR HOMEWORK...AND YOUR PLANNING

- How will you use the finished space?
This determines how you will approach your renovation.
- Is the structure strong and sound?
"Good Bones" must be there.
- Decide if the renovation will be to restore to historic and period correct specifications, or will you modify the structure for an alternate use.



SOURCE YOUR MATERIALS

- The current prices of new lumber is high. Reclaimed lumber is always high in cost. You would need to determine if the use of your wood will be visible and if the value of old wood makes sense.
- Try to use existing pieces, parts, barn finds, as much as possible. Latches, door knobs, hinges, mouldings, trim. All of these add cool factor to your project.



MAINTAIN AND PROTECT THE RURAL LANDSCAPE

- A big part of the appeal of reclaimed barns is the setting. The story being told maintains a sense of genus loci and authenticity if the landscape supports, rather than fights with, the structure.
- Making the whole project cohesive relies on being able to create an experience that is relatable and genuine.





Randy’s love of furniture building and upcycling, they transformed a traditional Cape Cod into a open, airy and supremely livable mid-century modern farmhouse. When the renovation was completed in 2018, the Shufords left Atlanta and relocated to Essex County to take up residence in their new home.

With one major project behind them, they turned their attention to the barn. Undertaking the rehabilitation and reimagining of an old barn is not for the feint of heart. And feint of heart the Shufords are not.

In a brief prepared by the Department of the Interior’s Heritage Preservation Services regarding the preservation of historic barns, Michael J. Auer wrote that “Historic barns are preserved for a number of

reasons. Some are so well built that they remain useful even after a hundred years or more. Many others are intimately connected with the families who built them and the surrounding communities.”

For the Shufords, the reasons go even deeper. “Historic barns are the handcrafted remnants of less hurried lives,” Betsy explains. “They are part of a family history, and people just feel an attachment to their stories. I felt a family responsibility to preserve the legacy, and to create a unique space to share with the community.”

Their approach to the renovation fell directly in line with the recommendations of preservations guidelines.



CLEAN SWEEP.

Shovels, rakes and pitchforks were used to clean out the fodder of decayed wood, rotted organic matter, and a petrified animal carcass or two.



GOOD FINDS.

A few gems found during the clean out include an old bank safe with "T.L. Dillard" printed on the front; many old soda bottles; family photos; furniture; and some hand and farm tools.



REDUCE. REUSE.

Unsalvageable nearby structures were removed and the old tin roofs saved to be used in the barn on the lounge walls.

THAT OLD WHITE BARN, SHE AIN'T WHAT SHE USED TO BE.

REHABILITATING AND REIMAGINING AN HISTORIC STRUCTURE TAKES A GOOD EYE, A GREAT IMAGINATION, AND A STRONG VISION. (GOOD TASTE DOESN'T HURT, EITHER.)



HANDMADE.

Handmade wrought iron door hardware, such as this single-twist iron hook, were crafted locally.



A STEP UP.

Thanks to Franklin and his love of wood, the hayloft was a great source of patina lumber used to build steps to the loft.



HAVE A SEAT.

Vintage 1950's back porch chairs that were found in old garage were distressed and finished by Randy.

BEFORES AND AFTERS

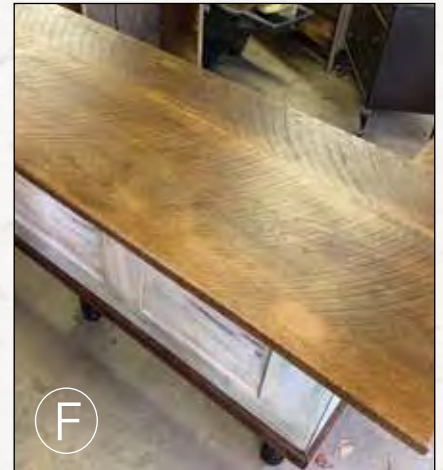
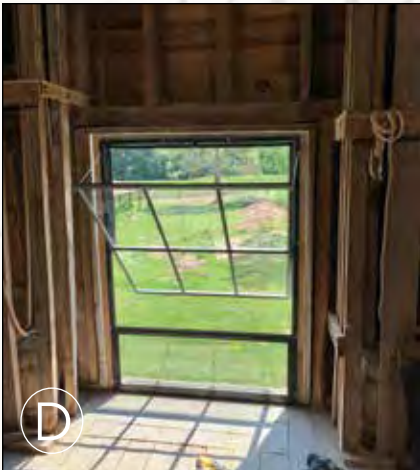
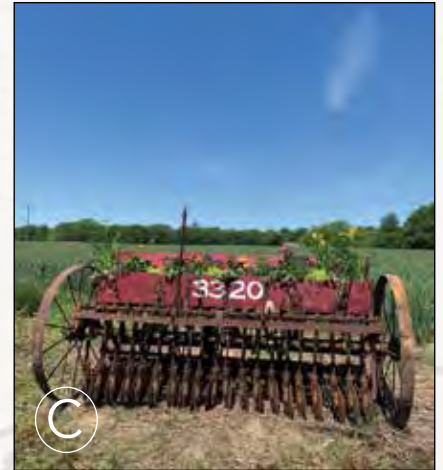
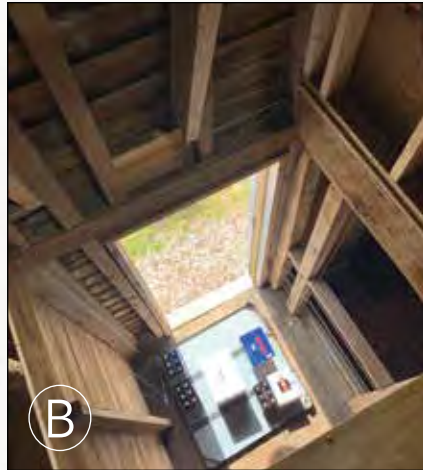


Horse stalls converted into reception entrance now referred to as the "stable entrance" with an old world brick stamped concrete floor.

All doors were rebuilt as replicas of the originals.



INNOVATIONS • IMAGINATION • UPCYCLING



- (A) DOWNSTAIRS BAR BUILT BY RANDY FROM OLD WIRE SPOOL.
- (B) OLD HAY DROP CHUTE CONVERTED TO DUMBWAITER TO LOAD HEAVY ITEMS UPSTAIRS.
- (C) AN OLD FARM IMPLEMENT FOUND IN AN OUTBUILDING BECAME THE WELCOME SIGN INTO THE PROPERTY.
- (D) ALL WINDOWS WERE REPLACED WITH FUNCTIONALLY CORRECT BARN STYLE WINDOWS, CUSTOM ORDERED.
- (E) GLASS PANEL GARAGE DOOR WAS INSTALLED IN THE BACK TO OPEN UP THE SPACE FOR LIGHT AND ACCESS TO A NEW FULL LENGTH DECK. THE VIEW OF THE WIDE OPEN FIELD OFFERS DEER OR TURKEY SPOTTINGS.
- (F) UPSTAIRS BAR HAND-BUILT BY RANDY OUT OF DOORS FROM THE ELLIS HOME.
- (G) OLD PORCH MOLDING FROM ANOTHER SHED REPURPOSED AS THE FIREPLACE MANTEL.
- (H) WOOD BURNER STOVE INSTALLED IN "LOUNGE" AREA OF BARN.
- (I) SOME AREA WALLS ARE COVERED IN TIN ROOFING REMOVED FROM A FALLEN SHED.



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SAVING A FAMILY TREASURE: BUILT BY BETSY SHUFORD'S GRANDFATHER 85 YEARS AGO, THE OLD WHITE BARN IS PART OF THE FAMILY'S HISTORY. UNIQUE IN STRUCTURE, FULL OF MEMORIES, AND BEARING THE SCARS OF TIME, IT NEEDED SOMEONE TO RESCUE IT. THANKS TO BETSY AND RANDY, THE OLD WHITE BARN NOW HAS A NEW LEASE ON LIFE.



Images of Essex County

with Poetry by Marty Glenn Taylor

Introduction and Photos by Hill Wellford, Jr.

The idea for this article came to me after reading a book of poems by my friend, Marty Glenn Taylor. The book, *Benton Point Moments*, published in 2020, is a collection of Marty's poems with illustrative paintings by members of the Tappahannock Artist Guild. Marty's poems reflect mental images of scenes she cherishes from living in Tappahannock for 38 years and her childhood in Morattico. I asked Marty if she thought it would be possible to use photographs to accentuate poems she has written. Marty never rejects a creative thought. This article puts that idea to the test.

KINGFISHER

Dawn and dusk, you wait,
perched on a branch or post,
eye cocked for movement,
where shallows dark display
no tasty, appetizing meal.

From my vantage point
I cheer you on,
Hope to watch you plunge bill first
to river minnow, spearing sustenance,
reward for tenacity.

I count you as my friend,
so well dressed, so properly
attired, schedule so precise,
time my day to match the rhythm
of yours, O, beautiful bird.



“Tears choke the grieving bird,
green grass clogs her gut.
Her cry echoes across the water.
How can I stay in a place
where you are not?”

MOURNING HER LOSS

Pre-dawn fog begins to lift along our marsh,
rose sky turns the river pink,
by the shore, a sorrowful goose cries out.

Three silent companions nod comfort,
console her as she searches,
searches for the lost loved one,
the last honk of speech,
searches for his easy movement of flight
and cupped wings of descent.



She senses the truth that looms before her.
This is her fear to be endured,
her time to suffer loss.
She holds her head with pride,
tells all who listen
of his strength, his agility.

Tears choke the grieving bird,
green grass clogs her gut.
Her cry echoes across the water.
How can I stay in a place where you are not?

WATERFOWL DAY ON MT. LANDING CREEK

Bobbing in a row beside our shore
a family of geese cycles in,
an unseen current calls them to harbor.
Twenty now, where once we saw ten,
necks long, heads high.
Two families joined by kinship or by choice.

Sentinels protect them fore and aft,
while on their riverside flank,
Tundra Swans cavort and play.

It's a waterfowl day, cold and overcast,
a day to cradle head under wing,
until it's time to feed again.



VIXEN

I was the last person to see her alive,
the brash young vixen with long legs
who pranced through my yard,
tail hanging from her mouth.

I watched as she searched for a place
to enjoy breakfast.
Hunched over in the daylily border,
she tore a small animal apart.

I remember her bright, inquisitive eyes,
her eager response to my call
"Kitty, kitty, kitty."
As she bounded toward me one evening
our surprise was mutual.



I wish I had known her as a kit,
so innocent, so trusting.
Full grown, she must have known
the law of the wild is unforgiving.

I can still see her pose of reckless abandon,
the same flaring of life that flames
brightly, briefly,
then suddenly dies.

ADOLESCENT EAGLE

An adolescent eagle learns to fish
in our creek's icy bay.
Wings wide, he tiptoes on ice, watching
for movement below the scrim.

A hop, then another, he flaps
his huge umbrella wings
above his mottled breast.
Is that a fish he sees
swimming beneath the ice?

His parents stand beside him,
instruct him for awhile, then take flight
to circle above the creek.
What does the young eagle learn
as day after day, the lesson unfurls?

He is a slow learner, better at
gliding than fishing.
And so the eagles return each morning,
the proud parents with their awkward son.



WHY BECOME A SPONSOR OF THE ESSEX COUNTY CONSERVATION ALLIANCE?

[There are at Least a Dozen Reasons]

- 1) ECCA is dedicated to Essex County's economic and cultural wellbeing.
- 2) ECCA is committed to preserving the rural landscapes and river that define Essex County.
- 3) ECCA promotes policies to preserve farmland and timber interests – Essex County's main economic drivers.
 - 4) ECCA encourages the county's treasured hunting tradition, which depends on its woodlands, open spaces, wetlands and marshes.
- 5) ECCA supports fishing interests that depend on healthy tributaries and a healthy Rappahannock River.
 - 6) ECCA recognizes the Rappahannock River as a major recreational asset and a magnet for tourism to support the county's economy.
- 7) ECCA advocates for a strong county comprehensive plan to encourage growth and development close to the Town of Tappahannock and to preserve the county's rich farming tradition.
 - 8) ECCA is uniquely situated to address serious outside threats to Essex County and the Rappahannock River, including unsustainable development and fracking.
 - 9) ECCA promotes the use of Conservation Easements to benefit landowners and to preserve the county's rural character.
 - 10) ECCA is securing state and national Rural Historic District designations for areas in Essex County that retain historic structures and landscapes.
- 11) ECCA champions the long and rich history of Essex County and the Town of Tappahannock.
- 12) ECCA publishes an annual magazine with excellent articles dedicated to Essex County.

ECCA Board Financial Report

By Margaret J. Smith, CPA, Treasurer

On behalf of the Directors, thank you for your continued generosity of the last year. The support of our members continues to allow the ECCA to realize our mission of educating landowners on the options available to them through conservation easements and additional outreach aimed at preserving our natural and historic resources.

Through our collective efforts over 18% of Essex County is now under easement, more than any other tidal county along the Rappahannock River. In 2022,

we were again grateful to have the support of so many individual and corporate donors.

Your generous donations over the past year have allowed our organization to fund new historical markers in Essex County, publish our magazine, and continue to fund the programs and publications critical to our mission.

Thank you for your continued support and we ask you to please remember the ECCA as you contemplate giving through the remainder of the year.

Thank You for Supporting ECCA in 2022

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HYLAH BOYD

IN MEMORIAM



There are few people I have had the privilege to know who have embraced so much care, attention, leadership and love for the countryside of Essex County—and the State of Virginia—as Hylah Boyd. She led with her heart and her instinctively wonderful eye and deep understanding of what our citizens love about the Old Dominion. We were very lucky to have had her on our Board for so long. And equally lucky to have her devoted husband of so many years, McGuire, accompany her to the many meetings she attended without fail. We will all miss her greatly in many, many ways.

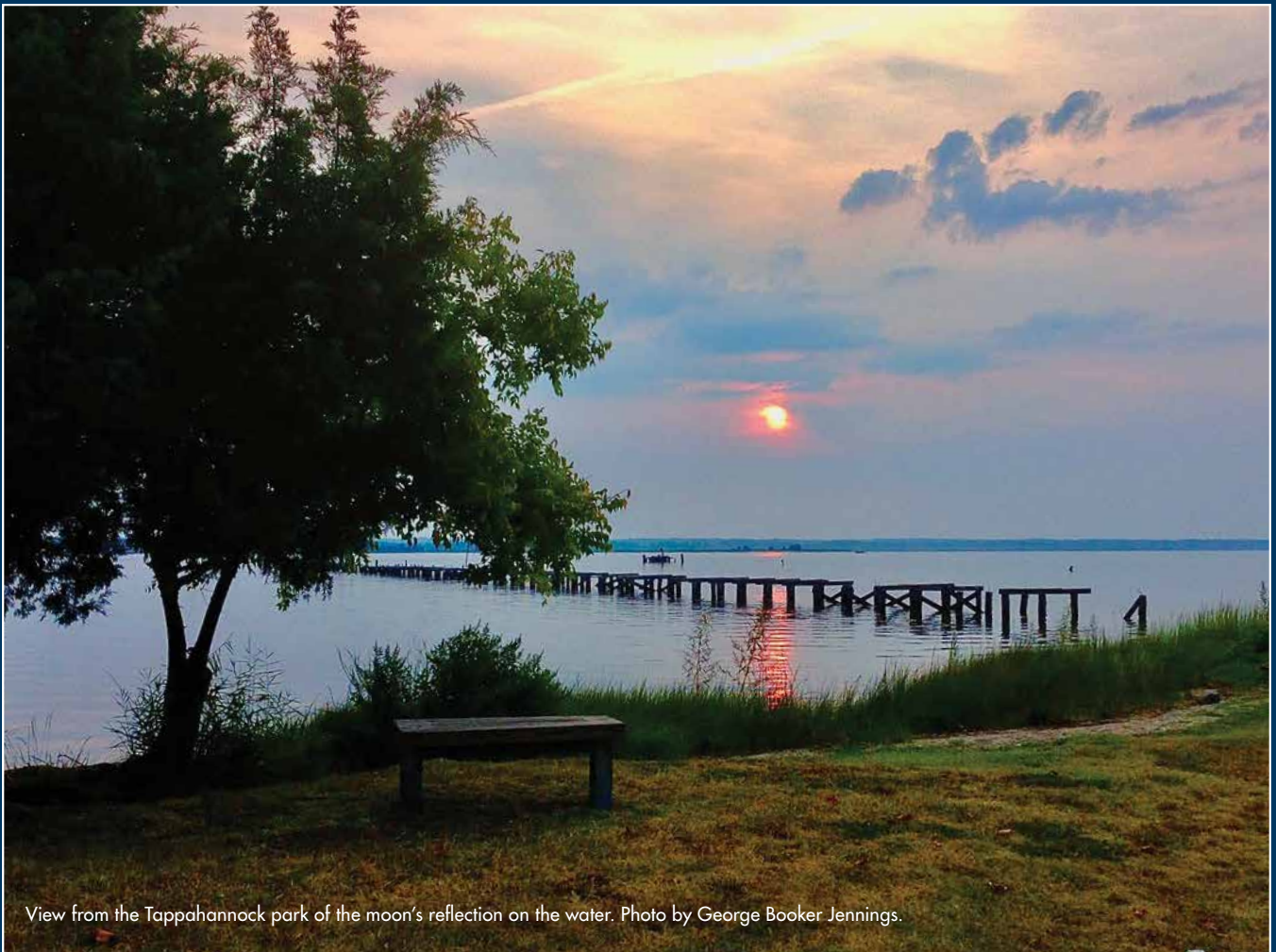
—Peter Bance





ESSEX COUNTY
CONSERVATION ALLIANCE

Post Office Box 356, TAPPAHANNOCK, VIRGINIA 22560



View from the Tappahannock park of the moon's reflection on the water. Photo by George Booker Jennings.