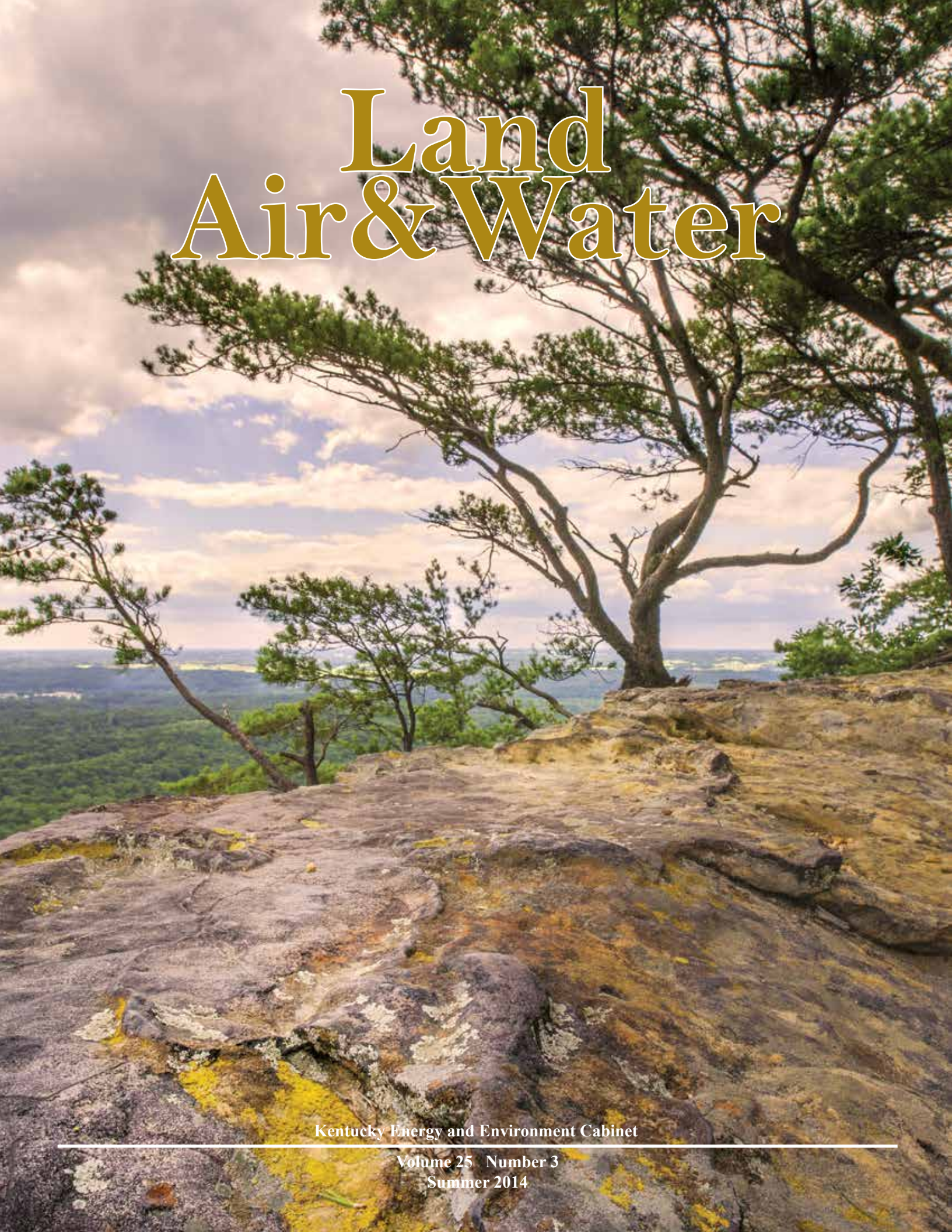

Land Air & Water

Kentucky Energy and Environment Cabinet

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From the Secretary's Desk

On June 2, 2014, the U.S. Environmental Protection Agency (EPA) announced a cornerstone of President Obama's Climate Action Plan—proposed rules for reducing carbon dioxide emissions from existing power plants. Called the Clean Power Plan, the proposed rule establishes state-specific reductions, and as expected, it is generating much discussion and debate within the state and across the country. There is also the usual confusion associated with a large rule-making (the rule alone is 645 pages), and I wanted to use this column as an opportunity to talk about what the rule is proposing and some of our initial thoughts on it.

The EEC will be very engaged on this proposal during the next year—developing comments where applicable and necessary. We have already been engaged with many diverse stakeholders in preliminary discussions regarding the proposal's potential impact on the state.

First, the proposed rule establishes state-specific carbon dioxide emission intensities for existing electricity generation fleets, under the EPA's Clean Air Act Section 111 (d) authority. This is an important aspect of the proposal because we feel EPA has recognized the variations among states in their existing generation fleet and the variations in their opportunities to transition to lower-emitting sources. We had stressed in communications and conversations with the EPA during the last year that unique characteristics of each state should be accounted for, and the EPA listened to us and other states on this issue. That is not to say that meeting the emissions targets will not be a challenge for us, but the proposed rule at least acknowledges that we are a heavy manufacturing state and that low-cost energy is crucial to our economy.

Another important aspect of the proposal is that, while it sets firm requirements for states, it provides multiple pathways for states to comply. Again, this does not mean that we won't have challenges in creating a state plan that will be approved by the EPA, but we are pleased the agency has listened to most states' requests for flexibility.

Energy efficiency, an area where we have had a great deal of success and see tremendous opportunities in the future, can play an important role in compliance with the proposed rule. This is also something we are encouraged to see, and in fact have emphasized in our conversations with EPA.

Ultimately, we will have to put together a plan that can be approved by the EPA and the legislature. But, in the meantime, it's important to remember that this is a *proposed* rule that will be subject to public comment. What the final regulation will look like could be very different. We will continue to emphasize the need for state flexibility. As we delve more deeply into the proposed rule and its supporting technical documents, there is no doubt we will be formulating comments for consideration.

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Our Cover

The view from the top of Pilot Knob in Pilot Knob State Nature Preserve in Powell County. Virginia pines frame the view, while the grayish and orange growths on the sandstone rock in the foreground are types of crustose lichen. Photograph by Barry Howard, Frankfort.

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LEFT: ***Gov. Steve Beshear presents a check to Glasgow Mayor Rhonda Trautman during a press conference announcing the gas-to-energy project.*** Photo courtesy of Alex Slitz, Bowling Green Daily News. ***RIGHT: Glasgow banner.*** Courtesy of the city of Glasgow Facebook. **BELOW*: Landfill gas-to-energy process.*** Graphic provided by KyForward and Jackson Energy

Land of opportunity

Glasgow's methane gas project creates renewable energy source; reduces greenhouse gas emissions

By Eileen Hardy
Department for Energy Development and Independence

It's a weekly ritual—taking the trash to the curb. Once it's on the garbage truck, we give little thought to what happens next…unless, of course, you are among the 15,000 residents of Glasgow, Ky., where their regional landfill recently turned into a valuable resource and new opportunity.

The 192-acre Glasgow Regional Landfill disposes of 100,000 tons of waste per year and recycles 2,500 tons annually, including compost, from 16 Kentucky counties. Along with this valuable and necessary service comes methane gas, a naturally occurring by-product of decaying waste. This odorous gas contains approximately 50 percent methane

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Methane, a potent greenhouse gas

By Kenya Stump
Department for Energy Development and Independence

While it's important to reduce, re-use and recycle as much as you can (see *Reduce, Reuse, Recycle* on Page 10), it's hard to avoid throwing out some trash each week. Household garbage that ends up in a municipal solid waste landfill represents a large source of methane emissions. Landfill gas-to-energy projects can capture roughly 60 percent to 90 percent of the methane emitted from a landfill, depending on system design and effectiveness.

Converting Landfill Gas to Energy

Landfill gas, when not properly controlled and captured, can migrate into groundwater and the atmosphere resulting in the potential for hazardous conditions, odor and other nuisance problems. There are four ways to utilize landfill gas as an energy source:

1. Electricity generation using internal combustion engines, turbines, micro-turbines and fuel cells.
2. Direct use in a boiler, kiln, dryer or other thermal application to offset the use of another fuel.
3. Cogeneration or using the landfill gas to generate both electricity and thermal energy in the form of steam or hot water.

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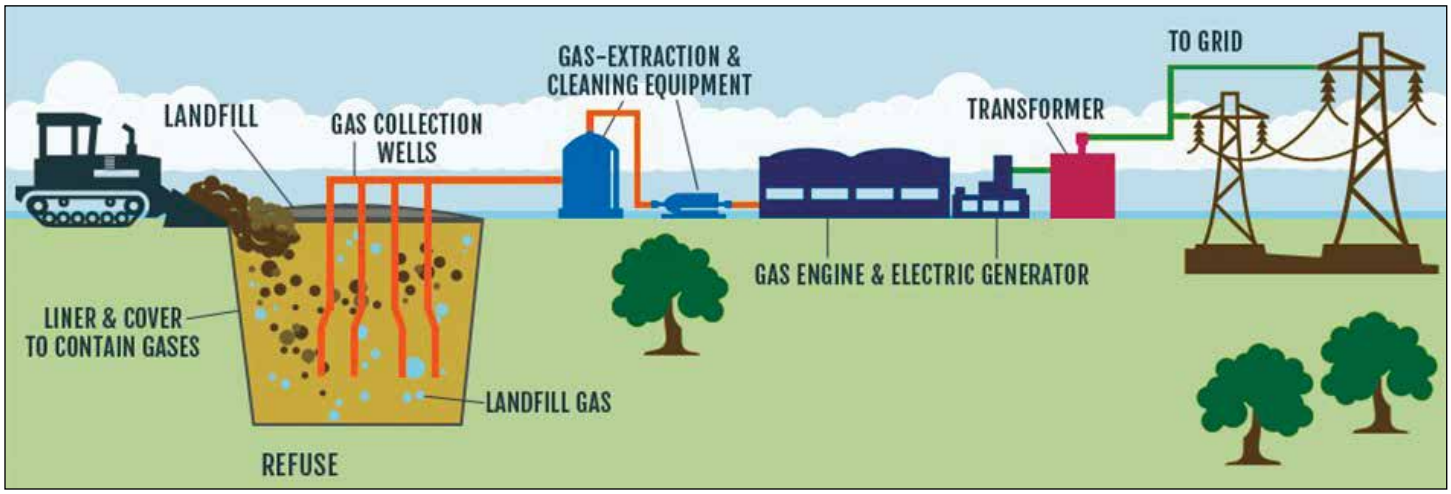
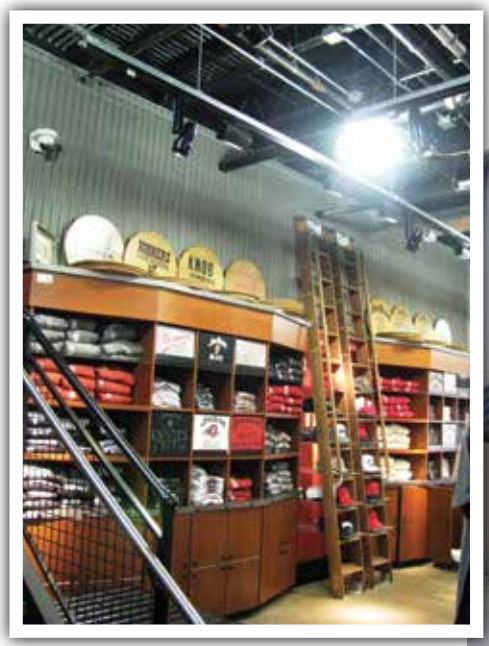
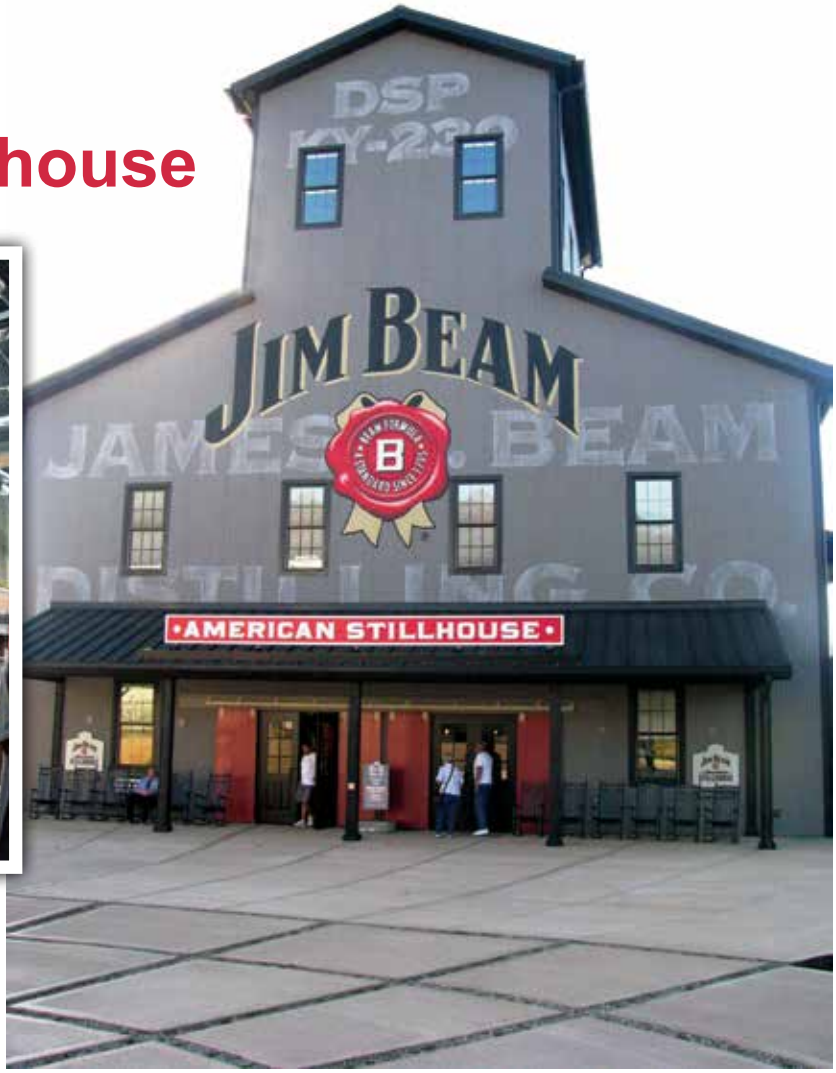


The American Stillhouse





Setting the Example
Bourbon and environmental stewardship

TOP: ***Corregated metal walls, energy-efficient lighting and reclaimed furniture and wood provide beauty and durability and exemplify the environmental mindset of Jim Beam and its employees.***

ABOVE: ***Reclaimed wood was used for the American Stillhouse flooring, saving money during construction.***

RIGHT: ***Concrete with high-ash content was used on the visitors' center grounds that allowed for water drainage into a nearby lake. The concrete pavers are connected by fine gravel and planted with thyme.***
Photos by Mary Jo Harrod

Legendary distillery builds LEED-gold certified visitors' center

By Mary Jo Harrod
Division of Compliance Assistance

Kentucky's Bourbon Trail has become a popular destination for visitors eager to learn about the industry, which has roots that go back more than 200 years in the Commonwealth. One of the oldest distilleries, Jim Beam Distillery, was created in 1787 when Jacob Bohm (later changed to Beam) arrived in central Kentucky with a copper pot still. Since those humble beginnings, Jim Beam has grown immensely and become one of the world's best-selling bourbons. When officials at Jim Beam's Clermont, Ky., facility decided to build a new visitors' center to accommodate the increased crowds, they wanted it to be environmentally friendly, but it also had to tell the distillery's remarkable story.

"We wanted something historic and new melded together," says Jim Noe, plant engineer at Clermont/Booker Noe Operations.

The Jim Beam Clermont facility is a member of Kentucky's voluntary environmental leadership program, KY EXCEL. The American Stillhouse was designed architecturally to fit into its surroundings, but it was also constructed to include features that earned it a LEED-gold certification. LEED

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ABOVE: Planting a tree during an Arbor Day celebration.
RIGHT: Following the proper steps in planting a tree will minimize transplant shock and ensure a healthy tree for years to come.
Cabinet photos

The 20-million-tree challenge

Reforesting Kentucky one tree at a time

By Cindy Schafer
Office of Communications

Have you thought lately about planting a tree? Summer is the perfect time to do your research for selecting the right tree species to plant in the fall or early spring near your home or on your property.

In April, Governor Beshear launched an ambitious initiative to reforest the Commonwealth—to be more specific, 20 million seedlings in 20 years. It's a big quest and one that is certainly attainable if we all pledge to plant just one seedling or tree.

According to the U.S. Census Bureau, in 2012 Kentucky's population was more than 4 million; 1.7 million were actual households. Assuming that half of those households live on property where they can plant one tree, it would boost the challenge numbers up by 850,000 trees. Add to that number the thousands of seedlings planted each year by organizations like the Boy Scouts and Girls Scouts and we are well on our way to achieving the goal.

Why are Trees so Important?

Besides the obvious that they produce oxygen—and we humans need oxygen to live—trees provide an abundance of other benefits. Among them is their ability to reduce carbon dioxide that is linked to global warming.

"Trees naturally absorb carbon dioxide and improve air quality," said Energy and Environment Cabinet Secretary Len Peters. "Trees also shade our homes, allowing us to turn up our thermostats in summer and reduce the amount of electricity we use."

When planted in a strategic location near a home or business, the canopy of a mature tree can lower the energy usage inside and, consequently, lower utility bills. Trees reduce outside air temperatures, too, helping reduce the creation of smog and ozone. They provide the added protection of wind breaks, privacy and a shield against noise pollution in urban settings. A tree's roots provide a stable foundation that fights against soil erosion, reducing runoff and improving water quality. For wildlife, they provide a necessary place for shelter and, depending on the species, food. When you factor in the added benefits of beauty and increased property value, there is really no excuse for not planting a seedling or tree.

As Gov. Beshear has said, "A healthy environment means a healthy Kentucky." Watch the governor's YouTube video on his reforestation initiative at http://tinyurl.com/oylj3xe.

Choose the Right Species

According to the Kentucky Division of Forestry, choosing the right tree adapted for your area and planting it in the right spot is key to its survival and the benefits you will receive from it. Always consider the tree's size at maturity, your soil conditions, and the purpose of the tree—for privacy between homes or to provide shade from summer sun or to block winter winds. It's also important to remember the best time of year to plant seedlings and trees so that Mother Nature can provide adequate water to the root system.

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The American Stillhouse

Continued from Page 2

stands for Leadership in Energy and Environmental Design, a green building program with four levels—certified, silver, gold and platinum. To meet this standard, the concrete on-site at Jim Beam has the required high ash content. On the grounds in front of the visitors' center, the concrete is designed to drain water, capturing the runoff and sending it to a lake. Fine gravel was placed in the cracks and also planted with thyme to keep the groundwater in the system. Permeable crushed gravel walkways around back lead to other structures.

Trees that were removed during construction were ground into mulch and area landscaping now contains native plants. Asphalt that had to be removed was sent to an asphalt plant to be reused. Not only was this the right thing to do, but it was cost neutral saving the distillery tipping fees and keeping construction debris out of the landfill.

For the Beam employees who bike to work, bike racks and a building with showers are provided, as is a special parking lot reserved for employees who carpool or drive energy-efficient vehicles, which further promotes the idea of environmental awareness.

Inside the center, a geothermal heating and cooling system was installed, which uses less energy and saves Jim Beam in utility costs. The walls are constructed of corrugated metal and provide an interesting visual effect. For the lighting, energy-efficient LEDs and fluorescent bulbs are used. Air curtains positioned over outside doors keep the outside air from entering. Non-VOC products, low-flow toilets and urinals, hand dryers and occupancy sensors in restrooms and staff work areas were installed to minimize waste. The low-flow toilets, sensors on restroom sinks and other plumbing innovations resulted in a water-use reduction of more than 30 percent and earned Jim Beam a LEED innovation credit for exceeding the water use standard.

For the upstairs floor and elevator, reclaimed wood from an old barn add beauty and durability. The reception area counter is made of wood from pickle vats that were left from a project at nearby Bernheim Forest.

Newest KYEXCEL Member

- Heaven Hill Distilleries Inc., Bernheim Facility—Jefferson County (Partner)

KY EXCEL members set a positive example by committing to a variety of projects that go beyond environmental regulations to improve and protect Kentucky's environment. Become an environmental leader today by calling 1-800-926-8111 or visit http://dca.ky.gov/kyexcel/ for information.

Noe says they began designing an earth-type of building, but the owners had a different need and vision for a signature look. When the owners wanted a black roof, which normally would absorb heat, the builders found a dark charcoal roof that reflects heat. Going just a few shades lighter made a difference. What they learned is that it is possible to accomplish a traditional look and build a LEED-certified structure.

"Decide what you want and be flexible enough to accomplish the objectives," says Noe. "If you want to construct a building and have it LEED-certified, you need to identify that at the start. Hold monthly meetings to monitor the progress."

Seventy-eight percent of the construction materials were diverted from the landfill. Everything was reused or recycled; even an old dinner bell from the Beam family home was salvaged and hangs outside the American Stillhouse. Many pieces of furniture were repurposed, including old ladders from a library.

"All of us love talking about going LEED with the American Stillhouse because we all are aspiring environmentalists," says Noe. "Being environmentally conscious is a mindset. We are stewards of the world we live in."

The 20-million-tree challenge

Continued from Page 3

"Regardless of your reasons, planting a tree or seedling has a positive impact on Kentucky's environment," said Peters. "Let's not forget they look beautiful, too."

Seedling order forms will be available from the Kentucky Division of Forestry in late August or early September for the spring planting season. Call 502-564-4496 for more information.

To learn more about Kentucky's 20/20 Vision for Reforestation, visit http://forestry.ky.gov/pages/2020vision.aspx For instructions on how to plant a bare root seedling, visit http://forestry.ky.gov/statenurseriesandtreeseedlings/Documents/seedlingplantinginstructions.pdf or a balled and burlap tree, visit http://forestry.ky.gov/Urban%20Forestry%20and%20Community%20Programs/Pages/TreePlanting.aspx.

Follow Kentucky's 20/20 Vision for Reforestation initiative on Facebook https://www.facebook.com/ReforestKentucky and Twitter https://twitter.com/KYReforestation.

The Pine Mountain Legacy Project

By Zeb Weese
Kentucky Heritage Land Conservation Fund

TOP LEFT: ***Hikers scaling Knobby Rock along the Pine Mountain Scenic Trail.*** KSNPC photo
TOP RIGHT: ***Bad Branch Falls at Bad Branch SNP.*** KSNPC photo
ABOVE: ***Cupp Lake at Kentenia State Forest.*** Division of Forestry photo

From the towering hemlocks along Watts Creek in Blanton Forest State Nature Preserve (SNP) in Harlan County to the remote forests of Archer-Benge SNP in Whitley County, the areas along Pine Mountain offer some of the most scenic vistas in the state.

With the recent purchase of 65 acres of Pine Mountain in Bell County for Pine Mountain State Park, the Kentucky Heritage Land Conservation Fund (KHLCF) has conserved more than 9,000 acres in southeastern Kentucky as part of the Pine Mountain Legacy Project. Along with partners like the Kentucky Natural Lands Trust (KNLT), Kentucky State Nature Preserves Commission (KSNPC) and the Kentucky Department of Parks, the KHLCF is creating a network of public conservation areas along the length of Pine Mountain. Most of these areas have hiking trails and some are open to other outdoor recreation. Some are just a few minutes from Pineville, Harlan or Whitesburg, while others are more of an adventure. All of them are worth the trip.

While grants from the KNLT, the U.S. Fish and Wildlife Service and others have purchased additional property at some of these sites, here are a few great places on Pine Mountain that were purchased with funds from the sale of Kentucky's "Nature's Finest" license plates:

Pine Mountain State Scenic Trail—Bell, Harlan, Letcher and Pike counties—The KHLCF has protected more than 500 acres for the Department of Parks in multiple tracts and funded habitat management on hundreds more. The goal of the Pine Mountain State Scenic Trail is to establish a 120-mile-long hiking trail along the crest of Pine Mountain from Breaks Interstate Park on the Virginia border to Cumberland Gap National Historical Park on the Tennessee border. So far, about 42 miles are open for hiking. The trail will eventually tie in with the Great Eastern Trail, a project that will ultimately parallel the Appalachian Trail. In addition to purchasing land along the crest for this linear park, the trail traverses Kentenia State Forest, Blanton Forest SNP, Bad Branch SNP and other existing natural areas. In some locations, overnight camping areas will eventually be constructed.

Bad Branch State Nature Preserve—Letcher County—A 853-acre tract was purchased by the KSNPC that protects the Presley House Branch, which flows into the Poor Fork of the Cumberland River. The preserve is most famous for Bad Branch Falls, a 60-foot-tall waterfall just off the main hiking trail.

James E. Bickford State Nature Preserve—Harlan County—Monies from the KHLCF were used to assist the Pine Mountain Settlement School and KSNPC in dedicating 348 acres as a nature preserve. Pine Mountain Settlement School is a nonprofit organization that provides instruction in environmental education and traditional arts and culture

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LEFT: ***Roberta Burnes helps the public understand the air quality and health dangers associated with open burning of household trash.***

BELOW: ***Burning trash, tires and other items releases hazardous polluntants that can cause serious health problems and cancer.*** Photos by DAQ

What's in that smoke?

Burning trash releases a wide variety of pollutants, including:

- Dioxins
- Particle pollution
- Polycyclic aromatic hydrocarbons
- Volatile organic compounds
- Carbon monoxide
- Hexachlorobenzene
- Heavy metals such as mercury and lead
- Ash

These pollutants are hazardous to human health, but none more so than dioxins, which are part of a group of highly toxic chlorinated organic chemicals. Study after study has linked dioxins to a range of serious health problems.

According to the U.S. Environmental Protection Agency, backyard burning of household trash is now the largest quantified source of airborne dioxin emissions in the U.S. Only small amounts of chlorine-containing material are required for dioxins to form during burning. Even food scraps (which contain salt, or sodium chloride) can contribute to dioxin formation when burned.

Dioxins are heavy compounds, often settling onto plants. When meat and dairy animals eat those plants, they also consume the dioxins. Dioxins are passed through the food chain, so animals at the top of the food chain—such as humans—are more likely to have higher levels of dioxins in their bodies.

The Open Burning Road Show

By Division for Air Quality

Every year as winter draws to a close, plumes of smoke start appearing on the horizon throughout rural Kentucky. Some call it spring cleaning—even though it lasts well into the fall. The Division for Air Quality (DAQ) calls it open burning, and not all of it is legal.

Roberta Burnes understands the challenges associated with open burning. As DAQ's environmental education specialist, Burnes' job includes educating the public about air quality, especially open burning. "Many people in Kentucky live in rural areas where trash pickup may not be available," says Burnes. "Traditionally, burning was just the way you got rid of things."

But times, and trash, have changed. And what goes up in smoke eventually comes down.

Today's trash contains plastics, polystyrene and other petroleum-based products that emit toxic pollutants when burned. Many of these pollutants are linked to heart and lung disease, suppression of the immune system, hormone disruption, interference with cell growth and development, and cancer (see inset *What's in that smoke?*).

That's why, when the weather warms, Burnes often takes the message about open burning on the road, frequently to fire departments. Why fire departments?

"Creating effective partnerships with the public is part of our mission," says Burnes, "and when it comes to open burning, firefighters are on the front lines. Partnering with our first responders just makes sense."

Campaigning for Cleaner Air

In recent years, DAQ used media campaigns to raise awareness about Kentucky's open burning regulation. Staff produced radio spots, posters, brochures and even billboards to spread the word.

This year, DAQ is focusing on a targeted education campaign aimed primarily at firefighters. "Firefighters see a lot of suspicious open burning," says Burnes. "They also field a lot of questions from the public about what's legal and what's not legal to burn. Getting everyone on the same page seemed like a good place to start." Thus, the Open Burning Road Show was born.

Burnes and other DAQ staff frequently meet with fire departments across the Commonwealth,

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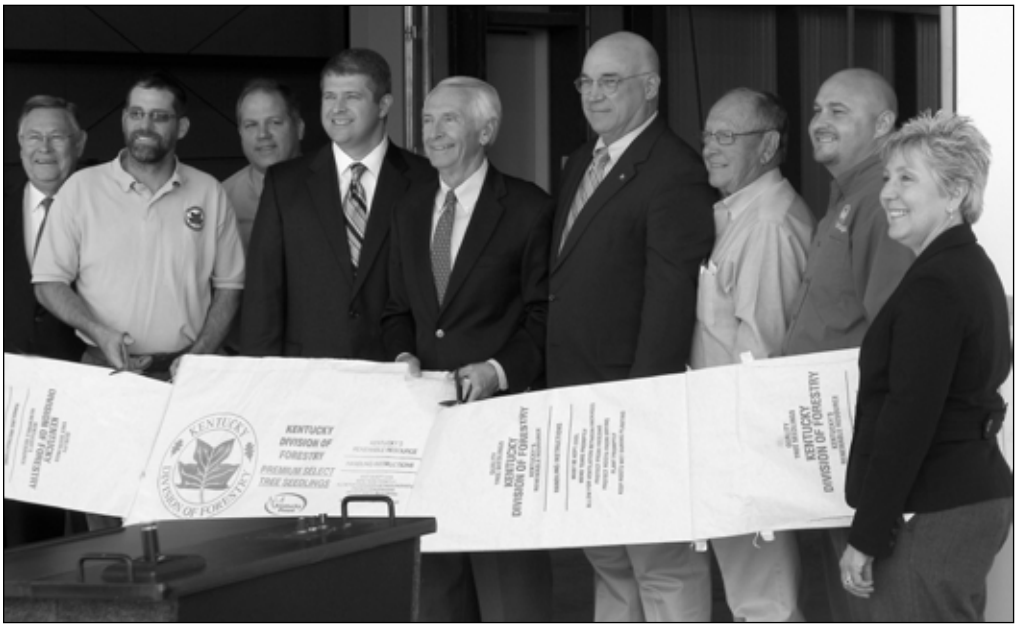
Morgan County tree nursery reopens



Gov. Steve Beshear (center) cuts the ceremonial ribbon. He is flanked by (far left to right) Secretary Len Peters, Charlie Saunders, Tim Sheehan, Sen. Ray S. Jones II, Reps. John Will Stacey and Hubert Collins, Morgan County Magistrate Frankie Spencer and KDF Director Leah MacSwords.
Jennifer L. Turner photo

By Jennifer L. Turner
Division of Forestry

The Morgan County tree nursery began in April 1960 on a site determined by the U.S. Forest Service to be the best location in Kentucky and one of the best in the eastern United States to grow tree seedlings. For 52 years the nursery planted, nurtured, packaged and distributed approximately 1.5 million seedlings each year.

On March 2, 2012, all that changed. A tornado destroyed the Kentucky Division of Forestry's Morgan County nursery buildings and later the town of West Liberty. The tornado scattered seedling bags and nursery debris across the countryside and as far away as West Virginia.

More than two years later on April 21, 2014, Gov. Steve Beshear, Energy and Environment Cabinet Secretary Len Peters, Division of Forestry Director Leah MacSwords, Sen. Ray S. Jones II, and Reps. John Will Stacy and Hubert Collins celebrated completion of the nursery's restoration project, which includes a new state-of-art processing building and a 5,000-square-foot cooler for storing the packaged seedlings prior to shipment.

Gov. Beshear and Nursery Superintendent Charles Saunders cut the ribbon made of tree seedling bags.

"I take great pride in celebrating this rebuilt tree nursery today," said Gov. Beshear. "The devastation that took place here two years ago seemed to be insurmountable. But with the commitment of forestry staff, the nursery is better than ever and is positioned to make an even bigger impact than before."

Both the Morgan County Nursery and the John P. Rhody Nursery in Marshall County will provide seedlings for a variety of reforestation projects across the Commonwealth, including the governor's 20/20 Vision for Reforestation project (see *The 20-million-tree challenge* on Page 3), an ambitious plan to reforest thousands of acres of land over the next two decades. Volunteer organizations, including the Boy Scouts, Girl Scouts and utility companies are joining the effort.

"Over the next 20 years, the 20/20 Vision campaign will plant 20 million seedlings produced by the Kentucky Division of Forestry," said Secretary Peters. "The rebuilding of the Morgan County Nursery will be a boost to this effort."

The Morgan County Nursery is also growing trees for the Arbor Day Foundation's Community Tree Recovery Program (see article on Page 8). It was created out of the need for trees in the wake of natural disasters and began by providing tree relief to the Gulf Coast following Hurricane Katrina. In Kentucky, 16 counties were designated tornado disaster areas after the 2012 tornado. These counties will be receiving seedlings for replanting as part of the Kentucky Community Recovery Program.

The Morgan County Nursery is the site for several American chestnut "mother" trees and backcross orchards. It plays a vital role in the Kentucky backcross breeding program, where the American chestnut and Chinese chestnut are pollinated and backcrossed with the mother trees to produce a hybrid with the desirable characteristics of the American chestnut and the blight resistance of the Chinese chestnut. The nursery is poised to fill the niche as a producer of blight-resistant American chestnut seedlings for Kentuckians when that day arrives.

Like nearby West Liberty and all the communities affected by the tornadoes that day in 2012, Morgan County Nursery is coming back better and stronger than it was. The Division of Forestry and its Morgan County Nursery are well rooted in the community and will continue to be an important asset to Kentucky's forest resources for many years to come.

Community Tree Recovery Campaign

State Arbor Day celebration takes place in city devastated by 2012 tornado

By Jennifer L. Turner
Division of Forestry

TOP LEFT: ***Sarah Gracey with KDF talks to Bush Elementary School students about proper planting of bare root seedlings.***
TOP RIGHT: ***Representatives from Lexmark, along with state and local officials, plant a tree during the Arbor Day celebration.***
RIGHT: ***Arbor Day Foundation Executive Director Dan Lambe helps a student plant a seedling at the Whitley Branch Wetland Restoration Area. The area was purchased by the Kentucky Heritage Land Conservation Fund.***
Photos by Jennifer L. Turner

Natural disasters like the March 2, 2012 tornados that tore through more than 100 miles of cities, towns and countryside in Kentucky killed 22 people, destroyed hundreds of homes and uprooted thousands of trees from yards, parks and forests. The destruction was so great that President Obama declared 16 Kentucky counties federal disaster areas.

Having learned that the Morgan County Nursery had also been destroyed by the tornados, the Arbor Day Foundation formed a partnership with the Kentucky Division of Forestry (KDF), FedEx and Lexmark to create the Kentucky Community Tree Recovery Campaign. This multi-year campaign will focus on getting trees replanted in the yards of Kentucky's tornado victims.

"Trees are such a valuable resource," said KDF Director Leah MacSwords. "Trees help reduce pollution, conserve energy, provide wildlife habitat and improve quality of life for the people of these communities."

The first 25,000 seedlings were distributed in March to people affected by the tornados in Campbell, Johnson, Menifee, Wolfe and Laurel counties. Each county received 5,000 seedlings to plant and distribute, many being planted during events held in conjunction with the city or county's Arbor Day celebrations. Such was the case in Laurel County.

On April 10, the Kentucky's official Arbor Day ceremony was held in London where state and local officials and representatives from Lexmark and the Arbor Day Foundation planted a ceremonial tree to commemorate the event. In addition, approximately 70 first-grade students from Bush Elementary School planted 500 seedlings of northern red oak, eastern redbud, persimmon and swamp white oak at the Whitley Branch Wetland Restoration Area. The students placed seedlings every 6 feet along a tributary of Little Laurel River.

"Arbor Day has been celebrated for the past 117 years in Kentucky," said MacSwords. "It's the forestry service's favorite holiday. Today, we're following Gov. Steve Beshear's 20/20 Vision for Reforestation to plant 1 million trees each year for 20 years."

"We can't do much more to help our environment than by planting trees," said Energy and Environment Cabinet Secretary Len Peters. "Everyone benefits and we grow together."

The Kentucky Community Tree Recovery Campaign will continue next year with seedling distribution in Kenton, Pendleton, Morgan, Magoffin and Martin counties. All seedlings are raised at KDF's Morgan County Nursery.

Rare occurrence in Kentucky

Communication and teamwork prevent potential disaster of an 8-acre landfill slide from impacting the environment

By George Gilbert, P.E.
Division of Waste Management

Around 10 a.m. on Sept. 4, 2013, the owner of Big Run Municipal Solid Waste Landfill near Ashland, Ky., reported a solid waste slide. It consisted of about 800,000 tons of waste, or about one year's worth of garbage, that had slid from its disposal location to an area extending 400 feet off the landfill plastic liner and clay. The total slide was about 20-feet deep and consisted of about 8 acres.

Landfill Manager Mike Vossmer and staff noticed bulging in the lower waste mass before the slide happened.

"I pulled everyone off the lower waste footprint and pond areas just in case," said Vossmer.

The Kentucky Division of Waste Management (DWM) Morehead Regional Office responded to the emergency.

"After quickly finding out that no one was hurt, my immediate concern was directing the facility to monitor the slide for movement, containment of leachate and surface water, and preparing for fire potential from the exposed waste by requiring an access for firefighting equipment," said Rodney Maze of the Morehead Regional Office and Environmental Response Team (ERT).

ERT set up a mobile command post on site and met with DWM Solid Waste Branch Manager Ron Gruzesky, the landfill owner, and the three engineering companies hired by the landfill—Kenvirons, Cornerstone Environmental Group, and Civil and Environmental Consultants.

"Big Run Landfill immediately devoted the necessary people, outside advisors, equipment and funds to remediate this unforeseen event and avoid any negative impacts on the environment or our neighbors," said Vossmer. "In addition, the expertise and cooperation we received from the ERT, Morehead Regional Office and Solid Waste Branch was extremely beneficial in remediating the slide quickly and efficiently."

Two of the engineering companies had previous experience with waste slides in other states and noted that waste exposed to the air could result in fire. Since it would take too long to excavate pathways and place soil over the wastes, the team decided to spray a temporary liquid cover onto the waste that quickly cured into a solid. Soon after, the operator's contractor began replacing cover soil. The owner also coordinated with the local fire department to plan contingency responses.

A temporary containment berm was constructed to catch any surface water

TOP: ***Big Run Landfill in spring 2013 before the slide.*** DWM photo
ABOVE: ***Immediately following the slide, a large wall of garbage (left) towers above facility personnel in the yellow vest.*** Photo by Rodney Maze

An aerial view of the slide. The higher elevation is lower center; the slide area is from that point to the uppper left. Big Run Landfill photo

run-off or leachate, which was pumped into the leachate tanks.

Once the slide stopped moving, work began on mitigating the slide and establishing environmental monitoring points. Monitoring wells were reinstalled and sampled, surface discharge was monitored via the pond below the landfill, and air monitoring stations were set up. The liner, leachate collection system and gas collection network were also to be evaluated for damage.

Three weeks later, the emergency response phase of the incident was declared complete and Big Run Landfill submitted a check for the cost of the response, which was $30,864.

Following the conclusion of the emergency phase, the Morehead Regional Office and the Solid Waste Branch continued to work with the landfill owner on remediation activities.

"The owner and its representatives did a fantastic job of recovering the waste from the slide while protecting human health and the environment," said Gruzesky.

A report on what caused the garbage slide and how to prevent a reoccurrence was submitted to the DWM in March 2014 by the landfill owner and Civil and Environmental Consultants Inc. It concluded that "soft spots" of wet material and excess pore pressure (when a particle of municipal solid waste feels like it is underwater) contributed to the failure. The soft spots were apparently caused by several months of high rainfall, different rates of water absorption in various solid wastes, and the presence of the soil over the previous garbage blocking water flow. In other words, the water had no place to go down, so it went sideways and took the garbage with it. Fortunately, the landfill bottom liner was undamaged, except for a 0.25-acre area in the corner of the newer disposal area.

The DWM agrees with the conclusions of the report and accepts the findings that wet industrial sludge probably contributed to the differences in waste properties allowing the soft spots.

The report also recommends constructing a permanent soil or stone berm to provide slope stability. It will be constructed 35 feet high at its deepest point and cover more than 4 acres on top of the landfill cap. The soil or rock weighs about 140 pounds per cubic foot, compared to wet garbage at about 72 pounds per cubic foot. The much heavier berm will hold the waste in place.

The landfill owner made repairs to the portion of the liner that was damaged and moved the waste back into the disposal area in preparation for the stone berm project. Throughout the waste relocation activities, air, surface water and groundwater were sampled and analyzed, and no impacts to the environment were detected from the slide.

"This project was a success because all parties involved were team players working together to resolve the situation with safety and the environment in the forefront of every decision," said Randall Russell, Cornerstone Environmental Group engineer.

DWM Director Anthony Hatton agrees. "The cooperation exhibited in this case is a model of how to work together when something goes wrong."

Reduce, Reuse, Recycle—tired or timeless?

By Virginia Lewis
Division of Waste Management

A giant wall of garbage at the Big Run Landfill slide creates a dramatic visual of what we throw away. According to state data, Kentucky generates approximately 16,800 tons of municipal solid waste per day. In fact, we create 6 million tons of municipal solid waste per year and about 4 million of that ends up in landfills—but doesn't have to.

Most of us have heard the message, "Reduce, Reuse, Recycle." But have we heard it so often that it's lost its importance? While to some it might sound like a tired song and dance, these words are timeless and more important now than ever.

Once waste is created, recycling (which includes composting) is one of the most effective methods of reducing the amount of material in the waste stream. It is not only important to make good decisions about how we manage waste, but also look for opportunities to conserve resources and reduce waste across the entire lifecycle of materials. It's a shift of thinking away from a waste management perspective to a lifestyle perspective. Here are some helpful ideas for how we can move in this direction.

Reduce and Reuse

• Look at how much food (and money) gets thrown away. According to the U.S. Environmental Protection Agency, more food and food straps go into

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Improving water quality in the Hanging Fork Watershed

Dedication and cooperation at the local level is key to success

By Kimberly Bartley
Division of Conservation

When the Lincoln County Conservation District started a project nearly 10 years ago within the Hanging Fork Watershed, it had no idea that the project would still be expanding to this day. The district also never imagined it would receive more than $460,000 in grant funds to help local residents improve water quality, but that is exactly what happened.

Because the quality of the local waterways was unfit for swimming and fishing, the Dix River Watershed Council began working with the Kentucky Division of Water and Third Rock Consultants to create a watershed plan. The Dix River Watershed is located in the Kentucky River Basin and receives waters from Hanging Fork Creek. The conservation district also was motivated to form a watershed council that was tasked with creating a local plan of action to cleanup up its waterways, and its work still continues today.

The conservation district worked with what was then the Kentucky Heritage Resource and Conservation Development Council to administer a federal 319 grant made possible by the Clean Water Act. The project began in a small, rural part of the watershed called Peyton Creek, where there is a high concentration of livestock. Years later, the district now has a Watershed Oversight Committee, a watershed coordinator, and educated landowners that are much more aware of their water quality. The district provided funding for the implementation of best management practices like fencing, alternative water sources, animal waste facilities, shade structures and stream buffers, which removed livestock and their waste from the water.

Allowing the Peyton Creek farmers and landowners to be involved in and help with the design of this project was important. Not only did this local participation make the project successful and nationally recognized, but it also encouraged the conservation district to continue its work in a larger part of the watershed.

"This program was one of the best for the farmers and landowners because of the cost share rate and the practices available, and it made a big impact on their operations," said Watershed Coordinator Paul Jefferies. "Most all landowners are good stewards of the land anyway, and they want to do their part and make a difference. This is why we were able to establish a good relationship with the landowners and actually assist them in improving the water quality."

Because of the growing project, the district partnered with the Boyle County Conservation District and was able to secure and provide funding for winter livestock feeding areas that further addressed animal waste issues by moving feeding areas away from the creeks.

The Lincoln County Conservation District continues to work locally to create additional water quality plans and spread awareness about the importance of water quality. One example includes the construction of a billboard on the side of U.S. Highway 150 that reads, "Thank a farmer when you see protected tree lined buffers along our creek banks—conservation improves our water quality." Additionally, the district hosted a field day on the Will Stallard Farm in Boyle County. More than 125 farmers and landowners from both counties were on hand to observe many of the successful projects and best management practices.

This project was successful because of the collaboration of so many agencies, including the Agriculture Watershed Oversight Committee, Boyle and Lincoln county conservation district boards, Natural Resource Conservation Service (NRCS), Boyle and Lincoln cooperative extension offices, Division of Water, Division of Conservation, and Dix River Watershed Council.

"None of this would have been possible without people that were willing to work together and work hard to make projects like this successful," said NRCS District Conservationist Bo Renfro. "There has to be dedication on the local level to take on a project this large and run with it."

Both districts couldn't be more satisfied with the results of these projects. So, what lies ahead for the Hanging Fork Watershed? Hopefully improved water quality, better informed citizens and maybe even a new project.

TOP: A feeding lot keeps livestock away from creeks and streams. ABOVE: A billboard creates awareness about water quality.
Photos by Division of Conservation

Reduce, Reuse, Recycle—tired or timeless?

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landfills than any other type of material thrown out. While composting may not be an option for everyone, reducing the amount of food wasted is. Minimize food you throw out, donate excess food to those in need, and compost food scraps when possible.

- Look for items with less packaging and consider buying bulk. More packaging means more raw materials used, and potentially more stuff going to the landfill.
- Buy only what you need and need what you buy. If you buy in bulk, make sure you have a way to keep food items from spoiling before you use them.
- Buy used. Everything from clothes to building materials can be purchased used at specialized reuse centers and consignment shops.
- Choose reusable items instead of disposable items. For example, bring your own plate, silverware and cup to work.
- One's trash is another's treasure. Donate gently used items like furniture, clothing and bikes to charitable organizations.
- Take care of items so they won't have to be replaced as often.

Recycling

As a state, we can pat ourselves on the back for having a 32.2 percent recycling rate. It's an impressive number, but what about the other 67.8 percent? We still have room to improve.

• Be informed. Learn what can be recycled in your area and where. For questions about recycling, contact your local solid waste coordinator or visit http://waste.ky.gov/RLA for a list of Kentucky recycling facilities by county.

• Look at everything before throwing it away. Common recyclables include paper, batteries, plastics, glass, used oil (accepted at many garages and auto supply stores), household hazardous waste (paints, cleaners and pesticides should be taken to special collection events for proper disposal), used tires (watch for tire collection events), food waste, consumer electronics, and yard and wood waste.

• Plastics quick facts: The resin identification codes (little numbers with arrows around them on the bottom of plastic containers) help identify the kind of plastic resin used to make the container and can help determine if the container can be accepted by your local recycling program. Different plastics are reused in different ways. For example, Polyethylene Terephthalate (PET), is commonly used in beverage bottles and many injection-molded consumer product containers. Cleaned, recycled PET flakes and pellets are in demand for spinning fiber for carpet yarns, producing fiberfill and geotextiles.

By thinking about what we're using and how to reduce the waste we produce—and ways we can recycle—we can help create a cleaner, healthier environment and save money.

For more information on how you can reduce, reuse and recycle, contact the Recycling and Local Assistance Branch at 502-564-6716 or visit http://waste.ky.gov/RLA/.

The Pine Mountain Legacy Project

Continued from Page 5

to thousands of students. It is one of the few conservation areas on the north slope of Pine Mountain; most are on the south side.

- **Kentenia State Forest—Harlan County**—A 762-acre tract was purchased for the Kentucky Division of Forestry that includes Cupp Lake and a scenic hiking area just off of Little Shepard Trail, a county road that goes along the crest of Pine Mountain in some areas.
- **Kentucky Ridge State Forest and Wildlife Management Area—Bell County**—The KHLCF purchased 3,395 acres for the Kentucky Department of Fish and Wildlife Resources and Kentucky Division of Forestry. This wildlife area is just above Pineville, adjacent to Pine Mountain State Resort Park, and allows hunting as well as hiking.
- **Blanton Forest State Nature Preserve—Harlan County**—The KHLCF purchased 1,635 acres of Kentucky's largest old-growth forest for the KSNPC. Some of the hemlocks are nearly 5 feet in diameter. Watt's Creek protects the federally endangered blackside dace.
- **Archer-Benge State Nature Preserve—Whitley County**—This 1,800-acre preserve was purchased for the KSNPC and is so remote that locals have referred to it as "South America" for more than a century—meaning you can't get there from here. In fact, nature preserve managers drive through two counties in Tennessee to access this Whitley County property. This inaccessibility has helped maintain the integrity of the ecosystem to an amazing degree.

While the KHLCF has protected more than 86,000 acres statewide to date, the efforts on Pine Mountain are among the most significant. It is increasingly difficult to find any place in Kentucky where you can truly unplug and hike for days. However, with each acre conserved on Pine Mountain it gets a little easier. For more information on these and other natural areas funded by the KHLCF, visit http://heritageland.ky.gov/Pages/Purchased-Properties-Descriptions.aspx

ABOVE: ***KSNPC's Brian Yahn stands in the mixed mesophytic forest at James E. Bickford SNP.*** Photo by KSNPC

The Open Burning Road Show

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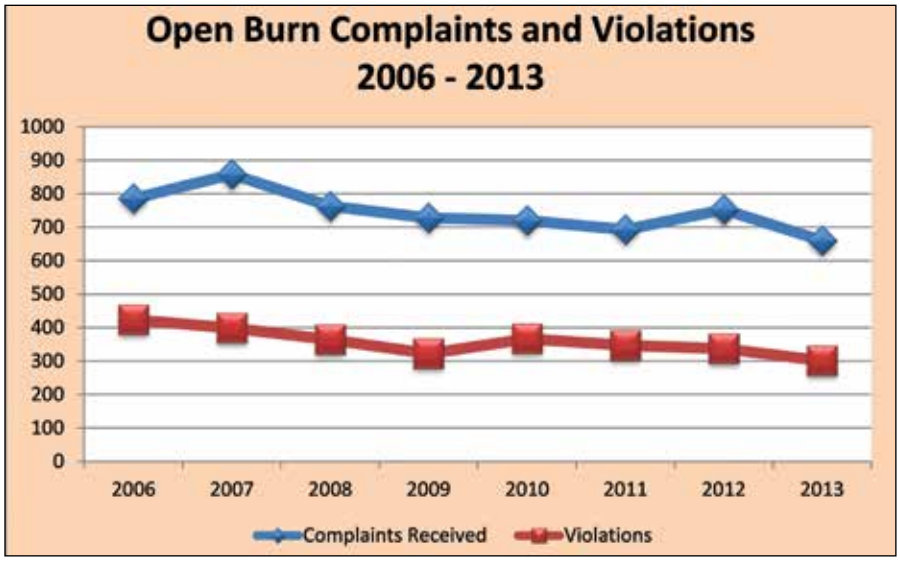


presenting one-hour training sessions about Kentucky's open burning regulation. Burnes remembers one of the first trainings she conducted, when she introduced herself to the couple dozen firefighters in the room. "They started laughing when I told them my name," she recalls. "They couldn't believe my last name was Burnes, since I was there to talk about open burning."

Often, Burnes begins the presentation by handing out Post-it® notes. On the wall, she tapes two signs: "Legal to Burn" and "Illegal to Burn." Participants write an item on a note and then stick the note under one of the signs on the wall. "It's a great way to see how much people already know, and it allows me to address misconceptions during the presentation," says Burnes.

Burnes addresses the health problems associated with open burning, fire hazards, ozone season restrictions, fire training protocols, and burning dos and don'ts. "The presentation is really about all the things you can and can't legally burn," says Burnes.

Clean Air Partners

Getting the message out about open burning isn't just good for air quality—it may also help reduce the number of nonemergency calls firefighters respond to. Firefighters are often in the perfect position to inform people when they're burning something they shouldn't.

DAQ's open burning brochure (at right) can also help. Fire departments, as well as the public, may request these free brochures by calling the open burning hotline, 888-BURN-LAW. Many firefighters carry these brochures in their trucks so they can hand them out when the occasion arises.

"We have found education to be the best prevention," says Pat Thompson, who is chief of the Sorgho Volunteer Fire Department in Daviess County. He also directs fire rescue training for the state. "Working with the Kentucky Division for Air Quality has been a great partnership," he says.

Fire departments also conduct fire trainings for their staff, and there's no substitute for practicing on a real house fire. "This live fire training allows firefighters to train in a controlled environment but with the realism of interior firefighting tactics," says Thompson. Departments wishing to conduct live fire trainings must contact the Kentucky Fire Commission and the DAQ for permission to burn an abandoned structure. Prior to the fire training exercise, any

materials that could produce toxic smoke must be removed from the structure.

DAQ inspectors work with fire trainers to identify and remove these materials, which may include roofing shingles, vinyl siding, asbestos and insulation. "Our job is to protect human health and the environment," says DAQ inspector Ashley Adams. "Minimizing the impact of open burning improves our air quality."

Properly preparing a site for live fire training may seem like a lot of work but it's worth it, says Thompson. "The employees of the Division for Air Quality have been extremely helpful, inspecting our sites, participating with oversight on training days, and attending our Green River Firefighters Association meetings to support our efforts in educating the fire service."

Spreading the Message

Open burning continues to be a serious health concern in Kentucky, but gradually things are changing for the better. Since the division began its open burning awareness campaign in 2006, complaints to the open burning hotline have trended downward. Violations of the open burning regulation have also decreased (see chart). In 2013, less than half of all open burning complaints resulted in violations.

Burnes is always looking for other audiences to share the clean air message with—especially young people. "If we can help students see the connection between open burning and their health, we have a chance to make an even greater impact on air quality for future generations," says Burnes.

To learn more about open burning, visit http://air.ky.gov/Pages/OpenBurning.aspx . For more information about open burning and your health visit http://1.usa.gov/RHLayt and http://1.usa.gov/1iKsDeT

Fire Cats score experience in fire suppression

By Jennifer L. Turner
Division of Forestry

Wildfires in Kentucky are most likely to occur during the spring and fall months when dry leaves and branches cover the forest floor. Last year, 980 wildfires burned more than 23,000 acres across the state. It's the lowest totals on record since 2004, but it's a harsh reminder that wildfires continue to be a problem and it takes a lot of manpower to keep them under control.

Knowing that more and more foresters from the public and private sectors are involved in wildfire management, Dr. Terrell T. "Red" Baker, chair of the University of Kentucky's (UK) Department of Forestry, recognized an urgent need for better trained and prepared foresters. He consulted with E.J. Bunzendahl, assistant fire management officer with the Daniel Boone National Forest, to teach a basic wildfire class to his forestry students. The Kentucky Division of Forestry's (KDF) Fire Chief Luke Saunier pulled together a fire crew of students, and they called themselves the UK Fire Cats.

"This is another example of the great partnership between KDF, the Daniel Boone National Forest, and UK Forestry," said Baker. "It's a wonderful opportunity for our students to work with future employers."

The U.S. Forest Service trained three crews totaling 16 students with KDF Forester Nick Valentine assigned as their crew boss. Mike Harp, KDF's forestry program specialist, ensured that the students' paperwork was in order and that they had the proper equipment needed to work during Kentucky's spring fire season.

On March 22, the crew was dispatched to assist with mop up and burnout operations on the Clan Creek Fire in Knox County. Mop up is work on a fire that has been stopped or contained, but more work is needed to ensure the fire does not rekindle or break over the containment lines. Upon arrival, the crew received a safety briefing before they ascended the hill to assist the Knox County crew already on site. By assisting on a fire already contained, the Fire Cats were able to work in a low stress situation, allowing Valentine and Saunier to educate them on the suppression tactics being implemented. The Fire Cats also gained first-hand experience using a drip torch to conduct burnout operations. Since March, all three crews have assisted in fighting seven wildland fires.

"Our students now have great team building skills, a greater understanding for fire behavior, as well as the tactics and experience that are required for fire suppression," said Baker.

With training and experience under their belts, some of the students are signing up for U.S. Forest Service wildfire detail this summer. UK is only the third school in the nation to put together a fire crew of forestry students.

KDF will be calling on the Fire Cats this fall when Kentucky's fall forest fire hazard season begins in October.

UK Fire Cats on the fire line performing mop up and burnout operations. Photos by Jennifer L. Turner

A tale of two developers

The dos and don'ts of brownfield redevelopment

By Herb Petitjean
Division of Compliance Assistance

As the cost of land and installation of infrastructure rises and urban sprawl increases, developers are realizing the benefits of redeveloping older properties. However, properties that have previously been developed often have the potential for environmental contamination due to the activities of the former companies that operated on the premises. Such properties are called brownfields.

There are many examples of successful businesses that have been established on former brownfields in Kentucky. Many more are expected as a result of the enacted KRS 224.1-415, a Kentucky law that provides a means to limit liability through Notice of Eligibility and Notice of Concurrence letters.

Kentucky offers a number of incentives to encourage the redevelopment of abandoned properties that may have environmental issues. In particular, the law goes a long way toward limiting the liability of developers who purchase brownfields.

"Investing in these properties is actually a means of protecting the environment," said Shawn Cecil of the Department for Environmental Protection. "It helps us identify abandoned properties and gets them under some form of management. For a community, it improves the looks of a sometimes blighted area, brings opportunities for job growth and a boost to local economies."

Be smart! Take advantage of all available resources and involve the Kentucky Brownfield Redevelopment Program early in the process. Assistance is confidential and can make the difference between a successful project and a failure.

We know that not all developers follow the proper steps to revitalize brownfields, so let's take a look at the steps on the right of two hypothetical development corporations and determine the proper procedures to follow when considering the purchase of a brownfield property.

To learn more about the Kentucky Brownfield Redevelopment Program, as well as information about free environmental assessments, tax incentives, grants and brownfield success stories, visit http://dca.ky.gov/brownfields.

Development Corporation A The Wrong Way

- Development Corporation A buys a property and then contacts the Brownfield Redevelopment Program with questions about liability.
- Development Corporation A looks at some old environmental reports, but does not contract for an assessment of current conditions prior to purchase.
- Development Corporation A does not get a Notice of Eligibility prior to purchase.
- Development Corporation A calls the Brownfield Redevelopment Program asking about possible incentives to help redevelop the property. They don't qualify for many of the incentives since they purchased the property without having a recent Phase I Environmental Site Assessment to document conditions at the property prior to their acquisition.
- Development Corporation A tries to get a loan from the bank and is turned down due to the bank's concern about liability. In addition, the corporation is not eligible for Cleaner Commonwealth Funds.
- Development Corporation A finds some buried drums filled with chemicals during construction. They cover them up and hope nobody notices.

Development Corporation B The Right Way

- Development Corporation B contacts the Brownfield Redevelopment Program while considering purchasing a property.
- Development Corporation B has an environmental professional conduct a Phase I Environmental Site Assessment within six months prior to purchasing the property.
- Development Corporation B makes use of the KRS 224.1-415 process to get a Notice of Eligibility prior to purchase.
- Development Corporation B works with the Brownfield Redevelopment Program from the beginning and is eligible for a number of incentives.
- Development Corporation B presents the Notice of Eligibility to the bank and receives favorable consideration for the loan. (If they hadn't, they could possibly have gotten a loan from the Cleaner Commonwealth Fund to clean up the property first, making it easier to get a loan from a commercial bank after remediation.)
- Development Corporation B finds some buried drums filled with chemicals during construction. (By this time, they have purchased the property and replaced the Notice of Eligibility with a Notice of Concurrence.) The Phase I assessment had not identified the buried drums, so Development Corporation B notifies the Division of Waste Management of the discovery, knowing they have limited their liability through the Notice of Concurrence.

Land of opportunity

Continued from Page 1

and can be eliminated by either flaring or producing energy. Over the years, the unpleasant methane odor had become an issue for the city of Glasgow. Two years ago, a public/private partnership was formed to combine strategies and resources to find a solution for the residents of the western Kentucky town.

With their eyes set on the future, Glasgow's Mayor Rhonda Trautman, along with officials of the city's Public Works Department, partnered with Farmers Rural Electric Cooperative Corp. (RECC) and East Kentucky Power Cooperative (EKPC), a generation and transmission cooperative owned by Farmers RECC and 15 other Kentucky electric co-ops. The partnership resulted in development of a comprehensive and coordinated plan targeting clean energy production, specifically to transform methane gas from the landfill into viable electricity. In April of this year, the $1.5 million Glasgow Landfill Gas Recovery System project was born.

"This is a win-win project for our city," said Mayor Trautman, "with immediate and long-term benefits to the residents of this community. By capturing the landfill gas and converting it to electricity, we are providing a local, sustainable source of electricity for the benefit of public and private users of Farmers RECC. And, by preventing the methane from being expelled into the atmosphere and using it as a renewable energy source, we are contributing environmental benefits for years to come."

The project was funded by a $100,000 grant awarded to the city of Glasgow from the Kentucky Energy and Environment Cabinet and the Department for Local Government (DLG) through the Energy Efficiency and Conservation for Local Governments Grant, as well as local funds from the Glasgow Regional Landfill. In addition, with the assistance of Farmers RECC, the city received a $1 million no-interest loan from the U.S. Department of Agriculture's Rural Economic Development Loan and Grant Program to assist with the construction of the methane recovery system.

The grant, through DLG, is part of a project encouraging local governments to take a comprehensive look at their energy needs, make improvements to help become more energy efficient and identify opportunities for renewable energy sources, such as the landfill gas project. These grants are from funds administered through the Kentucky Energy and Environment Cabinet from an environmental mitigation fund.

"This project is a result of a lot of dynamics coming together," said Bill Prather, CEO of Farmers RECC. "Everyone involved had the same goal—to solve the city's issues and meet the needs of its citizens. With cooperation, patience, good engineering and advice, and the right financial resources we were able to move forward. Today, all of the pieces have fallen into place."

The gas recovery system will be completed in two phases, with the city finishing construction of the gas collection component this July and EKPC constructing the power generation station and expecting to go online in mid-2015.

Once the gas recovery system is operational, the gas will be sold to EKPC for conversion to electricity. Methane gas is collected by drilling vertical wells into the waste mass and applying a vacuum to the wells, with the extracted gas then traveling through a pipe network to the power generating station to be burned to produce electricity (see diagram on Page 1). The electricity will then be fed into the local Farmers RECC power grid. The proceeds from the sale of the gas to EKPC will pay back the loan and, ultimately, create a positive cash flow for the city and the regional landfill operation.

Prather said initially the landfill gas-to-energy power station will be capable of producing one megawatt of electricity, with additional electric generating units being added as gas production increases.

"To help put this into perspective, one megawatt is equal to 1,000 kilowatts, and the typical household in this service territory uses, on average, 2 kilowatts. The Glasgow Landfill Gas Recovery project will supply the electrical power needs for nearly 500 residences."

Over the past 11 years EKPC, in cooperation with its owner-member cooperatives, has developed six other power plants fueled by methane from landfills. These plants have the capacity to generate more than 14 megawatts of electricity, enough to power nearly 9,000 homes. Read about these projects at http://www.envirowattsky.com/plants.html

Renewable energy sources are a key component to Gov. Beshear's energy strategy. With the growing concern for rising energy costs and federal energy guidelines, new attention is being focused on sources of renewable energy. The Glasgow project, and other landfill gas recovery projects are helping communities and businesses connect sustainable practices with economic development.

Methane, a potent greenhouse gas

Continued from Page 1

4. Use as an alternative fuel in vehicles in the form of compressed natural gas or liquefied natural gas.

Benefits of Landfill Gas to Energy

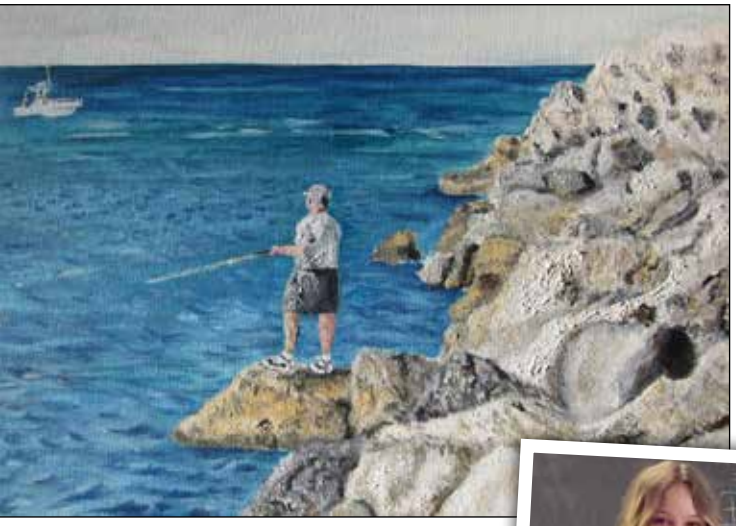
- Reduces the amount of methane emitted, which is more than 21 times stronger than carbon dioxide in terms of greenhouse gas impacts.
- Results in a renewable energy source.
- Improves local air quality.
- Supports sustainable community development.
- Creates revenues and cost savings.
- Provides an energy source for emergency operations.

Additional Information

Visit http://energy.ky.gov/renewable/Pages/LFGTE.aspx to view a map of 27 sites in Kentucky that are either planned, operational or candidates for landfill gas-to-energy projects, as well as incentives and assistance, and links to helpful information.

2014 Eco-Art Contest winners chosen

By Mary Jo Harrod
Division of Compliance Assistance



TOP *and* UPPER RIGHT*: "Dreaming about the Lions." Adrian Teegarden with a painting of her grandfather.* ABOVE *and* RIGHT*: "The Sitting Chair." Darby Acree carved the chair from a tree stump.*
FAR RIGHT*: Madison Mattingly's "Uwoduhi."* DCA photos

For the fourth consecutive year, high school students from around the state have created interesting and colorful artwork that they feel conveys an important environmental message.

"The Eco-Art Contest was created to encourage students to think about the environment and humans' impact on it," said R. Bruce Scott, Department for Environmental Protection commissioner. "Through their artwork, the students reflect their thoughts and inspire others to protect our environment."

Students submitted their art in a variety of media, including drawing/painting/printwork, mixed media, sculpture and photography, based on the contest themes of conservation, pollution prevention and environmental protection.

Madison Mattingly from Atherton High School in Jefferson County created a life-size sculpture she calls "Uwoduhi."

"The horse morphing into a fish represents the importance of Kentucky's natural environments and ecosystems for all living things, including us. Specifically, the horse with its birch bark texture, represents the land and all plant life. The fish tail represents Kentucky's beautiful waterways and how important clean water is to all ecosystems."

"I wanted to do something environmentally friendly and 100 percent natural," said Darby Acree of Metcalfe County High School, who named her piece "The Sitting Chair." "I wanted to turn an old tree stump into something useful."

Adrian Teegarden, of Woodford County High School, painted a photograph of her grandfather and entitled it "Dreaming about the Lions."

"My grandfather not only truly loved the power of nature and water, but dedicated his life to protect its beauty. By portraying him on the edge of a body of water, I hope to not only honor him personally, but to also honor all of the work he has accomplished in the Kentucky Division of Water."

All winners included Sarah Jeoung from Paul Laurence Dunbar High School in Lexington; Mary Nicole Peckham from Pleasure Ridge Park High School in Louisville; Darby Acree, Emily Jeter, Lily Tran and Lauren Coffey from Metcalfe County High School in Edmonton; Danielle McDonnell from Thomas Nelson High School in Bardstown; Adrian Teegarden from Woodford County High School in Versailles and Madison Mattingly from Atherton High School in Louisville.

The artwork, past and present, will be displayed in the hallways at the DEP Training Center in Frankfort. Make plans to visit the DEP Training Center on your next trip to the Capital City.

Details about the upcoming 2014–15 Eco-Art Contest will be announced later this year. For more information, visit http://dca.ky.gov/LGGS/Pages/ecoart.aspx.

Tom Dorman State Nature Preserve—a Kentucky River treasure

By Joyce Bender
Kentucky State Nature Preserves Commission

This is the first in a series that will appear in the future issues of Land, Air & Water.

It has been nearly 20 years since the Kentucky State Nature Preserves Commission (KSNPC) partnered with the Kentucky River Authority (KRA) to protect a unique area of forests, towering cliffs, bountiful wildflowers, sinkholes and limestone cascades. The KRA purchased the first 356 acres of what is now Tom Dorman State Nature Preserve (SNP) from The Nature Conservancy and later transferred ownership to the KSNPC. With help from the Kentucky Heritage Land Conservation Fund, the preserve has grown to more than 900 acres that border the Kentucky River on both sides in Jessamine and Garrard counties. The 220-foot cliffs, known as the Palisades, were formed by the erosive force of the Kentucky River. Some of the oldest bedrock in Kentucky, dating back 450 million years to the Ordovician period, is exposed on the Jessamine County side.

The Kentucky River Palisades are considered to be the most outstanding natural feature remaining in the Bluegrass Region. The river's entrenchment adds habitat diversity to the region as well as providing a dramatic landscape. The preserve protects one of the largest forested areas remaining within the Palisades corridor. It supports a number of rare plants as well as beautiful displays of wildflowers each spring. Hikers can glimpse deer and turkey from the moderately strenuous two-mile trail that winds through the forest down to the river's floodplain and back up to the ridge. It is a great place to bird watch, as many warblers use the river as a migration corridor. The preserve is extremely popular because of its beauty and location in central Kentucky. In addition to wide use by hikers, many college classes use the preserve for research and study.

TOP: ***Kentucky River Palisades.*** Photo by Shauna Dunham
ABOVE: ***Mesic Woods Trail.*** Photo by KSNPC

The preserve is open on the Garrard County side for public use year-round from sunrise to sunset. Spring is a good time to view the lush richness of the forested slopes, but all seasons offer gifts to its visitors. In summer, boaters on the river can marvel at the texture and colors of the sculpted forms of the cliffs. The forest's fall colors are brilliant, especially when framed against the cliffs and a cobalt sky. Winter removes the leafy canopy that sheltered the view of the cliffs and obscured the undulating ground where many sinkholes dot the uplands.

A short loop trail runs along the river's floodplain and passes through an old homestead; the chimney stones are all that remain. For those not wishing to descend to and climb back up from the river, a short spur trail accessible from the west or left side of the main two-mile loop trail parallels the bluff line and offers nice views of the cliffs. Note that the preserve is open for foot traffic only and dogs are not allowed. Visit http://naturepreserves.ky.gov/naturepreserves/Pages/tomdorman.aspx to learn more.

Awards

Heather McTeer Toney, U.S. Environmental Protection Agency Region 4 administrator (left), and Len Peters, Energy and Environment Cabinet secretary (right) congratulate Teena Halbig and Sheron Lear, co-founders of Floyd's Fork Environmental Association, on their award. Creative Services photo

EQC recognizes environmental stewards

By Janet Pinkston
Environmental Quality Commission

Improved sanitation leads to improved public health. That's why civil engineer **Gordon Garner** devoted his career to the engineering and design of public works. As executive director of the Metropolitan Sewer District for 18 years, Garner oversaw a sewer expansion program, adding up to 5,000 new customers each year. For his efforts, the Kentucky Environmental Quality Commission (EQC) presented Garner with a Lifetime Achievement Award during an Earth Day Awards ceremony in April.

Other recipients honored for their contributions to environmental protection and stewardship included:

• **Teena Halbig** and **Sheron Lear** founded Floyd's Fork Environmental Association to clean up a waterway that had become a dumping ground. Over a period of 22 years, the organization removed 120 tons of tires, appliances, shingles, 55-gallon drums and other trash from the creek.

• Councilwoman **Tina Ward-Pugh** of Louisville Metro government founded a sustainability committee and a website called Green Triangle. She expanded walking and biking trails, public green spaces and promoted composting and energy-saving practices. She forged partnerships to address storm water problems and leverage recycling and waste disposal ideas. Volunteers in her district started a one-acre community garden on the site of a former landfill.

• **Kurt Mason** made cleaning up Beargrass Creek a priority and that garnered him EQC's Public Service Award. Mason leads the way in reducing harmful runoff with the development of no-mow zones, conservation easements held by city government, and bioengineered streambank restoration and slope stabilization projects. Under his guidance, many workshops and forums have been held on natural buffers. His goal has been to help citizens understand how their choices affect the watershed.

• **The Green Institute** promotes ecoliteracy via a 12-week class for business and community leaders. Their homework results in projects such as community gardens, enhanced recycling, advertisements promoting sustainable practices, a bicycle/pedestrian greenway connecting multiple neighborhoods and reducing the heat island effect.

• Science teacher **Leslie Preston Meredith** of West Hardin Middle School encouraged students to plant a three-acre prairie on campus. In the process they studied soil and native grasses and saved the school district $1,529 annually in mowing costs. The children also monitored school buses for length of idling time, resulting in a policy change that reduced idling by 34 percent. Meredith also guided students in the production of a public service announcement promoting recycling and energy savings.

• Director **Terry Cook** of The Nature Conservancy of Kentucky lobbied for tax credits for landowners who wish to protect natural areas and developed a permanent funding source for this effort. By leveraging resources of partners in private and public sectors, the conservancy has helped conserve 100,000 acres. Cook also pursued a new law that enables nonprofit land trust organizations to apply for funds from the Kentucky Heritage Land Conservation Fund.

• High school students across Lexington belong to **The Bluegrass Youth Sustainability Council**, which has partnered with elementary schools to design curriculum for campus rain gardens. The council also conducted energy audits for Lexington-Fayette Urban County Government and Fayette County Public Schools and installed water bottle refilling stations in all high schools.

• The advanced placement students of **Karin Ceralde** at Shelby County High School participate in the National Audubon Society's Great Backyard Bird Count and Kentucky Division of Conservation

Continued on next page

Paul Laurence Dunbar High School wins Kentucky Envirothon

By Johnna McHugh
Division of Conservation

What are the three phases of soil erosion? Kentucky high school students who recently studied for the Kentucky Envirothon would know the answer is detachment, displacement and deposition. Ten teams of students competed against each other in May at the statewide Envirothon held at the Kentucky Leadership Center in Jabez, Ky. The questions were based on natural resources topics, including soils, forestry, aquatics, wildlife ecology and a current environmental issue that changes each year. This year's environmental issue was "sustainable local agriculture/locally grown." The 10 teams qualified for the Kentucky Envirothon by being the highest scoring teams of a total 32 teams that competed earlier this spring at two regional competitions.

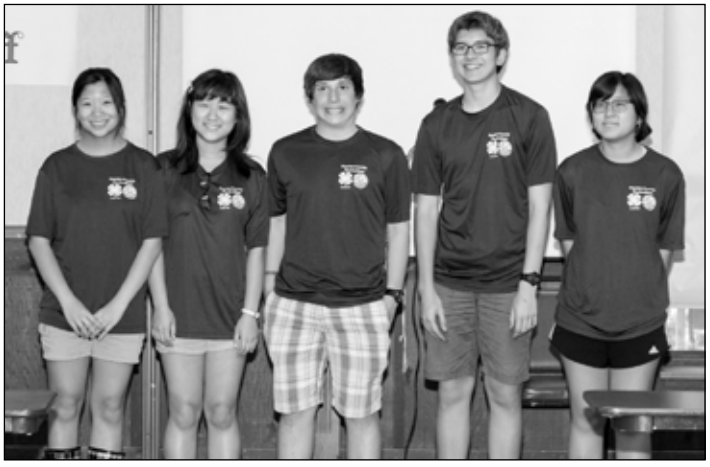
The team from Paul Laurence Dunbar High School, representing Fayette County, was the overall winners of the Kentucky competition. Each of the five team members will receive a $500 scholarship sponsored by Dow Corning. They also were recognized for being the highest scoring team in the current issue category.

Madison Southern High School was the highest scoring team affiliated with a local FFA chapter. They will represent Kentucky at the Environmental and Natural Resources Career Development Event, which will take place in conjunction with the National FFA Convention in Louisville, Ky., in October. They were recognized for being the highest scoring team in the forestry category.

The Clay County High School team had the highest scores in the soils and wildlife categories. Another team from Paul Laurence Dunbar High School scored the highest in the aquatics category, and a team from the Gatton Academy, representing Warren County, scored the highest in the oral presentation.

"The Kentucky Envirothon is a great competition for students," said Kimberly Richardson, director of the Kentucky Division of Conservation, about the importance of Envirothon to Kentucky's youth. "It is such a joy to see kids getting outside to explore the nature around them and getting away from the electronics that control our lives. Envirothon instills in these young adults respect their natural resources and work to conserve them."

The Kentucky Envirothon competition is sponsored by Kentucky Association of Conservation Districts, Kentucky Corn Growers Association, Kentucky Small Grain Council, Kentucky Farm Bureau, Kentucky Department of Agriculture, Kentucky Association of Conservation District employees, and Kentucky Association of Conservation Districts Auxiliary.



ABOVE: ***Paul Laurence Dunbar High School students are winners of the Kentucky Envirothon.*** **BELOW:** ***Madison Southern High School students will compete at the National FFA Convention this fall.***
Photos by David Hargis

EQC recognizes environmental stewards

Continued from previous page

Essay and Art Contest. Through the assignment, students write essays for the general public about what they have learned for increased awareness.

- **The DuPont—Louisville Works Plant** is the world's only supplier of vinyl fluoride, a chemical used in solar panels. To reduce pollution, DuPont introduced a new process in 2012 to reduce the amount of hazardous waste generated by the manufacturing process. Thanks to the new process, the quantity of hazardous waste generated is expected to be less than 10,000 pounds every two to three years—a reduction of 90 percent.

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Seedling nurseries: growing trees for healthy and productive forests

Cindy Schafer photos

River birch is a type of deciduous tree that is wonderful for moist, wet soils. It is relatively disease resistant and makes an excellent tree for urban environments.

River birch is a specimen tree that has an exfoliating bark that exposes the inner bark, which can be colored gray-brown to cinnamon brown to reddish brown and salmon pink. For these reasons, it is an excellent tree for home landscaping.

Seedlings are available from early fall to early spring from the Division of Forestry's nurseries. Orders are shipped for planting projects during the dormant period. Visit http://forestry.ky.gov/statenurseriesandtreeseedlings/Pages/default.aspx or call 1-800-866-0555 for information.

Just the Facts: River Birch (Betula nigra)

- ***Growth:*** River birch grows 40 feet to 70 feet in height with a spread of 40 feet to 60 feet. It has long, sharp-pointed, lustrous green leaves that change to yellow in the fall.
- ***Range:*** River birch occupies large eastern, north-south ranges in North America from Minnesota to Florida. The tree is intolerant to shade. It is best adapted to moist soils and is usually found in the wild along stream banks and in swampy bottomlands that are periodically flooded; it will survive in drier soils although reaches its maximum development in moist, fertile areas.
- ***Wildlife Uses:*** A number of species of birds eat river birch seeds, including ruffed grouse and wild turkey. White-tailed deer browse its twigs, buds and foliage. The bottomland hardwoods in which river birch occurs are prime wildlife habitat, providing nesting sites for waterfowl, and food and cover for many animals.
- ***Tree Trivia:*** From canoe skins and utensils used by Native Americans to scenes of striking sylvan beauty, the river birch has long been loved by Americans. This fascination is seen in the poetry of two very different ages. Henry Wadsworth Longfellow wrote in "The Song of Hiawatha:" *Give me of your bark, O Birch-tree! Of your yellow bark, O birch tree! I a light canoe will build me / That shall float upon the river.* And many years later, by Robert Frost who wrote in his poem "Birches:" *I'd like to go by climbing a birch tree, / And climb black branches up a snow-white trunk / Toward heaven… One could do worse than be a swinger of birches.*