Town Branch Trail

Environmental Education Sign Project

In most areas of so many cities, the influence of human activities and man-made objects overwhelms or obscures the sights, sounds and rhythms of the rest of our environment. We draw an artificial distinction between man and nature, though humans are part of nature. Because humans so dominate the urban environment, it is good to be reminded that we are part of a bigger and more complex system, and to think about how we can be more sensitive to and lessen our impact on other living things and the places we share.

Many people in cities and suburbs rarely get out to more pristine environments to learn about wildlife and natural systems. Bringing information about wildlife and the environment to people, in the cities where they live and work, is the best way to reach them. Therefore the Kentucky Department of Fish and Wildlife Resources, funded in part through the Federal Conservation and Restoration Program, approached Town Branch Trail, Inc. about developing and producing environmental education interpretive signs to go with the trail. Because construction of the first segment of the Town Branch Trail greenway was not anticipated to begin until 2003, it was decided that only two signs actually would be fabricated and installed, but the entire set would be produced as an exhibit which could travel to schools, libraries, scouting groups and the like.

The result is a compilation of fourteen topics associated with Town Branch Creek and its environmental context. The role of water in the environment is a main focus of the project, along with raising awareness about human impacts on ecosystems and ways to reduce those impacts.

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Town Branch Trail, inc

a greenway trail along Lexington's historic waterway

www.TownBranch.org

Invasive Species

A plant or animal not native to a particular area is considered an introduced, "exotic", or "alien" species. Sometimes a species is purposely introduced. Kudzu was planted to control erosion along railroads and highways. English Ivy and many ornamental plants were added to gardens. Other times the introduction of non-native species is quite accidental, like when zebra mussels travel on the bottoms of boats trucked from one region to another.

Although many exotic plant and animal species are harmless, some become a threat to native plants or animals. These invasive species can:

- *Spread or reproduce wildly because they have no natural enemies or diseases in their new environment.*
- *Crowd out native plants by using all the water or nutrients, causing their decline or eventual extinction.*
- *Upset the balance of the food chain.*

Use Native Plants in Lawns and Gardens

- *Adapted to conditions in the Bluegrass and need less maintenance.*
- *Require less water and fewer pesticides and fertilizers.*
- *Provide food and shelter to native wildlife.*

Common Invasive Species

Invasive species in Kentucky include starlings (birds), zebra mussels (shellfish), and bush honeysuckle, winter creeper and multiflora rose (plants). Bush honeysuckle covers the banks of Town Branch in many places.

Bush Honeysuckle

Photo by Tom Barnes

Multiflora Rose

Winter Creeper

Water Primrose

Zebra Mussels

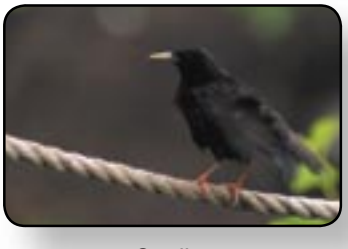


Photo by Tom Barnes

Starling

Biological Monitoring of Town Branch

By looking at what lives in a stream (biological monitoring), you can learn about its health, changes in stream conditions, and effects of pollution.

Fish and macroinvertebrates (aquatic insects, snails, crayfish, mussels, and worms) are good indicators of pollution levels because they:

- *Live in water all of their life.*
- *Differ in their tolerance or sensitivity to pollutants.*
- *Can be easily collected and identified in the field.*

Knowing just that fish and macroinvertebrates live in a stream is not enough. We need to know what kinds of organisms can be found, how many, and their health.

A large variety of fish and macroinvertebrates indicates better water quality. Finding mayfly nymphs or darters, which can survive only in water that is very clean, means the water is healthy.

Other organisms, such as worms or creek chub, love to live in water that is dirty. If you only find these animals, it may signal the presence of pollutants or physical problems such as loss of habitat caused by channel changes

Creatures in the Water

What lives in a stream can tell you about water quality. Discover the type of fish, aquatic insects, snails, and worms.

Excellent Water Quality if Find:

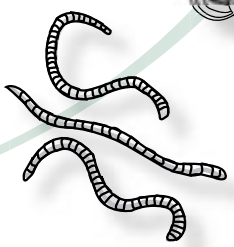
Mayfly Nymphs
Stonefly Nymphs
Caddisfly Larvae
Darter

Mayfly Nymph

Stonefly Nymph

Poor Water Quality if Only Find:

Worms
Pouch Snails
Leeches
Bluntnose Minnow
Creek Chub



Measuring the Health of Town Branch

As with people, checking the temperature is one way to see if a stream is healthy or sick, doing better or getting worse.

Indicators of Water Quality

Physical and chemical yardsticks can help measure water quality.

- ***Appearance*** *– chemicals may change water color, oil may cause a multi-color sheen, detergents may cause foam, and soil may cloud streams.*
- ***Smell*** *– odors may suggest the presence of sewage or pollutants.*
- ***Temperature*** *– high temperatures caused by the lack of shade reduce the ability of water to hold oxygen, which is necessary for life.*
- ***Oxygen*** *– low oxygen levels may signal contamination from human or animal wastes or too much fertilizer.*
- ***Nutrients, Bacteria, or Algae*** *– high amounts may point to human or animal waste or fertilizers.*
- ***Acidity or Alkalinity (pH)*** *– too high or too low levels can hurt fish and other creatures as most are adapted to a specific pH level.*
- ***Metals, Chlorine, and Pesticides*** *– even small quantities can harm life.*

Changes in physical and chemical measurements may indicate that something is affecting the water, such as discharges, spills or runoff. Kentucky River Watershed Watch volunteers use these measures to keep an eye on Bluegrass area streams.

Visual Indicators

Mysterious substance clouds Town Branch

Top: Rusty color could indicate a problem

Bottom: Possible oil or gasoline

Human Impacts on Town Branch

Early Lexington got its drinking water from springs. In 1795 the Trustees had to prohibit people from washing at the public springs because they were fouling the water.

Town Branch once flowed steadily through downtown. It was big enough and clean enough in early years that townspeople even fished there.

Over time, Lexington

- *threw its garbage and sewage into Town Branch and its tributaries.*
- *filled in and paved over many of the stream's recharge areas, wetlands and springs.*
- *straightened Town Branch to make way for new homes or businesses.*
- *diverted Town Branch to run mills and factories, including a lead factory, paper mill, hat factory, tanneries and flour mills.*
- *cut down trees and built buildings and roads, that increased flooding.*
- *covered over Town Branch and built roads and buildings on top of it.*
- *built a storm sewer system for downtown and the University which drains right into Town Branch.*
- *built a landfill right on the stream banks.*

Other Impacts

- *The Pepper Distillery warehouse collapsed in 1934, dumping 12,000 barrels or 250,000 gallons of bourbon into Town Branch.*
- *A 1999 paint factory fire spilled gallons of paint and linseed oil into a storm sewer draining directly into Town Branch. The paint killed many fish in Town Branch and Elkhorn Creek.*

Despite the impacts that people have had on Town Branch, fish and other creatures still live there and many parts are still beautiful. Nature is resilient if we give it a chance.

Lexington, Kentucky 1804

During the early years of Lexington there were numerous springs along the course of Town Branch, many of which had been created by excavating wet-weather seeps.

A. John Robert Shaw advertised in 1797 a log house with "a good spring before the door."

B. At the corner of Spring and Main streets, "the spring coming from underneath the house which gave the name of the street." Filled in by order of the town trustees in 1801.

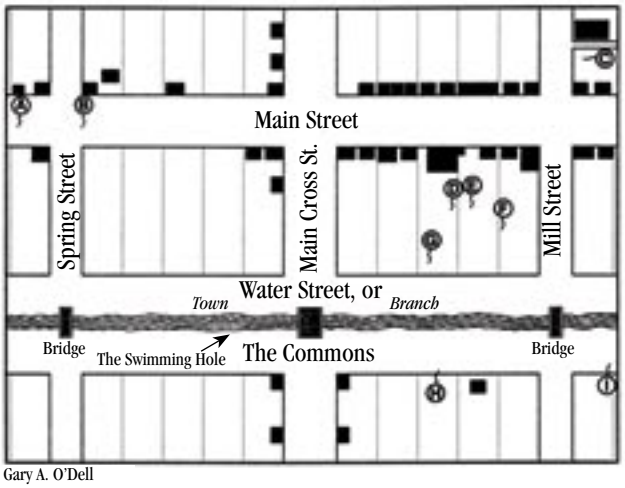
C. The schoolhouse spring became the second public water supply for the town.

D. John Bradford had a brick spring house 20 feet by 10 feet from which rose a "stream of cold water which never fails in the driest season."

E. The public spring was used as the community's primary water source for nearly half a century.

F. The Leavy spring house.

G. Bradford also had an additional "spring of cold water" in the back yard. So many springs occur so closely in this area that this group of springs was probably interconnected.



Gary A. O'Dell

H. A spring was reported in this location 140 feet from Broadway and 53 feet from Water Street, where "the bank went down steep into this spring, as into a deep hole.

I. In 1805 the Gazette advertised for sale a lot 16 feet by 32 feet, "Immediately in front of this Lot, is an excellent spring."

Water: What goes around . . .

Water forms a never-ending circle called the hydrologic cycle. It is nature's way of recycling water. Sunlight and gravity drive the hydrologic cycle.

Water:

- *Falls to the ground in the form of rain or snow.* ***(Precipitation)***
- *Flows downhill to ponds, streams, and lakes.* ***(Runoff)***
- *Sinks downward into the soil.* ***(Infiltration)***
- *Travels underground through tiny spaces in soil and cracks in rock.* ***(Percolation)***

Sun's Energy:

- *Melts ice and heats water.*
- *Changes water into vapor.* ***(Evaporation)***
- *Pulls water vapor from plants, which have gathered water through their roots.* ***(Transpiration)***
- *Heats the ground and causes warm updrafts.*

Water Vapor:

- *Collects as dew on the earth's surface as the air temperature cools* ***(Condensation)*** *or collects around tiny dust particles in the air to become droplets.*
- *Forms clouds from the droplets, which are blown by the winds.*
- *Cools as the clouds rise or as the clouds bump into colder air.*
- *Forms rain or snow to begin the cycle again.* ***(Precipitation)***

Everything is connected by the hydrologic cycle — what is done to the land and the air eventually affects the water. Pollutants (dirt or chemicals) in the air fall to the earth with rain or snow and can move with the water into nearby streams.

Hydrologic Cycle

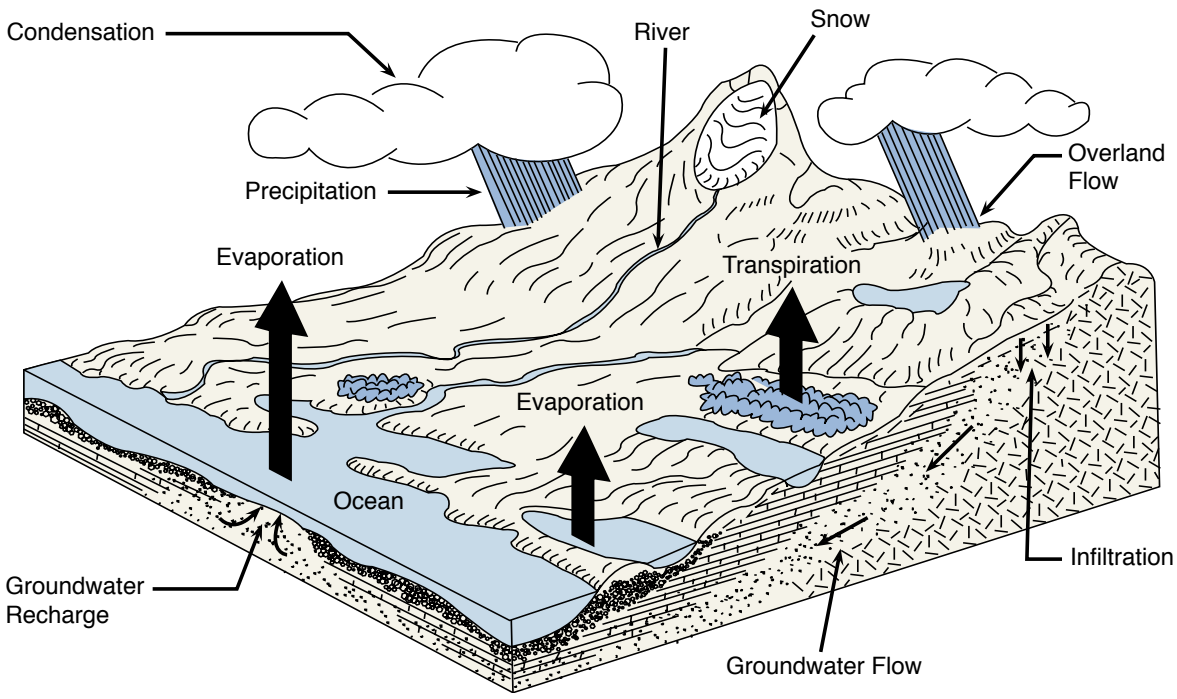


Illustration courtesy of Kentucky Geological Survey

Stream Morphology

The morphology of a stream is the shape and pattern taken by its bed and channels. A stream develops in response to the energy of the water moving through it and the ability of that water to carry or deposit sediments. Each stream has its own particular shape created by:

the surface conditions of its watershed

- *rock type*
- *soil*
- *steepness*
- *vegetation cover*
- *buildings, streets and other impervious surfaces*

amount of water coming from

- *rain or melted snow*
- *tributary streams*
- *groundwater flows*

the timing and magnitude of the water flows

- *daily and seasonal average rainfall*
- *frequency and sizes of flood-producing storms.*

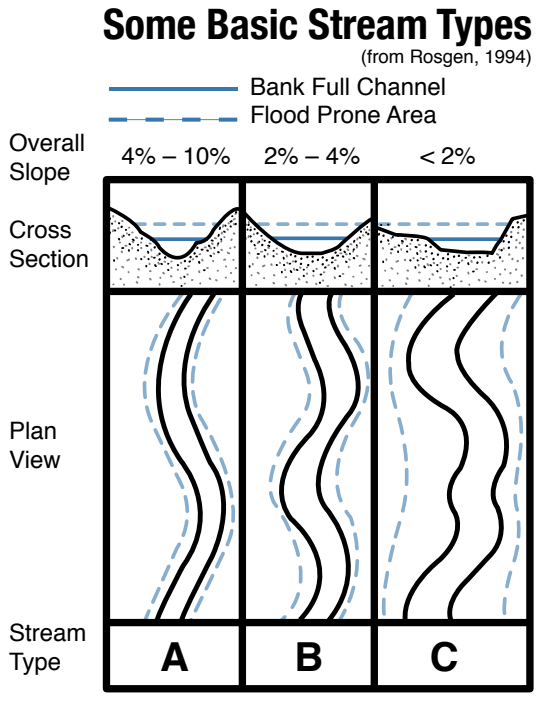
A stream is always changing, because the movement of the water wears away the land over which it flows. A stream is described by:

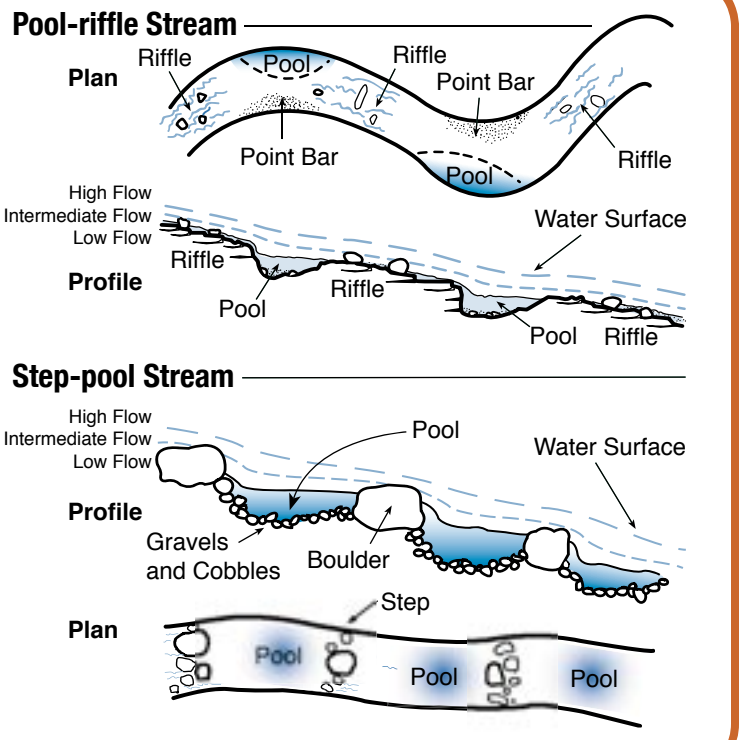
- *how curvy it is* ***(sinuosity)***
- *the steepness of its channel* ***(gradient)***
- *its channel width, depth, and roughness* ***(dimensions)***

The original shape of Town Branch has been heavily altered in places by:

- *stone wall construction that directed water for early industrial use*
- *re-engineering for flood control construction of bridges*
- *channelization and covering as downtown Lexington was built over the top of it*

A stream's form is a result of dynamics between water and land. Changing a stream's shape in one place often triggers compensating changes in other sections, causing unexpected problems of erosion and flooding.





Riparian Corridor

The riparian or stream corridor includes not only the stream itself, but a wider belt of land affected by the stream, consisting of

- *the stream banks*
- *the floodplain*
- *associated wetlands*
- *the transitional upland edge*

Stream corridors are important because they

- *provide safe pathways for animals to travel to find food and mates*
- *connect areas of natural habitat otherwise isolated from each other*
- *often comprise the largest amount of natural habitat available in developed areas, although in a long and narrow shape*

Floodplains:

Wide flat areas where flood waters spread out and slow down, reducing erosion. The stream deposits silt, so floodplain soils are often very fertile.

Wetlands:

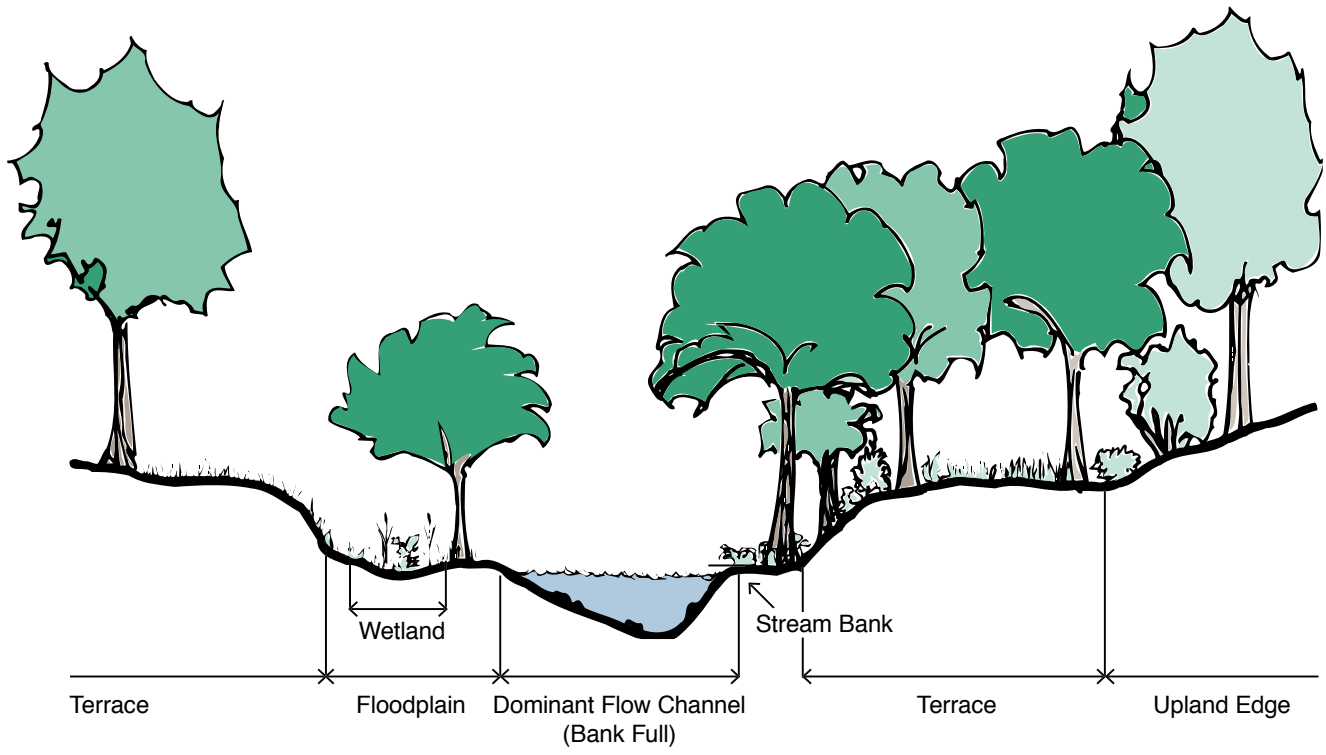
Areas that store water and allow it to seep into the earth. Wetland plants filter nutrients and pollutants out of the water. Amphibian species such as salamanders and newts may be born and develop in wetlands.

Upland Vegetation:

Vegetation at the edges of the stream corridor provides cover so animals can get to the water to drink or hunt. It also reduces erosion, and filters out pollutants before they can reach the stream.

Greenway trails in stream corridors provide two important benefits: protecting the stream corridor and creating recreational opportunities.

Anatomy of a Stream Corridor



Urban Wildlife

You don't need to visit a zoo or the countryside to discover wild animals. They can be found in your own backyard. Urban wildlife has adapted to changing habitats, noise, lights, pollution, traffic, and people. Some urban wildlife is easy to see (squirrels and birds) but others are hidden from sight (salamanders and earthworms) or come out only at night (opossums, fireflies, and bats).

Be an Animal Detective

Wild animals leave clues or signs in backyards, woods, and parks. A sign is anything that tells you where an animal has been, what it was doing, and what it was eating.

Look for:

- *Tracks or animal footprints that can be found in snow, mud, dust, and even on sidewalks or floors.*
- *Scat or droppings (animal poop).*
- *Tooth marks on plants, branches, or nuts.*
- *Nests, webs, or roosting places.*

Listen for:

- *Variations in bird calls.*
- *Chirping, buzzing, and sounds of insects.*
- *Scratching of squirrels or raccoons climbing trees.*

Ideas for Attracting Wildlife to Your Yard

Consider planting butterfly and hummingbird gardens, placing feeders or bird and bat houses, and installing bird baths. Compost piles provide a source of food for many small organisms, such as earthworms, millipedes, and mites.

Photo by Tom Barnes

Opossum

Photo by Tom Barnes

Raccoon

Bat

Eastern Garter Snake

Caterpillars

Photo by Tom Barnes

Pickerel Frog

Stormwater Runoff

When it rains, water that doesn't soak into the ground runs off to streams or storm sewers, picking up bits of soil and small debris. Some of the things the rain washes into the storm drains, and therefore the streams, are:

In urban areas:

- *oil, gasoline, grease and other car and truck fluids from roads and parking lots*
- *fertilizers, pesticides and herbicides*
- *dirt from construction sites*
- *cigarette butts*
- *pet waste*
- *litter*

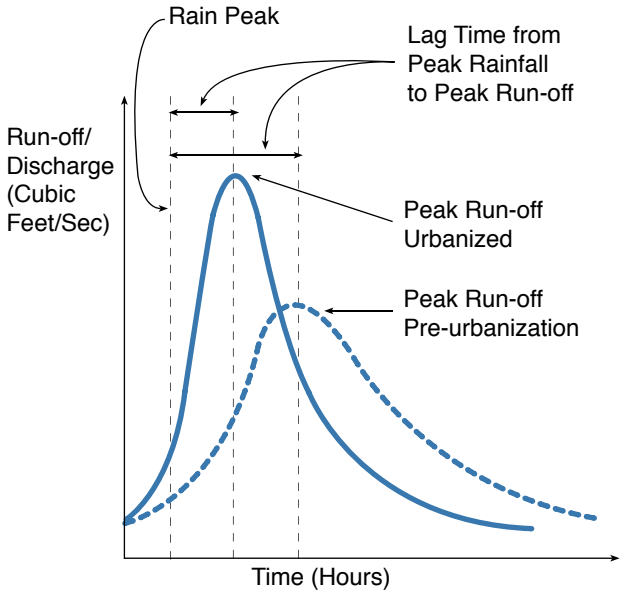
In rural areas:

- *farm chemicals*
- *animal waste*

Vegetation along a stream can help filter out some of the pollutants in surface runoff and protect the stream. Wetlands can store water and release it more slowly, allowing sediment to settle.

Lexington has a history of problems with flooding and storm water management. One of the functions of the proposed greenway system is to allow stream corridors and floodplains to perform their natural function of slowing, storing and cleaning storm water runoff. The storm water that runs off the streets of Lexington flows directly into Town Branch with no filtering or treatment of any kind.

Never pour anything except clean water into a storm drain.



Spilled auto fluids may end up in a stream.

Stormwater infiltration causes sanitary sewer to overflow.

Watersheds

All the area draining toward a stream is its watershed. Large watersheds are made of many smaller ones. Town Branch is part of a hierarchy that includes the South Elkhorn Creek, Elkhorn Creek, and Kentucky River watersheds.

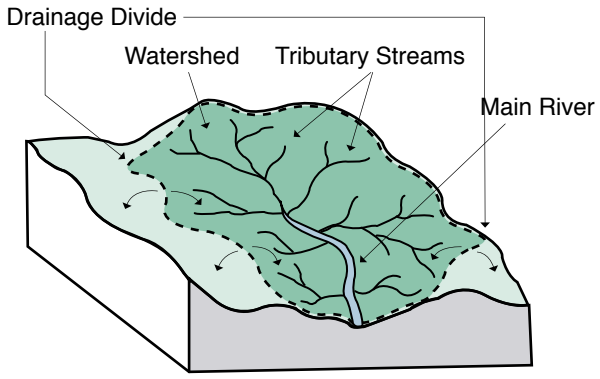
The size and flow of a stream depend on its watershed's

- *area*
- *topography*
- *geology and soil*
- *surface or land cover*
- *climate*

Streams are fed by overland flow, or runoff, and groundwater moving through soil and bedrock. Different surfaces absorb different amounts of rain.

What soaks in becomes part of the water table and provides a steady supply of water for the base flow of the stream. Rain runs off quickly from hard surfaces, which can cause flash flooding.

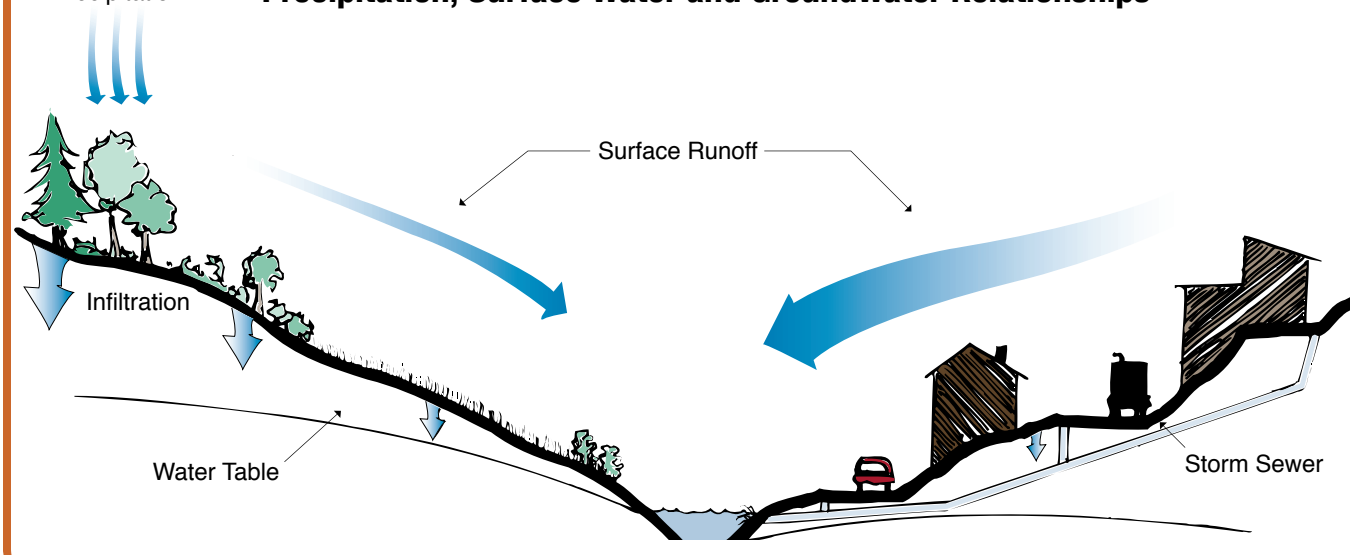
As land in a watershed gets developed, hard surfaces replace forest and field, so more rain runs off. Town Branch's watershed is mostly impervious surface. The creek flows very high right after a rain but there is little groundwater to keep it flowing in dry weather.



To protect streams, we can use building technologies that help control run-off and replenish groundwater:

- *porous pavements*
- *retention basins*
- *grass-lined drainage ditches*

Precipitation, Surface Water and Groundwater Relationships



Wetlands

Wetlands go by many names: swamps, marshes, bogs, and wet meadows. They offer unique benefits to people and the environment.

- *Filter pollutants from water.*
- *Soak up water like a sponge to reduce flooding.*
- *Help control storm water runoff from urban areas.*
- *Provide shelter and food for plants and animals.*
- *Offer recreational opportunities for bird or animal watching.*

Endangered Wetlands

More than half of America's original wetlands have been destroyed. Every year 70,000 to 90,000 acres of privately owned wetlands are drained or filled for development, mining, agriculture, and other purposes.

Since colonial times, many wetlands along Town Branch have been filled so that land could be farmed or developed into Lexington's streets and buildings. The loss of these wetlands is one reason for Lexington's history of flooding after rainstorms. Water, which used to be stored in these wetlands, now quickly runs off of rooftops and pavement causing streams to overflow or flood.

The Lexington Fayette Urban County Government is working to preserve and restore wetlands.

What are Wetlands?

Wetlands are areas covered with water for at least part of the year and have plants adapted to wet or soggy soil conditions.

Wetlands Inhabitants

Photo by Tom Barnes

Cattail

Photo by Tom Barnes

Salamander

Photo by Tom Barnes

Bull Frog

Photo by Tom Barnes

Arrowhead

Stream Habitats

Streams provide many types of habitat, or homes, for wildlife. Some features you can find in Town Branch include:

Riffles:
Where the water splashes over ledges and small rocks, lots of oxygen is mixed with the water, which is good for fish and other creatures.

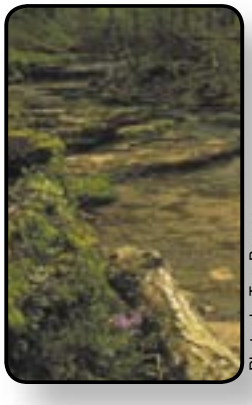
Gravel:
Small rocks and gravel on the stream bottom provide safe places for insects and small aquatic life to hide and feed. Some fish lay their eggs in gravel bottoms. Too much sediment or silt from erosion can fill the spaces in the gravel, smothering creatures or leaving them without shelter.

Pools:
Pools are deep quiet spots that provide safe places for fish to rest, or to retreat to when the water is low. The depth keeps the water cooler in summer and warmer in winter. Fish often wait in pools to catch food floating down from faster water.

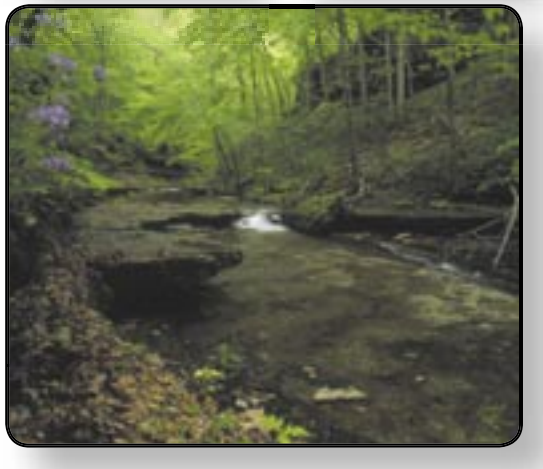
Rocks and fallen trees:
Big rocks and trees create quiet eddies in the water, where fish can rest or hide. Fallen trees attract insects and other small creatures that fish eat.

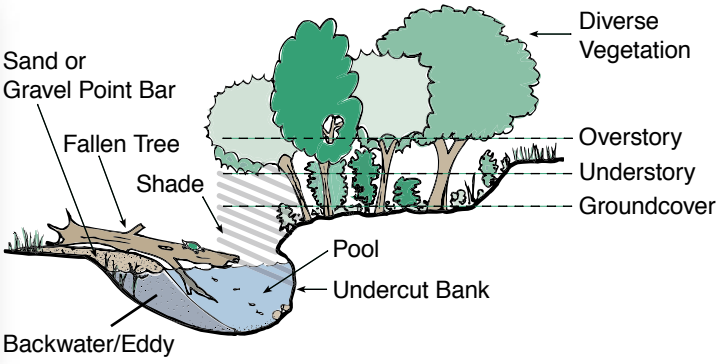
Vegetation:
Trees along the stream bank provide shelter for small animals. Shade helps control the growth of algae and keeps the water cooler so it holds more oxygen. Fallen leaves are food for insects that fish and other animals eat.

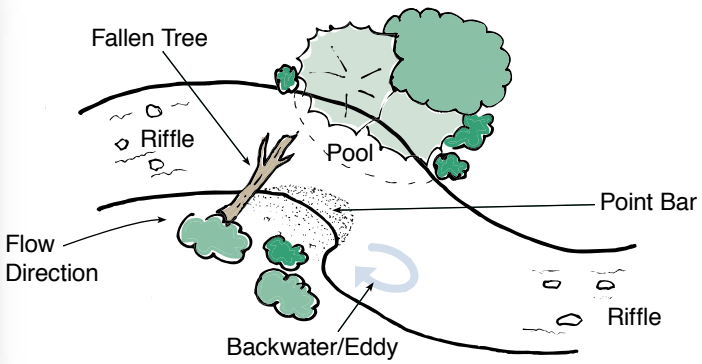
Stream Features



Photos by Tom Barnes







Karst

The Central Bluegrass region is a ***karst*** landscape, meaning it contains features created because the bedrock can be dissolved by water.

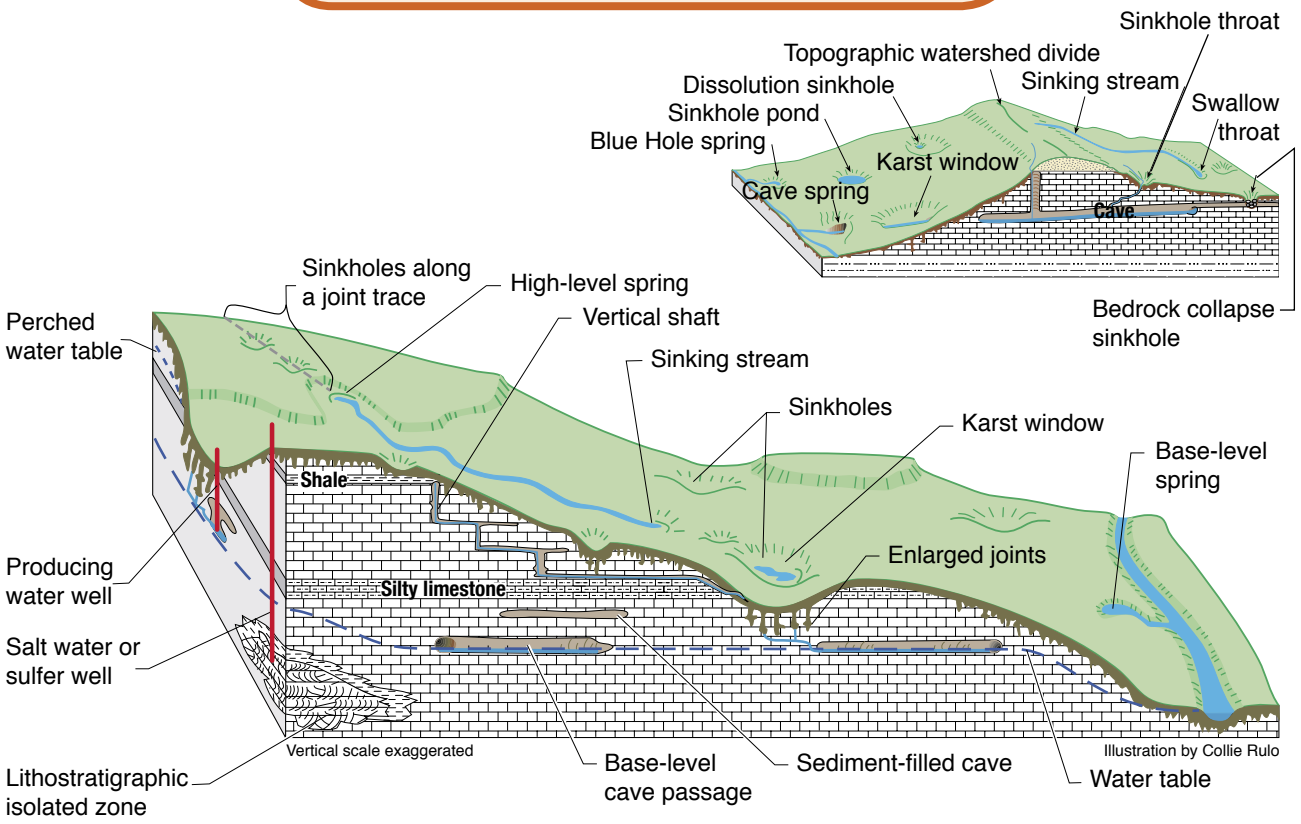
- ***Underground streams and surface streams*** *which disappear into the ground*
- ***Fissures and cracks*** *- where water travels through the rock*
- ***Springs*** *- where water comes to the surface after travelling underground*
- ***Caves*** *- channels and open spaces in the rock where water has worn it away*
- ***Sinkholes*** *- where a cave or channel near the surface collapses, or the ground slowly sinks as the rock below it dissolves and washes away*

Lexington was settled because many springs provided good sources of fresh water. Several springs in downtown Lexington flowed into Town Branch. Nearby McConnell Springs has karst features you can look at.

In karst landscapes water can travel one way on the surface of the ground and another direction underground. Pollutants can travel far and in unexpected directions. Cracks and openings in karst mean that lawn care products or agricultural chemicals can easily enter underground drainage paths and pollute drinking water wells or streams.

In the past it was common to throw trash or even run sewer lines into sinkholes, but now there are laws against this. It is important to protect sinkholes, because they connect to the underground water system. Contaminants that get into sinkholes can affect the water for miles and miles. But even putting lawn clippings and other natural materials in sinkholes can be harmful. When these organic materials decompose they use up oxygen, killing cave dwelling aquatic animals.

Karst Features



The Impact of Common Household Chemicals

We use many products daily that are actually powerful chemicals. Paints, cleaners, automotive fluids, garden products, even cosmetics, contain chemicals that can get into the water when

- *we rinse them down the drain*
- *rain or sprinklers wash them into storm sewers or streams*
- *they soak into the soil and are carried by groundwater into streams*

Stormwater generally is not treated. Wastewater treatment and even drinking water treatment do not remove many chemicals. Products we use go into groundwater and streams, affecting not only plants and animals but people who get their drinking water from these sources.

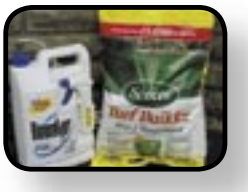
What can you do to reduce the impact of household chemicals?

- *Do without it — is it convenient but not really necessary?*
- *Use less of it, and use it less often.*
- *Substitute a less harmful product.*
- *Follow directions for safe use and disposal.*
- *Never pour chemicals into storm drains or the street.*

Some Alternatives

Paints, solvents

- Use water or latex based paints when possible.
- Give unused paint to charities, to neighbors, or use in craft projects.
- Allow paint to dry in cans, and/or fill cans with clean sand or cat litter before leaving them beside your trash can for pick up.
- For small amounts of solvents, let evaporate outdoors away from children and animals.



Garden chemicals

- Reduce amount of lawn
- Pull weeds by hand
- Put mulch in planting beds
- Never apply chemicals when it is going to rain or is windy
- Use plants resistant to disease and pests
- Plant the right plants for the conditions in your yard

Household cleaners:

(Those containing lye, phenols, trichlorobenzene, and petroleum distillates are especially toxic.)

- Oven cleaner: Apply table salt to spills, scrub with washing soda and water
- Detergent: Find the one with the least phosphate.
- Drain cleaner: Put 1/2 cup baking soda down the drain, then 1/2 cup vinegar, then boiling water (adults only).
- Glass cleaner: 1 part water, 1 part vinegar
- All-purpose cleaner: 1 cup baking soda in 1 gallon hot water

For information about disposal of common household chemicals, call LEXCALL 425-2255

Town Branch Trail: A greenway trail along Lexington's historic waterway

Town Branch Trail (TBT) is a proposed 'shared-use' greenway trail (paved route for pedestrians and bicyclists) that will connect downtown Lexington with area neighborhoods, parks and historic sites as it follows the westward course of Lexington's historic waterway, the Town Branch of Elkhorn Creek. The trail is a significant component of the recently adopted Lexington-Fayette County Greenway Masterplan.

The many benefits of Town Branch Trail include:

Recreation and Health

Town Branch Trail will promote healthful walking, bicycling and running by providing a safe way to get between neighborhoods and many popular destinations, for residents and visitors alike.

Tourism and Economic Development

An attraction for tourists and convention visitors, the trail will also encourage reinvestment in an underutilized area of the city. The amenity of the trail will attract new residential, commercial and mixed use development, and new businesses will spring up to serve trail visitors.

Education

The Town Branch Trail has many opportunities for learning about Lexington history, natural history and environmental science topics.

Environment

The greenway will bring many visitors close to Town Branch, becoming a catalyst for efforts to improve the water quality and wildlife habitat along the stream.

Community Development

Town Branch Trail will provide a link among downtown and suburban neighborhoods, and be a recreational amenity for many underserved urban neighborhoods.

Town Branch Trail, Inc. is a 501(C)(3) non-profit group working to make Town Branch Trail a reality. Visit our webpage at http://www.townbranch.org or call Van Meter Pettit at 859-258-9253

Cut and send to get on our mailing list

Name: _____

Address: _____

City: _____ **State:** _____ **Zip:** _____

Email: _____ **Phone:** _____

☐ Please put me on your mailing list

☐ Please contact me about volunteer opportunities

☐ I am enclosing a tax-deductible contribution in the amount of _____

Mail to: Town Branch Trail, Inc., 155 Constitution St. , Lexington, KY 40507

Town Branch Trail: a greenway trail along Lexington's historic waterway