Watershed Observer

Newsletter of the American Chestnut Land Trust - Volume 34 No. 3 Summer 2020

Contents

Be sure to check our web site, http://acltweb.org, to verify the current status of our events.

Please visit our trails! All trails will remain open as usual from dawn to dusk every day. Research has shown that communing with nature is good for both physical and mental health! Plus, the plants and trees emit a chemical that is thought to boost the immune system!

Questions? Comments?

Please call us at 410-414-400

Connecting People to the Land During a Pandemic

In our March 30th blog post entitled, "Amidst the COVID-19 Crisis, ACLT is Responsible and Proactive" (***https://bit.ly/ACLT-Covid***), we outlined the changes we implemented immediately following Governor Hogan's "Stay at Home" restrictions. We'd like to update our supporters on what's been happening since.

Our first observation: People are looking for an escape from the mandatory "lockdown" and have found it on our trails. It is well documented that being outdoors has many health benefits—both physical and psychological—and the Governor's orders have allowed and encouraged outdoor activities. We have adapted our Trail Rules to require people to maintain the 6' social distancing requirement by stepping off the trails when passing other hikers, only hiking with family members from the same household, and limiting the number in groups to no more than ten.

> "Thanks so much for having the trails open! Much needed mental recuperation."
>
> "Thank you for all the work you do to make this wonderful place accessible!"

Now more than ever, we are "connecting people to the land" by keeping our trails open throughout the crisis. The number of visitors has skyrocketed and includes many newcomers. While we have had a couple minor incidences of vandalism and littering, people are behaving, obeying the new rules, and truly enjoying our trails, as evidenced by the many positive comments and thank-yous we've received via the sign-in sheets and "touchless" sign-in app.

Even though the 22-mile challenge is not intended to be done all in one day, these brave young men did it! Photo courtesy of Jeff Danielson. Pictured: Jeff Danielson (left) Nate Beardmore (right front), Jake Beardmore (middle), and Teddy Danielson (back)

Unfortunately, we have had to cancel all of our Spring and Summer events and guided hikes. However, our Earth Day "Virtual 5K" was a huge success, and our "Hit the Trails" 22-Mile Challenge, currently underway, is receiving tons of support as evidenced by the high number of registrants as well as posts to our Facebook group. The Challenge runs through June 30th. For more information, go to: ***https://bit.ly/hitthetrails***.

An added bonus resulting from our virtual events is the number of new memberships generated. Both events are family-oriented and we structured the event fees to encourage families to pay an extra $5 to receive a one-year membership. Thus far, the two events have resulted in the addition of over 50 new family memberships.

The goal of the Outreach and Membership Committee is to keep our long-time supporters, as well as new visitors and event participants, engaged and invested in ACLT once the COVID-19 crisis is finally behind us. We have reason to believe that that's quite possible, as evidence by the fact that our parking lots have remained full even after the County reopened its parks and lifted restrictions.

Looking forward to the fall, we are hoping to be able to hold the Parkers Creek Challenge in late September, since it is another outdoor event. But we may need to look for alternatives to our Annual Dinner and Auction, traditionally held in November.

In the meantime, the O&M Committee is looking for other ways to educate our visitors about the importance of preserving the land, and protecting the wildlife and waterways of Southern Maryland. To increase visitors' awareness and appreciation, we will soon be offering a "Find the Faces" photo contest and a scavenger hunt.

Miriam Gholl
Community Relations Manager

aclt

American Chestnut Land Trust, Inc.

P. O. Box 2363
Prince Frederick, MD 20678
Phone: 410-414-3400
Fax: 410-414-3402
info@acltweb.org
http://acltweb.org

Published quarterly by the American Chestnut Land Trust. The ACLT is dedicated to the preservation of Calvert County, Maryland's Natural and Historical Resources. Since it was established in 1986, ACLT has preserved over 3,200 acres. We own 1390 acres, manage 1,819 acres owned by the State of Maryland, and hold conservation easements on 374 privately-owned acres.

Editors: Ellen and David Farr

From the President's Desk ...

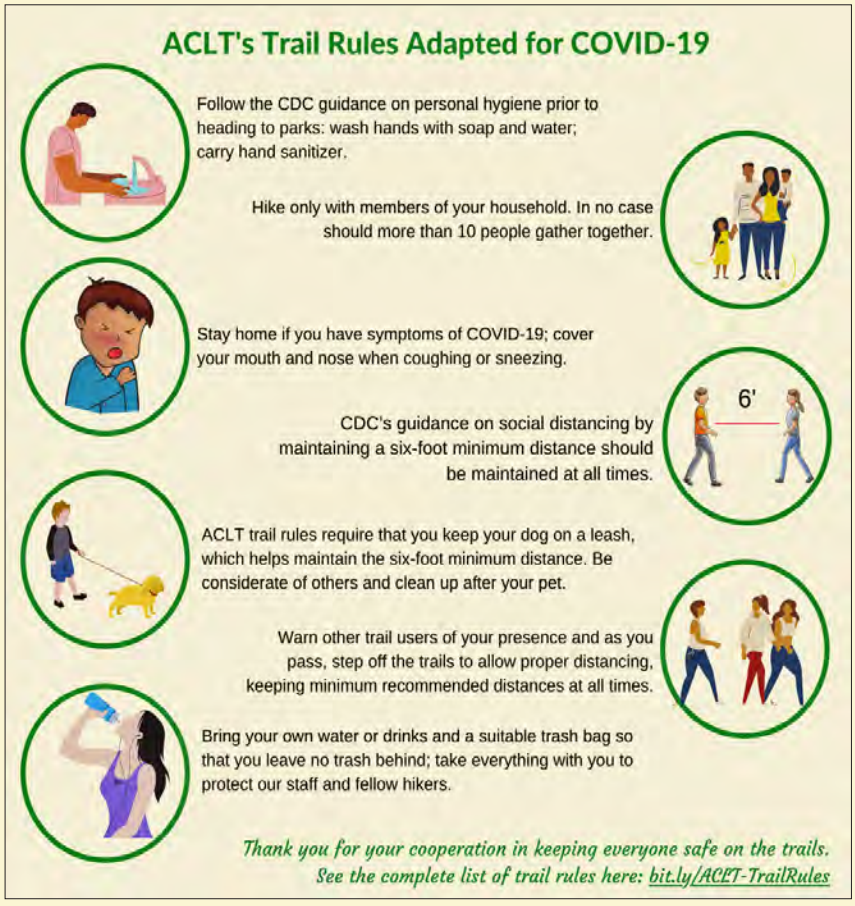
Adapting and Still Connecting

The coronavirus pandemic mandates that we make significant changes in our lifestyle. But some things don't change and ACLT's 22 miles of trails are still welcoming you. You can continue to pursue activities that enable you to enjoy hiking, walking, and relaxing on the properties of ACLT. Unwind and enjoy the natural beauty, listen to the wind in the leaves, the buzzing of the insects, and the chirping of the birds. Or perhaps you need a more physical activity such as hiking the longer trails or joining the trail maintenance group. Whatever you need, let ACLT help you add enjoyment to your day.

Keep in touch. Visit ACLT's trails in person and visit us on line. Keep up to date with our activities and the discoveries from our research programs.

Our home page has a direct feed from our Facebook page. We do ask that you show respect to fellow walkers and follow the trail rules list below. As you enjoy the ACLT properties do not forget that ACLT is a volunteer organization that is very dependent on support from it users.

David Farr, President



Around ACLT

Food Access in a Pandemic – How Land Trusts Can Help

This topic is just walking right out of the newspapers, in terms of relevance. In May, I was asked to participate in a Land Trust Alliance webinar on how land trusts can support food access. This article is a fair summary:

In this pandemic, we have learned not only how quickly disease can spread, but also the vulnerabilities of our food supply chain. According to Johns Hopkins University, "Clearly, any infectious disease outbreak is not just a public health issue, but a food systems issue—and a complex one at that."(**1**) And a March 21st *New York Times* article raises the question, "Will the Coronavirus Threaten Our Food"(**2**), noting supply chain vulnerabilities.

To understand what is happening today, and why store shelves can be bare even in big agricultural areas, we need to understand how we got here. It wasn't so long ago, when people in the United States could tell the season of the year by what food was on their plates (strawberries and asparagus in spring, tomatoes, beans, and corn in summer, sweet potatoes and apples in the fall, and preserved foods in the winter). Even as recently as 80 years ago, our food system was local and farming activity dominated the landscape.

In 1940, if you lived on a farm, you grew a large garden and you "put up" food for the winter. If you lived in a city, there were markets, street vendors, and "mom and pop" shops. By the way, there were 500,000 mom and pop stores in the U.S. We were connected to the land and water because of our need for local food, if nothing else. We either produced the food ourselves or knew the suppliers who did. What happened?

Local food systems in the 20th century

Early in the 20th century, food stores began to grow bigger, provide more variety, and sell cheaper and cleaner food. A&P was one of the first. It standardized both store layouts and product offerings. It operated its own network of warehouses and delivery trucks, bypassing the middle men. Then many other food stores followed the same business plan.

Another huge change in our food system in the 20th century was the move from consumption of unprocessed foods to processed foods. National food companies took advantage of American's fascination with TV in the 1960s to introduce them to thousands of processed foods.

How wonderful was it to be able to sit in front of the TV with a TV dinner and enjoy *Father Knows Best*, *Andy Griffin*, *The Beverly Hillbillies*. This was much better than growing food in the garden and having to wash it and cook it on the stove. And besides, we were told that Wonder Bread helps build strong bodies 12 ways And Twinkies have a shelf life of . . .forever! What could be better? We believed in progress and this was progress.

By the early 1970s, USDA Secretary of Agriculture Earl Butz told farmers "to scale up or get out". New technology, hybrid crops, better fertilizers, allowed farmers to produce more with less. Farms became very efficient and highly productive industrial operations. As farms became more specialized, the number of commodities per farm dropped from 5 to just over one per farm by the end of the century. However, if that commodity did poorly for a year or two, a farmer was at risk of losing the farm.

The final big change in the 20th century was the development of trade agreements which allowed corporate farm monopolies in third world nations (with low labor costs) to have access to our rich retail markets. For consumers, the advantage of trade agreements was that it brought to their local stores the least expensive prices and a wide variety of options year round, like strawberries in January. However, it forced U.S. farmers to compete with multi-national corporations whose workers make a fraction of the wages that U.S. farmers have to pay.

And each time there was a new innovation, Americans moved further from a local food system model. The 500,000 mom and pop stores,

each with local farms and value-added producers who supplied them, were reduced to 20,000 supermarkets with tens of thousands of items for sale in each store, much of it processed and packaged for long store shelf life by the end of the 20th century.(**3**)

As a result of all of the changes in the industry, the number farms and new farmers has declined dramatically in the last 50 years. The percentage of farmers between 25 and 35 years of age went from 32% to 5% from 1890 to 2007. However, the percentage of farmers 65+ went from 11% to 30% over the same period.(**4**)

But there are other reasons to be concerned about our food system besides the loss of farms and the lack of young farmers. Climate change is impacting food production around the globe The U.S. Department of Agriculture is predicting changes in weather patterns during this century that will impact food production, including the change in maximum number of consecutive dry days. In the West and Texas, they could see the number of consecutive dry days increase by roughly 10 to 20 days.

It is interesting to note that the Federal Reserve Bank of St. Louis and the Board of Governors of the Federal Reserve System (**5**) have become strong advocates for regional food systems and they even call it a matter of national security. In the Report entitled, "Harvesting Opportunity", they say that "Given the tremendous upheavals in the nation and the world today, farm advocates, state and federal agencies, and Congress are also viewing U.S. agriculture as a national security priority given a rising world population and what could be America's vulnerability in food production".

Emerging trends in the 21st century

By the turn of the century, consumers began to seek out locally sourced foods and it has become the hottest trend in upscale restaurants. The number of farmers markets has increased dramatically and even some chain food stores have begun to feature local foods in season. Future Farmers of America memberships have been growing as more students have been asking for classes in farming. Of note is that most of the students who are enrolling did not grow up on a farm.

According a 2018 survey by the National Young Farmers Coalition, 61% of new farmers cannot find affordable farmland for sale and 54% say that the purchase price of farmland exceeds the value of what they can produce. Recognizing that land trusts own or hold easements on over 85 million acres in the United States, the National Young Farmers Coalition has reached out to lands trusts asking for their help in new farmers getting access to farmland. With all the lands now owned or maintained by land trusts in the U.S. they can be part of the solution to food insecurity, especially during crises such as a pandemic. At the Land Trust Alliance webinar with which I participated in May, two other land trusts highlighted their successes in engaging people in food production and providing opportunities on their land for beginning farmers to get started.

In the webinar, I noted that from its beginning ACLT has made its land available to farmers to continue the historic landscape mosaic in rural Calvert County. Double Oak farm has drawn many people to the land trust and volunteers are working hard during this pandemic to supply those in need with healthy locally-produced food.

Everybody eats! Double Oak farm is a great example of how a land trust can help its community and show how to produce food without harming the ecosystem that we all cherish.

Greg Bowen
Executive Director

Literature Cited

1 "What the Coronavirus in China Shows Us About Food System Resilience", by Erin Biehl, Feb. 28, 2020

2 ***https://www.nytimes.com/2020/03/31/opinion/coronavirus-food-supply.html***

3 Source: A&P: The Story of the Great Atlantic & Pacific Tea Company

4 ***https://www.youngfarmers.org/wp-content/uploads/2017/08/Building_A_Future_With_Farmers.pdf***

5 ***https://www.stlouisfed.org/community-development/publications/harvesting-opportunity***

Top: Charlie Kreizenbeck. Chesapeake Conservation Corp Intern managing the Farm.

Bottom: Potatoes Growing on Double Oak Farm.

Chinese Lespedeza at Double Oak Farm

ACLT's Double Oak Farm has a problem with an invasive species known as Chinese lespedeza. For a number of years we have been trying to eradicate it by repeated mowing, and yet it prevails in our meadows and fields, over-taking native grasses. An integrated approach of using controlled burning and herbicide application has been shown to be most effective at controlling Chinese lespedeza, and while ACLT plans to utilize this method in the skinny back field at Double Oak, it will not be feasible to use in other areas.

Spraying close to the sustainable agriculture garden and food forest at Double Oak Farm could have potentially adverse effects on organic fruit and vegetable production due to drift caused by wind. Additionally, ACLT's *Master Land Management Plan* calls for following two overarching goals. The first is that "ACLT should utilize a precautionary approach that is derived from Principle 6 of the Forest Stewardship Council's U.S. Forest Management Standard which states: Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and integrity of the forest." It goes on to say that extreme caution should be taken (given scientific uncertainty) where land disturbance and the application of toxicants are involved. The intent of this principle is to maximize positive environmental impacts while minimizing adverse environmental impacts. For these two reasons, ACLT looks to explore different ways in which Chinese lespedeza can be organically controlled. Methods that can be investigated include steam weeding, vinegar (or acetic acid) application, cover cropping, and solarization through the use of plastic.

Similar control methods are used to combat *Cynodon dactylon* or Bermuda grass as it's commonly called. Another common name for this species of this perennial grass is "wiregrass" due to it's long above ground stems which can spread out to around two feet long and can easily overwhelm and choke out native grasses. Invasives like wiregrass and lespedeza can of course be hand pulled every two weeks as they come up. However, depending on the size of your area this can be overly laborious and impractical.

Another manual method for weed repression is flame or steam weeding. If you own a propane flame weeder or a larger, more serious flame thrower this can be great fun and an exhilarating way to release frustration towards persistent weeds! The North Carolina State Extension office recommends that you do not, however, fry the weeds to a crisp; "When using a flame weeder you do not need to actually burn the weeds. A brief exposure to the flame will heat the water inside the plant without flames". A disappointing sentiment for most people's inner child, but a more responsible and adult way of dealing with pesky sidewalk or driveway weeds. The leaf tissues will collapse very rapidly after treatment.

Organic herbicide alternatives to mass produced inorganic weed killers are unfortunately less effective in killing the roots of herbaceous weeds and therefore need to be applied repeatedly in order to kill the plant (either sprayed or brushed on every two weeks, according to their label). These alternatives can also be costly in comparison with more commercially available liquid weed killers. The University of Maryland Extension office suggests acetic acid (or concentrated vinegar) to be applied as a spray for alternative weed control. However, as an article on this alternative notes, "Herbicidal vinegar is stronger than household vinegar: the acetic acid concentration for herbicidal use is 10 -20%, compared to 5% acetic acid"[1]. Commercially available acetic acid works best for broadleaf weeds and should be used with caution as it can cause irritation to the skin and eyes. More information may be found on the University of Maryland Extension website. On plants like lespedeza, which work their way into our fields and meadows alongside native species, this method may require a more broad spectrum of spraying, rather than a spot treatment, which would make re-seeding necessary in the future. The other downside is that it may not damage the seed-bank, causing an eventual resurgence of the invasive.

Another method is solarization, with which the ACLT has combated invasive *Phragmites australis* plants in the Parkers Creek marsh. By using black plastic we have effectively smothered large patches of phragmites on the creek banks. The ACLT has found the greatest success with black plastic, which does not let the light of the sun through and heats up the plant, smothering and killing it. Perhaps this is another option for small patches of lespedeza on the Double Oak property.

In the control of wiregrass there has been great success with cover cropping, which is the systematic planting of various species of ground cover such as clover and vetch. These plants are allowed to grow thick and out-compete undesirable species in the field. Cover cropping is becoming a common practice among farmers to help mitigate weed growth and improve the soil in which they are planting. Perhaps with the right combination, the ACLT could continue to improve the soil of the old tobacco farm that is the Double Oak property while simultaneously out-competing the non-native species. These cover-crops could then be mowed or tilled under to provide a fertile planting bed for native species of grass, which would aid in the development of a Double Oak meadow. This meadow would help provide habitat for songbirds and other wildlife, and act as a demonstration for similar projects across the county.

Native species are important to local pollinators and wildlife and should be left intact when possible, and ACLT is committed to best environmental practices. These are just a few of the ways we are thinking about this problem in the future, we hope to experiment in small patches throughout the Double Oak property to find one that works best and has limited environmental consequence. What are your thoughts on this? Have you had any experience with Chinese Lespedeza? If so, we'd appreciate any suggestions you may have.

Charlie Kreizenbeck
Chesapeake Conservation
Corps Intern

Check us out on Facebook.
https://www.facebook.com/AmericanChestnutLandTrust/

A Call to Action in Land Conservation

Andrew Bowman, president and CEO of the Land Trust Alliance.

On the heels of more concerning reports regarding the fragile state of earth's biodiversity and the worsening impacts of climate change coming to light over the past year, a plan of action and a source of hope have also emerged. Andrew Bowman, President and CEO of the Land Trust Alliance, announced the start of an ambitious yet solid campaign during his keynote address at the National Land Conservation Rally in North Carolina last fall. In what he has termed the New Decade Challenge, land trusts and their partners are being called upon to preserve as much land in the next ten years as has already been preserved in the last thirty. In other words, we must increase from an average of 1 million acres preserved a year to 10 million acres a year by 2030. Though this may seem like a tall order, land preservation is needed more than ever amidst the even greater challenges we face resulting from widespread development, biodiversity loss, and climate change.

In his address, Bowman cited sobering statistics on the loss of biodiversity around the world and the sad consequences we are seeing from unsustainable development and climate change. With over a million species of plants and animals at risk of extinction worldwide and 29% of the total bird population lost in the U.S. alone since 1970, we are facing a biodiversity crisis. Bowman also described the urgent need for steps to be taken to slow the disastrous effects of climate change before it is too late. The current aim has been to maintain efforts to prevent the global mean temperature increase from exceeding 2.0 degrees C, but compelling evidence is emerging that suggests not letting this increase exceed 1.5 degrees will be necessary in order to prevent catastrophic impact. To accomplish this, greenhouse gas emissions must be cut by half before we reach 2030 and commitment needs to increase fivefold according to the UN Intergovernmental Panel on Climate Change and the 2019 UN Climate Action Summit.

A large part of both biodiversity loss and accelerating climate change is due to the deforestation and loss of wildlands in the process of development. The Center for American Progress states that from 2001 to 2017, development has increased by more than 24 million acres across the continental U.S.; that's about a football field of natural land converted every 30 seconds. Most of the land that is being developed is privately-owned, which is exactly the type of lands that land trusts work to save. It is clear to see the important role that land trusts play in protecting these lands and how a new commitment to action is needed now more than ever.

By realizing the gravity of our current situation, the challenge to preserve 10 million more acres a year by 2030 suddenly comes into perspective. The good news is that land trusts can go a long way in achieving this goal to protect biodiversity and combat climate change. In preserving natural lands that offer ecosystem services and act as carbon sinks, as well as by implementing beneficial

(Continued on page 10)

Land Manager's Corner

New Hope for Restoring an Old Forest Giant

While very few of us have ever gotten to see the chestnut-filled forests that were the norm a century ago, we've certainly heard plenty about them—and for good reason. The American chestnut tree played a huge role in the economy and the ecosystem. As a prevalent canopy tree, with a tall straight trunk of rot-resistant wood, it was used for everything from log cabins and furniture to telephone poles and railroad ties. Its ability to quickly re-grow from cut stumps further increased its value and it is thought that it may have been the most commonly cut tree species in American in the early 1900's. Ecologically speaking, the American chestnut provided a large and dependable food source for many species of wildlife. Unlike oaks, chestnuts produced mast every year and the fact that they didn't flower until June meant that their buds were not in danger of being impacted by a late-season frost which results in diminished fruit production in some other native species that flower earlier in the year (***https://www.americanforests.org/magazine/article/revival-of-the-american-chestnut/***). Of course humans ate the plentiful nut as well and it was an important source of income for farmers in the region who could collect and sell them or use them to fatten their hogs (Popkin, 2020).

Before the introduction of *Cryphonectria parasitica*, the fungus that causes chestnut blight, it was estimated that there were 4 billion mature chestnut trees in the forests of the eastern U.S. (Detwiler, 1915). After surviving for 40 million years, the entire species was functionally extinct within just 40 years of the disease being noticed in the U.S. in 1904, though research suggests the fungus may have been brought over on Japanese chestnut trees as early as 1876 (Anagnostakis, 1987; Anagnostakis and Hillman, 1992). Knowing the important role the American chestnut played in the economy and the environment, it's no wonder there is so much interest in efforts to restore this impressive forest giant. Work to create blight resistant American chestnuts have been underway for decades, but could restoring the chestnut-dominated forests of our ancestors be a real possibility in the not-so-distant future?

Today, there are two main methods that are being used to develop potentially blight-resistant trees. The American Chestnut Foundation's (TACF) breeding program is probably the most well-known. For 30 years, TACF has selectively bred American chestnuts with Chinese chestnuts to generate a hybrid tree species that retains the growth form and ecological function of the American chestnut but contains the blight resistance of the Chinese chestnut. The goal is to dilute the gene pool so that ultimately, trees contain as much of the American chestnut genome as possible while still exhibiting blight resistance. TACF increases resistance with each generation by breeding trees with the most resistance and then identifying the most blight resistant progeny. According the TACF's website, they have completed three generations and

Map of the historic American chestnut range. Photo from The American Chestnut Foundation, Carolinas chapter website: ***https://www.acf.org/nc-sc/photos/american-chestnut-blight/***

"selected hybrids have inherited between 60% and 90% of their genome from American chestnut and exhibit blight resistance on a spectrum that is intermediate between American chestnut and Chinese chestnut" (***https://www.acf.org/science-strategies/tree-breeding/***).

A perhaps lesser-known effort that has been underway for almost the same amount of time is the transgenic work being completed by two tree geneticists at the State University of New York's College of Environmental Science and Forestry. Bill Powell and Chuck Maynard have been working on a separate but parallel effort to genetically engineer an American chestnut tree that is resistant to the chestnut blight. While equally challenging and time consuming, genetic engineering allows for more control over selecting for blight resistance rather than relying on the random mixing of genes that occurs during tradition breeding programs like the one being undertaken at TACF. One of the first thoughts was to simply take the gene that expressed resistance to the blight in Chinese chestnut trees and insert this gene into the American chestnut genome. Of course, the answer wasn't that simple as they found that at

least 6 different genes were involved in creating blight resistance in Chinese chestnuts (Popkin, 2020).

According to a recent New York Times article, Powell also spent a few years researching an antimicrobial compound based on a frog gene, but ultimately decided to abandon that path because he feared a negative response from the public over a tree that had been altered to include animal genes. Finally, Powell learned of a gene in wheat that produces the enzyme oxalate oxidase (OxO), an enzyme that would prove very useful in allowing chestnut trees to survive after being infected by chestnut blight (Popkin, 2020).

The *Cryphonectria parasitica* fungus enters a tree through wounds in the tree's outer bark. Once the fungus becomes established in the tree, it generates oxalic acid which results in an acidic environment that weakens plant cell walls by decreasing lignin content and increasing cellulose content within the cells and makes them more vulnerable to being infected and killed by other enzymes associated with the blight fungus. As the fungal infection progresses, living cells in the cambium are killed, eventually girdling the tree and preventing the flow of water and nutrients which ultimately results in the death of the above-ground portion of the tree (Anagnostakis, 2000; Dutton and Evans 1996; Welch et al., 2007). The OxO enzyme catalyzes the degradation of the oxalic acid that is caused by the chestnut blight infection and breaks it down into carbon dioxide and hydrogen peroxide, allowing the tree cells to survive despite a fungal infection and enabling the tree to show resistance to the disease (Welch et al., 2007).

Image of Chestnut blight on an American chestnut tree. Image from the National Park Service: ***https://www.nps.gov/articles/american-chestnuts-in-the-capital-region.htm***

The level of resistance shown by American chestnut trees with the wheat gene that produces the OxO gene has made these transgenic trees the most promising hope for the possibility of a blight resistant American chestnut tree. However, it may be a few years still until there is a chance of them being planted in forests that they once dominated. Because the OxO gene was transported into the American chestnut genome using an Agrobacterium, the new transgenic tree is regulated by the USDA. Additionally, the EPA interprets the enzyme to be acting as a pesticide because it is impacting the spread of a fungal disease, so it is also under their regulatory review. And in case review by two federal agencies wasn't enough, it is also be voluntarily submitted for review by the FDA since its nuts will likely be consumed by humans (National Academies of Sciences, Engineering, and Medicine, 2019; Popkin, 2020). Navigating the regulatory pathway for 3 federal agencies will be yet another hurdle in the long and challenging process of trying to restore the American chestnut tree.

The trees resulting from the traditional breeding efforts undertaken by TACF will not have to go through review by any of these federal agencies (National Academies of Sciences, Engineering, and Medicine, 2019). If the transgenic trees from the SUNY are approved for use by the USDA, EPA, and FDA, they will be integrated into TACF's breeding program to combine the resistance mechanisms achieved by both programs and to increase the native gene pool of chestnut trees that carry the wheat gene and will ultimately be planted in the wild.

The fungus that causes chestnut blight affects the above ground portion of the tree but cannot survive in the soil and therefore does not affect the health of the roots themselves. This enables infected chestnut trees to re-sprout after the above ground portion of the tree is killed by the blight. The *Cryphonectria parasitica* fungus cannot survive in the soil because microorganisms found in the soil compete with the fungus. Unfortunately, one of these microorganisms that can be found in the soil is *Phytophthora cinnamomi*, which causes root rot (also known as ink rot disease) in chestnut trees in warmer climates. *P. cinnamomi* historically impacted chestnut trees in the southern portion of the U.S., but as the climate changes and temperatures rise, the areas where the pathogen can survive are expanding northward and are expected to reach New England by 2080. So, while *C. parasitica* kills the aboveground portion of the tree, *P. cinnamomi* kills the below ground portion of the tree. To address this, TACF has incorporated breeding to select for *P. cinnamomi* resistance into its breeding program and aims to breed trees that show resistance to the root rot pathogen with transgenic or blight-resistant hybrids to create trees that exhibit resistance to both diseases (***https://www.acf.org/science-strategies/tree-breeding/***).

While the soil may host the root rot pathogen, it can successfully fight off the fungus that causes chestnut blight. Due to this, a technique called mudpacking was developed by TACF's pathologist Dr. Fred Hebard and has been used to increase the lifespan of chestnut trees that have been infected by the chestnut blight. Mudpacking involves gathering soil from within 10

feet of the tree and adding enough water to turn it into a sticky mud. The mud is then applied around the entire stem or trunk wherever a chestnut canker is present. The mud should extend at least one foot beyond the canker in both directions to ensure the canker can't spread beyond the mud before the soil microorganisms have a chance to fight the fungus. The entire area should then be wrapped with shrink wrap to keep the soil moist and hold the mixture on the tree. The wrapped area should be checked monthly to ensure the canker has not spread beyond the wrapped area and to ensure the mud is still moist (***https://www.acf.org/ma-ri/the-project/mudpacking-cankers/***).

While this will not cure the chestnut tree, it will allow the tree to fight the blight at the location of each canker and reduce the chances of the blight girdling the tree. In order for this method to keep the tree alive, it is important to treat each canker (***https://www.acf.org/ma-ri/the-project/mudpacking-cankers/***). This is hard to do on large trees where some cankers may be inaccessible; however, we are going to attempt to use mudpacking on cankers on the few remaining chestnut trees on ACLT property when possible to prolong the life of these few specimen trees that have far outlasted all of their relatives.

It seems that a blight-resistant American chestnut may finally be within reach, but this brings about the question of whether this new American chestnut will regain its role as a dominant canopy species. In its absence, this niche has been filled by oaks, hickories, and maples throughout much of the Appalachian region and also by tulip poplars and beeches in the Southern Maryland region. Oaks can also harbor the chestnut blight fungus and while it has much less of a detrimental effect on them as a whole, oaks have helped sustain the fungus while the American chestnut has largely been absent from our forests. With the persistent *C. parasitica* still present in the ecosystem, a resistant American chestnut is the only way to bring back this forest giant. Now, there is more hope than ever, that someday soon we will see transgenic and hybrid American chestnut trees that are able to fight off the fungus and survive in the complex forest ecosystems that they once dominated.

Namesake American Chestnut tree with the main trunk lying on ground on the right and smaller trunk still standing.

Autumn Phillips-Lewis
Land Manager

Works Cited:

The American Chestnut Foundation. "Breeding for Blight Resistance". <***https://www.acf.org/science-strategies/tree-breeding***/>. Accessed May 18, 2020.

The American Chestnut Foundation, Massachusetts/Rhode Island chapter. "Mudpacking". <***https://www.acf.org/ma-ri/the-project/mudpacking-cankers***/>. Accessed May 18, 2020.

Anagnostakis, S.L. 1987. Chestnut blight: The classical problem of an introduced pathogen. Mycologia 79(1):23-37.

Anagnostakis, S.L. 2000. Revitalization of the majestic chestnut: Chestnut blight disease. APSnet Feature. <***https://www.apsnet.org/edcenter/apsnetfeatures/Pages/ChestnutBlightDisease.aspx***. >Accessed May 18, 2020.

Anagnostakis, S.L., ad B. Hillman. 1992. Evolution of the chestnut tree and its blight. Arnoldia 52(2):2-10.

Detwiler, S. 1915. The American chestnut tree. American Forestry 21(262):957-960.

Dutton, M.V., and C.S. Evans. 1996. Oxalate production by fungi: Its role in pathogenicity and ecology in the soil environment. Canadian Journal of Microbiology 42(9):881-895.

Horton, T. 2010. "Revival of the American Chestnut". American Forest. <***https://www.americanforests.org/magazine/article/revival-of-the-american-chestnut***/>

National Academies of Sciences, Engineering, and Medicine. 2019. Forest Health and Biotechnology: Possibilities and Considerations. Washington, DC: The National Academies Press. https://doi.org/10.17226/25221.

Popkin, G. April 2020. "Can Genetic Engineering Bring Back the American Chestnut?". The New York Times Magazine.

Welch, A.J., A.J. Stipanovic, C.A. Maynard, and W.A. Powell. 2007. The effects of oxalic acid on transgenic Castanea dentata callus tissue expressing oxalate oxidase. Plant Science 172 (3):488-496.

(CONTINUED FROM PAGE 6)
land management practices, land trusts can make a significant difference. A study from the Proceedings of the National Academy of Sciences found that the preservation and sustainable management of natural and working lands for carbon sequestration can contribute up to 37% of the greenhouse gas emission reductions needed to prevent the global mean temperature increase from exceeding 2.0 degrees C by 2030. An additional study conducted in partnership with The Nature Conservancy further edifies the value that land trusts can offer by concluding that nationwide natural climate solutions can remove up to 21% of yearly carbon pollution in the U.S., the equivalent of that produced by all U.S. cars and light trucks (approximately 263 million vehicles). Other organizations and scientists hold that making full use of natural means to sequester carbon can contribute to the reduction of an even greater percentage, closer to a third of all emissions.

It is clear that land trusts and other conservation groups can play an important role in the climate change solution, but we have to make a concerted effort in order to achieve these targets. Bowman continues on to stress the fact that our communities must strive together to preserve and protect from development a million acres of forestland and grassland a year, and manage the 25 million acres already preserved by land trusts in the best way possible to offset carbon emissions. We won't be able to make these changes overnight, but the New Decade Challenge is designed to bring land trusts up to speed to meet the challenges we are already facing. By stepping up action over the next ten years, we can work to maximize all that the land preservation community has to offer in the global fight to slow biodiversity loss and climate change.

Rachel Delbo
Chesapeake Conservation Corps Intern

Thank you for your support ...

New Members

ACLT would like to welcome the following new members since the Spring 2020 ACLT would like to welcome the following new members since the Spring 2020 Newsletter:

Fernando Argeels
Madeleine Blake
Allison Burnett
Robert Butts
Debbie & Gregory Carr
Denis Faherty
Meg Faller
Forgeng Family
Scott Galczynski & Lora Harris
Melissa Gray
David Hartsig
Carrie LeFever
Rebecca McGuire
Christine Montague
Christina Nigro
Mary Anna Phillips
Lisa Railey
Carrie & Brian Raines
Eric Rome
Cynthia Seymour
Randall Soileau
Ted Staples
Michele Tucker
Ronald Wilson

Memorial Donations

Thank you to the following members, who made a memorial contribution since our last newsletter:

In memory of **Joseph Baldo**:
Jane Head

In memory of **Tina Boesz**:
Patricia Peak

In memory of **Sally Douglas**:
Nancy McK. Smith

In memory of **Thomas "Summers" Gwynn III**:
Teresa & Guillermo Arguero
Michelle Garske
Phillip Holmes
Marvin Weiner

In memory of **Jeffrey Klapper**:
Anonymous
Anonymous
Greg & Tamea Bowen
Walter & Mary Ellen Boynton
Elizabeth Deutch
Glenn & Karen Edgecombe
Becky & Paul Flanagan
Lonnie & Jon Frank
Marcia & Gary Hammett
Jason Hittleman
John & Patricia Hofmann
Carla & David Hostetter
Barbee & Bruce Hudson
Jeanette Kaufmann
Barbara Klapper
Chrissy McNulty
Mary Jane Nace
Cheryl Place
Robert Poling
Teresa Scarpace
Trish Weaver
Nancy Zinn

In memory of **Michael Tomassoni:**
Matthew Sander
Tom Tyler & Caroline Costle
The EPA Office of Site Remediation Enforcement

In Honor of Donations

Thank you to the following members, who made an "in honor of" contribution since our last newsletter:

In honor of **Mary Ellen Boynton**:
Sarah & Jessica Boynton

In honor of **Marcy Damon**:
James Cummings

In honor of **Randi & Peter Vogt:**
Nancy McK. Smith

General Contributions and Designated Gifts

Donations received through the Virtual 5K

*Welcome to our new members, who joined through the 5K.
Richard & Guenever Aldrich
Laura Amin
Dawn & Steve Balinski
Joy Bartholomew & Mark Edmondson
Tamea & Greg Bowen
Allison Burnett
Sandy Burton

Jaime Cantlon*
Christa Conant
Megan Connell*
Melanee Derenzy
Timothy Dow
Jamie Elliott*
Holly Fallica
David & Ellen Farr
Bob Field
Sandra Foley
Deborah Francisco*
Scott Galczynski & Lora Harris
Morgan Gates
Miriam & Robert Gholl
Stacy Gleason
Sheri Hill*
Kathy Horak
Janis Hurst
BL Johnston
Anne Jones*
Patricia Jones*
Jeanette Kaufmann & Rich Noonan
John Koelbel
Bruce & Liz Laher
Ann Lange*
Keith Linville
John Little
Gary & Sandra Loew
Vanessa Marshall
Katy Mayer*
Pamela-Jeanne Moran
Christy and Bryan Mullins*
Pat Newell
Susan Noble*
Beth & Ralph Nolletti*
Elizabeth Orlandi
Bobby Pantuso*
Lauren Pitts*
Leanne Powers
Sam & Brenna Prestidge
Sheri Price
Mark Rinaldi*
Christopher Roettgen
Jake Rupard
Colton Smith*
Rebekah Stefanic*
Katherine Sullivan*
Guy Toscano
Steve Tracy*
Robyn Truslow
Amy Werking
Noah Wood
John Yoe*

General Donations

Kevin Achorn
John Borrazzo
Denise Breitburg & Mark Smith
Larry & Joanne Chaney
Jessica & Ty Clark
Annetta DePompa
Fisher Foundation
Miriam & Robert Gholl
Ms. Sandra Jarrett
David Rice
Marc Rodriguez
Beth Rogers
Elaine Strong
Paul Vetterle
Keith & Geetha Waehrer

In Honor of Earth Day

Michael Cunningham

Holly Hill Donations

Thank you to the following members who made a donation to the Holly Hill campaign since our last newsletter:
Fran Armstrong
Greg & Tamea Bowen
Denise Breitburg & Mark Smith
Ron & Kathy Klauda
Robyn, Eric & Wesley Truslow

Spring Appeal

Jerry Adams & Harriet Yaffe
Larry Bostian & Cynthia Allen
Karen Anderson
Phillip & Betty Anderson
Joy Bartholomew & Mark Edmondson
Stanley & Barbara Benning
James Borell & Jo Anne Longhill
Greg & Tamea Bowen
Robert Boxwell
Walter & Mary Ellen Boynton
Josef & Gloria Brown
Margot Caldwell
Patricia Childs
Jessica & Ty Clark
Gary Clarke
Donald & Judith Dahmann
Michael Duffy &
Margaret McCartney-Duffy.
Pam Dvorsky
Glenn & Karen Edgecombe
Kathy & Mike Ellwood
David & Ellen Farr
Tony Fazio
Jim & Judy Ferris
Bob Field
Carl Fleischhauer & Paula Johnson
Bernie Fowler
Jan Greene
Patrick & Abbey Griffin
Gretchen Hambright
Jane Head
John & Patricia Hofmann
Robert Jaeger
BL Johnston & Robert Keisling
Troy Juliar
Victor Kennedy &
Deborah Coffin Kennedy
Nancy Klapper
Ronald & Kathy Klauda
Bruce & Liz Laher
Joyce Loveless
Frederick & Marina Lowther
Cathy Manley
Jacques & Kennie Mauche
Bruce McDonald
Penny Moran
Yvonne Navalaney
Steve Nelson
Raymon & Phyllis Noble
Edwin & Monica Noell
Cheryl Place
Austin & Pam Platt
Jeffery & Michele Quesenberry
Janice & Chuck Rodgers
Campbell Scribner
Bill Seabrook & Gay Ludington
Suzanne & Craig Shelden
Penn Staples
Peter & Jennie Stathis
Stephen Straka
Sharon Stuart
Joseph Turner & Leslie Starr
Peter & Randi Vogt
Fay Walton
Harry & Robin Wedewer
Michael Young

American Chestnut Land Trust, Inc.
Post Office Box 2363
Prince Frederick, MD 20678

NONPROFIT
STANDARD MAIL
PERMIT NO.
548
PRINCE FREDERICK
MD

Why does it say "Or Current Resident" in my address?
In order to use your donations as efficiently as possible, we use USPS Bulk Mail and this statement is now required in the address. Thank you for understanding!

Come Join Us!

Detach and Mail to: The American Chestnut Land Trust, Inc., P.O. Box 2363, Prince Frederick, MD 20678

Name _____ **e-mail** _____

Address _____

_____

Phone_____ **I (we) learned about ACLT from** _____

Regular Membership

___ Land Saver—$35.00

___ Land Protector—$60.00

___ Land Conservator—$150.00

___ Habitat Protector—$500.00

___ Trustee of Land—$1000.00

___ Sustaining—$5000.00

Corporate Membership

___ Land Saver Corporate—$150.00

___Land Protector Corporate—$250.00

___ Land Conservator Corporate—$500.00

The American Chestnut Land Trust is a 501 (c) (3) charitable organization. A copy of the current ACLT financial statement is available on request. Requests should be directed to the American Chestnut Land Trust, Inc, P.O. Box 2363, Prince Frederick, MD 20678 or call (410) 414-3400. For the cost of copies and postage, documents and information submitted under the Business Regulation Article of the Annotated Code of Maryland are available from the Secretary of State.