

Water Resources Management Report



4.0 SOLEBURY TOWNSHIP'S WATERSHEDS

Solebury Township is approximately 28 square miles in size and is located within the Piedmont Province of the Appalachian Highlands, and ranges in elevation from almost 500 feet above mean sea level (MSL) to less than 100 feet above MSL. The township is underlain by sandstone and carbonate-rock aquifers which are associated with the Early Mesozoic basin aquifers and the Piedmont and Blue Ridge aquifers, respectively (USGS, 1997). These aquifers are the primary source of water for the township's wells, and generally have good well yields.

Agriculture is the primary land use within Solebury Township and through the township's agricultural preservation programs and other land preservation programs, approximately 5,000 acres (>25% of the township's total area) of agricultural area has been preserved. Although large tracts of land remain forested, residential and commercial development has been increasing and the township's population as increased approximately 160% between 1960 and 2000 (Solebury, 2002).

Unlike most municipalities, Solebury Township's boundaries encompass most of its watersheds. Specifically, the township contains five major watersheds which comprise approximately 33 square miles ([Attachment A](#) & [Attachment B](#)): Paunacussing, Cuttalossa, Primrose, Aquetong, and Pidcock creek watersheds. In addition, there are four minor watersheds located in Solebury Township: Coppernose Run, Laurel Run, Rabbit Run, and Dark Hollow. The following sections describe the existing conditions of each of the five major watersheds, including the physical setting, vegetation, fish and wildlife, and water quality/classification. In addition, an overview of the four minor watersheds is provided in

Solebury Township is recognized for its agricultural heritage and is one of Buck County's Significant Agricultural Areas. Due to their commitment to preservation, Solebury Township won the Pennsylvania Planning Association's 2006 Outstanding Planning Award for Implementation.

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Section 4.6.

4.1. Paunacussing Creek

- ⌘ 7.9 square mile watershed
- ⌘ Supports native brown trout
- ⌘ Wild & Scenic River (NPS)

Paunacussing Creek watershed is located in the northern portion of Solebury Township (52% within the township) and partially within Buckingham (31.5%) and Plumstead (16.5%) townships. The watershed is approximately 7.9 square miles in size ([Attachment A](#)) and is identified as one of thirty-three **Priority 2 Sites** in the Bucks County Natural Areas Inventory (Rhoads and Block, 1999). Development in the watershed includes historic villages and other residential areas including new developments and older rural farms. The villages of [Carversville](#) and [Lumberville](#) are included in the [National Register of Historic Places](#) (NPS, 2007) and have remained small communities/villages with homes that are 100 to 200 years old. Although a number of residents live within the villages and surrounding residential neighborhoods, a significant portion of the residences within the watershed are located on larger tracts of land, which contributes to the overall rural character of the watershed.



Paunacussing Creek was named for an island in the Delaware River located near Lumberville, which was called Paunacussing until 1721, when it became Bull's Island (Davis, 1905). The word Paunacussing came from the Lenni-Lenape, who historically had villages within the watershed.

Priority sites are ranked (i.e., 1 through 4) based on the quality and uniqueness of their natural features.

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The predominant land use in Paunacussing Creek watershed is agricultural consisting of crops, open pastures/fields, and tree nurseries. Most of the agricultural areas are concentrated in the southern and eastern portions of the watershed. The non-agricultural areas primarily consist of residential areas/villages and forested areas (Figure 7).

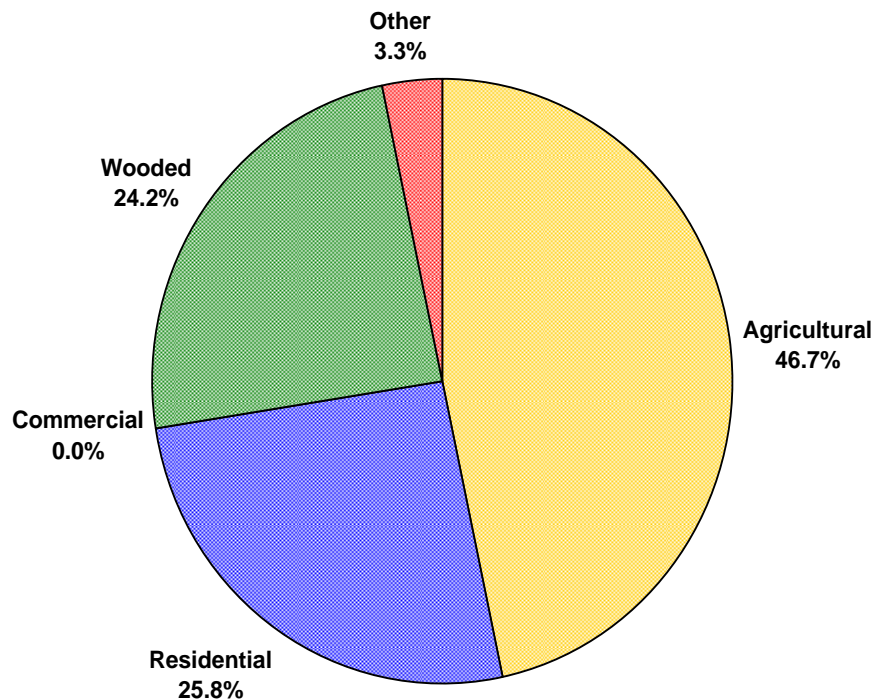


Figure 7. Land Use in Paunacussing Creek's Watershed (2000)

Source: DVRPC, 2000

Forested areas in the Paunacussing Creek watershed primarily occur on steeper slopes and along several stream reaches and are dominated by mixed hardwoods such as tulip poplar, American beech, American sycamore, black cherry, Eastern hemlock, oaks, and red maple. Much of the native understory vegetation in these forested areas has been over-browsed by deer resulting in a dominance of non-native invasive species. Illinois pondweed, a rare plant species, and sand cherry, a state endangered tree species, have been documented as occurring within the watershed but have not been observed in several years (Shultzabarger, 2005; Rhoads and Block, 1999).

Delaware Valley Regional Planning Commission (2000) defines five primary categories of land use as follows:

Residential - Homes and associated lots/lawns and wooded areas.

Agricultural - Farmland (pastures, crops, nurseries) and associated farmsteads/buildings.

Wooded - Tracts of wooded areas and hedgerows; may include wooded portions of parcels that are zoned as residential.

Commercial - Structures and areas associated with the sale of goods/services.

Other - Industrial (e.g., mining), schools, parks, bodies of water, and other land uses not included in the first four categories.

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Fauna in Paunacussing Creek's watershed is diverse and is dominated by species that utilize deciduous forests and areas associated with human disturbance. Specifically, wildlife species in the area include habitat generalists such as the eastern cottontail, groundhog, chipmunk, gray squirrel, deer, raccoon, opossum, red fox, mink, and possibly the occasional black bear. In addition, the large expanse of mostly undeveloped land interspersed with bodies of open water supports a wide array of birds such as the great blue heron, mallard duck, wild turkey, woodpeckers, red tail hawk, in addition to a number of songbirds such as the American robin, blue jay, morning dove, cardinal, and gray catbird. Furthermore, the Paunacussing Creek watershed supports breeding habitat for 13 rare species of birds and 2 bird species of concern (Rhoads and Block, 1999).

The Paunacussing Creek watershed is located primarily within the Stockton Formation ([Attachment C](#)), which consists of reddish-brown sandstone. Sandstone is observed along the lower reach of the stream and is the source for the reddish brown sediment throughout the creek. Boulders are also common throughout the creek, and areas of exposed bedrock are frequent in the lower reaches of the watershed. Topography of the watershed is predominantly gently-sloped, but becomes steeper near Carversville and Lumberville as it slopes towards the Delaware River. Elevation ranges from over 500 feet above mean sea level (MSL) in the northwestern portion of the watershed to around 100 feet above MSL near the confluence of the creek with the Delaware River.

Paunacussing Creek is classified as a high-quality cold-water fishery (HQ-CWF) in [Chapter 93 of Title 25 of the Pennsylvania Code](#), which means that it maintains a water quality sufficient to support a cold water fishery (i.e., trout species). Additionally, it is part of the [Lower Delaware National Wild and Scenic River](#). The combined total length of the perennial portion of the stream channel and its tributaries is approximately 8.5 miles. There are three main branches that converge just upstream of Carversville and form the main stem: the northern branch begins near Cottageville and flows along Carversville Road, the middle branch originates at a spring fed pond near Holicong Road and a spring near Indian Spring Road, and the southern branch of Paunacussing Creek originates at the outflow of two farm ponds off Mechanicsville Road ([Attachment D](#)). The creek flows northeast until it converges with the Delaware River at Lumberville. Paunacussing Creek is approximately 25 feet



Less than 12,000 miles of the nation's 3.5 million miles of rivers and streams are designated as Wild and Scenic Rivers, which truly makes Paunacussing Creek a unique resource.

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wide and 0.25 feet to 6.5 feet deep in the main stem downstream of Carversville.

Paunacussing Creek supports a diverse fish community that includes reproducing brown trout, American eel, and a variety of sunfish. In addition, the watershed is known to provide habitat for a variety of amphibians and reptiles such as dusky salamanders, northern two-lined salamander, long-tailed salamander, northern red salamander, bullfrogs, green frogs, pickerel frogs, painted turtles, and snapping turtles. The macroinvertebrate community contains a variety of mayflies, stoneflies, and caddisflies.

Paunacussing Creek's watershed is being impacted by streambank erosion and excessive siltation/sedimentation within the creek channel. Erosion is evident along the main stem, where there are areas with incised banks and extensive sediment deposition. Although historic conditions along the creek such as mill dams, stone walls, and undersized bridges and culverts contribute to this problem, the loss of native/natural vegetation in the riparian corridor (i.e., deer browse, property maintenance, and degradation by livestock use) and increased areas of impervious surfaces (i.e., development) are also major contributing factors. These concerns and Solebury Township's management strategy are discussed in more detail in Sections 5 and 6 of this report.



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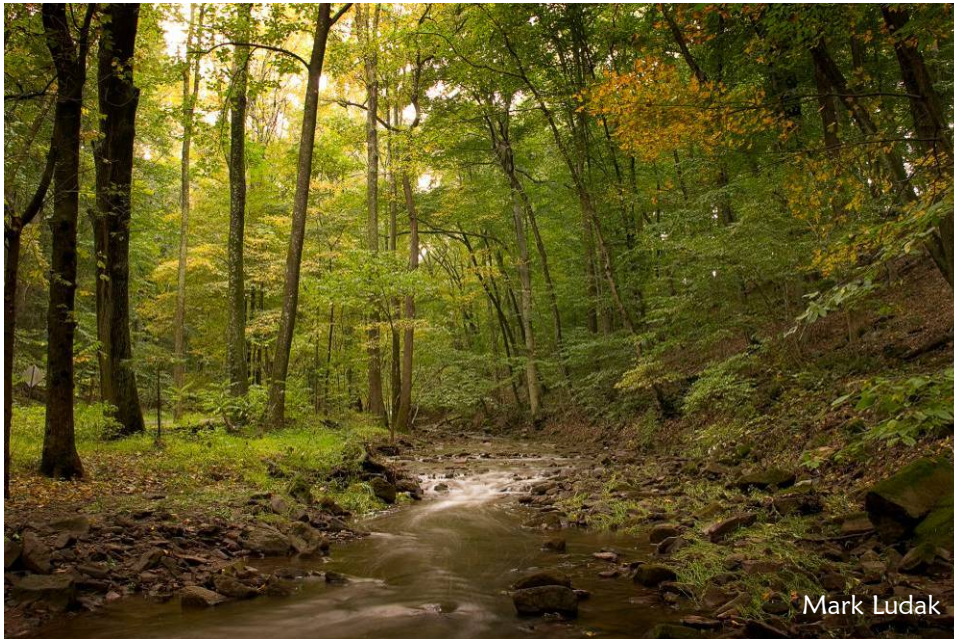
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4.2. Cuttalossa Creek

- ⌘ 2.3 square mile watershed
- ⌘ Supports native brown trout
- ⌘ Relatively low development

The 2.3 square-mile Cuttalossa Creek watershed is located immediately south of the Paunacussing Creek watershed and is located entirely within Solebury Township (Attach-

ment A). Agriculture is the primary land use in the watershed (50.7%) and commercial development is limited (Figure 8). Residential development which accounts for 22.3% of the area in the watershed consists primarily of historic residences on large property parcels, and the remainder of the watershed consists of forested land.



Riparian buffers that consist of deciduous trees such as tulip poplar, American beech, and American sycamore remain intact along much of the stream. The lower reach of the watershed also contains a dominance of rhododendron and Eastern hemlock. Illinois pondweed, a rare plant species, has been documented as occurring within the watershed (Shultzabarger, 2005) and a variety of ferns are abundant in the understory of the floodplain.

Cuttalossa Creek is named after a Lenni-Lenape village, which was located near the creek.

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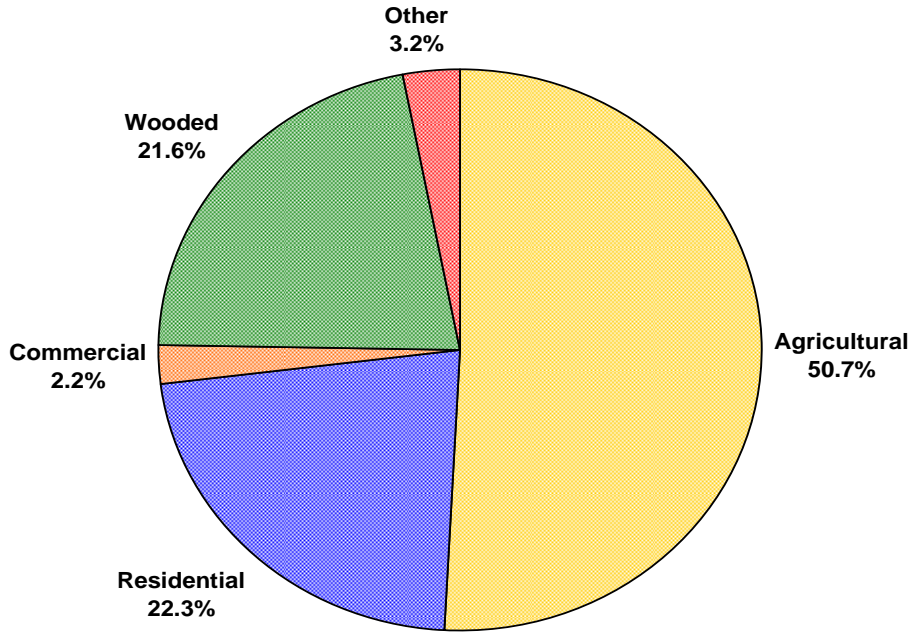


Figure 8. Land Use in Cuttaloosa Creek's Watershed (2000).

Source: DVRPC, 2000

Similar to Paunacussing Creek, Cuttaloosa Creek is designated as a high quality cold- water fishery (HQ-CWF) per [Chapter 93 of Title 25 of the Pennsylvania Code](#). The total length of the perennial stream channel portions is approximately 2.7 miles and includes three primary headwater areas consisting of a small pond in the woods near Greenhill Road, another tributary that is also near Greenhill Road, and a spring fed pond on Creamery Road ([Attachment D](#)). Cuttaloosa Creek is approximately 3 to 15 feet wide and 0.2 to over 12 feet deep. The downstream portion is confined by topography and Cuttaloosa Road, but it is not incised like Paunacussing creek.

Cuttaloosa Creek watershed is located within the reddish brown sandstone of the Stockton Formation. Elevation of the watershed ranges from around 400 feet above MSL to around 100 feet above MSL near the confluence of the creek with the Delaware River. Topography in the upper reaches of the watershed is gently-sloped, whereas the lower reach has exposed bedrock and large boulders and is surrounded by steep slopes that form what is known as the



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[Cuttalossa Creek Valley](#) (from Sugan Road to River Road) which is a registered historic district (NPS, 2007) and was identified as a Priority 3 site in the Bucks County Natural Areas Inventory (Rhoads and Block, 1999). Just upstream from its confluence with the Delaware River, there is a mill dam near the Cuttalossa Inn, which forms a small waterfall.

Fish diversity in Cuttalossa Creek is low, which is to be expected because the watershed is small and fish passage from the Delaware River is blocked by the mill dam located near the Cuttalossa Inn. Fish that are present include brown trout, American eel, and tessellated darters. Other common types of aquatic organisms include amphibians and macroinvertebrates. Northern red salamanders and pickerel frogs have been observed in the stream. The macroinvertebrate community includes a variety of species, including several types of mayflies, stoneflies, caddisflies, beetles, and dragonflies.

Wildlife in the Cuttalossa Creek watershed includes the same habitat generalists present in the Paunacussing Creek watershed, especially those that utilize agricultural areas and waterbodies. Some of the more common species include, but are not limited to, eastern cottontail, groundhog, deer, raccoon, red fox, and mink. In addition, Rhoads and Block's report (1999) indicates that the watershed supports 59 bird species and breeding habitat for 8 rare bird species. Some common bird species likely to occur in the watershed include the great blue heron, mallard duck, red tail hawk, turkey vulture, and barn swallow, as well as a number of songbirds such as the American robin, song sparrow, morning dove, cardinal, and American goldfinch.

Erosion in Cuttalossa Creek is not as extensive as in Paunacussing Creek. However, the steep slopes within the Cuttalossa Creek Valley and the loss of understory/streambank vegetation due to over browsing by deer has resulted in collapsing banks. Additionally, undersized culverts and bridges and antiquated stormwater management measures, particularly in the lower reach of the watershed, are concerns affecting the overall health of the watershed. These concerns and Solebury Township's management strategy are discussed in more detail in Sections 5 and 6 of this report.



Stiltgrass is a common invasive plant species that occurs throughout Solebury Township. It is shade tolerant and occurs in woods and along streams. Deer over-graze on the native species and open up areas for stiltgrass, which deer do not eat.

Stiltgrass is a major concern for streams because it has very shallow roots which do not stabilize stream banks and its establishment has resulted in increased erosion.



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4.3. Primrose Creek

- ∞ 2.7 square mile watershed
- ∞ Impacted by quarry activities

Primrose Creek is located in the middle of Solebury Township between Cuttalossa and Aquetong creeks and has a 2.7 square mile watershed ([Attachment A](#)). The creek originates in the vicinity of Solebury Village and converges with the Delaware River near Phillips Mill. Although agricultural and residential land uses dominate the watershed, the most influential land use is industrial (identified as “Other” in Figure 9), specifically mining, because the mining activities have influenced/alterd the natural surface water and ground water hydrology in Primrose Creek watershed.



Wooded areas still account for a large percent of the watershed’s area (>25%) and primarily occur on the larger properties and along some of the stream reaches. Some of the more common tree species include American sycamore, black willow, American beech, black cherry, and walnut. Below the quarry, there is a large emergent

Phillips Mill is a registered historic district, which was noted for the artists who lived here. This hamlet was the site of a large mill powered by Primrose Creek.



Aerial photograph of New Hope Crushed Stone quarry in 2000

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wetland with typical species, such as rushes, sedges, and cattails. Rare plant species that have been documented within the watershed include Aunt Lucy, common hop-tree, and showy goldenrod (Shultzabarger, 2005).

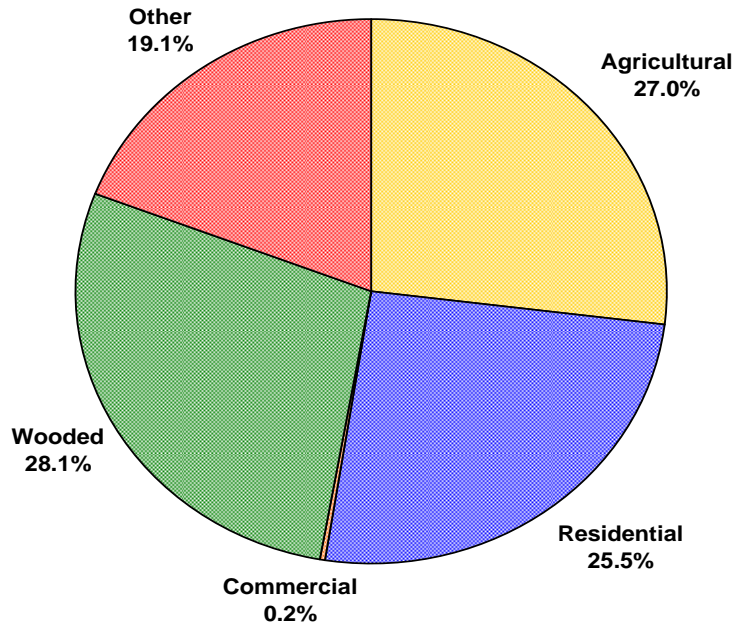


Figure 9. Land Use in Primrose Creek's Watershed (2000).

Source: DVRPC, 2000

Wildlife species associated with Primrose Creek watershed include habitat generalists that are tolerant of mining and agricultural activities and include deer, raccoon, opossum, and skunk. In addition, dominant bird species include the European starling, red tail hawk, American crow, and turkey vulture, in addition to waterfowl such as mallard duck and Canada goose, and songbirds such as the American robin, house sparrow, and morning dove.

The Primrose Creek watershed is located primarily within four geologic formations ([Attachment C](#)). It is located within the Stockton formation (similar to Paunacussing and Cuttalossa creeks) and Brunswick formation, and a significant portion of the watershed is underlain by the limestone and dolomite of the Allentown formation and the Beekmantown group. The limestone and dolomite are associated with the karst geology and sinkholes in the watershed. In the upper reaches of the watershed, there are large



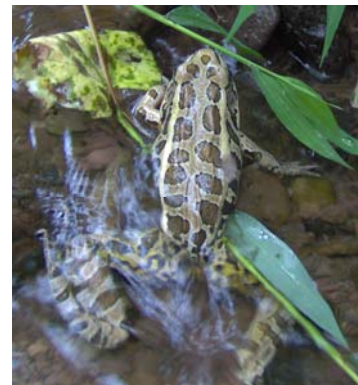
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boulders and cobbles in the streambed. Below the quarry, the stream contains deposits of fine sediment and has fairly level topography. Topography in the upper reaches is steeper than in the lower reaches, and elevation ranges from around 400 feet above MSL to less than 100 feet above MSL near the confluence of the creek with the Delaware River. Primrose Creek ranges from 1 to 12 feet wide and from 1 inch to over 5 feet deep. The majority of the downstream portion of Primrose Creek, below the New Hope Crushed Stone Quarry, is unconfined as it flows through flat topography.

Primrose Creek is a trout stocked fishery (TSF) per [Chapter 93 of Title 25 of the Pennsylvania Code](#): all unnamed tributaries of the Delaware River from the Lehigh River to Pidcock Creek receive this protection. This means that Primrose Creek is protected for the maintenance of stocked trout for a portion of the year; however, no trout have been observed in Primrose Creek during fish community assessments conducted by Solebury Township in 2006 and 2007. Three small branches of Primrose Creek converge between Phillips Mill and Sukan roads ([Attachment D](#)). One of these branches originates at a large spring that once powered a mill; however, the stream dries up a short distance downstream from the mill due to pumping by the New Hope Crushed Stone Quarry. A portion of the stream has been mined, resulting in two disconnected channels located upstream and downstream of the quarry. Just below the quarry's discharge pipe the stream begins to flow again towards the Delaware River through Phillip's Mill.

Aquatic fauna in Primrose Creek differs from that found in Paunacussing and Cuttalossa creeks. The quarry pit acts as a barrier for fish; therefore, upstream species are limited to those that were there before the stream channel was disrupted by mining activities, or are associated with one of the ponds in the watershed. Bass, sunfish, and killifish are some of the fish that occur in the watershed. Dusky salamanders, pickerel frogs, green frogs, and snapping turtles are also common in the watershed. The macroinvertebrate community is not as diverse as the other watersheds, but does include mayflies, stoneflies, caddisflies, and snails.

A primary concern in Primrose Creek watershed is the New Hope Crushed Stone Quarry. The stream channel has been mined out within the perimeters of the quarry, resulting in the upper reaches being disconnected from the lower reach. The quarry pumps



A primary concern in Primrose Creek watershed is the New Hope Crushed Stone Quarry. The stream channel has been mined out within the perimeters of the quarry, resulting in the upper reaches being disconnected from the lower reach.

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ground water resulting in dry wells and the formation of numerous sinkholes: currently, a large sinkhole exists just upstream of the quarry, which is where the upstream portion of the stream ends. In addition, the stream reach immediately upstream of the quarry has severe erosion problems. The quarry's permit conditions regulate the quarry's discharge and specify a minimum flow rate that the quarry is required to maintain. However, no flow has been observed in the downstream reach of Primrose Creek below the New Hope Crushed Stone Quarry during low flow periods, when the stream is dependent on ground water sources. These concerns and Solebury Township's management strategy are discussed in more detail in Sections 5 and 6 of this report.



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4.4. Aquetong Creek

- ∞ 7.6 square mile watershed
- ∞ Supports native brown trout
 - ∞ Karst geology
 - ∞ Ingham Spring = unique

The Aquetong Creek watershed is approximately 7.6 square miles in area, is located within the central portion of Solebury Township, and extends into New Hope Borough (approximately 9.6%) ([Attachment A](#)). The majority of the watershed (>75%) consists of forested and agricultural areas including nurseries, crops, and horse farms (Figure 10). There are more small-lot residential neighborhoods in Aquetong Creek watershed than in the other township watersheds, but the majority of the remaining large parcels have been preserved. Commercial development is more dense in this watershed than in the others, particularly along the Route 202 corridor. The Route 202 corridor is zoned residential and commercial and is serviced by several water supply systems (which have ground water as a source) and public sewer. Wastewater in this area is sent to the Lambertville waste water treatment plant in New Jersey and is discharged to the Delaware River. This results in a water deficit for this area.



Aquetong Creek's name is from Aquetong Spring (now Ingham Spring), which was Native American for "place of the pine trees" (F.X. Browne, 2006). Ingham Spring was sacred to the Lenni Lenape and was the location of the first mill in Solebury Township (Davis, 1905).

A few of the major water supply wells along the Route 202 Corridor include:

- Bucks County Water & Sewer Authority
- Hermitage
- Logan Square

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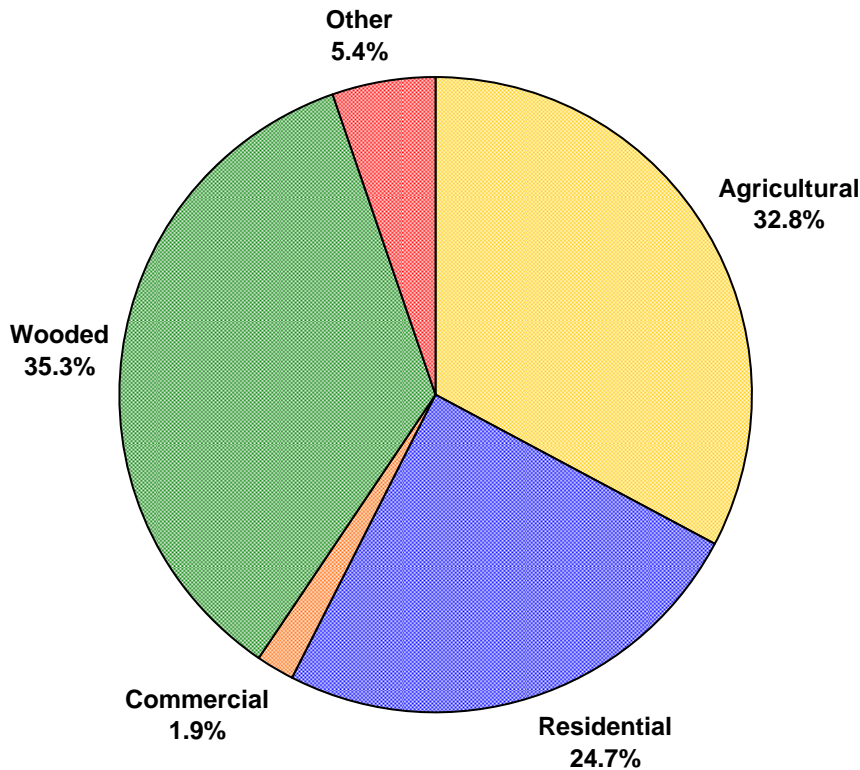


Figure 10. Land Use in Aquetong Creek's Watershed (2000).

Source: DVRPC, 2000

Forested areas occur throughout the watershed and commonly occur on the larger parcels. American sycamore, red maple, tulip poplar, American beech, and grape vines are common species. Rare plant species identified in the watershed include Mead's sedge and wild senna (Shulzabarger, 2005). Ingham Lake and Ingham Spring are classified as a Priority 2 site and Suga (Burrell's) Lake is a Priority 3 site in the Buck County's Natural Areas Inventory (Rhoads and Block, 1999).

Fauna within the Aquetong Creek watershed includes wildlife species such as eastern cottontail, groundhog, deer, raccoon, opossum, red fox, skunk, and possibly the occasional black bear. In addition, the large expanse of mostly undeveloped land interspersed with surface water and forest supports a wide array of birds such as the mallard duck, red tail hawk, turkey vulture, American crow, and Canada goose, in addition to a number of songbirds such as the American

Honey Hollow watershed (i.e., sub-watershed of Aquetong Creek) is a National Historic Landmark (PHMC, 2007) and the Upper Aquetong Valley (i.e., the area of Aquetong, Meetinghouse, Creamery, and Suga Roads) is a National Registered Historic District (NPS, 2007).



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robin, blue jay, morning dove, cardinal, barn swallow, house sparrow, and gray catbird.

Geologic formations underlying the Aquetong Creek watershed include the Stockton Formation, Stockton Conglomerate, Beekmantown Group, Brunswick Formation, Leithsville Formation, diabase, Brunswick Formation, and the Allentown Formation ([Attachment C](#)). These formations are sandstone, sandstone conglomerate, dolomite limestone, diabase, and shale. Similar to Primrose Creek, the dolomite and limestone formations cause karst geology, which when combined with a geological **fault**, have resulted in the formation of Ingham Spring ([Attachment C](#)). The watershed includes gentle rolling hills and very few areas with steep slopes: elevations range between almost 450 feet above MSL to 100 feet above MSL. The substrate of Aquetong Creek primarily consists of cobble and gravel, and very few boulders.

Aquetong Creek is a high quality cold-water fishery (HQ-CWF) per [Chapter 93 of Title 25 of the Pennsylvania Code](#). The total length of the perennial portion of Aquetong Creek is approximately 10.75 miles. The stream is approximately 25 feet wide near the New Hope Borough and Solebury Township border. The creek is generally 1 to 2 feet deep, but becomes much deeper in the lakes.

Aquetong Creek's headwaters include two large springs (Ingham Spring and a large spring at Gateshead Farm) and several other headwater reaches, including Honey Hollow, which is a notable branch of Aquetong Creek. Ingham Lake and Sukan (Burrell's) Lake, both located in the Aquetong Creek watershed, are the largest reservoirs in Solebury Township.

Aquetong Creek supports native brown trout and Ingham Spring was used as a trout hatchery in the past. It is probable that trout reproduction occurs within Aquetong Creek because small/young trout have been observed in the creek and the dam at the Bucks County Playhouse prohibits trout from swimming upstream from the Delaware River. Other species that occur in the creek include American eel, white suckers, and bass as well as northern two-lined salamanders and green frogs. A variety of turtles, including snapping and painted turtles, occur in the watershed. Eastern spiny softshell turtles are native to western Pennsylvania, but have been introduced into eastern Pennsylvania, and may occur in Ingham



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A **fault** is a fracture in rock which has movement.

Aquetong Creek supports trout and Ingham Spring was used as a trout hatchery in the past.

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Lake. Macroinvertebrates include a variety of mayflies, stoneflies, caddisflies, as well as other genera.

The demand for public water and sewer along the Route 202 corridor influences the water budget of the entire Aquetong Creek watershed because water used/consumed is not recharged into the ground water aquifers. The increased water withdrawals associated with development can result in reduced flow in tributaries. These primary concerns and Solebury Township's management strategy are discussed in more detail in Sections 5 and 6 of this report.



The demand for public water and sewer along the Route 202 corridor influences the water budget of the entire Aquetong Creek watershed because water used/consumed is not recharged into the ground water aquifers.

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4.5. Pidcock Creek

- ⌘ 12.7 square mile watershed
- ⌘ Supports diverse fish community
- ⌘ Spans 4 townships

Pidcock Creek is the southernmost stream in Solebury Township and has a large watershed (12.7 square miles) that extends into Buckingham (36.7%), Upper Makefield (30.1%), and Wrightstown (1.5%) townships ([Attachment A](#)). Land use in the Pidcock Creek watershed is primarily dominated by agricultural, forested, and residential uses (Figure 11). Another prominent land use within the watershed is associated within [Bowman's Hill Wildflower Preserve](#) which is a 100+ acre nature preserve. Although development is increasing in the watershed, continued agricultural activities and preserved properties help to maintain the overall character of the watershed.



Forested areas occur throughout the watershed, particularly along Pidcock Creek, and consist of walnut, oaks, American beech, river birch, and black cherry. Several species of rare plants occur in this watershed but are primarily associated with the Bowman's Hill Wildflower Preserve where deer are excluded and the plant diversity and understory vegetation are protected. Pidcock Creek is designated as a Priority 3 site in the Bucks County Natural Areas Inventory (Rhoads and Block, 1999).

Pidcock Creek was named for John Pidcock, who settled at the mouth of the stream. John Pidcock's home (the Thompson-Neely house) is in Washington Crossing State Park, which is on the National Register of Historic Places (NPS, 2007). In addition, several other historic resources, such as residences and taverns, occur throughout the

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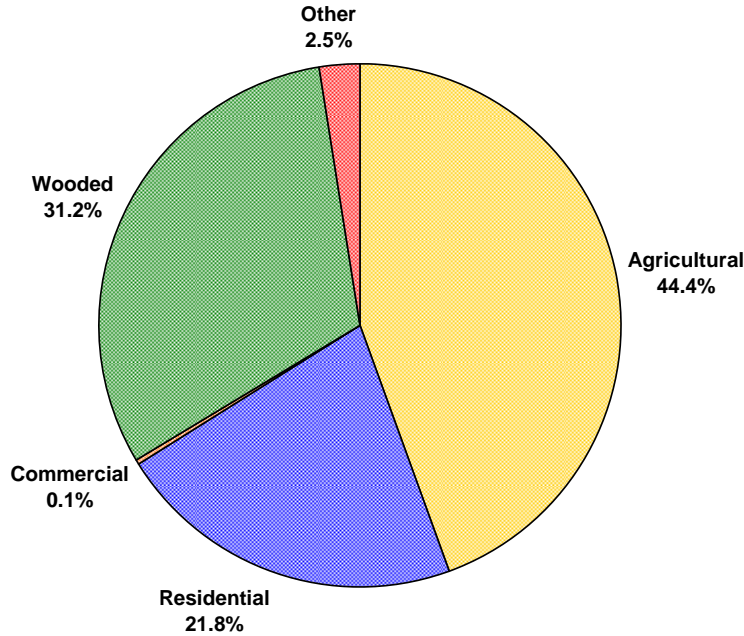


Figure 11. Land Use in Pidcock Creek's Watershed (2000).

Source: DVRPC, 2000

Wildlife species that occur in the Pidcock Creek watershed are similar to those found in the other watersheds and include species tolerant of development and agricultural practices. Common species include the gray squirrel, chipmunk, groundhog, deer, raccoon, red fox, mink, and possibly the occasional black bear. According to the Rhoads and Block report (1999), the Pidcock Creek watershed provides breeding habitat for 11 rare bird species as well as 67 species of birds including the great blue heron, mallard duck, red tail hawk, turkey vulture, Canada goose, American robin, American goldfinch, blue jay, morning dove, cardinal, barn swallow, gray catbird, and the ruby-throated hummingbirds (especially in the wildflower preserve).

The geology of the Pidcock Creek watershed is the red sandstone of the Brunswick Formation ([Attachment C](#)) and diabase, which is a black igneous rock. The watershed contains Bowman's Hill and is bounded by Buckingham Mountain, Solebury Mountain, and Jericho Mountain which are characterized by steep slopes. However, the topography of the portion of the watershed located within Solebury



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Township is gentle and ranges between 50 feet MSL and 260 feet MSL.

Pidcock Creek is a warm water fishery (W/WF) per [Chapter 93 of Title 25 of the Pennsylvania Code](#): meaning that the water quality in Pidcock Creek is protected for warm water fish such as bass and sunfish. The majority of the creek's headwater tributaries originate within Upper Makefield and Solebury townships and are not associated with springs or spring fed ponds as is the case with the other watersheds. The result is a reduction in cold water inputs and a warm-water classification by the DEP.

Fish diversity in Pidcock Creek consists of warm water species such as sunfish and bass. Some fish species that are particularly common in the watershed include American eels, white suckers, redbreast sunfish, green sunfish, blacknose dace, tessellated darter. This is a warmwater fishery, and therefore, coldwater species, such as trout, do not occur in Pidcock Creek. Amphibians such as green frogs and pickerel frogs, and turtles such as snapping turtles and painted turtles are very common throughout the watershed. Macroinvertebrates include mayflies, caddisflies, and hellgrammites. Crayfish, including native and introduced species, also occur in Primrose Creek.

Concerns in Pidcock Creek watershed include inadequate riparian corridors. Pidcock Creek has several reaches where the stream banks lack natural vegetation because they have been mowed, resulting in reduced bank stability and increased erosion/sedimentation; less shading and increased stream temperatures; and reduced protective stream buffers and the potential for increased stream contamination associated with fertilizers and other lawn care products. These concerns and Solebury Township's management strategy are discussed in more detail in Sections 5 and 6 of this report.

Pidcock Creek is a warm water fishery per the Pennsylvania Code: meaning that the water quality in Pidcock Creek is protected for warm water fish such as bass and sunfish.



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4.6. Minor Watersheds

- ⌘ Coppernose Run
- ⌘ Laurel Run
- ⌘ Rabbit Run
- ⌘ Dark Hollow

There are four other perennial streams identified in Solebury Township which form the primary minor watersheds: Coppernose Run, Laurel Run, Rabbit Run, and Dark Hollow. All of these streams are considered trout stocked fishery (TSF) streams per [Chapter 93 of Title 25 of the Pennsylvania Code](#). This means that they are protected for the maintenance of stocked trout for a portion of the year. Rabbit Run and Dark Hollow are explicitly identified as TSF; Coppernose Run and Laurel Run are considered TSF because they are undesignated tributaries to the Delaware River between the Lehigh River and Pidcock Creek.

4.6.1 *Coppernose Run*

Coppernose Run is located below Paunacussing Creek, at the eastern end of Lumberville. It is named for the hill which it flows over Coppernose Hill. It is a second order stream with an approximately 0.6 square mile watershed which is entirely located within Solebury Township ([Attachment A](#)). Land use in this watershed is primarily agricultural and forested, and to a lesser extent, residential. Approximately half of the watershed has been preserved and a portion of the watershed is located within the Lumberville historic district. There are very few large properties in this watershed that are not yet preserved. Forested areas in this watershed are similar in character to those of the lower portions of Paunacussing and Cuttalousa watersheds, which is largely due to their close proximity

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and similar geology and topography. Common tree species along the stream include hardwood species, such as red maple and ash. The watershed is located within the reddish-brown sandstone of the Stockton Formation ([Attachment C](#)).

4.6.2 Laurel Run

Laurel Run is located between Cuttalossa Creek and Center Bridge. It is a second order watershed with an approximately 0.9 square mile watershed, which is entirely located within Solebury Township ([Attachment A](#)). Land use in this watershed is agricultural, forested, residential, and recreational. Recreational use includes Laurel Park and the David R. Johnson Natural Area. Including these two properties, over half of the watershed has been preserved. The David R. Johnson Natural Area has been identified as a Priority 4 site in the Bucks County Natural Areas Inventory. The Natural Areas Inventory identified this location because of the number of amphibian species in Laurel Run and the forest community types in the watershed: rich hemlock – mesic hardwood forest and red oak – mixed hardwood forest (Rhoads and Block, 1999). Similar to Coppernose Run, this watershed is located within the Stockton Formation which consists of a reddish-brown sandstone of ([Attachment C](#)).

4.6.3 Rabbit Run

Rabbit Run is located within both Solebury Township and New Hope Borough ([Attachment A](#)), and is a second order stream with a watershed area of 0.4 square miles. Land use within Rabbit Run consists of residential (including dense residential), agricultural, commercial, light industrial, and recreational. Pat Livezey Park is the only property in this watershed that has been preserved through the Solebury Township Land Preservation Program. There are very few wooded areas in this watershed and the primary vegetative community is lawn. Because of the, current land use and zoning practices, particular attention should be paid to stormwater management within this watershed. The watershed is underlain by the Brunswick Formation, which is a red shale with sandstone and conglomerate.

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4.6.4 Dark Hollow

Dark Hollow is also located within Solebury Township and New Hope Borough ([Attachment A](#)), and is a second order stream with an approximately 0.7 square mile watershed. The portion of the watershed within Solebury Township is zoned residential and agricultural. Primary land use in the watershed is forested, residential, and agricultural. The extensive amount of wooded areas within the watershed may be partially due to the steep slopes within the watershed. The watershed is located primarily within the Brunswick formation and underlain by diabase.