

Day: Sunday	Start Time: 8:30 am	End Time: 2:30 pm
Co-Leader: Frederic Reiner	Co-Leader: Jonathan Tamir	Limit: 20 people
Transportation: Bus 5	Driver: Bus Driver	Bus Captain: Frederic Reiner Radios: 3 / First Aid Kit: 1
Fees: none	Travel Distance: 15 Miles one way	Travel Time: 25 Min one way

Moderate 3 to 4 ½ mile Hike at Tumbling Waters and Scenic Gorge Trails at the Pocono Environmental Education Center

Tumbling Waters Trail is along gurgling creeks through tranquil hemlock ravines, down to roaring waterfalls and up to views of the Delaware River Valley and the Kittatinny Ridge in New Jersey. This 3-mile orange-blazed trail begins along the Fossil trail, across from Pocono Environmental Education Center's two group lodges, 30 yards up the campus road from PEEC's dining hall. At the end of the first mile, hikers are rewarded with a beautiful overlook of the Delaware Valley and Kittatinny Mountains in New Jersey at Hermits Hill. At 1.5 miles, take a series of switchbacks down 240ft. to the waterfalls. We will enjoy listening to the waterfalls while taking lunch. Afterward, you must climb back up the switchbacks before continuing the main trail, which quickly ascends Killer Hill (total of 340ft elevation gain from the falls to top of the hill). We will pass through 3 forest types: a hemlock forest, a mixed oak forest, and a pine plantation before arriving on the shore of Pickerel Pond, which is a few minutes from the end of this trail.

After a break at the main lodge for bathrooms, head back out for about another hour towards the Moderate to Easy 1½ mile Scenic Gorge which begins with Ridgeline Trail. Experience an open hardwood forest ecosystem & a dark, cool hemlock canopy along Spackman's Creek. Distance from camp 15 Miles /25 Min one way.

- Bring standard hiking gear: Hat, Walking Stick, Water, Food, Hiking Shoes
- Pack your lunch during breakfast
- Distance from camp 15 Miles /25 Min one way
- [Video of Tumbling Waterfall](#) / [Video of Hike 1](#) / [Video of hike 2](#)
- [Pictures of the trail](#)

Leaders Notes:

- The Delaware Water Gap of the National Park Service: <http://www.nps.gov/dewa>. For emergencies call Park Dispatch at (570) 426-2435, or (800) 543-4295. Or 911
- You will be on a bus with other hikes ([Ridgeline Trail](#)). Coordinate your timing and exchange phone numbers with the other hike leaders to minimize waiting time getting on the bus at the end of the hikes.
- You are doing two separate hikes that both end and start in front of the office of PEEC. Contact the other trip leaders during the hike to see if the pace of either group needs to be adjusted.
- The Ridgeline hike is scheduled to be three hours. The Scenic George hike is a smaller loop of the Ridge Trail. The Ridge Trail breaks off the smaller loop to go further out then connects back up later. So, you can refer to the Ridge Trail hike leader and maybe meetup where the two trails join back up to end your hikes together.
- Expect to spend time down at the waterfall — a good place for a snack break.
- There is a decent long uphill from the waterfall back to the office. Pace yourself.
- Bring plenty of water.
- Majority of the trail is covered. Keep a hat on to keep the ticks/bugs off.
- During rainy seasons this trail can be muddy in sections, so waterproof footwear is recommended
- Give one Radio to the bus driver for communication after the hike. Make sure the driver understands how to use it. Test use it with him/her.

Logistics -

- 8:30 am – Depart from Camp
- 8:30 am – 9:00 am Travel from Cedar Lake Camp to Pocono Environmental Education Center
- 9:00 am – 9:15 am Bathroom, Gear Check, Leaders Circle Talk
- 9:15 am- 11:30 am: Tumbling Waters Trail
- 11:30 am – noon: Bathroom break / Lunch
- Noon – 1:30 pm: Scenic Gorge Trail (If you cannot start this by noon, either don't bother or set turn-around time and do not complete the whole loop.)
- 1:30 pm– 2:00 pm Bathroom, people round up
- 2:00 pm - 2:30 pm Travel from PEEC to Camp

Tumbling Waters TRAIL GUIDE

- Moderate Difficulty Level: 2 hours -- 3.01 miles Elevation Gain: 400 feet
- Trail Condition: Well-maintained trail / Hike Type: Loop / Trailhead: The trail starts at the PEEC main lodge.
- Tumbling Waters: This 3-mile orange-blazed trail begins along the Fossil trail, across from PEEC's two group lodges, 30 yards up the campus road from PEEC's dining hall.
- At 1 mile, enjoy the beautiful overlook of the Delaware Valley & the Kittatinny Mountains in New Jersey
- At 1.5 miles, take a series of switchbacks down to the waterfalls. Climb back up the switchbacks to continue the main trail, which quickly ascends Killer Hill.
- Walkthrough a hemlock forest, a mixed oak forest, and a pine plantation before arriving at Pickerel Pond which is approximately 10-minutes from the trail's end. This brings you to the parking lot in front of the main building. Give yourself at least two hours to hike this scenic trail.

PEEC's Educational Goals

PEEC's Environmental Study Goals

- To develop in people an awareness of the concern about the environment through formal and non-formal education.
- To help people acquire the knowledge, skills, attitudes, motivation, and commitment to enhancing the quality of the environment.

PEEC's Environmental Education (EE) Objectives

- **Awareness:** To help individuals and social groups acquire a strong feeling of concern for the environment and the motivation for actively participating in its protection and improvement.
- **Knowledge:** To help individuals and social groups acquire a basic understanding of the total environment, its associated problems, and humanity's critically responsible presence and role in it.
- **Attitude:** To help individuals and social groups acquire social values and the ability to make sound choices while developing sensitivity to the environment.
- **Skills:** To help individuals and social groups acquire the *skills* for solving environmental problems.
- **Evaluation:** To help individuals and social groups evaluate environmental measures and education programs in terms of ecological, political, economic, social, and educational factors.
- **Participation:** To help individuals and social groups move toward taking the necessary action to resolve environmental problems.

PEEC's Environmental Education (EE) Guidelines

- EE is total education in a total environment- natural and human-made, ecological, technological, social, cultural, and aesthetic.
- EE is a continuous life-long process both formally in school and non-formally out of school.
- EE is interdisciplinary.
- EE emphasizes people's direct involvement to prevent and solve problems.
- EE examines issues from a global perspective while accommodating for regional differences.
- EE focuses on current and future environmental situations.
- EE examines *all* development and growth from an ecological perspective.
- EE promotes local, national, and international cooperation to help solve environmental problems.

JOE 2019 Information Packet for Moderate 3 to 4 ½ mile Hike at Tumbling Waters and Scenic Gorge Trails at PEEC

1 WELCOME to the Tumbling Waters Trail at the Pocono Environmental Education Center. This trail is 3 miles long and is marked by bright orange blazes. The trailhead is located across from Lodge A. You should give yourself about two hours to complete this trail. This trail winds its way through several diverse habitats that are characteristic of the Pocono region, such as hemlock ravines, upland-mixed oak forests, and pine plantations. Other highlights of this trail include a scenic vista overlooking the Delaware River Valley and a waterfall in a shaded hemlock ravine. The numbered markers along the trail correspond to the entries in this guide. These explanations will give you a glimpse into both the natural and human history of this beautiful area. While hiking, please respect the environment, pay attention to your presence in the woods, and as always, practice Leave No Trace hiking ethics.

3 EXPOSED BEDROCK Here is a large area of exposed bedrock. Notice the parallel grooves and scratches in the rock. If you were standing here about 13,000 years ago, you would be at the bottom of a glacial ice sheet more than a mile thick! Rocks carried in these glaciers made these marks as they scraped across the surface of the rock. These glacial striations are evidence that this area was covered by glaciers during the last ice age. Using a compass, you can measure the orientation of the striations to determine the direction the ice flowed.

4 CEDAR KNOLL This area is called Cedar Knoll. From the Knoll, the trail goes downhill to Brisco Mountain Road descending through a relatively open field with red cedars, gray birches, and scotch (Scots) pines. Be careful crossing the road. After crossing the road, continue the gravel path, following the orange blazes. Look along the right side of the trail for traces of wire fences put up by people who used to own this land.

5 LAND OWNER S' HOUSE This small clearing is where the landowners' house once stood. Look for evidence such as a telephone pole, an old spring house, and even some persistent garden flowers. Much of this area was farmed as late as the 1930s.

6 MIXED OAK FOREST The woodland you are in now is typical of higher elevations here in the Poconos. It is known as a mixed oak forest. The dominant trees here are chestnut oak (*Quercus prinus*), red oak (*Quercus rubra*), some ashes and hickories, and shrubs like shadbush (*Amelanchier*) and blueberry (*Vaccinium Boreale*). Scattered throughout are a few white pines. Just ahead on the trail, look for several tall white pines. The large dead pine on the right side of the trail was struck and killed by lightning in the summer of 2000. Look for the split that spirals down the tree. You may be inclined to assume that this is the path the bolt took as it came down the tree, though that isn't the case at all. When a tree is struck by lightning, its super-heats the sap inside. When the sap boils like this, the gasses need somewhere to go, so escapes by blasting off a chunk of a tree like this one. The structure of a tree varies by species and this white pine grows in a spiraling fashion, so the chunk that was blown off wraps around the tree.

7 EAGLES, SNAKES, HAWKS & MORE! This stone fireplace is all that's left of a small cabin that once stood here. While walking along the ridge, keep an eye out for soaring bald eagles (*Haliaeetus leucocephalus*), turkey vultures (*Cathartes aura*) and hawks—especially during migration time in the spring and fall. There are two species of venomous snakes in this area—the northern copperhead (*Akistrodon contortrix mokasen*) and the timber rattlesnake (*Crotalus horridus*). Both prefer wooded hillsides and sunny, rocky ledges. These snakes (and all snakes for that matter) are often misunderstood and feared by many people. This fear leads to persecution and senseless killing. Snakes are an important part of a healthy, diverse ecosystem and are completely harmless when left alone.

8 DELAWARE RIVER VALLEYS Take some time to enjoy the beautiful view of the Delaware River Valley. All the land that you see, including the land you are walking on, is part of the 80,000-acre Delaware Water Gap National Recreation Area. The land was acquired by the federal government in the 1960s with plans of building a dam on the river. The entire valley below you was almost a giant reservoir until plans for the dam were dropped and the government gave the land to the National Park Service. Looking across the river valley, you can see the Kittatinny Ridge in New Jersey. This 400-mile-long ridge is part of the Appalachian Mountains and running along the ridge is the 2,100-mile-long Appalachian Trail. The bushes growing out of the rocks here are scrub oaks (*Quercus* sp.) – The smallest member of the oak family in the Poconos.

The trail continues with a descent into the ravine below. Watch your step – the trail is steep with loose rocks. On warm, sunny days look for the elusive fence lizard (*Sceloporus undulatus*) running over the rocks and hiding behind trees. The fence lizard is one of only three true lizards native to Pennsylvania.

9 SWITCHBACKS TRAIL The switchback trail here will lead you down to the waterfalls! Please stay on the trail following the switchbacks – no shortcuts. The trail is designed to minimize erosion, which can be a problem in steep areas. As you walk down the trail, try to feel the drop in temperature. The type of forest will change from the mixed-oak forest to what's known as a hemlock ravine. The eastern hemlock (*Tsuga canadensis*), Pennsylvania's state tree, is the large evergreen tree with short, flat needles and tiny cones. The bark of this tree was harvested for its tannic acid, which was used to dye leather.

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10 ENJOY THE WATERFALL By now you will be able to see the waterfalls. Stay awhile and enjoy the beauty. This is the halfway point of the trail. Hemlocks dominate the forest here. Due to the lack of sunlight, not many plants can grow on the ground here. Plants such as the rhododendrons, mosses, and ferns are shade-tolerant and can thrive under these conditions. Water levels fluctuate throughout the seasons and depending on the time of year; you can see salamanders, crayfish, frogs, and fish. The water tumbling over the rocks adds vital dissolved oxygen. The source of this stream is a combination of lake water, groundwater, and runoff from rainfall. About a mile downstream, the stream empties into the Delaware River.

- To continue the trail, go back up the switchbacks when you get to the top the trail goes to the left.

11 BETULA LENTA This marker is attached to a black birch (*Betula lenta*) tree. Black birches are occasionally found in association with hemlock forests. The sap from these trees was traditionally used to make birch beer, an alcoholic drink in early settler times. The wood is hard and heavy and is used to make furniture. Buds and seeds are eaten by a variety of birds including goldfinches (*Carduelis tristis*) and ruffed grouse (*Bonasa umbellus*).

12 MIXED - DECIDUOUS FOREST You are about to go through another transition in forest type. Since leaving the waterfalls, the forest has been mostly hemlock dominated. The next forest community is typical mixed-deciduous. This area is characterized by birches, hickories, white and red oaks, and many small red lines. The canopy here is not as dense as the hemlock forest so that sunlight can reach the lower levels. This allows other plants like shrubs, flowers, and grasses to grow here. Notice the many small hemlocks growing along with the transition. These transition areas are called ecotones, and ecotones such as this one are excellent places to observe wildlife. The varied plant life allows animals the opportunity to take advantage of both plant communities for food and shelter.

13 PINE PLANTATION You are now entering a pine plantation. These pines were planted about 50-60 years ago after the preceding forest was logged. Notice how they are in straight lines. The two most common species of pine planted here are red pine (*Pinus resinosa*) and Scots (Scotch) pine (*Pinus sylvestris*). Look on the ground for needles from both. The Red Pine has 3-8-inch needles that come in clusters of 2. The Scots pine also has needles in clusters of two, but they are much shorter— about 1-3 inches. The Scots pine also has bright orange (or butterscotch) colored bark on the upper half of its trunk.

14 PICKEREL POND This is Pickerel Pond. This is not a natural pond; it was originally built by the Pharo Family by damming a small stream. Ponds such as this provide habitat for a variety of plants and animals. Amphibians such as newts, salamanders, and frogs can be found here. Choruses of singing frogs can be heard here during the breeding season. Look for evidence of the resident beavers such as chewed sticks and pointed stumps.

15 LOOK UP! If you look up, you will notice an unnatural object in this tree. What is it? It is a house designed to attract a nursery colony of bats. Despite what many people believe, bats are not blind, do not fly into people's hair, and are responsible for fewer cases of rabies than dogs. Bats are important for maintaining balanced ecosystems because they are the only major predator of night-flying insects. Our most common bat, the little brown bat (*Myotis lucifugus*), can eat up to 600 mosquitoes an hour! Unfortunately, many bats are in trouble due to loss of habitat, senseless killing, and white-nose syndrome. Six out of Pennsylvania's eleven species are considered of "special concern" (rare, threatened, endangered, or an undetermined status) according to the EPA biological survey. If occupied, this bat box could house over 500 female bats and their young.

16 STONE ROWS You may have noticed many of these stone rows along this trail or even elsewhere in the Poconos. These stone rows are evidence of earlier human activity. Much of this area was at one time cleared for lumber, farming, and pastureland. As settlers cleared the ground of stones, they made these walls. As flatter and more fertile farmland were opened to settlement in the West, these fields and pastures were abandoned. Over time, the forest grows back, but these walls are a reminder that this land was once much different. These old walls are now a favorite home for snakes and chipmunks.

17 NON-NATIVE PLANTS Notice the old foundation here. Again, it is evident that this land was once occupied. Around this area are many species of non-native plants, such as multiflora rose (*Rosa multiflora*), honeysuckle (*Lonicera*), and garlic mustard (*Alliaria petiolata*). Many non-native plants were brought here intentionally by early settlers, and some were introduced accidentally. Some plants "escaped" from gardens and were well-suited for the conditions here. Almost one-fourth of the plants in the east are introduced species. From here, the trail crosses the road and continues through a large hedgerow of forsythia (*Forsythia*) (another non-native plant).

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18 EMERGENT WETLAND This area is known as an emergent wetland. This wetland is dominated by green plants such as skunk cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), and gray dogwood (*Cornus racemosa*). Wetlands are a vital part of a healthy environment. They filter water and control flooding. They provide essential habitat for many species of reptiles, amphibians, insects, and birds. This marker is attached to shagbark hickory (*Carya ovata*). Notice the bark which gives the tree its name. Bats are often found hiding behind these 'shags. The wood is traditionally used for tool and ax handles.

The trail continues along another wall. Look for little piles of chewed nutshells on top of the rocks. Chipmunks like to eat where they can survey the area for dangers such as predators.

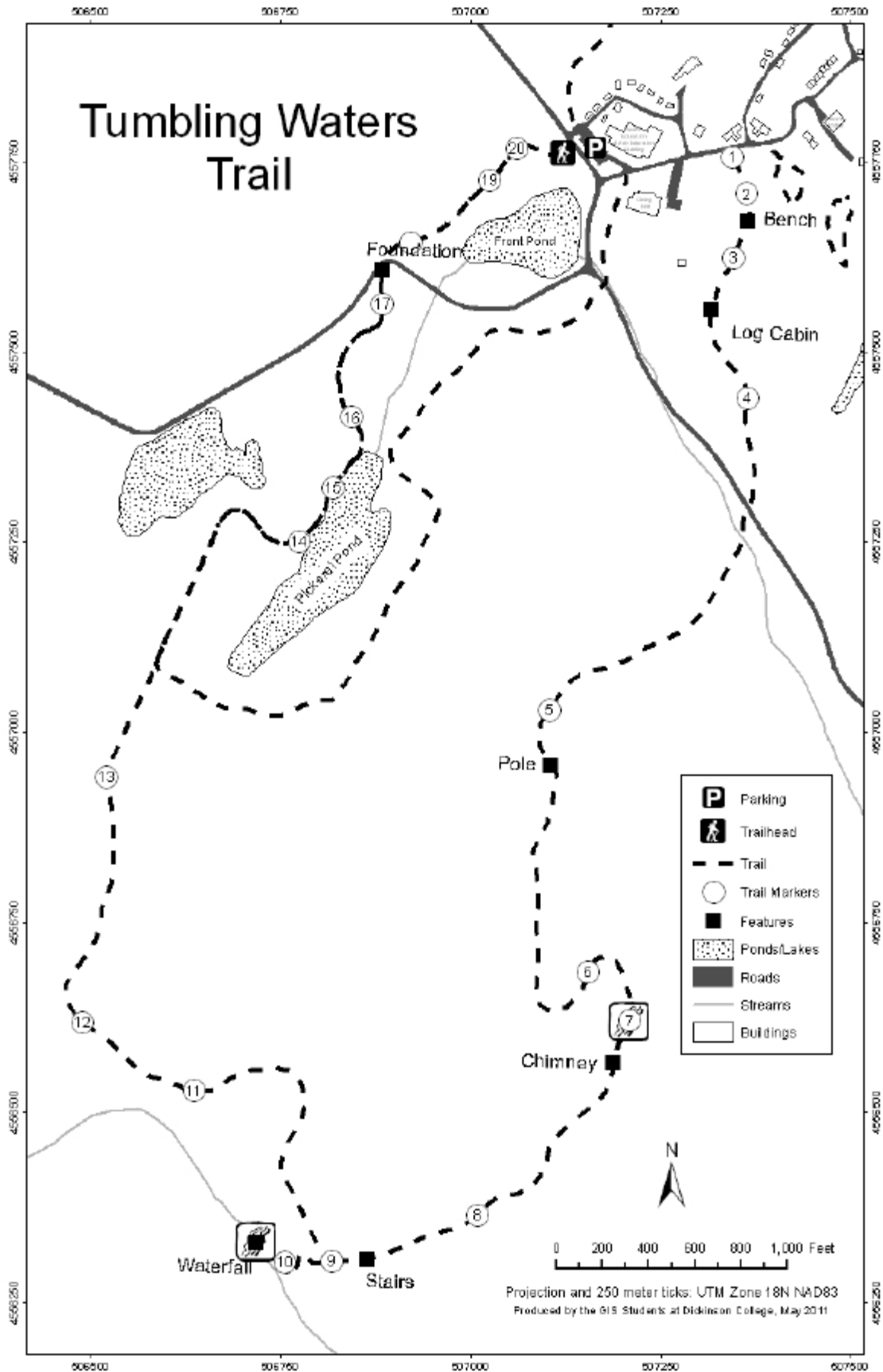
19 T H E S U C C E S S I O N The open field you see here is a very different habitat from the wetland and forest areas. The soil is drier, and sunlight reaches even the small plants on the ground. This field is a great place to see many different species of wildflowers (no picking, please). The field is mowed periodically, but if left undisturbed, small plants would be replaced by taller plants, shrubs, and finally trees. This gradual change in a habitat is called succession. The 'trash graveyard' was established in 1998 to demonstrate the amount of time it takes for trash to decay, decompose, or break down. Please do not litter.

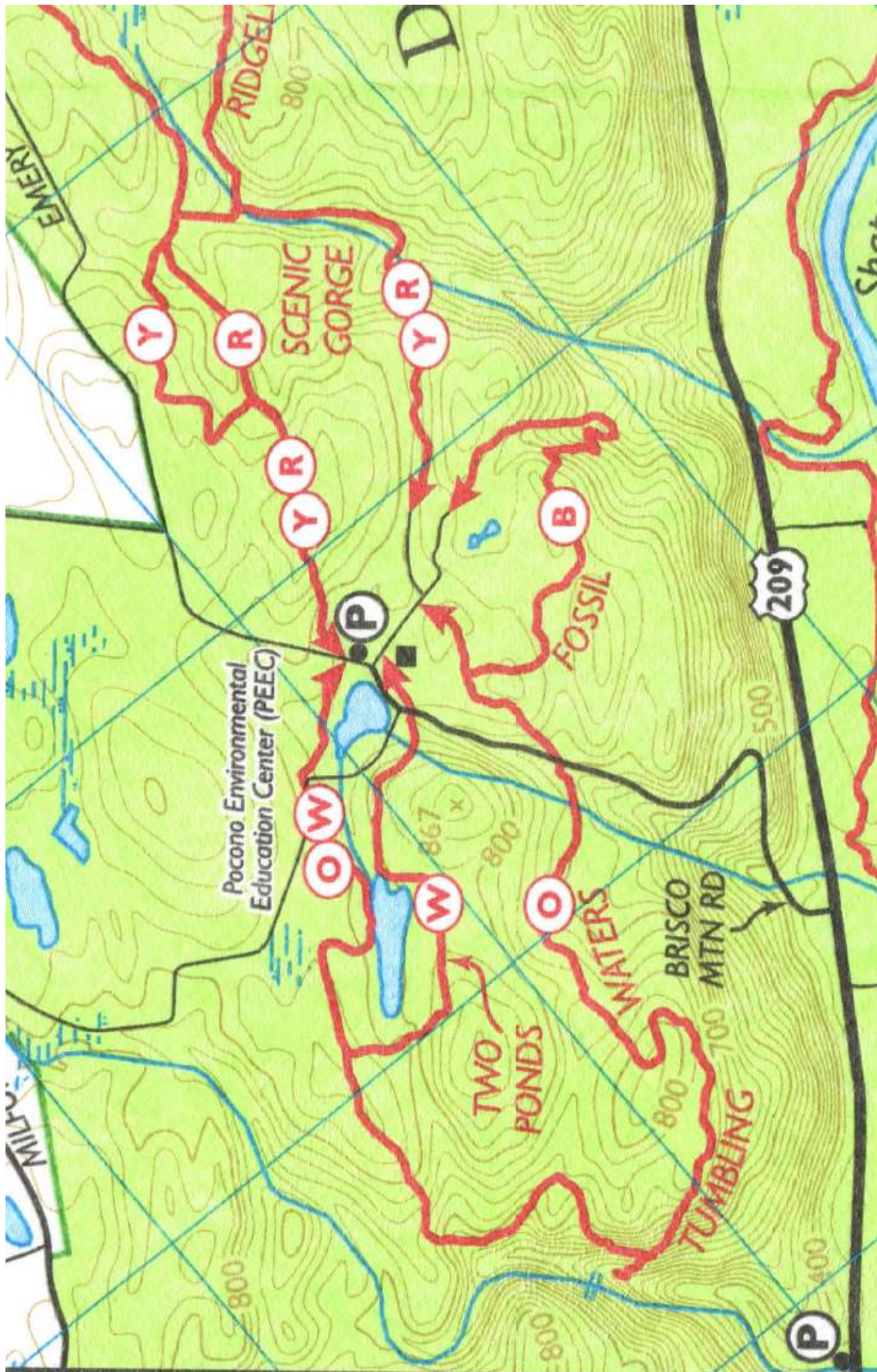
Follow the tree line through the field, taking a right turn at the post. Look around here for a tree with three different shaped leaves. This is a Sassafras tree. The roots were traditionally used to make root beer.

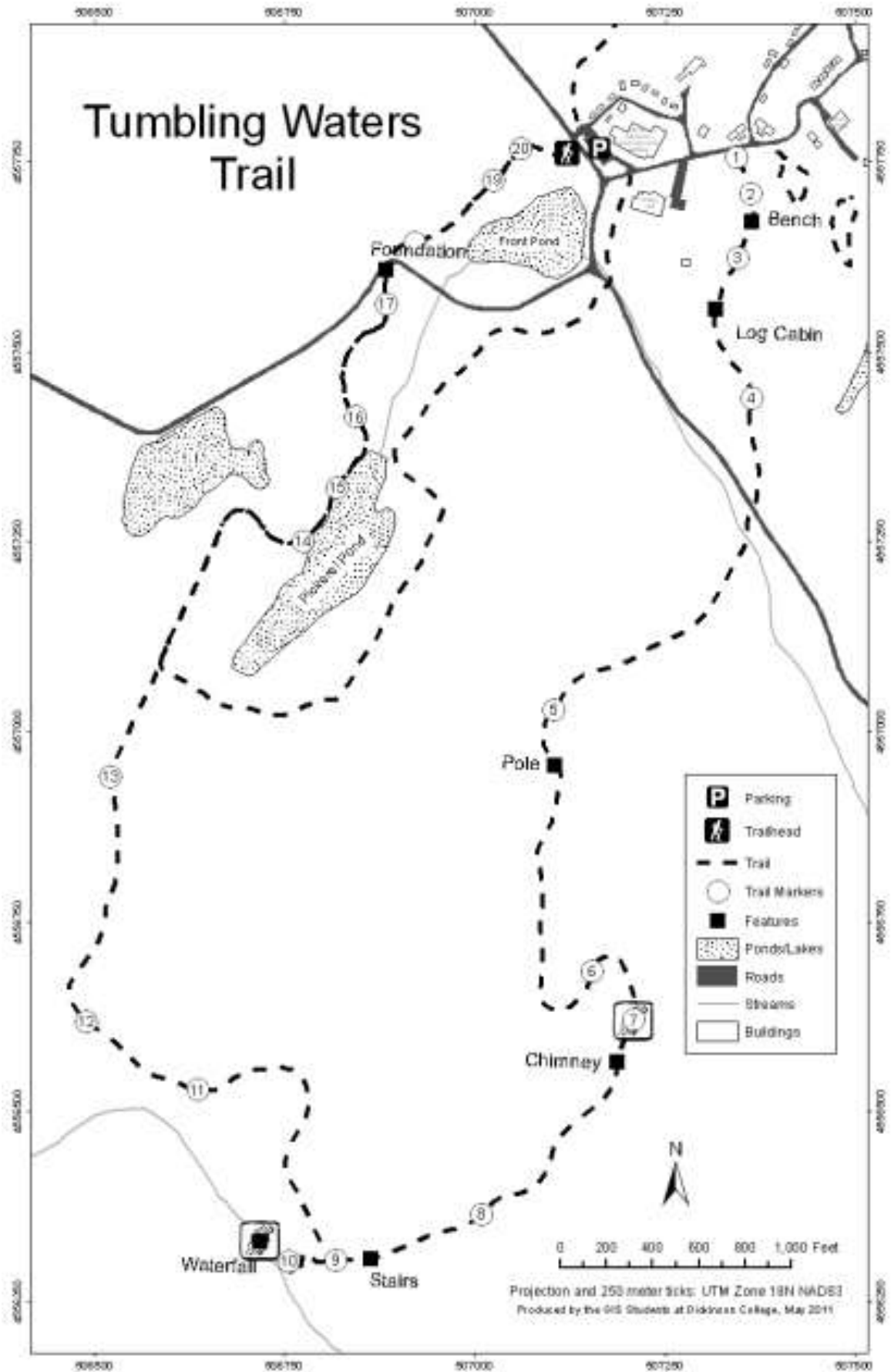
20 SHRUB WETLAND You are now walking over a shrub wetland. The boardwalk helps to protect this fragile area. This wetland represents the transition from a drier upland habitat (the field) to the pond. Plant and animal life are diverse here. Local wildlife is a great place to view some of the local wildlife. Some of the shrubs growing here include the gray dogwood, chokecherry (*Prunus virginiana*), arrowwood (*Viburnum dentatum*), and multiflora Rose: (*Rosa multiflora*)

Continue along the boardwalk leading you back to PEEC.

The natural world is always changing. It changes from season to season, year to year, century to century. The face of this landscape is constantly being reshaped by both natural and human forces. Time itself brings change. We hope that this trail has given you a glimpse into the natural world and the beauty of the Poconos. If you have any questions, feel free to ask at the front desk. If you no longer need this trail guide, please return it to the front desk so that it may be used again.

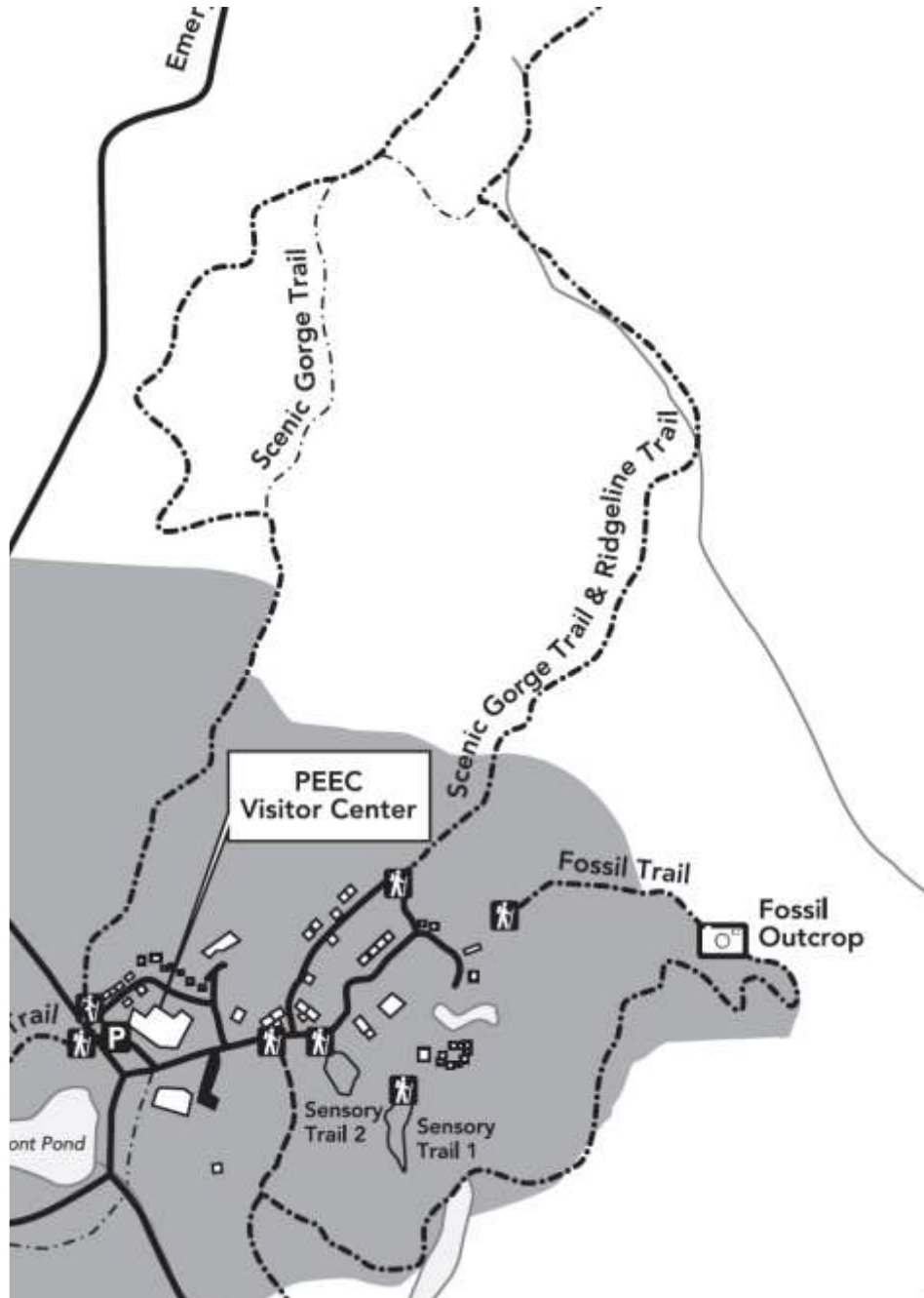






Scenic Gorge Trail: Allow at least an hour to enjoy this 1.5-mile trail. This trail is blazed in red and begins with the Ridgeline Trail behind Cabin #1. For the first half-mile and the last mile of the trail, the Scenic Gorge Trail runs concurrently with the Ridgeline Trail. The trail is moderately difficult with a few steep sections. Hikers enter a deep, majestic hemlock forest following Spackman's Creek and walk from an open hardwood forest ecosystem into the dark, cool hemlock canopy. During rainy seasons this trail can be muddy in sections, so waterproof footwear is recommended. A small waterfall and spring add, yet another layer of natural features to the hike. The trail ends, along with Ridgeline Trail, on Lower Campus. Follow the campus road back to the main building.

Difficulty: Easy-moderate **Blaze:** Red **Elevation Change:** 94 feet



Scenic Gorge TRAIL GUIDE

1 Welcome to the Scenic Gorge Trail at the Pocono Environmental Education Center (PEEC). Allow at least an hour to enjoy this 2-mile trail, which is blazed in red and is moderately difficult with a few steep sections. The trail begins next to Cabin 1, goes through the upland deciduous forest and a hemlock grove along Spackmans' Creek, ending on lower campus. This guide focuses on the differences between the two major habitats and explores several microhabitats. A habitat is an environment in which an organism lives, including climate, altitude, moisture, sunlight, and human activity. The numbered markers along the trail correspond to the explanations in this guide.

2 CREATIVE PLAYGROUND This area was known as the Creative Playground. The numerous tree stumps and the four wood posts ahead on the left were all part of this natural playground.

3 POISON IVY **Poison ivy** (*Toxicodendron radicans*) is in the family *Anacardiaceae*, the same family as cashews. Poison ivy is important here and in many other forest ecosystems. Birds and deer eat the small white berries without consequences. Unfortunately, humans are not so lucky! If you touch any part of the plant including stems, leaves, berries, or the hairy trunk, you may develop an itchy rash. Do not touch the plant at any time of the year! To identify poison ivy, look for a leaf with three leaflets and a vine with red-brown hair-like roots growing up the sides of trees. **If you do touch the vine, wash with cold water as hot water will open the pores in your skin and let in more of the toxic oil.**

4 TREE LIFE SPAN Trees die for many reasons: age, virus, fungus, insect manifestation, lightning, and cutting. Many insects live in dead trees, helping to break down the tree and return nutrients to the soil. Woodpeckers and other animals eat insects in dead standing trees, making standing dead trees an important part of the forest ecosystem. Owls, raccoons, porcupines, flying squirrels, and other animals raise their young in tree cavities. Moss, fungi, and lichen aid in the decomposition process. Fungi, such as mushrooms, have no chlorophyll to convert sunlight to energy. They depend on energy from organic material to survive.

5 EUROPEAN LARCH TREES In front of you are some European larch trees (*Larix deciduas*), also called Tamarack. Although these trees are conifers, they are deciduous, as their scientific name implies. Thus, they drop their leaves annually. Tamarack trees are harvested for their strong, disease-resistant wood, which is used in telephone poles and railroad ties. Seeds from the 1.5-inch cones are eaten by rabbits, squirrels and ruffed grouse.

6 THE PUMP HOUSE The building in front of you is the pump house. Water from wells around PEEC is held in tanks below the surface of the ground. The pump house, aided by gravity, disperses the water throughout PEEC. The large, grassy mound behind the pump station is a water tank storage area. Behind the pump station on your left is a septic system commonly referred to as turkey mounds.

The trail continues along the right of the mound.

7 WATER BARS You are about to start down a steep hill. As you travel down, you'll step down wooden beams – water bars – that seem like stairs. The beams were placed there to control erosion along the path. Plants normally keep the hillside from eroding by securing the soil with their root systems. Along the path, no plants can grow, so the soil is loose and can easily wash away. The water bars help prevent significant erosion of the trail.

8 LE TREES If you look down the path, you can see several le trees (*Acer*) lining the trail. If you investigate the woods, you don't see any. Why is that? Did some crazy PEEC staff member decide to line the trail with less? No, let require lighter. In the woods, other trees shade out the young less. Plenty of light comes through the trail, allowing the less to grow.

9 LICHEN A lichen is an organism that has a symbiotic relationship between its two components, fungus, and algae. A symbiotic relationship is one that is beneficial to both parties. The algae serve as the phycobiont. Algae has chlorophyll so that it can obtain energy from the sun. The fungus serves as the mycobiont. It supplies protection from adverse conditions such as drought. Notice the abundance of lichen on the trees and rocks around you. Lichen is an indicator of very clean air, so breathe deeply!

10 WHITE PINE Notice the soft-looking pines in front of you. Which pine is this? Examine the needle bundles, or fascicles, closely. How many needles in each fascicle? Each fascicle has five needles which help to identify this tree as a white pine quickly. Notice the word "white" also has five letters – a helpful hint! White pine (*Pinus strobus*) was named for its white sap. This pine can grow to 200 feet, making it very useful as timber during colonial times. The pine suffers from two maladies, the white pine weevil, and the white pine blister rust. The weevil kills the topmost shoot of young pine, causing the pine to grow deformed and reducing its value as timber. The blister rust is a serious fungal pest.

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11 PILEATED WOODPECKERS Look at the large holes in the trees on the right. What caused them? If you guessed a woodpecker, you're right! The pileated woodpecker (*Dryocopus pileatus*), the largest surviving woodpecker in North America, excavated these holes. Without watching the woodpecker make the hole, we know that the pileated is the culprit because the holes are large and rectangular. Pileated woodpeckers are about the size of a crow and have a conspicuous red crest. Holes in trees are created to search for carpenter ants, to nest in the spring, or to roost during winter. Three to six eggs are laid during May. If the hole is fresh, new sap runs down the side of the tree. Older holes have scar tissue growth around the edges. The older the hole, the more scar tissue the tree has grown.

12 CHESTNUT OAKS VS. HEMLOCK'S Look to your right, then to your left. What differences do you see? To your left is a chestnut oak forest, relatively sunny and dry. To your right is a cool, damp hemlock grove. Chestnut oaks (*Quercus prinus*) need well-drained soil and much sunlight. Eastern hemlock (*Tsuga canadensis*) grows in a damp, cool environment. The gorge is an ideal environment for the hemlock.

Hemlocks help increase the suitability of their habitat in two ways. First, their constant leaf cover traps moisture and blocks sunlight, making the habitat even cooler. Hemlock's root system does not travel deep into the soil, as do many other species of trees. Instead, the root system is wide, covering a large surface area. This means hemlocks can survive in as little as one to two inches of soil, making the gorge a perfectly suited habitat.

13 WHITE OAKS This area is not very well-drained and is sunny, so neither chestnut oak nor hemlock can survive. The conditions here are good for white oak (*Quercus alba*). White oak has smooth lobed leaves and nearly white, thin-scaled bark. The roots grow deep, so several inches of soil are required for the oaks to survive. The acorns are sweet when boiled, and Native Americans used them as food when necessary. Unlike red oaks, white oak acorns germinate in the fall, but must be buried by squirrels, or will freeze during winter. White oaks in this area have a common adaptation for survival in wet areas – the base of the trunk is considerably wider than the rest of the trunk.

14 CLIMAX FOREST Notice the rock wall parallel to the trail. Before becoming a National Recreation Area, this land was extensively farmed. The rocky terrain made farming on the Pocono Plateau difficult. All rocks had to be removed from the field, but what did the farmer do with all the rocks? The rocks were piled on the side of the field, creating a wall. Sometimes, you can see an old tree in the middle of the wall or next to a huge boulder the farmer could not move. The farmer kept the tree there since it was not in the way of the farming and provided shade in the middle of a hot day. Eventually, the rock walls served as property boundaries. Through the process of succession, fields slowly change to forests. Succession occurs when a plant more suited to a habitat becomes dominant through competitive and reproductive adaptations. Native grasses, wildflowers, and small shrubs were the first types of vegetation to take over this field. Light-loving tree species came next. In this area, white oak (*Quercus alba*) and shagbark hickory (*Carya ovata*) came next. The climax forest, or the final stage of succession, in this area, is American beech (*Fagus grandifolia*).

15 HEMLOCK RESOURCES The hemlock grove in this gorge has retained much of its pre-European character. Most forests in the eastern US have been cleared, but this gorge remained relatively untouched. Why? The knotty wood of the hemlocks produces only low-grade lumber. Because most hemlocks are found in steep gorges, removing the trees is time-consuming and difficult, and therefore, not profitable. Hemlock has only one economic value – tannic acid. Found in the bark, it is used to tan animal hides to make leather. The resulting leather is very reddish-brown. Often, tannin from chestnut oak acorns is added to reduce the redness.

16 LOOK DOWN! Look down at the stream. Notice how the waterfalls over the rocks and turns white. Here, air mixes with the water causing the water to look white. Downstream, the water is well-oxygenated. The pools below the falls have deep, well-oxygenated, cool water ideal for trout and other fish. Immature insects, such as the dragonfly, fishfly, stonefly, and caddisfly nymphs, live in the streambed. Stream-dwelling insects are adapted to maneuver and obtain food in a fast current. They are well camouflaged – try to find some! Just return them to the water quickly, since they can only live out of the water for a few minutes.

17 SEDIMENTARY ROCK Look at the rock face along the stream. This rock was created 370 million years ago during the Devonian period. At that time, this area was a shallow sea with silt deposition on the seafloor. The silt compacted and lithified – cemented together – creating the layered sedimentary rock you see. When Africa collided with North America 230 million years ago, during the Permian period, the eastern part of North America went through an orogeny, or mountain building event. Since then, this stream has been carving out the rock, exposing the layers we see today.

18 BLACK BIRCH Black birch (*Betula lenta*), also called cherry birch and sweet birch grows in areas that are damp and cool, making it one of the few deciduous trees able to grow in a hemlock grove. Large black birches can be found hanging precariously on cliff edges, where they can obtain sunlight, an adaptation for living in a hemlock gorge. Notice the dark bark has horizontal lines called spiracles. Spiracles are visible only on birch, cherry, and tamarack trees. The black birch has hard, heavy wood; so, it is often used to make furniture. The twigs and leaves contain oil of wintergreen. Taste one! Fermented sap from the twigs is used to make the drink birch beer. The ruffed grouse (*Bonasa umbellus*), Pennsylvania's

JOE 2019 Information Packet for Moderate 3 to 4 ½ mile Hike at Tumbling Waters and Scenic Gorge Trails at PEEC

state bird, eats the buds and seeds, while white-tailed deer (*Odocoileus virginianus*), Pennsylvania's state mammal, and eastern cottontail rabbits (*Sylvilagus floridanus*) eat the twigs.

19 EASTERN HEMLOCKS Eastern hemlocks (*Tsuga canadensis*) are native to North America but are currently suffering a serious threat to their survival. A small invasive insect, the hemlock woolly adelgid (*Adelgis tsugae*), attaches itself to the base of the needles and sucks the fluids out from the needle. The needles turn brown and fall off. In a few years, the hemlock tree dies from lack of nutrients needed from the needles. Hemlock groves all over the nation have been seriously damaged and destroyed. Research is now underway to possibly introduce the woolly adelgid's natural predator to control the population.

20 GROUNDWATER Water flows from this spring all year-round. The rock layers block the horizontal flow of the groundwater and force the water to the surface. With this constant supply of slow-moving water, small green plants grow here year-round. This is also a good place to find aquatic insects. Just remember, if you do find any, return them to the water quickly.

21 STREAMS Look at the gully in front of you. Is there any water flowing? This stream is highly seasonal. During the spring, the stream reaches its highest flow due to melting snow and high levels of rainfall, making the small bridge a necessity. During the summer and fall, rainfall decreases, causing the stream to become a trickle or a series of small puddles. During a drought, this stream completely dries up.

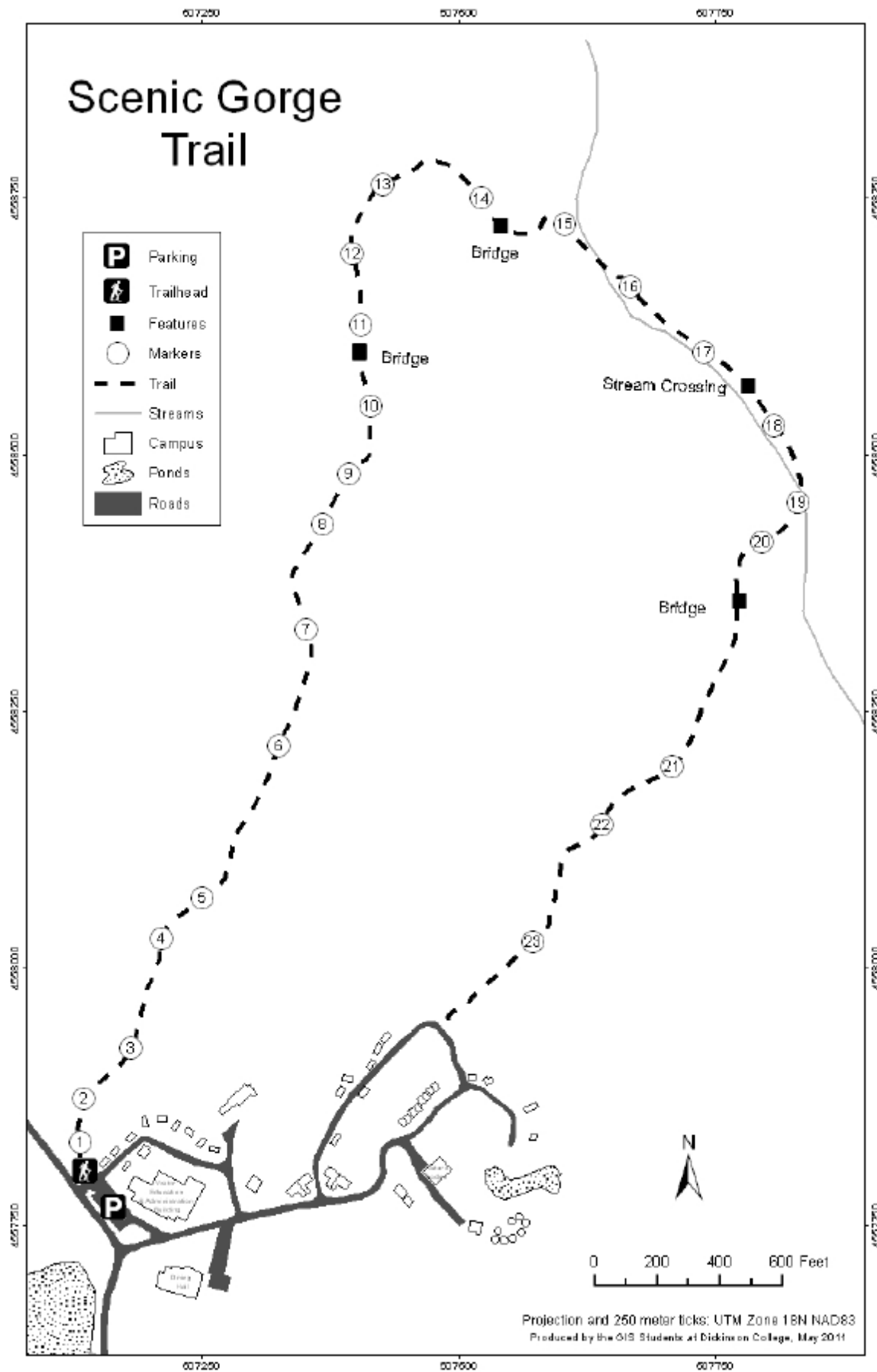
22 AMERICAN BEECH American beech (*Fagus grandifolia*) is a popular tree because of its smooth gray bark, sometimes called elephant skin. During the winter, the leaves turn a golden brown but do not fall until spring. The theory behind this phenomenon is that beech and oaks were in the tropics during the last ice age. At the end of the ice age, the glaciers retreated, and beech and oak migrated north. Their leaves had to die for the trees to survive the winter but did not drop until replaced by new growth.

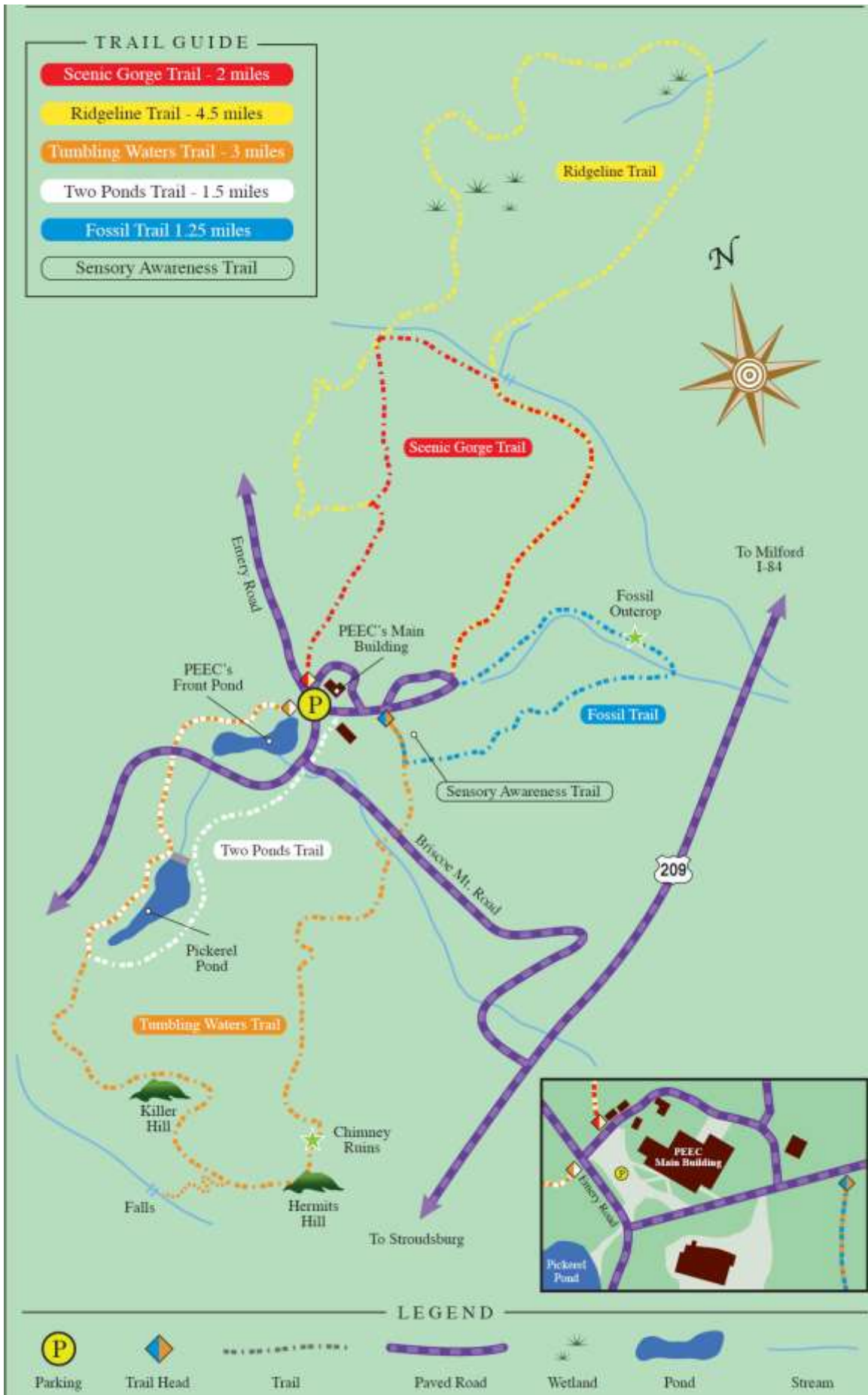
23 CHESTNUT OAKS Chestnut oaks (*Quercus prinus*) are the predominant tree in this area. The tree can be identified by its multi-lobed, smooth-edged leaves, and square-shaped, deeply-grooved bark. Look on the ground. Do you see any acorns? Like all oaks, chestnut oaks drop their acorns in the fall. The fallen acorns are multi-colored, ranging from red to green. Chestnut oak acorns, like white oak acorns, start to sprout immediately, not waiting for spring. This adaptation gives the chestnut oak time to develop before it must compete with other saplings. On well-drained ridgetops in this part of the United States, the climax forest is made up of chestnut oaks. Before the chestnut blight, the American chestnut (*Castanea dentata*) was the dominant trees on tops of ridges. Approximately three-quarters of all trees in the eastern U.S. were American chestnut until the blight completely wiped them out.

24 TURKEY MOUND The mounds of grass visible through the trees on the left are human-made. Notice the white pipes sticking out of the sides. The mound is made of sand and is used to filter sewage water since the shallow, rocky soil does not clean sufficiently. The mound is called a turkey mound because wild turkeys (*Meleagris gallopavo*) can often be found on top searching for food.

25 STAGHORN SUMAC Do not touch this tree! It is covered with poison ivy that may cause an itchy rash. In front of you across the street is staghorn sumac (*Rhus typhina*). This tree is not related to poison sumac and will not give you a rash if you touch it. Look closely at the stems. The fuzzy, v-shaped stems often remind people of a male deer's antler in velvet, thus the name "staghorn." The large, compound leaves turn bright red and completely fall off in the autumn. Large clusters of small red berries are left on the end of each twig throughout the winter. Birds eat the berries when other food sources become scarce.

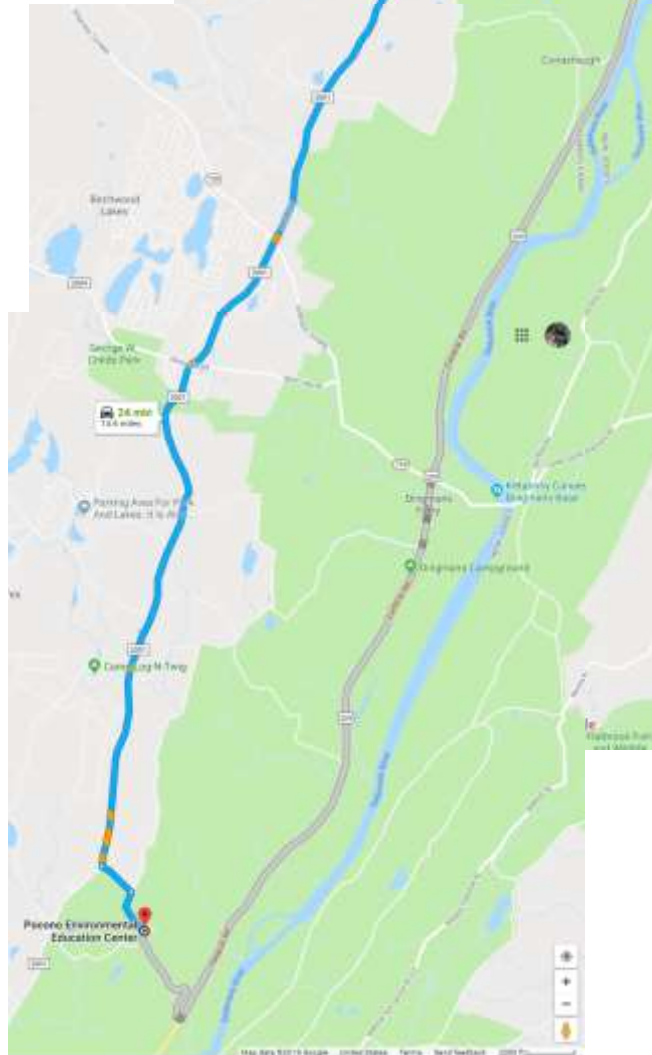
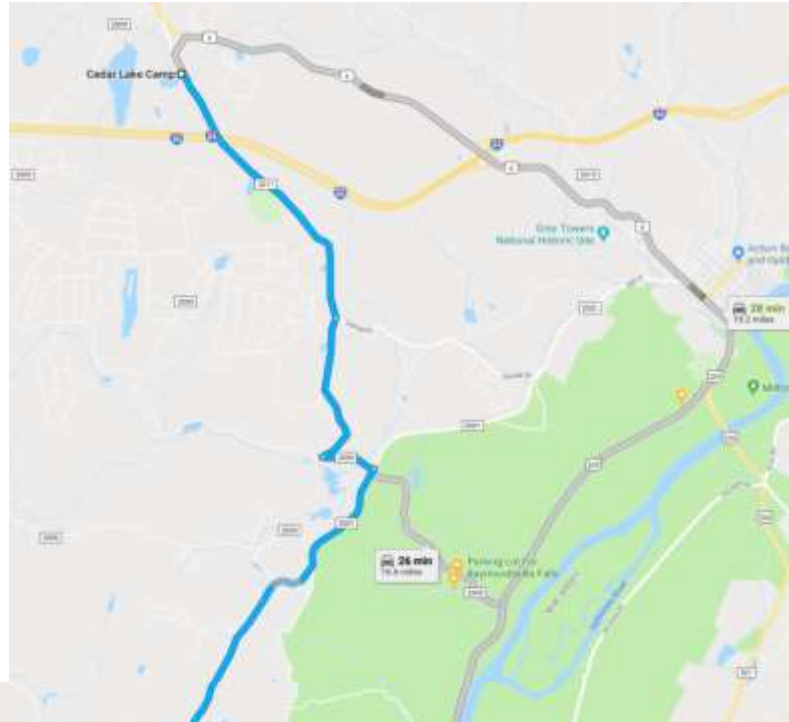
This is the last marker on the trail. Head up the road to the right, then follow the main road to the right back to the main building. We hope you enjoyed the trail. Feel free to ask PEEC staff any questions you may have.





Driving directions from Cedar Lake Camp to PEEC

1. Start heading out of the driveway and turn right going southeast on Sawkill Rd toward Honeywell Rd.
 - a. Then 2.35 miles 2.35 total miles
 2. Turn right onto Kiesel Rd.
 - a. Kiesel Rd is 0.1 miles past Vanauken Hill Rd
 - b. If you reach Fisher Ln, you've gone about 0.7 miles too far
 - c. Then 1.26 miles 3.60 total miles
 3. Turn left onto Raymondskill Rd.
 - a. Then 0.44 miles 4.04 total miles
 4. Turn right onto Route 2001/SR2001.
 - a. Then 1.83 miles 5.88 total miles
 - b. Route 2001/SR2001 becomes Milford Rd.
 - c. Then 7.99 miles 13.87 total miles
 5. Turn left onto Thurner Rd.
 - a. Thurner Rd is 0.7 miles past Valley View Dr
 - b. If you reach Roosie Rd, you've gone about 0.2 miles too far
 - c. Then 0.32 miles 14.18 total miles
 6. Turn right onto Emery Rd.
 - a. Then 0.40 miles 14.58 total miles
 7. Pocono Environmental Education Center, 538 EMERY RD.
 - a. If you reach Brisco Mountain Rd, you've gone a little too far
- 26MIN 14.6MI



Emergency Phone Numbers:

Pocono Environmental Education Center 570-828-2319

The Delaware Water Gap of the National Park Service: <http://www.nps.gov/dewa>

For emergencies call Park Dispatch at (570) 426-2435, or (800) 543-4295.

Emergency centers in the area:

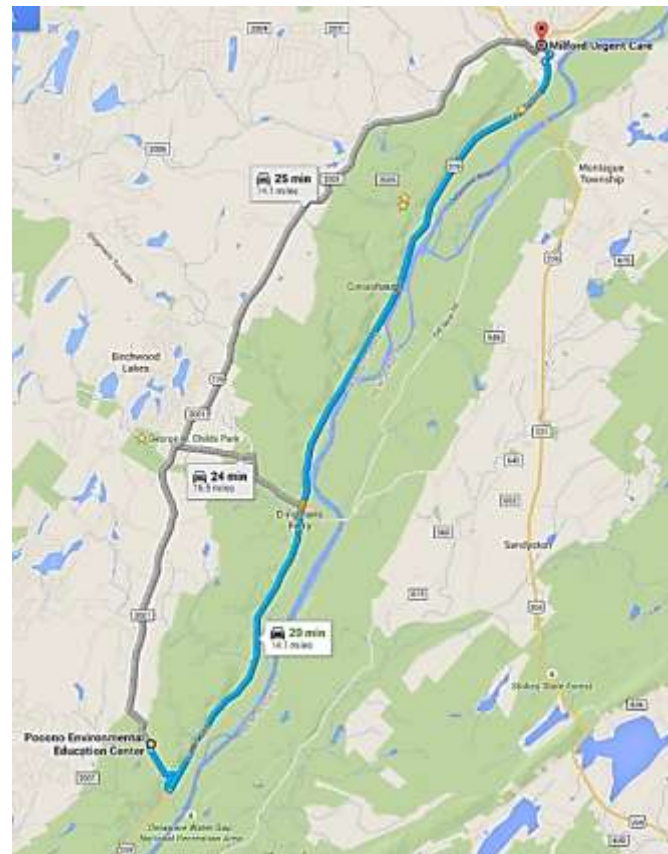
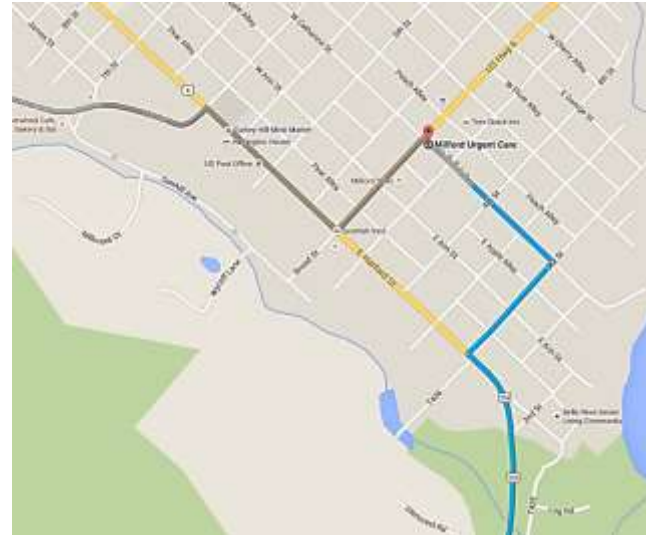
Milford Urgent Care

111 E Catharine St # 130, Milford, PA 18337 (non-life threatening)

Driving directions from PEEC to Milford Urgent Care

21MIN 14.1MI

1. Start out going south on Emery Rd toward Brisco Mountain Rd.
 - a. Then 0.06 miles 0.06 total miles
2. Emery Rd becomes Brisco Mountain Rd.
 - a. Then 0.84 miles 0.90 total miles
3. Turn left onto US Highway 209/US-209 N. Continue to follow US-209 N.
 - a. Then 13.05 miles 13.95 total miles
4. Turn right onto Broad St/US-6 E/US-209 N.
 - a. Broad St is just past Blackberry Aly
 - b. Pike County Public Library is on the corner
 - c. If you are on W Harford St and reach Gooseberry Aly, you've gone a little too far
 - d. Then 0.15 miles 14.09 total miles
5. Turn right onto E Catherine St.
 - a. E Catherine St is just past Apple Aly
 - b. If you reach W Peach Aly, you've gone a little too far
 - c. Then 0.05 miles 14.14 total miles
6. Milford Urgent Care, 111 E Catherine St, Milford, PA, is on the right.
 - a. If you reach 4th St, you've gone a little too far



The nearest level III trauma center for an urgent situation is the **Lehigh Valley Hospital - Pocono Medical Center**

206 E Brown St, East Stroudsburg, PA 18301

(570) 421-4000 General Switchboard

Emergency Services (Mattioli Emergency Center) 570-476-3353

Driving Directions from PEEC to

Lehigh Valley Hospital - Pocono Medical Center

32MIN 20.4MI

1. Start out going south on Emery Rd toward Brisco Mountain Rd.
 - a. Then 0.06 miles 0.06 total miles
2. Emery Rd becomes Brisco Mountain Rd.
 - a. Then 0.84 miles 0.90 total miles
3. Turn right onto US Highway 209/US-209 S. Continue to follow US-209 S.
 - a. Then 14.89 miles 15.79 total miles
4. Enter next roundabout and take the 2nd exit onto Seven Bridge Rd/US-209 S.
 - a. Then 3.14 miles 18.93 total miles
5. Merge onto I-80 W/US-209 S toward Stroudsburg.
 - a. Then 1.13 miles 20.06 total miles
6. Take EXIT 308 toward East Stroudsburg.
 - a. Then 0.20 miles 20.26 total miles
7. Merge onto Prospect St.
 - a. Then 0.09 miles 20.35 total miles
8. Turn right onto E Brown St.
 - a. E Brown St is just past Orchard St
 - b. If you reach Center St, you've gone about 0.1 miles too far
 - c. Then 0.10 miles 20.45 total miles
9. Lehigh Valley Hospital - Pocono Medical Center, 206 E Brown St, East Stroudsburg, PA, is on the left.
 - a. If you reach Smith St, you've gone about 0.3 miles too far

