Chapter 10 – Development Constraints

Overview

There are four (4) Natural Heritage Areas identified in Shenango Township. These are described in the Lawrence County Natural Heritage Inventory, prepared by the Western Pennsylvania Conservancy in 2002. Also of note and the largest of the areas is the Shenango Township BDA (Biological Diversity Area) at the headwaters of McKee Run. These areas are considered environmentally sensitive and can be severely compromised by intense development which involves earth disturbance. Natural assets such as these should be monitored as the Township continues to develop.

When development proposals are being reviewed which are located in the vicinity of these areas, mapped on the New Castle South Quadrant of the Commonwealth of Pennsylvania Topographic and Geologic Survey, attention to proposed earth disturbance activities in conjunction with the development should be considered.

Natural Heritage Inventory Definitions

BIOLOGICAL DIVERSITY AREA (BDA): An area that contains one or both of the following:

1. One or more locations of plants, animals or natural communities recognized as a state or federal
2. species of special concern High quality examples of natural communities or areas supporting exceptional native diversity

DEDICATED AREA (DA): A public or private property, possibly disturbed in the past, where the owner's stated objectives are to protect and maintain the ecological integrity and biological diversity of the property. This is usually done largely through a hands-off management approach, with intervention only when there are demonstrable threats to the ecology of the area.

EXCEPTIONAL VALUE WATER (EV): A surface water that meets one or more of the following conditions is an Exceptional Value Water:

1. The water is located in a National wildlife refuge or a State game propagation and protection area.
2. The water is located in a designated State park natural area or State forest natural area, National natural landmark, Federal or State wild river, Federal wilderness area or National recreational area.
3. The water is an outstanding National, State, regional or local resource water.
4. The water is a surface water of exceptional recreational significance.
5. The water achieves a score of at least 92% (or its equivalent) using the methods and procedures described by the Fish and Boat Commission.
6. The water is designated as a ‘‘wilderness trout stream’’ by the Fish and Boat Commission following public notice and comment.
7. The water is a surface water of exceptional ecological significance.

LANDSCAPE CONSERVATION AREAS (LCA): A large contiguous area which is important because of its size, open space, habitats, and/or the inclusion of one or more Biological Diversity Areas. Although an LCA includes a variety of land uses, it typically has not been heavily disturbed and thus retains much of its natural character.

Natural Heritage Areas in Shenango Township[1]

Beaver River Floodplain BDA

Fringed Gentian Fen BDA

Gardner Swamp BDA

Slippery Rock Gorge LCA

Beaver River Floodplain BDA

This site marks a large location of floodplain forest along the Beaver River between Moravia and Wampum, PA. The northern sections are disturbed by past cutting and are regenerating. To the south is an area of mature sycamore (river birch) - box-elder floodplain forest. A dense growth of green-head coneflower (*Rudbeckia laciniata*) grows on a natural levee paralleling the river. Behind the levee the floodplain flattens out and has a thick herbaceous layer with wild ginger (*Asarum canadense*), Virginia bluebell (*Mertensia virginica*), large-flowered trillium (*Trillium grandiflorum*) and jewelweed (*Impatiens* spp.).

Threats and Stresses: The floodplain habitats rely on occasional flooding from the Beaver River. The Beaver River is free flowing at this site but is controlled by dams on both the Shenango and

[1] Lawrence County Natural Heritage Inventory, prepared by the Western Pennsylvania Conservancy.

Mahoning Rivers. Many exotic invasive species have come to dominate the floodplain including multiflora rose (*Rosa multiflora*), garlic mustard (*Alliaria petiolata*) and dame's rocket (*Hesperis matronalis*). These species are poised to gain a greater foothold, especially with continued disturbance due to the natural flooding cycles. Further opening of the canopy would almost certainly make the situation worse. An overabundance of deer is leading to significant loss in forest regeneration.

Recommendations: Maintaining natural flooding cycles, allowing the floodplain community to mature without additional timbering and controlling invasive exotic species will be key in conserving this floodplain forest. Deer herds in the area should be kept at a level that is compatible with the health of the deer and the ecological health of the floodplain community. Activities upstream that change the flooding regime of the river, earth-moving activities and canopy removal should be avoided.

Fringed Gentian Fen BDA

Fringed Gentian Fen

Fringed Gentian Fen BDA contains eleven plant species of special concern growing within an **open sedge (*Carex stricta*, *C. prairea*, *C. lacustris*) fen** and also holds a population of an animal species of special concern in PA (**Special Animal 1**). The BDA also includes a shrub swamp. Fringed Gentian Fen is an alkaline wet meadow occupying the mid-slope portion of a tributary to Big Run. In addition to a host of rare and unique species, tussock sedge (*Carex stricta*), wide-leaved cattail (*Typha latifolia*), knotted rush (*Juncus nodosus*), yellow indian grass (*Sorghastrum nutans*), spiked muhly (*Muhlenbergia glomerata*) and the fen's namesake - fringed gentian (*Gentianopsis crinita*) - grow abundantly in this wetland. Some shrubs and tree saplings such as silky dogwood (*Cornus amomum*), sugar maple (*Acer saccharum*) and green ash (*Fraxinus pennsylvanica*) grow throughout the fen possibly providing shade and competition for some of the species that require high levels of light.

The shrub swamp is about two acres in size and is dominated by arrow-wood (*Viburnum dentatum*), meadowsweet (*Spiraea alba*), black willow (*Salix nigra*), swamp rose (*Rosa palustris*)

and poison sumac (*Toxicodendron vernix*). Common herbaceous species in the swamp area are floating manna grass (*Glyceria septentrionalis*), crested log fern (*Dryopteris cristata*), fowl manna grass (*Glyceria striata*), cinnamon fern (*Osmunda cinnamomea*), hemlock water-parsnip (*Sium suave*) and halbeard-leaf tearthumb (*Polygonum arifolium*). A young wooded area surrounds the shrub swamp. Common canopy species include white oak (*Quercus alba*), black cherry (*Prunus serotina*), Sassafras (*Sassafras albidum*), red maple (*Acer rubrum*), shagbark hickory (*Carya ovata*) and black walnut (*Juglans nigra*). Understory species include cucumber tree (*Magnolia accuminata*), black gum (*Nyssa sylvatica*), spicebush (*Lindera benzoin*) and American hornbeam (*Carpinus caroliniana*). Some shrubs are present, including nannyberry (*Viburnum lentago*), arrow-wood (*Viburnum dentatum*) and highbush blueberry (*Vaccinium corymbosum*). Common herbaceous species are skunk cabbage (*Symplocarpus*

Threats and Stresses: The Western Pennsylvania Conservancy protects a very small portion of the fen. The fen itself is small and is isolated within the surrounding landscape, which is mostly pasture. Succession of the fen to a more shrub or tree dominated community raises management questions. Hydrologic changes and land use changes could threaten the integrity of the fen habitat. Invasive species have the potential to affect the species composition of the fen if allowed to establish.

The special animal population within the BDA has existed at the site for some years. The relatively quiet and isolated area where the animals breed has remained unchanged. However, these animals are sensitive to disturbance, including casual visitation, that occurs within a few hundred meters from their location. Any activities that occur frequently or continuously with the stream corridor within this BDA stand to impact these animals. Removal of trees, living or dead, could remove valuable habitat essential to these animals.

Recommendations: Maintaining ground water flow and quality are the most critical factors in keeping the natural communities present within the BDA intact. Activities that lead to changes in the hydrology of the wetlands including ditching, draining or upstream development should be carefully evaluated. A better understanding of the land uses and likely land use changes would help to predict better the affects to the fen. Any land use changes that lead to increased nutrient loading should be carefully examined for its potential impact on the fen community. Impacts of development in the recharge zone should be carefully evaluated. Also stewardship of the fen should include monitoring for species composition changes. Given the presence of the animal species of concern within this BDA, current levels of activity and disturbance are likely compatible with their needs. Assuring that landowners within the corridor are aware of the natural history and needs of the animals would confer added protection.

Gardner Swamp BDA

This BDA is part of Shenango Township Park. Most of the area is wooded with a small area containing athletic fields. A fitness trail runs through the wooded area. Near to the wooded area is a beaver impounded wetland that is the location of a Pennsylvania threatened plant, **Torrey's Rush (*Juncus torreyi*)**. This plant was seen in 1997, but was not seen during the inventory survey. However, this plant is likely still here and will require visitation during the right time of the growing season to better evaluate its status.

The wetland is isolated by numerous intensive land uses: to the west is a small reclaimed strip mine, to the east is a residential area, to the north is a strip mall and to the south is Gardner Road.

Threats and Stresses: The integrity of this wetland is dependent on groundwater discharge and surface water influx. Beaver have created changes in the wetland and may have created, historically, habitat for numerous species of special concern. Certainly beaver will continue to influence this wetland. How fluctuating water levels may affect this particular species is not known. Additionally invasive species such as multiflora rose (*Rosa multiflora*) and dame's rocket (*Hesperis matronalis*) have the potential to reduce plant diversity in the wetland. Filling and runoff from abandoned reclaimed strip mines and residential development may negatively impact the wetland by adding nutrients to the system.

Recommendations: Beaver have been active in this wetland for a long time. Monitoring of their activity in combination with monitoring of changes in the wetland community, including the plant species of special concern, would provide the most valuable information for developing a management strategy for this BDA. If beaver activity is deemed as detrimental to this relatively isolated wetland, steps to discourage or remove them could be necessary. Invasive species need to be monitored and controlled so that they do not disrupt the ecological integrity of the nearby forest community and the wetland.

Slippery Rock Gorge

Slippery Rock Gorge LCA includes Slippery Rock Creek where it descends through a gorge to meet with Connoquenessing Creek at the village of Wurtemburg. The gorge was created during the last ice age when the waters of glacial Lake Arthur burst through an ice dam and drained through the channel of Slippery Rock Creek. Recent research has indicated that there was no dam burst but rather a slow flood similar to typical rainfall floods seen today (D'Urso 2000). The LCA encompasses the area from the Kennedy Mill Bridge to the confluence of Slippery Rock Creek and Connoquenessing Creek.

The LCA contains four BDA's, two of which are part of the McConnell's Mill State Park Natural Area and two that are outside of the natural area. The BDA's in the natural area are Grindstone Confluence BDA and Hell Run BDA. Muddy Creek Falls BDA is located in the farthest upstream part of the LCA and Harris Bridge Slopes BDA is farthest downstream.

Ten natural community types occur within the LCA, eight of which are found in the natural area. Outside of the natural area are the hemlock (white pine) - red oak - mixed hardwood forest and a skunk cabbage - golden saxifrage forest seep. Inside the natural area are tuliptree – beech - maple forest, hemlock – tuliptree - birch forest, sugar maple – basswood forest, rich hemlock - mesic hardwood forest, red maple – elm - willow floodplain swamp, river birch - sycamore floodplain scrub, red oak - mixed hardwood forest and a red maple terrestrial forest.

The community locations depend upon slope exposure and the presence of wetland seeps supplied by groundwater and topographic position. Forests with high amounts of hemlock occur in the deepest stream valleys such as Hell Run and Grindstone Run and there is a tendency for a higher amounts of hemlock on the east side of the gorge where conditions are cool and moist.

McConnell's Mill State Park covers most of the middle section of the gorge. Comprising 2,759 acres, the park was designated in 1974 as a National Natural Landmark by the National Park Service, based on the geological features present (Resource Management Plan 1998). More recently, during 2001, the park was approved by Pennsylvania's Ornithological Technical Committee as one of only seventy-eight Important Bird Areas (IBA) in the Commonwealth because of its high quality of bird life.

Areas of Interest

Fringed Gentian Fen DA is a managed land, owned by the Western Pennsylvania Conservancy and constitutes a small portion of Fringed Gentian Fen BDA in Shenango Township. Greater landscape planning is needed for the protection of this fen in order to insure that the recharge area is protected. Located in Shenango Township, this fen shares similarities with the fen at Plain Grove.

Hell Run is the only exceptional value (EV) stream in the County. It begins in Shenango Township of Lawrence County, drains 6 square miles and runs 4.7 miles. Hell Run drains the highest point in Lawrence County. McConnell's Mill State Park covers most of the watershed of this stream. A localized threat of mine drainage (AMD) and septic system problems impact the uppermost section outside of the park boundary. Skunk Run, like Hell Run, has its origins in Shenango Township of Lawrence County. Skunk Run is smaller than Hell Run draining only 1.83

square miles and is classified as a coldwater fishery. As recorded in 1975, strip-mining and silt affected Skunk Run (Wierich 1975). In 1993, Billingsley and Johns found four species of fish living in the stream and noted a substrate of bedrock, boulders, rubble and gravel (Billingsley and Johns 1993).

Big Run Greenway is a small greenway extends eastward from the Shenango River in the southern portion of the City of New Castle, along the Big Run, a trout-stocked stream. It includes wetlands, floodplains, and forested areas sometimes adjacent to urban development. This is an alkaline wet meadow occupying the middle portions of a slope draining into one of the Big Run's tributaries. Also included in this greenway is Cascade Falls, one of the county's most scenic features. The falls are located within Cascade Park, New Castle City park that lies in Shenango Township.

In addition to these specific areas of environmentally sensitive land, based on Geographic Information System analysis there are also lands generally constrained for development based on other topographic conditions and water features. These features are estimated as follows:

SHENANGO TOWNSHIP ACREAGE CONSTRAINED FOR DEVELOPMENT		
Steep slopes	1,454.85	10.0%
Wetlands	347.63	.23%
Floodplains	1,606.57	11.0%
Total	3,409.05	23.3%

As with the Natural Heritage Areas, as development proposal are reviewed and land development standards applied, lands exhibiting these characteristics should be monitored for the impact of earth disturbance activities associated with development.