“Who knew Nebraska had so many trees?” I thought when we arrived in Halsey, Nebraska, home of the Charles E. Bessey Nursery. Thousands of mature trees surround the property, their green, leafy majesty so unexpected in the plains—a desert oasis, a verdant outcropping of about 20,000 acres of trees in the surrounding sandhills. The nursery sits on the edge of a 91,000-acre section of Nebraska National Forest and Grasslands. It's a man-made forest, the seedlings for which have been grown at the Bessey Nursery since 1902.

Most of the seedlings for the Upper Big Blue Natural Resources District Conservation Tree Program are also grown here, which is why I’m touring the facility on this glorious autumn day. The nursery annually produces 1.5 million bare root seedlings, which are shipped across the state and region for planting. There’s a wide variety of trees produced, from fir to fruit. Some of the species are familiar, such as Silver Maple and Colorado Blue Spruce, while others are new to me. (Ever heard of a Buffaloberry or Skunkbush Sumac?)

The tour begins with a planting demonstration. A forester steers a John Deere down a bed of slightly raised sand the length of a football field. Another forester rides on a planting apparatus pulled behind, feeding seeds through a hopper. Six rows of seeds are deposited into the sand on each pass and tucked in with protective plastic sheeting. The trees will be harvested when they are still fairly small, so they are able to be planted close together. Sand, as it turns out, is an ideal medium for a nursery operation. The tiny trees can grow quickly if properly irrigated. When it’s time to harvest them, a gentle tug is all that’s required to pull them up with their roots perfectly clean and fully intact—ready to ship and replant. The operation is fed by the Ogallala Aquifer, the vast underwater reservoir that sits a few hundred feet below the surface.

Next to this freshly planted field sits a row of greenhouses filled with hundreds of thousands of pine, spruce, and Douglas Fir trees in containers. I’m a giant as I walk through the center aisle of a greenhouse full of baby fir trees, my...Continued on page 7 >>

(Photos) Richard Gilbert, manager of Bessey Nursery, shows off this year's crop of trees. The nursery supplies trees for the Upper Big Blue NRD as well as other parts of the state and region.

Cadence Marquart examines trees on her family’s acreage in York. The trees were likely grown at Bessey Nursery, as they were purchased through the NRD’s Conservation Tree Program. More on the Marquarts on page 5.
More than 100 people attended the annual Project GROW Winter Workshop hosted by the Upper Big Blue NRD in December. Most attendees were farmers or other ag professionals. Speakers were a diverse group of researchers and practitioners, presenting on a range of topics, from increasing carbon in soil to more accurate irrigation and fertilization practices. (Recordings of these speakers and other materials are available at upperbigblue.org/projectgrow.)

“We were very happy with the turn out and participation of our local ag community,” said Dan Leininger, water conservationist for the Upper Big Blue NRD and event organizer. “Opportunities for professional development are important and we are pleased to be able to provide that for our partners in agriculture.” Leininger was the first speaker of the day, presenting on the Project GROW demonstration fields in York. Leininger discussed the methods used in the fields in 2019, where 160 acres of corn and soybeans were grown with cooperating farmer Scott Gonnerman. To improve soil health, no-till practices were implemented and a mix of cover crops were planted in addition to the cash crops. Manure was also added to increase the microbiotic activity in the soil. These efforts led to a reduction in residual nitrogen.

Dr. Patricio Grassini, associate professor of agronomy at UNL, and Fatima Amor-Tenorio, a post-doctoral student who works with Grassini, presented on their research on irrigation and nitrogen efficiency. They looked at data to benchmark water and fertilizer use across the state to determine where producers were losing money due to overuse of resources without yield increases. They concluded that in Nebraska there is much room for improvement in this area and that achieving high corn yields with relatively small amounts of residual nitrogen is a realistic goal, especially as corn in rotation with soybeans exhibited higher yields with lower nitrogen balance.

Crystal Powers, a research and communication extension specialist with the Nebraska Water Center, followed with a presentation on the nitrogen contamination problem in Nebraska’s groundwater supply. She acknowledged that it is a complicated problem tied into food supply, rural vitality, and health, and suggested Nebraskans need to take action to reduce further nitrate contamination in groundwater. More than a matter of human and environmental health, the excess nitrogen left in fields is a huge economic drain for producers. UNL estimates that 77 percent of fields in the Upper Big Blue NRD in 2018 had 20-40 pounds of excess nitrogen applied, costing individual producers thousands of dollars. She also presented data on the health risks and associated costs involved with nitrogen contamination, including cancers and negative birth outcomes. Some communities in Nebraska are implementing water treatment solutions to remove nitrogen (and associated uranium) at a cost of about $60 per person in a large city up to $650 per person in a smaller town.

The keynote speaker of the day was Keith Berns, no-till farmer and co-owner of Green Cover Seed. Berns compared the activity in soil to the economy of a nation. Carbon, he explained, is the currency of this economy and all supply and demand turn on this one simple element. He also discussed the vital role that microbiota and fungi play in the healthy economy of the soil, as they are involved in plant defense, nutrition, and communication. Conventional tillage, Berns suggests, is highly damaging to the soil as it disrupts the infrastructure provided by these beneficial microorganisms. Berns recommended no-till and cover crop practices to improve the health of a producer’s soil and increase yield while keeping inputs at a minimum.

The final speaker of the day was state climatologist Al Dutcher. Dutcher recapped the wild weather patterns in Nebraska in 2019 and predicted some possible weather outcomes to look for in 2020. He suggested that an elevated risk of flooding will continue through much of the Corn Belt through spring 2020 and that the degree of risk will hinge on precipitation, temperature, frost depth, and storm tracks through the winter months.
Another day of learning is on the horizon, as the Nebraska On-Farm Research Network will hold their 2020 annual results update on February 28 in York at the Holthus Convention Center. This meeting will include a special focus on cover crops and soil health and is jointly sponsored by the USDA-NRCS and the Nebraska On-Farm Research Network. The event will run from 9 a.m. to 4 p.m. and will include lunch. There is no cost to attend, but registration is required. Contact onfarm@uni.edu or (402)624-8030 to register.

The 2020 Project GROW Winter Workshop will be held December 2 and will feature keynote speaker Dr. Jill Clapperton. Clapperton is the principal scientist, founder and owner of Rhizoterra Inc., and is a well-known international lecturer and advocate for practices that promote soil health. She was the Rhizosphere Ecologist for 16 years at Agriculture and Agri-Food Canada’s Lethbridge Research Centre in Lethbridge, Alberta, Canada, before she moved to a ranch in the Bitterroot Valley of western Montana. More information and registration details to follow in fall 2020.

Improving and protecting the quality of drinking water for all residents is the goal of a continuing collaboration between the city of York and the Upper Big Blue Natural Resources District. Their latest effort in the cause is an inventory of all private wells in the Wellhead Protection Area—a region that extends from the ballfield complex on the east to beyond the airport on the west, and north to south encompassing the residential and business sector of York. The area also includes a section of land south of Interstate 80 on Highway 81. The NRD is collecting data about all domestic, livestock, and irrigation wells in this area, both active and abandoned wells, to create an accurate picture of the risks wells may pose to the water system.

Depending on their condition, wells can be a direct conduit for contaminants to enter the city’s drinking water. Mapping well locations will help the city and NRD to better understand how many wells are still in use and if further action is needed to safeguard the water supply. If a number of inactive wells exist in the Wellhead Protection Area, the city may be eligible for additional grant funding that could provide tools like ground penetrating radar for research and services such as well decommissioning.

Unused wells that are improperly sealed can provide an opportunity for pollutants to travel into the aquifer and endanger everyone who consumes water from nearby sources. These wells pose a double danger—children and animals can easily become trapped in them, leading to serious injury or death.

“We would like to hear from everyone who has a well on their property or who thinks they might,” said Marie Krausnick, water department manager. “If you’re not sure, let us come and check it out.”

Complete the York Well Watch Inventory and find other resources on well identification and decommissioning at upperbigblue.org/wellwatch.

The York Well Watch Program is funded by a Source Water Protection Grant from the Nebraska Department of Environment and Energy. Reimbursement for a limited number of compost bins and rain barrels for York residents is also part of this grant funding. To apply for these reimbursement funds, visit upperbigblue.org/projectgrow.
There are hundreds of documented benefits to surrounding yourself, your business, or your community with trees. From physical and mental wellbeing to economic stimulus and crime reduction, planting trees on your property is a simple way to make a big impact. That’s why the Upper Big Blue Natural Resources District is once again offering its popular Conservation Trees Program this year. The program provides residents of the district with the opportunity to buy bulk seedlings at a low cost for spring 2020 planting. For added convenience, this year trees can be ordered via the NRD’s website upperbigblue.org/trees or via the form on the back page.

Last year, the Upper Big Blue NRD sold more than 15,650 trees in the district. While this number may seem large, it is in fact a decrease from previous years. This decline has been experienced by NRDs across the state, as fewer landowners are making this essential investment in their property.

However, the Nebraska Association of Resource Districts predicts that tree sales may increase this year, due to the harsh 2018-19 winter/spring. “Sales in 2020 are expected to rise, as livestock producers look for low-cost options to protect their herds,” stated an article in the organization’s annual report, which noted that livestock with access to tree windbreaks had better survival rates last winter. “With extreme weather events becoming more frequent, livestock producers are re-evaluating the importance of placing strategic trees and shrubs to increase protection for their animals.”

The Conservation Tree Program collects orders between November 1 and March 30. Trees are delivered in April. Some tree species do sell out, so those that want a particular type of tree are encouraged to order early. The Upper Big Blue is offering 50 tree varieties this year, including blooming shrubs such as lilacs and honeysuckle; fruit and nut trees including black cherry and pecan; popular conifer varieties including Colorado Blue Spruce; and deciduous trees including several varieties of willows and maples. The seedlings are $1.18 each and must be ordered in sets of 25. For orders of 150 trees or more, NRD staff will also plant the trees ordered for an additional $1.18 per tree. For these larger orders, NRD staff will provide free consultation services to the property owner to plan where trees will be planted and which varieties to install for best results and to achieve specific goals.
New this year, the Upper Big Blue NRD will also offer small acreage tree packages containing 50 trees for $55. The packages will include ten trees each of five species. The East Package contains Colorado Blue Spruce, Swamp White Oak, Nanking Cherry, and McKenzie Chokeberry. The Wildlife Package features American Plum, Elderberry, Woods Rose, Nanking Cherry, and McKenzie Chokeberry, and the Flowering Package includes Nanking Cherry, Red-Osier Dogwood, Common Lilac, Crabapple, and Caragana.

While there are benefits for everyone to planting more trees, there are extra advantages for ag producers. For those raising livestock, a shelterbelt of trees can increase calf survival by 12 percent, minimize winter stress on the herd by providing a windbreak, and increase feed efficiency. For those with row crops, a shelterbelt is even more beneficial. A field windbreak can increase yields by 12-25 percent (depending on the crop). Trees keep costs down by conserving plant moisture and by reducing wind damage and abrasion of plants.

A shelterbelt near a farmstead can be particularly beneficial in Nebraska, as trees protect the home from noise, dust, and snow drifts, as well as cut down on heating and cooling costs. Those who enjoy hunting and fishing also benefit from additional trees on their property, as more trees means more wildlife. Trees provide habitat and food sources for many animals, as well as shelter from bad weather and cover from predators. Trees planted along waterways means cleaner, more habitable water for fish, as the trees filter pollutants, reduce erosion, and stabilize stream banks.

Those that are considering tree purchase for a school, church, business, or community should note that an increase in trees has been linked to reduced air and water pollution, lower air temperatures, decreased crime, lower stress levels for residents, and increased economic development. For individual property owners, there are economic gains to planting trees as well. As was already mentioned, trees near a home or office building decrease heating and cooling costs. They also add beauty and increase property values.

**SILVOpasture SYNERGY**

“NRD trees are such a great deal!” says Melinda Marquart of Arbor Vitae Acres. She and her husband Andy, a farmer, have planted more than 200 trees on their acreage in York County. When they bought the property in 2007, it was in bad shape, having previously been used as a junk yard. A few scrubbby cedars were all that remained of an existing shelterbelt. Restoring the land through tree planting was a top priority.

“We started by improving the shelterbelt, then added the orchard the next year,” she said, pointing out the peach, plum, apple, and pear trees. “We’ve added a few others over the years,” including a stand of Northern Pecan trees and replacements for trees nibbled down by hungry deer.

“Our yard is a deer highway,” she jokes, noting the sturdy fencing that protects the smaller trees.

The placement of the Northern Pecan trees in their goat pasture is a practice called silvopasture, where trees and livestock work symbiotically and produce more together than they could alone. As the trees mature, they will provide shade for the goats while the goats provide fertilizer for the trees. This will mean a greater harvest of two crops, milk and nuts, for the Marquarts.

The trees they have planted provide many benefits: protection from the elements; food for the family and their goats; and a fun place to explore nature for their four children. “Every little seedling was planted with my own hands. It’s so cool to see them now over 20 feet tall,” said Melinda. “I love trees. I am thankful for the Conservation Tree Program through the NRD. It’s been a great way for us to add trees at a low cost.”

*(above)* The Marquart family surrounded by trees they purchased through the NRD Conservation Tree Program.

*(below)* Two of the Marquart’s dairy goats chow down on the family’s discarded Christmas tree after the holidays.
Spring will be here before we know it, and with it, some potential problems for the trees on your property. Be alert to the health of your trees and contact the NRD or the UNL extension office in your county if you have questions. This is a brief resource on some tree issues we’ve been asked about recently:

**EMERALD ASH BORER**

You’ve probably heard the news about the threat of Emerald Ash Borers, the invasive Asian insect that has been spreading across the United States since 2002 leaving tens of millions of dead trees in its wake. This insect has been found in eastern Nebraska and the infestation is expected to further impact the state in 2020. The Emerald Ash Borer (EAB) is a wood boring insect that is typically ½ inch long and is a metallic green color with a bronze color underneath the wings. These insects tend to attack healthy trees, while most other boring insects will only feed on stressed or dying trees. Signs of EAB infestation include:

- Suckers (new sprouts shooting out from the base of the tree)
- Decline in the tree from the top of the canopy downward
- Small D-shaped exit holes along the trunk and branches
- Increased woodpecker damage
- S-shaped serpentine galleries underneath the bark of the tree

If you notice symptoms of EAB in your ash tree, you should contact your local University of Nebraska-Lincoln Extension Educator. Trees invested with EAB are treatable if the damage is not yet severe. Trees with more than 50 percent canopy loss will likely not recover. There are several treatments available to control EAB infestation on your trees; however, doing the job properly (especially on large trees) may require professional assistance.

More information can be found at [nfs.unl.edu/nebraska-eab](https://nfs.unl.edu/nebraska-eab).

**BAGWORM**

Bagworms are a type of caterpillar that infest conifer trees and can cause death or serious damage. You likely won’t see the caterpillars, but you might notice the two-inch bags covered with bits of needles or leaves that will hang like ornaments from your tree. Each bag can contain 1,000 eggs. When the eggs hatch in May or June, the insect will feed on the tree before developing into ash-colored moths. Adult moths will emerge in September to find a mate and create new egg sacks. For a small tree infestation, you can pick off and destroy the bags before they hatch in May, thus disrupting the life cycle. For a large tree infestation, thoroughly spray foliage with an insecticide while the larvae are small (mid-June). You may need to reapply in July. More information on specific treatments can be found at [nfs.unl.edu](https://nfs.unl.edu).

**PINE WILT**

Pine wilt is a disease that has killed thousands of trees in Nebraska since the mid-1990s. Trees affected by pine wilt initially develop faded gray-green needles, which quickly turn brown. Symptoms develop rapidly in late summer or fall. Some trees die branch by branch, especially from late fall to late spring. Dead needles may remain on the tree for a year or more. Pine wilt is caused by microscopic worm-like organisms (nematodes) that are carried from tree to tree by pine sawyer beetles. Adult beetles land on healthy trees to feed, carrying the nematodes with them. The beetles chew on twigs, creating wounds through which the nematodes enter the trees. Susceptible trees die within a few months following infection.

Scotch pines are highly susceptible to pine wilt and Austrian pine is moderately susceptible. Native pines such as ponderosa and eastern white pine rarely die of the disease. Spruces, firs, junipers and red cedar are not susceptible. Trees with pine wilt cannot be saved. Diseased trees must be destroyed to prevent the beetles from spreading the nematodes to other trees. Healthy, high-value trees can be protected from pine wilt with a trunk injection. The treatment will need to be reapplied every 2-3 years.

Looking for more tree resources? Contact the NRD to request a copy of *Conservation Trees for Nebraska*, a free booklet that contains information on watering, pruning, and long-term tree care, as well as details about 50+ tree varieties that are well suited for growing in Nebraska. You can also find more information at [nrtdtrees.org](http://nrtdtrees.org).

*Information from this article is drawn from Nebraska Forest Service and University of Nebraska resources.*
Best Wishes! DeBuhr and Feather Retire

After more than four decades of service each, two leaders have retired from their roles with the Upper Big Blue NRD. Rod DeBuhr came to work for the NRD in 1979, starting as the water department manager. From 2015 to his retirement in January 2020, he served as the assistant general manager. Much of DeBuhr’s efforts were devoted to research and education to encourage growers to improve irrigation practices for profitability and sustainability.

Ken Feather began his career with the Upper Big Blue NRD in 1977 as an engineering technician. He drafted water plans, issued irrigation permits, inspected dams, and started planting trees. Two years later, Feather moved into the role of forestry department manager, the position he would hold for the next 41 years. In that time, he has planted more than one million trees in the district. Feather will retire in February.

Rod and Ken, thank you for your decades of service to the people of this district!

..."A Visit to Bessey Nursery" continued from page 1

...hand brushing along the treetops of a miniature forest. In addition to the bare root conifer and hardwood seedlings produced here each year, the nursery also grows 750,000-850,000 container trees like these. The tour continues to other nursery fields (the facility has 46 acres of irrigated seed beds), where row upon row of trees are growing in perfectly ordered lines. Richard Gilbert, manager of Bessey Nursery, displays the current stock with pride, showing off the many varieties produced and elaborating on the characteristics of each, pointing out the trees that have the best fall colors or the tastiest fruit and which are most heat- or drought-tolerant. One of the most significant components of Bessey Nursery is not on our tour today. In a nearby building is a large walk-in freezer filled with labeled boxes. There, about 14,000 pounds of tree seeds are kept as a buffer against natural disasters such as fire and blight. This seed bank represents a secure future for Nebraska and the region, as Gilbert and his crew could use it to repopulate forests after catastrophic loss.

Planting trees is a hopeful activity, an investment in our collective future. I return from Bessey Nursery with a few small trees of my own—a maple for my front yard, elderberry and chokeberry for the back. I’ve lived in my house for years, yet putting these trees in the ground is the first time the place really feels like my home—a place where I intend to be, and to invest in, for years to come.
2020 CONSERVATION TREE PROGRAM ORDER FORM

Name ____________________________________________
Address ____________________________________________
City, Zip ____________________________________________
Telephone ____________________________________________
Email ____________________________________________

Each species must be ordered in lots of 25
Sales Tax is calculated by the county in which the order will be picked up.
You will be contacted after April 1 to pick up your order.
The Upper Big Blue NRD will plant orders (within the District’s boundaries) of 150 or more for an additional $1.18/tree. Call 402-362-6601 for assistance creating a planting plan.

RESERVE YOUR SEEDLINGS BY MARCH 30

Small Acreage Packages contain 10 each of five species, 50 trees total, for $55 plus tax—a great value!

<table>
<thead>
<tr>
<th>East Package</th>
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<th>Flowering Package</th>
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<td>Elderberry</td>
<td>Red Osier Dogwood</td>
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<td>Swamp White Oak</td>
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<td>Common Lilac</td>
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<td>Crabapple</td>
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<tr>
<td>McKenzie Chokeberry</td>
<td>McKenzie Chokeberry</td>
<td>Caragana</td>
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Seedling Bundles contain 25 each of a single species and cost $1.18 per tree ($29.50 per bundle) plus tax.

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<thead>
<tr>
<th>Conifers</th>
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<th>Fruit &amp; Nut</th>
<th>Shrubs</th>
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<td>Black Cherry</td>
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<td>Co. Blue Spruce</td>
<td>Hawthorne</td>
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<tr>
<td>Eastern Red Cedar</td>
<td>Peachleaf Willow*</td>
<td>Hazelnut*</td>
<td>Chokeberry</td>
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<td>Jack Pine</td>
<td>Red Maple</td>
<td>Manchurian Apricot</td>
<td>Chokecherry*</td>
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<td>Russian Olive</td>
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<td>Swamp White Oak*</td>
<td>False Indigo*</td>
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<tr>
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<td>Gambel Oak</td>
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*Recommended for use in Riparian Forest Buffer Projects along streams.

Your Cost (Number of Small Acreage Packages Ordered _____ x $55) + (Number of Seedling Bundles Ordered _____ x $29.50) = $ ______

Sales Tax (7.5%—Geneva, David City, York) (7%—Clay Center, Hastings, Osceola, Seward, Wilber) or (5.5%—Aurora) _____/$_______

Your Total = $___________

Please Return with Payment to: Upper Big Blue NRD
319 E 25th St
York, NE 68476

---NRD USE ONLY---

Date Entered _________ Called / Mailed / Online / Walk-in
Date Paid _________ Check # _________ Cash _____ CC ___
Special Instructions ____________________________________________________________