

## **Aquatic Features**

Due to the geographical position of the study area within the Frick Environmental Center (FEC) (i.e., hilltop and hillsides), the aquatic features present in the park are headwaters type systems that provide a valuable feature to the aquatic systems in which these waters contribute flow, which is the Ninemile Run watershed. Functions provided by headwaters type aquatic systems generally include aquatic or semi-aquatic macroinvertebrates and amphibians adapted to headwaters systems; retention and conversion of organic material deposited by surrounding upland vegetation; and sediment retention. The following paragraphs describe the aquatic systems observed within the park boundaries.

## **Palustrine Wetlands**

As defined in the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, *et al.* 1979), palustrine wetlands (wetlands) are a system of “non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens and all such wetlands that occur in tidal areas where salinity due to ocean derived salts is below 5 %.” Palustrine wetlands provide a unique habitat feature that is continually threatened by anthropogenic activities including, but not limited to, development and its associated activities. Wetlands are habitat features that are extremely important to the flora and fauna that have evolved to rely on these systems. As such, wetlands in an urban landscape, such as Frick Park, are valuable resources that should be protected to the extent possible. It is also important to note that all palustrine wetlands are landscape features that are protected under both federal and state laws.

Functions and values provided by palustrine wetlands include the opportunity for groundwater discharge, groundwater recharge, floodflow alteration, sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, production export, wildlife habitat, aquatic habitat, endangered species habitat, recreation, uniqueness/heritage, educational/scientific value, and visual quality/aesthetics. Wetlands that provide for the functions of groundwater discharge, groundwater recharge, and floodflow alteration generally provide the opportunity for the natural management of water quantity. Wetlands that provide for the function of sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and production export generally provide an opportunity for natural water filtration and subsequent water quality improvement. Wetlands that provide for the functions of

aquatic habitat, endangered species habitat, and wildlife habitat provide the opportunity to support wildlife or threatened and/or endangered species. Wetlands that provide for the functions of recreation, uniqueness/heritage, educational/scientific value, and visual quality/aesthetics provide a function to people from an educational or recreational perspective.

Field investigations identified two palustrine wetlands and one vernal pool type feature within the FEC. The palustrine wetlands observed within the park are hillside seep/topographic depression type wetlands. Wetland W1 is a 50% palustrine emergent (PEM)/50% palustrine scrub/shrub (PSS) wetland that is approximately 600 square feet in size. The dominant vegetative community within W1 is composed of wingstem (*Verbesina alternifolia*), northern arrowwood (*Viburnum recognitum*), silky dogwood (*Cornus amomum*), cleavers bedstraw (*Galium aparine*), and soft rush (*Juncus effusus*). Wetland W2 is a 20% PEM/80% PSS wetland that is approximately 1,000 square feet in size. The dominant vegetative community within W2 is fox sedge (*Carex vulpinoidea*), a willow species (*Salix* species), silky dogwood, a jewelweed species (*Impatiens* species), and multiflora rose (*Rosa multiflora*). The area identified as a vernal pool type feature is approximately 50 square feet in size and is located along an ephemeral drainage. Within this area, a depression was formed as a result of a downed tree. The area previously occupied by the root ball of the tree provides an opportunity for water to collect and pool during the fall or spring season and provide vernal pool characteristics.

A cursory evaluation of the functions provided by the wetlands and vernal pool type feature observed within the park was conducted. Hillside seep type wetlands are typically associated with a groundwater discharge source and provide several functions. Some of the functions provided by hillside seep type wetlands include providing an opportunity for filtering of overland flow run-off from surrounding uplands that could be carrying sediments, toxicants, or nutrients; they can provide food sources or other products that could be utilized by wildlife; and they can provide a unique habitat feature for flora and fauna suited to life in seep type habitats. These types of features can also provide a source of water that may be utilized for wildlife. Also, these wetlands are often found in association with intermittent or perennial stream channels. Topographical depression type wetlands (including vernal pools) typically collect and detain water. Because of this characteristic, these wetlands may provide an opportunity to settle out sediments, toxicants, or nutrients that may be carried in water that flows into these areas. Because these wetlands can detain water, they provide a habitat feature that can be utilized by wildlife suited to wetlands that are periodically inundated, which could include reptiles and amphibians.

## Surface Waters

According to the Pennsylvania Code, Title 25, Chapter 87, *Surface Mining of Coal* (2002), there are three stream types: perennial, intermittent, and ephemeral stream. The perennial stream is defined as “a body of water flowing in a channel or bed composed primarily of substrates associated with flowing waters and is capable, in the absence of pollution or other manmade stream disturbances, of supporting a benthic macroinvertebrate community which is composed of two or more recognizable taxonomic groups of organisms which are large enough to be seen by the unaided eye.” The intermittent stream is defined as “a body of water flowing in a channel or bed composed primarily of substrates associated with flowing water, which, during periods of the year, is below the local water table and obtains its flow from both surface runoff and groundwater discharges.” The ephemeral stream is defined as “a water conveyance which lacks substrates associated with flowing waters and flows only in direct response to precipitation in the immediate watershed or in response to melting snowpack and which is always above the local water table.” Generally speaking perennial and intermittent streams are groundwater driven systems, for at least part of the year; ephemeral streams or drainages are wet weather systems that concentrate and convey run-off from storm events or snow melt.

Functions and values provided by surface water resources include providing habitat for aquatic species, providing baseflow for downstream waterways, providing floodflow detention and retention, water quality improvement, and recreation. The specific functions and values provided by streams differ from one stream to the next due to numerous factors, some of which include stream size, watershed characteristics, and surrounding land use, to name a few. Due to the topographical position of the FEC, the streams within the park are headwaters type streams. Typically the geographical location of the FEC, within an urban environment, would provide water quality degradation pressures such as run-off from surrounding uplands including lawns, parking lots, roadways, etc. to streams in these areas. However, due to the forested component of the FEC and distance from potential pollutant sources, many of these factors do not likely have an influence on these streams within the FEC.

Field investigations of the FEC property identified one groundwater driven stream (S1) and two ephemeral drainages (EPH1 and EPH2). S1 originates within the southwestern portion of the FEC. S1 is an intermittent stream with a southeasterly flow. EPH1 and EPH2 are located within the southeastern portion of the FEC. These resources join to form one channel approximately 300 feet outside the project area. All project area streams continue beyond the project area. Water conveyed within these streams eventually flows into Ninemile Run.

## Vegetation

During the walk over of the project area to identify aquatic resources, two primary vegetative habitat types were observed within the FEC. The dominant habitat type is deciduous forest, with herbaceous rangeland covering a small portion of the FEC area. The vegetative species observed within the forested and rangeland portion of the FEC were documented. Table 1 presents the species observed within the FEC. Please note that this is not a complete list of vegetation growing within the FEC; a diverse vegetative community was observed within the FEC boundary. However, there are numerous aggressive, non-native species within the FEC that could displace some of the native plant species within the park.

**Table 1**  
**Vegetative Species in FEC**

Common Name	Scientific Name
<i>Herbaceous Vegetation</i>	
Aniseroot	<i>Osmorhiza longistylis</i>
Aster species	<i>Symphotrichum</i> species
Avens species	<i>Geum</i> species
Blue-stemmed goldenrod	<i>Solidago caesia</i>
Celandine-poppy	<i>Stylophorum diphyllum</i>
Cleavers	<i>Galium aparine</i>
Common burdock	<i>Arctium minus</i>
Common milkweed	<i>Asclepias syriaca</i>
Common ragweed	<i>Ambrosia artemisiifolia</i>
Dame's-rocket*	<i>Hesperis matronalis*</i>
False solomon's seal	<i>Smilacina racemosa</i>
Fire pink	<i>Silene virginica</i>
Foamflower	<i>Tiarella cordifolia</i>
Fox sedge	<i>Carex vulpinoidea</i>
Garden lupine	<i>Lupinus polyphyllus</i>
Garlic mustard*	<i>Alliaria petiolata*</i>
Hairy solomon's seal	<i>Polygonatum pubescens</i>
Indian cucumber-root	<i>Medeola virginiana</i>
Jack-in-the-pulpit	<i>Arisaema atrorubens</i>
Jewelweed species	<i>Impatiens</i> species
Jumpseed	<i>Tovara virginiana</i>
Lady's-thumb	<i>Polygonum persicaria</i>
Lily-of-the-valley	<i>Conballaria majalis</i>
Liverleaf	<i>Hepatica nobilis</i> var. <i>acuta</i>
Mayapple	<i>Podophyllum peltatum</i>
Pokeweed	<i>Phytolacca Americana</i>
Red clover	<i>Trifolium pretense</i>
Small flowered agrimony	<i>Agrimonia parviflora</i>
Soft rush	<i>Juncus effusus</i>
Squawroot	<i>Conopholis americana</i>
Tall buttercup	<i>Ranunculus acris</i>
Toothwort	<i>Cardamine concatenata</i>
Twinleaf	<i>Jeffersonia diphylla</i>
Violet species	<i>Viola</i> species

**Table 1  
Vegetative Species in FEC (continued)**

<b>Common Name</b>	<b>Scientific Name</b>
<i>Herbaceous Vegetation (continued)</i>	
White snakeroot	<i>Eupatorium rugosum</i>
Wingstem	<i>Verbesina alternifolia</i>
Wood geranium	<i>Geranium maculatum</i>
<i>Vines</i>	
Common periwinkle	<i>Vinca minor</i>
Fox grape	<i>Vitis labrusca</i>
Hedge bindweed	<i>Convolvulus sepium</i>
Japanese honeysuckle*	<i>Lonicera japonica</i> *
Oriental bittersweet*	<i>Celastrus orbiculatus</i> *
Poison ivy	<i>Toxicodendron radicans</i>
Porcelain-berry*	<i>Ampelopsis brevipedunculata</i> *
Virgin's-bower	<i>Clematis virginiana</i>
Virginia creeper	<i>Parthenocissus quinquefolia</i>
<i>Shrubs</i>	
Black raspberry	<i>Rubus occidentalis</i>
Burning-bush*	<i>Euonymus alatus</i> *
Common blackberry	<i>Rubus alleghensis</i>
Common privet*	<i>Ligustrum vulgare</i> *
Common spicebush	<i>Lindera benzoin</i>
Eastern redbud	<i>Cercis canadensis</i>
Forsythia	<i>Forsythia suspense</i>
Hairy mock-orange	<i>Philadelphus hirsutus</i>
Japanese barberry*	<i>Berberis thunbergii</i> *
Multiflora rose*	<i>Rosa multiflora</i> *
Northern arrow-wood	<i>Viburnum recognitum</i>
Rosebay	<i>Rhododendron maximum</i>
Silky dogwood	<i>Cornus amomum</i>
Willow species	<i>Salix species</i>
Witch hazel	<i>Hamamelis virginiana</i>
<i>Trees</i>	
American beech	<i>Fagus grandifolia</i>
Black cherry	<i>Prunus serotina</i>
Black locust	<i>Robinia pseudoacacia</i>
Hackberry	<i>Celtis occidentalis</i>
Hawthorne species	<i>Crataegus species</i>
Hercules'-club	<i>Aralia spinosa</i>
Norway maple*	<i>Acer platanoides</i> *
Pin cherry	<i>Prunus pensylvanica</i>
Pin oak	<i>Quercus palustris</i>
Shagbark hickory	<i>Carya ovata</i>
Slippery elm	<i>Ulmus rubra</i>
Staghorn sumac	<i>Rhus typhina</i>
Sugar maple	<i>Acer saccharum</i>
Sycamore maple*	<i>Acer pseudoplatanus</i> *
Tulip tree	<i>Liriodendron tulipifera</i>
White ash	<i>Fraxinus americana</i>
White oak	<i>Quercus alba</i>

\*Plant species identified on Pennsylvania Department of Conservation and Natural Resources website (2010) as "Invasive Plants in Pennsylvania."

## References

Cowardin, L.M., V. Charter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States, Report No. FWS/OBL-79/31*. United States Department of the Interior, Fish and Wildlife Service, Washington, District of Columbia.

Pennsylvania Code. *Title 25, Environmental Protection*. 2002. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania.

Pennsylvania Department of Conservation and Natural Resources. 2010. Invasive Plants in Pennsylvania. Accessed at  
<<http://www.dcnr.state.pa.us/forestry/wildplant/invasivelist.aspx>>