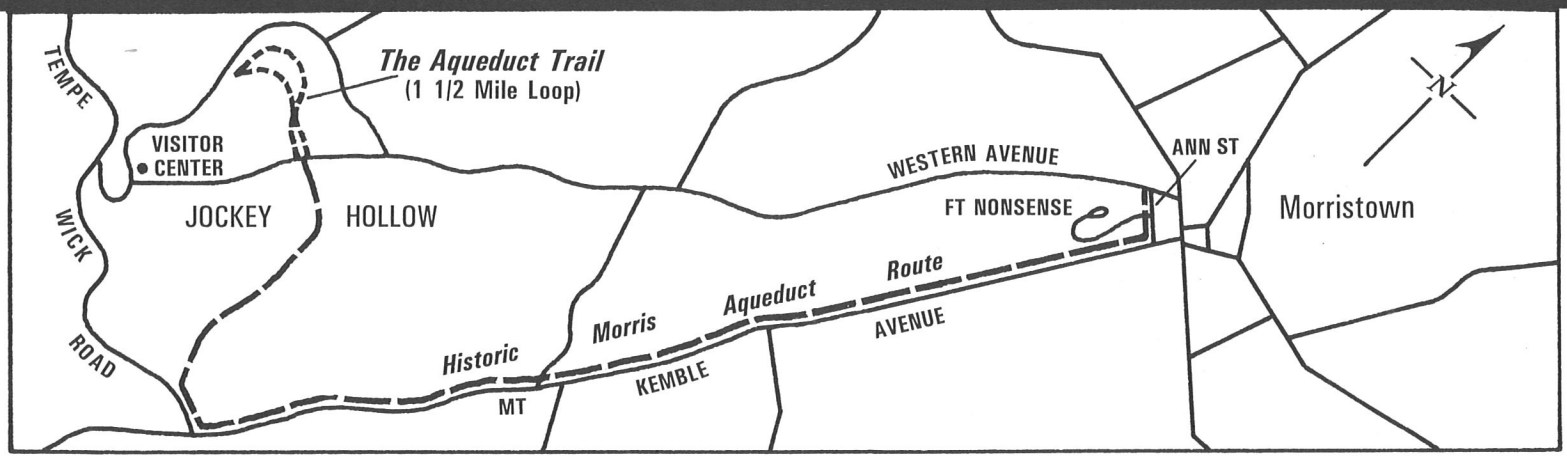
The Aqueduct Trail

Self-Guided Interpretive Trail

National Park Service

Morristown National Historical Park

New Jersey



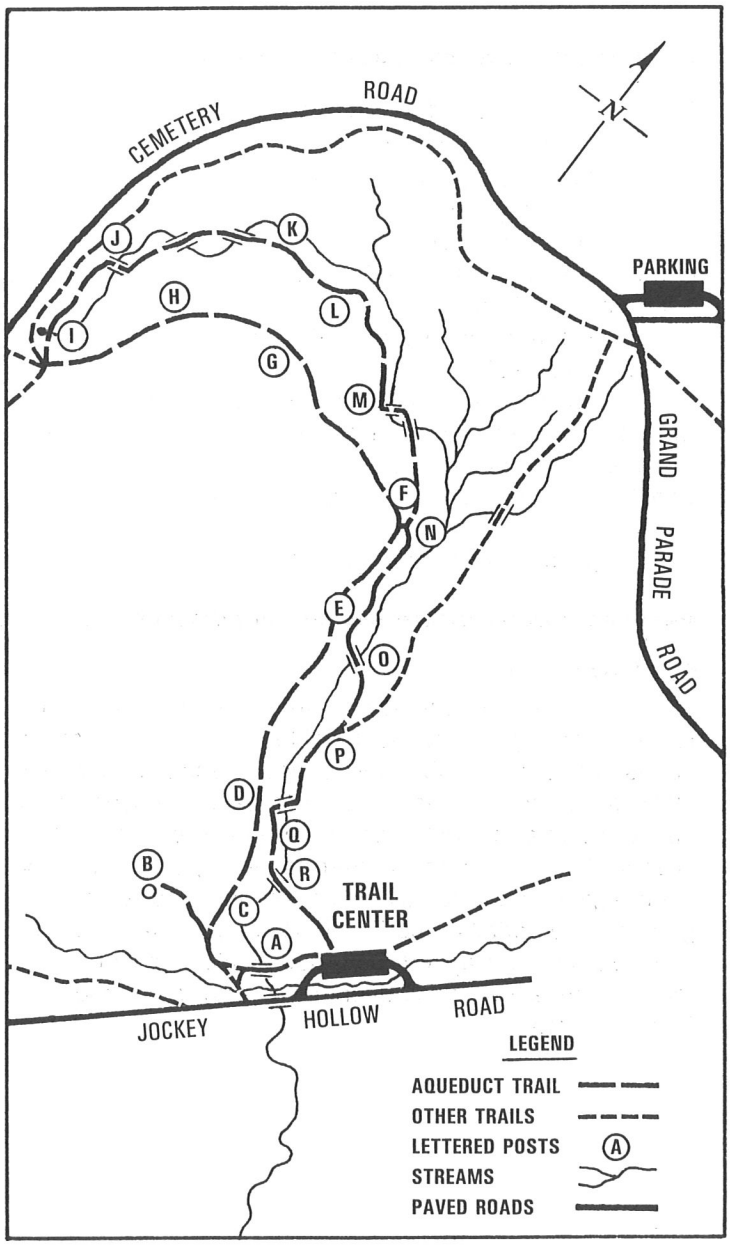
The Aqueduct Trail

Welcome to the Aqueduct Trail, a 1½-mile self-guided loop trail passing over slightly hilly terrain to the source of Primrose Brook. Allow 1 - 1½ hours to leisurely walk this loop. Eighteen lettered posts correspond to this guide, which highlights remnants of the Morris Aqueduct Water System and other natural and historic features.

(There is a short loop return at the half-way point on the trail for those not wishing to walk the full loop.)

This now extinct network was created around 1890 to supply the growing community of Morristown with safe and dependable water. Water was collected from springs and carried by way of trenches to storage reservoirs.

As you walk the trail, you will see that humans have impacted this area in many ways. Slowly, nature is returning this area to its natural state.



Tick Advisory

This area is inhabited by northern deer ticks which can transmit Lyme disease to humans. A few simple precautions will minimize your chances of being bitten by a tick:

- ☐ Stay on the trails. Ticks are much more likely to be found in leaf litter than on the clear ground of the trails.
- ☐ Tuck your pant legs into your socks, and your shirt into your pants. Keep ticks on the outside.
- ☐ Wear light colored clothing. Inspect your clothes for ticks often.
- ☐ Wear repellents, applied according to labels.
- ☐ Check your head and body thoroughly when you return home.

A. Water

Water is essential to life. Each of us is made up of 70% water, and we require an intake of about two and one half quarts a day to maintain health. Yet as one of our most precious and irreplaceable natural resources, water is often taken for granted. Of the earth's finite water supply, 97% is salt water, 2% is glacier ice, and less then 1% is suitable for drinking water, with most of that found in groundwater aquifers. Not far from its groundwater source, this water in Primrose Brook is beginning a long journey to the sea (Unfortunately, we are compelled to issue cautions about drinking this water untreated even at this early point in its journey).

A few miles downstream from here it will join the Passaic River, flow southward through the area of the Great Swamp, then north through Paterson and eventually into the Atlantic Ocean at Newark Bay. These waters will provide many life-giving benefits to the numerous plant and animal communities along the way. Evaporation will later return this water to the atmosphere, and eventually it will replenish the earth as rain or snow.

B. The Aqueduct System

These historic hills were changed about 1890 as a growing Morristown sought to insure a supply of clean water. The iron pipes in this brick vault brought water in from ditches and "collecting arm" trenches. The remains of one of these ditches is evident nearby, built to channel water to this site from the springs of Primrose Brook. A gravity system forced some of the water from this vault into a nearby reservoir.

Earlier, men had cleared these hills for crops and farm animals, and for an army camp. Jockey Hollow is said to have gotten its name before the Revolution for its popularity as an area for horse trading and riding.

*(Return to the main trail to proceed to **C**).*

C. Reservoir

This open depression was once a reservoir used for water storage. Aqueduct builders dug several storage ponds in this area. Abandoned since becoming parkland in 1933, the pond has been subject to natural processes that insure the fate of most such human-made ponds, and has filled in. Silt and organic matter carried by the brook have been deposited in the still water, providing substrate for grasses and cattails, and the deposits eventually welcomed other plants and trapped more sediments. From pond to marsh to meadow, it will eventually return to its original forested state.

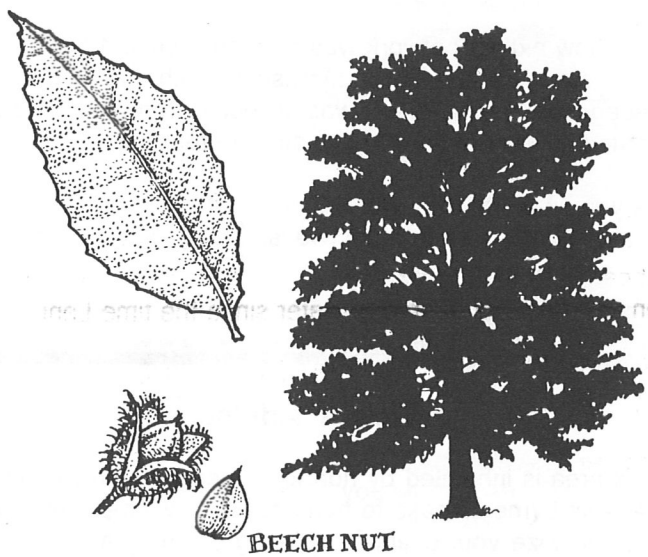
D. Encampments

Soldiers of the First Maryland Brigade cleared trees, built huts on these hillsides, nourished themselves with the waters of Primrose Brook, and endured the harshest winter of the century here in 1779-80. Six hundred to 900 acres of mature forest gave way to the axe, and provided huts and fires for over 10,000 troops of the Continental Army during the 7 months they spent here.

Jockey Hollow was selected as a winter encampment site for Washington's army based on its good sources of water, its supply of wood for huts and fires, and its well-drained hillsides and hollows that promised shelter from winter winds. Much of the cleared land was later used for farming into the 1900s.

E. American Beech

These American Beech (*Fagus grandifolia*) trees are an important part of the mature forest that has re-established itself here, and flourish on the well-drained, shaded hillsides. Easily recognized by their smooth gray bark, beech trees provide food for a variety of animals and wood that is well-suited for furniture, tool handles, flooring, and woodenware. Ruffed grouse, wild turkey, raccoon, deer, fox, squirrels, opossums, and humans all fare well on the fruits of this tree. Beech nuts sustained flocks of passenger pigeons as well, and the clearing of these trees for farmland over large areas, and overhunting, caused the extinction of these once numerous birds in the early 20th century.



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F. Collection Ditch

Noted earlier at Stop B, this ditch continues on toward the headwaters of Primrose Brook. Dug to channel water from this source, it was part of a system of ditches, impoundments, and pipelines that were installed to carry water to a Morristown reservoir.

G. Highlands Geology

Jockey Hollow lies in the geological province of New Jersey known as the Highlands. The distinctive character of the Highlands is derived from Precambrian bedrock which is over one billion years old. This hard bedrock consisting mainly of granite, marble, and gneiss (pronounced "nice") is fairly impermeable to water, and contributes to the branching pattern of the stream flow.

The steep, rocky slope you see before you typifies why this area was sometimes poor for farming. With the boulders being too cumbersome and numerous to remove, the area remained unused by farmers.

H. The Forest Returns

Prior to colonization, the most magnificent deciduous forests of all were in eastern North America. This area, like most, was greatly affected with the arrival of Europeans. Much of the surrounding area was cleared for farming, and Jockey Hollow in particular was almost completely cleared by soldiers who needed wood to build log huts and fires.

After the soldiers left, and some farmland was abandoned, this area was covered by successional forest. Today, it is gradually returning to the way it might have looked long ago, dominated by tulip trees, beeches, oaks, hickories, and maples. One species that is now notably absent is the American chestnut. This tree has been nearly eliminated due to the accidental introduction of the chestnut blight fungus from China.

(At the trail juncture, take the first right, and proceed down the "wooden steps").

I. Ground Water Spring

The Precambrian bedrock underlying the park contains groundwater in scattered locations. Here, cracks in the bedrock have allowed groundwater to reach the surface. This spring, the source of Primrose Brook, has been an important source of water since the time Leni Lenape Indians lived in these hills. Farmer Henry Wick, General Washington's army, and the Aqueduct Water Company all made use of the waters flowing here.

J. Bent Tulip Tree

Snow, ice, or possibly an eroding stream bank bent this tulip tree when it was young, but it has made a remarkable recovery. With branches that adapted and reached for the sun, it has joined the ranks of its fellow tulip trees as the tallest trees of this forest. Native Americans favored the strong, light wood from tulip trees for making dugout canoes. In addition, tulip tree bark was much valued for producing a stimulating tonic which served as a treatment for intermittent and chronic rheumatism.

K. Witch Hazel

Witch hazel resembles a twisted shrub-like tree and is marked by brown/gray bark with shallow toothed leaves. These trees flower in October after their leaves fall to the ground in anticipation of the cold winter ahead. Witch hazel was an important medicinal remedy to Native Americans and early settlers in the Jockey Hollow area. Historically, people would combine the bark and twigs with alcohol and water to create an astringent.

Native Americans used the witch hazel concoction to treat internal hemorrhages and hemorrhoids and also as a liniment and eyewash. Early settlers would occasionally treat strains, bruises, or fevers by combining witch hazel with a steam towel and placing the remedy on the affected area. In England, the forked twigs of witch hazel and other trees were used as divining rods to locate water and minerals.

L. There is life in death!

These stumps are in the process of being recycled. Lichens, mosses, insects, fungi, and bacteria are all working to decompose the dead wood. This process returns elements such as calcium, magnesium, and phosphorus to the soil from which they can be reabsorbed by the higher plants.

M. Finding It's Own Way

Primrose Brook seems to have known what was best for it, and has broken free of the confining trench to resume its natural watercourse. Straightening, diking, and channelization of streams and rivers to redirect their flows, control floods, and convert natural floodplains to cropland has had many unforeseen detrimental effects. Chief among these is the reduction of the variety of stream habitats, critical to biological diversity and maintenance of the integrity of stream ecosystems.

(At the trail juncture, take a left, proceeding toward the stream).

N. Needed Watershed Protection

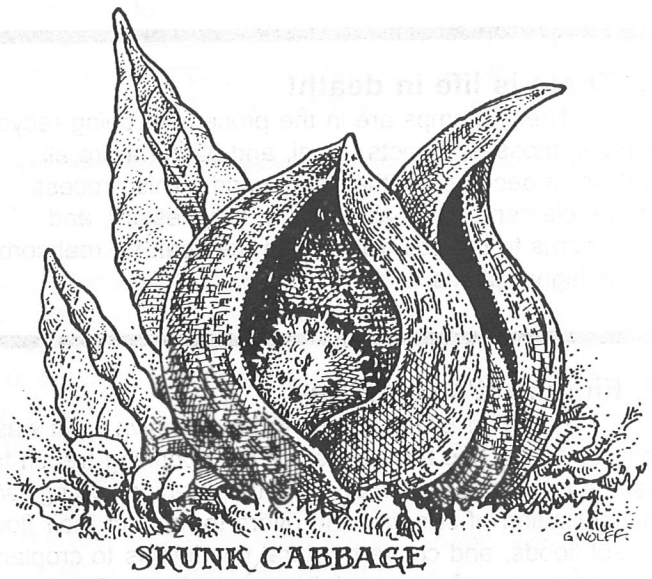
Primrose Brook's flow increases as it's joined by another small stream whose watershed extends up towards the soldier huts at the Pennsylvania Line.

Once a nation of pristine waters, today 40% of our rivers, lakes, and streams are no longer suitable for fishing or swimming due to pollution. While we've made progress against some forms of pollution, the biggest threat to our valuable waterways today is from non-point source pollution, runoff from the land. This can carry fertilizers, pesticides, herbicides, petroleum products, inorganic chemicals and salts, animal wastes, and sediments that destroy fish and other aquatic life.

N. Watership Protection (continued)

The key to protecting these valuable waters is being mindful of our land use practices throughout their watersheds, all of the land area that drains into them. We all live in a watershed.

Take a few moments to observe the variety of plant life which this site supports. In late winter, perhaps you'll notice the early-emerging skunk cabbage. Snow actually melts around these plants, due to the heat of cellular respiration resulting from their rapid growth. Later in spring, look for their unfolded large green cabbage-like leaves and the hooded flower that emits an odor similar to that of decaying flesh, attracting the insects that pollinate it. Springtime also brings the flowers of various violets. Summer and fall bring aster flowers, and ferns can be seen almost year round.



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O. Exotic Invaders

Humans are sometimes unaware of the role they play in changing the environment. As worldwide trade was made possible, and more common, humans caused certain kinds of organisms to become widely dispersed. A species that has been dispersed outside of its original range is called an exotic, or alien, inside of its new community. Many of these exotics are destructive in new localities. Until humans enabled these organisms to cross oceanic and mountain barriers, they remained in check in their own ecosystems. Two examples of exotics that have proven to be problematic are before you. The small, spiny shrub is Japanese barberry *(Berberis thunbergii)*, and the aggressive vine is bittersweet *(Celastrus orbiculatus)*. Both species were introduced from East Asia, most likely as ornamental plants. With the absence of natural deterrents, both species have dominated areas of the park, and have prevented new growth of native species.

P. Bye-Wash Trench

Unlike most of the other collecting trenches in the area which were used to collect and divert water to one of Jockey Hollow's storage reservoirs, this bye-wash trench served an entirely different purpose. Here, hillside runoff was caught to prevent erosion on the steep slopes and keep soil-laden water from washing into the reservoir below. The water collected in this bye-wash trench was not used to supply Morristown. Rather, it would have remained in Jockey Hollow to nourish the forest.

Q. Aquatic Life

Clean, healthy streams abound with life, and Primrose Brook is no exception. Throughout the year, even on the bleakest winter day, a world of activity exists here beneath the surface, and important work is being done. Aquatic insect larvae are busy shredding leaves and other plant matter in the stream as they feed on the microbes that colonize them. Cutting these leaves into smaller particles facilitates their breakdown and availability for uptake as food by other organisms. Fish and assorted predators feed on the insect life. Energy in this shaded, headwater stream is provided mainly from the plant matter that falls into it and the processing of that matter by key organisms in a complex web of life.

R. Beyond Jockey Hollow

In the stream below you will find more remnants of the old Aqueduct System. The pipes leading into the stream once carried water through Jockey Hollow to a reservoir where it was pumped into another series of pipes leading to Morristown. The entire Morris Aqueduct System of pipes and ditches was over seven miles long and provided water to local residents. Today, Jockey Hollow and the Aqueduct System have returned to a more natural setting, although the evidence of human interaction with the environment is still apparent.

You have seen some ways humans have impacted this forest and how nature has compensated and adapted to the changes. Hopefully, your walk has been both enjoyable and informative. If you wish to recycle this guide, please return it to the dispenser at the beginning of the trail. The rest of Morristown National Historical Park awaits your exploration.

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