

= Spring Brook ( Lackawanna River ) =

Spring Brook ( also known as Spring Brook Creek ) is a tributary of the Lackawanna River in Lackawanna County and Luzerne County , in Pennsylvania , in the United States . It is approximately 17 miles ( 27 km ) long and flows through Covington Township , Spring Brook Township , and Moosic in Lackawanna County and Pittston Township in Luzerne County . The watershed of the stream has an area of 57 @. @ 2 square miles ( 148 km<sup>2</sup> ) . It is designated as a High @- @ Quality Coldwater Fishery and a Migratory Fishery above Interstate 476 and as a Coldwater Fishery and a Migratory Fishery below it . A section is also designated as Class A Wild Trout Waters . The stream 's tributaries include Panther Creek , Plank Bridge Creek , Rattlesnake Creek , Green Run , Monument Creek , and Covey Swamp Creek . It has a relatively high level of water quality and is very slightly acidic , with a pH of 6 @. @ 4 to 6 @. @ 9 .

The upper reaches of the watershed of Spring Brook are mountainous and swampy . Further downstream , the stream flows through a water gap in the Moosic Mountains . Sandstone , shale , and some coal are present in the vicinity of the stream . It has been channelized in a concrete channel for part of its length and is the main source of flooding in Spring Brook Township , Lackawanna County . The stream is the second @- @ largest tributary of the Lackawanna River . Reservoirs on Spring Brook include the Spring Brook Intake , the Nesbitt Reservoir , the Watres Reservoir . There are three dams on the stream . The watershed is mainly forested , with only a small amount of urban land .

In the past , industries in the watershed of Spring Brook included timbering , coal mining , and agriculture . Two railroads also passed through the watershed in the early 1900s , at least one of which was established by the 1880s . The stream 's watershed has served as a water supply since at least the early 1900s and still serves as a water supply for the Lackawanna Valley . Several bridges have also been constructed across the stream in the 20th century . The stream has been part of several studies since 1970 . Part of its length is navigable by kayaking , paddling , and rafting .

= = Course = =

Spring Brook begins near Interstate 380 in Covington Township , Lackawanna County . It flows south for a short distance before meandering west for a few miles , crossing Interstate 380 and entering Spring Brook Township . The stream then turns south for several tenths of a mile before turning northwest for several tenths of a mile . It turns southwest before turning north @- @ northwest and flowing around The Hogback . On the northern side of that hill , the stream turns south and then northwest , entering the Watres Reservoir . The stream exits the reservoir on its western side and flows northwest for a few miles , passing Pinnacle Hill and receiving the tributaries Panther Creek and Plank Bridge Creek from the left . It eventually bends east and enters the Nesbitt Reservoir after crossing Pennsylvania Route 502 . Here , it receives the tributary Rattlesnake Creek from the right and flows between high hills . On the northern side of the reservoir , the stream flows north , receiving the tributary Green Run from the right before turning west @- @ southwest . A few miles further downstream , it passes through the Spring Brook Intake before exiting Lackawanna County .

Upon exiting Lackawanna County , Spring Brook enters Pittston Township , Luzerne County . It receives the tributary Monument Creek from the left and turns north @- @ northwest for a few miles , flowing alongside Pennsylvania Route 502 . On this stretch , it leaves behind the hills that it flows through , crosses Pennsylvania Route 502 , and exits Luzerne County . Upon exiting Luzerne County , the stream enters Moosic , Lackawanna County and continues flowing north @- @ northwest and receives the tributary Covey Swamp Creek from the right . The stream then turns west @- @ southwest for a short distance before turning south and then west , crossing Interstate 81 . It then turns northwest for a few tenths of a mile , crossing US Route 11 before reaching its confluence with the Lackawanna River .

Spring Brook joins the Lackawanna River 3 @. @ 62 miles ( 5 @. @ 83 km ) upriver of its mouth .

## == Tributaries ==

Spring Brook has numerous named tributaries : Panther Creek , Plank Bridge Creek , Rattlesnake Creek , Green Run , Monument Creek , and Covey Swamp Creek . Panther Creek joins Spring Brook 10 @. @ 40 miles ( 16 @. @ 74 km ) upstream of its mouth . Its watershed has an area of 7 @. @ 18 square miles ( 18 @. @ 6 km<sup>2</sup> ) . Plank Bridge Creek joins Spring Brook 8 @. @ 65 miles ( 13 @. @ 92 km ) upstream of its mouth . Its watershed has an area of 1 @. @ 26 square miles ( 3 @. @ 3 km<sup>2</sup> ) . Rattlesnake Creek joins Spring Brook 7 @. @ 96 miles ( 12 @. @ 81 km ) upstream of its mouth . Its watershed has an area of 9 @. @ 18 square miles ( 23 @. @ 8 km<sup>2</sup> ) . Green Run reaches its confluence with Spring Brook 6 @. @ 48 miles ( 10 @. @ 43 km ) upstream of its mouth . Its watershed has an area of 4 @. @ 32 square miles ( 11 @. @ 2 km<sup>2</sup> ) . Spring Brook also has numerous unnamed tributaries .

## == Hydrology ==

Spring Brook experiences noticeable flow loss . As of 2009 , it has high levels of sodium and alkalinity . Pittson Township and the borough of Moosic have permits to discharge stormwater into it . However , the water quality and habitat quality of the stream are relatively unimpacted . The stream has relatively high water quality even where it flows through a concrete channel . In a study by the Susquehanna River Basin Commission , it was found not to fail any water quality standards either during base flow or storm flow conditions . However , a study from the previous year found concentrations of sodium and alkalinity exceeding the threshold for concern . In the early 1900s , Spring Brook was a clear stream in its upper reaches . However , by the time it reached the property of the Du Pont Powder Company , it was affected by slush pumped into it by the Pennsylvania Coal Company .

Between 1971 and 1990 , the streamflow of Spring Brook ranged from 0 @. @ 900 to 27 @. @ 0 cubic feet per second . The discharge ranged from 0 @. @ 06 to 22 cubic feet per second in the 1970s . The gage height of the stream in the 1970s ranged from 4 @. @ 72 to 6 @. @ 35 feet ( 1 @. @ 44 to 1 @. @ 94 m ) . The peak annual discharge of the stream at its mouth has a 10 percent chance of reaching 5050 cubic feet per second . It has a 2 percent chance of reaching 10 @. @ 900 cubic feet per second and a 1 percent chance of reaching 14 @. @ 700 cubic feet per second . The peak annual discharge has a 0 @. @ 2 percent chance of reaching 29 @. @ 500 cubic feet per second .

The concentration of dissolved oxygen in Spring Brook at the community of Spring Brook was measured to be 10 @. @ 6 milligrams per liter in 1975 . The concentration of hydrogen ions was measured to range from 0 @. @ 00013 to 0 @. @ 00040 milligrams per liter in the 1970s . The concentration of carbon dioxide ranged from 2 @. @ 2 to 6 @. @ 2 milligrams per liter and the bicarbonate concentration ranged from 9 to 12 milligrams per liter . The sulfate concentration in Spring Brook ranged from 12 @. @ 0 to 19 @. @ 0 milligrams per liter . The chloride concentration ranged between 3 @. @ 7 and 8 @. @ 0 milligrams per liter .

The concentration of organic nitrogen in Spring Brook at the community of Spring Brook was measured to be 0 @. @ 09 milligrams per liter in 1975 . The concentration of ammonia in the form of nitrogen was measured to be 0 @. @ 040 milligrams per liter . The concentration of nitrates in the form of nitrogen was 0 @. @ 74 milligrams per liter and the concentration of nitrites in the form of nitrogen ranged from 0 @. @ 045 to 0 @. @ 29 milligrams per liter in 1971 .

The concentration of sodium and potassium ( as Na ) in Spring Brook ranged from 1 @. @ 4 to 3 @. @ 9 milligrams per liter . The concentration of magnesium ranged from 0 @. @ 90 to 1 @. @ 60 milligrams per liter and the calcium concentration ranged from 7 @. @ 30 to 8 @. @ 80 milligrams per liter . The concentration of recoverable iron in the stream was measured to be 60 micrograms per liter in 1975 .

The concentration of alkalinity in the waters of Spring Brook between the Watres Dam and the Nesbitt Reservoir is 11 milligrams per liter . In the 1970s , the stream 's pH ranged from 6 @. @ 4 to

6 @. @ 9 . The total concentration of water hardness ranged from 23 to 28 milligrams per liter . The turbidity of the stream at the community of Spring Brook was one measured to be less than 5 Jackson Turbidity Units . The specific conductance of the stream ranged from 60 to 78 micro @-@ siemens per centimeter at 25 ° C ( 77 ° F ) during five measurements in the 1970s . The concentration of dissolved solids in the stream was measured to be 54 milligrams per liter in 1975 .

= = Geography , geology , and climate = =

The elevation near the mouth of Spring Brook is 617 feet ( 188 m ) above sea level . The elevation of the stream 's source is approximately 1 @, @ 860 feet ( 570 m ) above sea level . The gradient of the creek is 77 @. @ 3 feet ( 23 @. @ 6 m ) per mile .

The topography of the watershed of Spring Brook is mainly mountainous , with swampy land in its upper reaches . Some bogs are also present in this area . Wetlands near the stream 's headwaters include the Yostville marshes . In the stream 's middle and lower reaches , its valley is flanked by steep , high mountains . Its channel is sinuous and flows through rock formations consisting of sandstone and shale . There is also some coal in the lower reaches of the watershed . There are some culm dumps along the stream between Pennsylvania Route 502 and US Route 11 .

Spring Brook flows across the Pocono Plateau and passes through the Moosic Mountains via a water gap known as the Spring Brook Gap . Its mouth is in the Lackawanna Valley . In its lower reaches , the stream is channelized in a large open concrete channel . A number of bank stabilization projects have been done on the stream from Berlin Village downstream to its mouth . Some land in the vicinity of the stream is designated as a 100 year floodplain .

There are a number of dams on Spring Brook . One of these is the Spring Brook Intake Dam , which was determined in 1980 to be in good condition . Another is the Nesbitt Dam and a third is the Watres Dam .

Most of the Group A and Group B soils in Spring Brook Township , Lackawanna County are located along Spring Brook . These soils groups consist mainly of Pope soils .

The average annual rate of precipitation in the watershed of Spring Brook is between 35 and 40 inches ( 89 and 102 cm ) . The water temperature of the stream at the community of Spring Brook ranged from 8 @. @ 0 to 15 @. @ 5 ° C ( 46 @. @ 4 to 59 @. @ 9 ° F ) in five measurements during the 1970s .

= = Watershed = =

The watershed of Spring Brook has an area of 57 @. @ 2 square miles ( 148 km<sup>2</sup> ) . The watershed is in southern Lackawanna County and northeastern Luzerne County . It is in the lower part of the Lackawanna River watershed , in its south @-@ central and southwestern section . The watershed is part of the North Pocono Watershed region of the Lackawanna River watershed . The mouth of the stream is in the United States Geological Survey quadrangle of Avoca . However , its source is in the quadrangle of Moscow . The creek mainly flows in a northwesterly direction .

Spring Brook is the second @-@ largest tributary of the Lackawanna River , after Roaring Brook . It is a third @-@ order stream . A significant portion of the watershed is forested . However , some residential areas , such as Yostville , Maple Lake , and Spring Brook Village are in the stream 's vicinity . The stream also flows through an urban area in Moosic . Its headwaters are near Yostville . However , only a few square miles of the watershed is urban . Approximately 60 percent of the stream 's watershed is owned by the Theta Company as of 2006 .

Reservoirs and ponds in the watershed of Spring Brook include the Spring Brook Intake , the Nesbitt Reservoir , the Watres Reservoir , and Maple Lake . The first three are used as drinking water reservoirs and the lakes also serve as flood protection . The Pennsylvania American Water Company owns all four lakes and several hundred acres of the surrounding land . There are flood levees at the mouth of the stream . There is some evidence of coal mining on a ridge overlooking the area in the stream 's vicinity . However , residential encroachment on the stream 's floodplain is a more significant environmental concern .

Spring Brook is the main source of flooding in Spring Brook Township , Lackawanna County .

= = History and industries = =

Spring Brook was entered into the Geographic Names Information System on August 2 , 1979 . Its identifier in the Geographic Names Information System is 1188206 .

Spring Brook provided power for early lumbering in Spring Brook Township , Lackawanna County . In the early 1900s , the main industries in the watershed of Spring Brook included coal mining and agriculture . The Pennsylvania Coal Company historically had a washery that discharged into the stream . The Du Pont Powder Company also operated in the watershed at that time . A railroad line along the stream was present by the 1880s . The Wilkes @-@ Barre and Eastern Railroad also crossed the stream 's watershed and the Scranton and Spring Brook Railroad followed the stream between Rockdale and its mouth . During this time period , major communities in the watershed included Moosic , which had a population of 3964 at the time . The main stem and several tributaries were also historically used as a water supply by the Spring Brook Water Supply Company . The stream is still used as an important water supply in the Lackawanna Valley , as of 2001 . Together with Roaring Brook and Stafford Meadow Brook , it serves as a water supply to a substantial part of the valley . Some areas of the watershed have been subjected to extensive timbering programs as recently as 2001 . The Nesbitt Water Filtration Plant is in the watershed , in Pittston Township , Luzerne County . It is owned by the Pennsylvania American Water Company .

Spring Brook flooded during Hurricane Diane in 1955 , reaching a discharge of 10 @,@ 300 cubic feet per second ( 290 m<sup>3</sup> / s ) near Moosic and destroying three homes and inundating the basements and first floors of many others . The Pennsylvania Department of Environmental Protection constructed a levee on the stream after this flooding event . The stream also experienced bank failure during floods in October 1985 and January 1996 . It also flooded homes and trailers in its vicinity .

A two @-@ span steel stringer / multi @-@ beam or girder bridge carrying Main Street / State Route 3024 over Spring Brook was built in 1956 . It is 111 @.@ 9 feet ( 34 @.@ 1 m ) long and is situated in Moosic . Another bridge of the same type was built over the stream in 1957 . This bridge is 155 @.@ 8 feet ( 47 @.@ 5 m ) long and is in Pittston Township . A two @-@ span prestressed box beam or girders bridge was built over the stream in Moosic in 1958 . It is 138 @.@ 1 feet ( 42 @.@ 1 m ) long and carries Pennsylvania Route 502 . Another bridge of the same type ( but with only one span ) was built in Moosic in 1959 and repaired in 1985 . It carries US Route 11 and is 67 @.@ 9 feet ( 20 @.@ 7 m ) long . In 1961 , a two @-@ span steel stringer / multi @-@ beam or girder bridge was built over the stream in Moosic . It is 180 @.@ 1 feet ( 54 @.@ 9 m ) long and carries Pennsylvania Route 502 . A prestressed box beam carrying Pennsylvania Route 502 over the stream was constructed in 1987 . This bridge is in Pittston Township and has a length of 27 @.@ 9 feet ( 8 @.@ 5 m ) .

Spring Brook has been studied several times . It was studied by the United States Geological Survey from 1971 to 1975 , by Daniels ( working for the Pennsylvania Fish and Boat Commission ) in 1976 , by Rider and Blacksmith ( working for the Pennsylvania Department of Environmental Protection ) in 1985 , by Copeland ( working for the Pennsylvania Fish and Boat Commission ) in 1992 , by Moase ( working for the Pennsylvania Fish and Boat Commission ) in 1993 , and Popp and McGurl in 2003 . The stream is on the Pennsylvania Department of Environmental Protection Bureau of Abandoned Mine Restoration 's priority list for restoration .

= = Biology = =

The drainage basin of Spring Brook is designated as a High @-@ Quality Coldwater Fishery and a Migratory Fishery from its headwaters downstream to the Northeast Extension of the Pennsylvania Turnpike ( Interstate 476 ) . From that point downstream to its mouth , the drainage basin of the stream is designated as a Coldwater Fishery and a Migratory Fishery . Wild trout naturally reproduce in Spring Brook from its headwaters downstream to its mouth . A 2 @.@ 4 @-@ mile ( 4 @-@

kilometer ) section of the stream from the Watres Dam downstream to the Nesbitt Reservoir is considered by the Pennsylvania Fish and Boat Commission to be Class A Wild Trout Waters for both brook trout and brown trout . The tributaries Green Run and Panther Creek are Class A Wild Trout Waters for brook trout and part of the tributary Rattlesnake Creek is Class A Wild Trout Waters for both brook trout and brown trout .

Numerous macroinvertebrate species have been observed in Spring Brook . A total of 18 genera are from the orders Ephemeroptera , Plecoptera , and Trichoptera . A short distance upstream of the Watres Reservoir , the most common genera taxa were the family Chironomidae and the genera *Drunella* , *Ephemerella* , and *Hydropsyche* . Of a 200 @-@ individual sample , 34 , 28 , 25 , and 20 individuals of each taxon have been observed , respectively . Slightly less common are the genera *Epeorus* , *Hexatoma* , *Leuctra* , and *Lepidostoma* . Of the 200 @-@ individual sample , 15 , 13 , 11 , and 10 individuals of each taxon have been observed , respectively . Still less common are the genera *Baetis* , *Paraleptophlebia* , *Acroneuria* , *Stenonema* , *Nigronia* , *Agapetus* , *Dolophilodes* , and *Optioservus* . In the 200 @-@ individual sample , 8 , 6 , 5 , 4 , 4 , 3 , 2 , and 2 individuals of each taxon have been observed , respectively . Only one individual each of the genera *Isonychia* , *Amphinemura* , *Cheumatopsyche* , *Rhyacophila* , *Neophylax* , *Psephenus* , *Boyeria* , *Tabanus* , and *Cambarus* were observed .

The wetlands at the headwaters of Spring Brook are home to boreal forest trees . These include black spruce , paper birch , and tamarack . Huckleberry , lady 's slipper , leather leaf , mountain laurel , pitcher plant , and rhododendron plants inhabit bogs in the area .

The modified Hilsenhoff Biotic Index value of Spring Brook a short distance upstream of the Watres Reservoir is 2 @.@ 56 . The modified EPT Index value at this location is 15 . The taxa richness value is 26 .

= = Recreation = =

A trail known as the Spring Brook / Wilkes @-@ Barre and Eastern Greenway was proposed in the Lackawanna River Watershed Conservation Plan in 2001 . There are plans for trails on the flood levee at the stream 's mouth and on the old Wilkes @-@ Barre and Eastern Railroad corridor .

A stretch of at least 7 miles ( 11 km ) of Spring Brook are navigable by kayaking , paddling , or rafting . This stretch runs from the Nesbitt Reservoir to Moosic . The difficulty of the stream ranges from Class II to Class IV .

Spring Brook is an approved trout stream . In 1996 , it was opened for trout fishing on April 29 .