

How Can Trees Be a Direct Part of a Public Water Supply System's Operation?

In this view to the south, Douglas County's E 1700 Road splits the original Baldwin Woods into two separate tracts. With the recent expansion of the property, a much larger contiguous tract to the west is now available for research.

On April 30, 2016, the Kansas Biological Survey announced the expansion of a natural area located in Douglas County, Kansas. This preserve, collectively known as Baldwin Woods, was comprised of three different tracts of land covering 202 acres before the expansion. These tracts are under the management of the University of Kansas Field Station. The two largest tracts are separated by a paved county road which directly connects Baldwin City to its largest neighboring city, Lawrence. The third tract is separated from the other two by a privately owned tract of land only 460 feet wide. The University of Kansas made the first purchase of Baldwin Woods land in 1965, and have made additional smaller purchases through 1974. The forest preserve has remained at this size until the purchases this year.

With the generosity of some Baldwin Woods neighbors who offered to sell their land below market value, and with funding from the U.S. Forest Service, the U.S. Fish and Wildlife Service, The Conservation Fund and the Douglas County Heritage Conservation Council, Baldwin Woods is now 456 acres in size! The purchase also makes the preserve one contiguous tract of land, except for the 80-acre tract known as the Rice Woodland, which lies east of East 1700 Road connecting Baldwin City and Lawrence.

The Woods lie on the south side of the Wakarusa River valley, nearly adjacent to the watershed divide between the Wakarusa and the Marais des Cygnes Drainage Basins in southeast Douglas County. Most of the tracts have been in native timber since the time leading up to statehood, with

only minimal disturbance. One such disturbance was the roadbed of the Leavenworth, Lawrence & Fort Gibson Railroad which was constructed through the woods from Lawrence to Ottawa in 1868. It was abandoned by the Santa Fe Railroad in 1963. At ground level, visible evidence of the railroad is hard to discern.

Prior to the first transfer of land, a survey of the woody fauna was completed. At that time 52 different species of woody plants were identified, which included 31 different trees. More recent surveys finds that all of the originally found species remain, and a few non-native plants have now moved in. Botanists refer to this type of forest as an Eastern Deciduous Forest, which can be found from eastern Kansas to the Atlantic coast.

More than one reader is probably asking why was it important for the

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The National Natural Landmarks in Kansas:

Site	County	Establishment
Baldwin Woods	Douglas	1980
Baker University Wetlands	Douglas	1969
Big Basin Preserve	Clark	1979
Monument Rocks Natural Area	Gove	1968
Rock City	Ottawa	1976

The full list of the National Natural Areas in the United States can be found at <https://www.nature.nps.gov/nnl/docs/NNLRegistry.pdf>

university and conservation groups to expand the preserve, why was the first purchase necessary, and why is this article in this publication? Baldwin Woods' proximity to the university is an obvious benefit, as it is only 15 miles from the KU campus, and thus makes it very accessible to managers and researchers there. It is also located near the Kansas City & Johnson County - Lawrence - Topeka corridor that is continuing to experience urban and semi-urban development. This unique area was designated by the National Park Service as a National Natural Landmark in 1980, and was the last site in Kansas to be so designated. The National Natural Landmark Program attempts to recognize the best examples of biological and geological features in both public and private ownership.

Baldwin Woods has been the site of many different kinds of research. Past research conducted here have included studies of the diversity of the plant and animal species and changes of the succession of the land from mainly grasses to tall slow-growing and long-lived trees. Future research is not completely decided at this time immediately after the land ownership transfer. Many discussions will be held with many different disciplines, and likely in conjunction with the sellers of the properties, to determine what research is important, practical and unique to this area. It is likely that some of this research will at least indirectly benefit water systems, especially those that rely on reservoirs impacted by sedimentation.

The land that has been added is primarily forested, although some of it is currently enrolled in the Conservation Reserve Program (CRP) and some of it has been used for grazing and haying.

What's the benefit?

So how does the Baldwin Woods benefit public water systems? It might help us, through research, understand what standard of water quality might be possible for the rivers and creeks in

The city of Lawrence has many water wells along the south side of the Kansas River in Burcham Park. Lawrence Well No. 7 is, as are most of the wells along the river, located within a forest of large Cottonwood Trees, which don't appear to negatively affect groundwater pumping.

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this part of Kansas. Research might show us how undisturbed watersheds behave without water rushing off of pavement, what a natural creek actually looks like and how the water flows through such a system at low and high flows. Maybe there are some



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Consider this: The Kansas Department of Health and Environment requires that the area within 100 feet of permitted wells be absent of pollution sources, and controlled to remain that way through documentation showing direct ownership or a perpetual lease.

interesting and useful facts about the water demand of trees in an undisturbed setting. Is there something about nutrient use by trees that is waiting to be learned that can help remediate groundwater contamination sites? The expanded site should provide better opportunities to conduct experiments that compare and contrast the natural world with the world we use for cities, subdivisions,

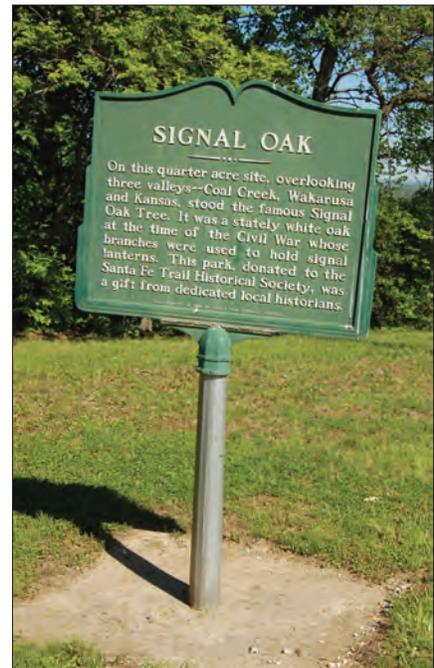
transportation, food production, etc. Why my interest in trees? I've had a long interest in the world and everything in it. Trees are just one part of my curiosity. Of course I have my favorite trees. Redbuds capture my attention in their willingness to be on the edges of groves of trees, trying to push the edge of the grove a little farther into the grassland. I like Sycamores, but at a distance. They

provide such great contrast to the black bark of trees in the wintertime. (I hear the leaves of a Sycamore are difficult to remove from lawns in Autumn.) Overall though, the Oaks have most of my affection. It might not be a recommended practice, but I often grab handfuls of acorns during my fall travels to plant on my property. I know I can find at least a dozen Oak trees today, a few of which are more than 12 feet tall. To my knowledge, there are no other Oaks in my neighborhood, and I wonder why the Hackberry, Locust and Hedge dominate as they do. I'm trying my best to increase the diversity of trees and specifically oak varieties.

So, how can trees be a direct part of a public water supply system's operation? Consider this: The Kansas Department of Health and Environment requires that the area within 100 feet of

There once was a large White Oak tree called Signal Oak on the top of the bluff above what is now Baldwin Woods. Prior to Kansas statehood, men from Missouri referred to as Border Ruffians would often come to the Lawrence area searching for escaped slaves. When these people would depart Baldwin City for Lawrence, the free-state settlers would warn those in the vicinity of Blue Mound, ten miles to the north, of the raiders pending arrival by hanging lanterns in this tall oak tree. The Blue Mound residents would relay the lantern warning to Mount Oread on the west side of Lawrence.

The Signal Oak Tree is no longer alive; it died around 1914. A small park suitable for picnics has been established at the site however, to preserve the history of the tree and the struggle for the establishment of the state of Kansas. The park offers a magnificent view of the Wakarusa and Kansas River Valleys.



This historical marker identifies the location of Signal Oak Park near Baldwin City.

Left: One can see for miles across the Wakarusa River Valley to Lawrence and the Kansas River Valley from Signal Oak Park.

permitted wells be absent of pollution sources, and controlled to remain that way through documentation showing direct ownership or a perpetual lease. From the source water protection part of the brain, one might think the language should say “the area within a minimum of 100 feet.” Instead of settling for the smallest area allowed, public water supply system should consider the benefits of controlling a larger area and therefore better protecting their wells from contamination sources. Having a larger area under control also provides much greater flexibility to relocate a water well if the need occurs without having to renegotiate a new lease or purchase.

So if a water system has a semi-permanent well (hopefully) in a perpetual easement, why aren't these small tracts of land being used to grow a small semi-permanent crop like Black Walnut trees? The Kansas Forest Service states that the Black Walnut tree is native to the eastern half of Kansas. It prefers deep, fertile, well-drained bottomland soils. A mature

Heavy equipment needed to redrill wells may find that trees increase the difficulty of maneuvering to the new well drilling location.

height of 90 feet is possible, with an average height of 24 to 28 feet in its native range after 20 years. This kind of crop needs no herbicides, pesticides or fertilizers. The roots of trees are found deeper than most grasses, and therefore might have the capacity to remove more nutrients. Once established, if trees are planted parallel to the boundary of the well easement, the boundary should become semi-permanent too. Walnut trees that have been grown with proper care can be harvested for lumber to be used for furniture, veneers, gun stocks and wall paneling.

There are likely some negative factors to tree planting in well easements. Heavy equipment needed to

redrill wells may find that trees increase the difficulty of maneuvering to the new well drilling location. Careful planning of tree planting locations could reduce this difficulty. Are there other problems? Is there a water system and landowner willing to try this idea to learn what can happen to benefit other water systems?

Let KRWA know if this is a project that you think might succeed around your system's well sites. The Source Water Protection staff would be pleased to incorporate this idea into your existing Source Water Protection Plan or to put it in a new plan developed for you. We welcome your thoughts, concerns, requests and ideas.

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WHATEVER IT TAKES!



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