



that would be sensitive to increased stormwater discharges as well as direct impacts from construction activities.

Community 16282011 is a small sand-gravel prairie that could be improved with removal of trees and shrubs and possibly some controlled burns. Additional survey of this prairie should be conducted to better determine what management steps should be considered.

Much of the area to the east of Trading Post Trail contains deeply dissected ravines and gullies that suggest that this area experienced severe erosion. Most of the conifers planted in this area appear to have been planted to check erosion. While these trees have helped to some degree, most of the areas with conifers now lack a ground cover and with many trees down from recent storms, soils may once again become susceptible to erosion.

## **Community Description**

### **Community 15-28-20-07**

Community 15-28-20-07 is an oak woodland-brushland dominated by 10 to 12 inch diameter pin oak, with patches of brushland dominated by oak seedlings and buckthorn. Also mixed in, are small patches of conifers, especially along Stagecoach Trail. Woody species included in this community include pin oak, black locust, prickly ash, prickly gooseberry, wild raspberry, and ironwood. Big-toothed aspen and quaking aspen occur throughout as small clones. Ground cover consists of a light covering of Pennsylvania sedge and herbs such as purple-stemmed aster. On the upper northeast-facing slope of this community, more of a mesic oak forest community exists, dominated by red and bur oak with a subcanopy of red elm, paper birch, and basswood. The rich understory of this area includes hog peanut, downy rattlesnake plantain, lady fern, interrupted fern, round-lobed hepatica, wood anemone, and pointed-leaved tick-trefoil.

*Disturbance Indicators:* Buckthorn and other invasive species are quite predominant in the understory shrub layer of this community. In spite of this; however, tree regeneration is generally good. Also the species diversity, especially the rich mesic species composition of its upper slopes, leads us to rank this community overall as having a C quality.

### **Community 15-28-20-12**

This community is located west and north of Afton Hills Lane, and lies adjacent to residential areas served by this road. Community 15-28-20-12 is oak woodland succeeding to oak forest. Large bur oak up to 30 inches in diameter, dominate this community. The open grown crowns suggest this area was once an oak savanna and with suppression of fires and no grazing has succeeded to oak woodland. As indicated already, this woodland is gradually succeeding to a forest community with such species as paper birch, big-toothed aspen, red oak, white oak, black cherry, red cedar, and American elm gradually filling in the canopy. An age collected on an aspen tree was estimated at about 50 years as compared to many of the large bur oak being in excess of 200 years old. The shrub layer is dominated by buckthorn and is accompanied by occasional red oak regeneration, wild raspberry, and prickly gooseberry. Depending on the local abundance of buckthorn in the understory, the abundance of ground layer species is low to moderate. Major groundcover species include Pennsylvania sedge, *Carex sp.*, lady fern, feather moss, strawberry, yellow avens, and *Aster sp.*

*Disturbance Indicators:* Although this community has considerable invasion by buckthorn, the large size of the bur oaks, coupled with fairly good oak regeneration assigns this community a quality ranking of CD.

### **Community 15-28-20-14**

Community 15-28-20-14 is an oak savanna/woodland restoration site located on Belwin Property. Within the past several years, understory trees and shrubs have been removed to encourage savanna species to return. The canopy cover following this restoration is estimated at about 40% and in addition to large, open grown bur oak trees, also includes scattered, small diameter bur oak, pin oak, paper birch, black cherry, elm, and boxelder. Shrub species include choke cherry, wild raspberry, buckthorn, smooth sumac and buckthorn. A relatively high diversity of graminoid and herbaceous species is found on this site including smooth brome, Indian grass, switchgrass, Kentucky bluegrass, Pennsylvania sedge, prairie dropseed, hairy grama, little bluestem, big bluestem, timothy, thimbleweed, gray goldenrod, common St. John's-wort, red clover, aster, showy goldenrod, yarrow, early meadow rue, sweet scented bedstraw, horse-gentian, and Canada goldenrod. It was not clear during the survey how much seeding of native species had occurred on this site. This community also includes two old fields dominated by introduced grass and forbs with occasional patches of prairie species.

#### **Community 16-28-20-01**

This community runs along the east side of Trading Post Road. Community 16-28-20-01 is a lowland hardwood forest dominated by large cottonwood (20 inch average diameter) and black willow, with a scattered subcanopy of boxelder, black cherry, red oak, quaking aspen, bitternut hickory, and silver maple. At the south end of this community, there is a small conifer plantation of jack pine and red pine. The canopy of this community is very open, with a canopy cover of about 40%. The thick, brushy, shrub layer is dominated by buckthorn along with prickly gooseberry, wild raspberry, and wild grape. Ground cover herbaceous species include creeping charlie, wood nettle, sweet cicely, yellow avens, white snake root, sweet scented bedstraw, and common mullein.

*Disturbance Indicators:* A dry creek bed, running parallel with Trading Post Road, contains several areas of severe erosion with, deeply incised gullies. The shrub layer includes several native species, but is generally dominated by buckthorn and other thorny invasive species. This area may have at one time had a denser canopy dominated by large American elm trees, which were decimated by Dutch Elm Disease.

Unfortunately, regeneration is poor in this forest area and erosion continues to impact the viability of this forest community. This community appears to be succeeding to a shrub-dominated community. We assigned a D quality ranking.

#### **Community 16-28-20-02**

This community is located southeast of Trading Post Trail. Community 16-28-20-02 is a moderate to poor quality mesic oak forest dominated by large (20 inch average diameter) basswood and cottonwood, and aspen clones with trees of 15 inch average diameter. A high abundance of red oak comprises the subcanopy layer, with average diameters of 10 to 15 inches. Other scattered trees in the subcanopy include black cherry and white birch, with all trees comprising an 80% canopy cover. Dense buckthorn dominates the shrub layer, accompanied by prickly gooseberry, black cherry, wild raspberry, and Tartarian honeysuckle. A heavy carpet of common pyrola dominates the ground layer, accompanied by herbaceous species such as yellow avens, sweet scented bedstraw, wood nettle, common strawberry, and the graminoid Pennsylvania sedge. This community occurs upslope from a ravine running along the east side of Trading Post Road, so it has a gently sloping west facing aspect.

*Disturbance Indicators:* The existence of herbaceous diversity and high abundance of common pyrola in the ground layer indicates this community has retained some of its native species

composition. The persistence of invasive species such as buckthorn in the shrub layer has not yet shaded out the native ground cover. For these reasons we have assigned a CD quality ranking.

#### **Community 16-28-20-03**

Community 16-28-20-03 is a conifer plantation dominated by red and jack pine along with a lesser amount of white spruce. This good quality plantation is situated on a sandy, west-facing slope. Trees average 10 to 14 inches in diameter and there is no evidence of past thinning. An 11-inch red pine was cored and estimated to be about 51 years of age. Hardwood species that have established themselves include bur oak and quaking aspen. Buckthorn dominates the shrub layer, along with black cherry, prickly gooseberry, and chokecherry. An occasional lady fern is present within the ground layer.

#### **Community 16-28-20-04**

The eastern border of this community extends along the west side of Trading Post Trail with scattered residential homes throughout it. Community 16-28-20-04 is a mesic oak forest dominated by red, white, and pin oak, with most trees averaging 16 to 30 inches in diameter. Portions of this community contain almost pure quaking and big-toothed aspen clones, especially on the ridge top, where paper birch and small white pine are also present. Other trees scattered throughout the canopy include cottonwood, and black ash. Although not continuous, a sub canopy of eastern red cedar, American elm, and young oak and aspen is present. Scattered, tall buckthorn dominate the shrub layer, accompanied by prickly ash, choke-cherry, gray dogwood, prickly gooseberry, wild raspberry, American hazelnut, and young red pine. The ground layer includes herbaceous species such as lady fern, yellow avens, strawberry, moonseed, Canada anemone, and false Solomon's seal, along with the graminoid Pennsylvania sedge.

The MNDNR Natural Heritage Program mapped this community as part of MCBS Site #65; however due to disturbance, this oak forest is not mapped on the Washington Map of rare features.

*Disturbance Indicators:* This community has numerous residential home sites and driveways that have resulted in fragmentation. This disturbance has likely increased the spread of invasive shrubs. This community contains many large oak trees and overall has good species diversity. A quality ranking of C is assigned to this community.

#### **Community 16-28-20-05**

Community 16-28-20-05 is a conifer plantation dominated by red pine.

#### **Community 16-28-20-06**

Community 16-28-20-06 is an old field dominated by grass, smooth brome, Canada goldenrod, and occasional shrubs such as choke-cherry, buckthorn, amur maple, smooth sumac, and boxelder. Other herbaceous species in the ground layer include St. John's-wort and bee balm.

#### **Community 16-28-20-07**

Community 16-28-20-07 is an old field dominated by nonnative grasses and a 20 to 30% cover of coniferous species. Scattered trees include red cedar, red pine, and scotch pine. Some boxelder are also scattered throughout the subcanopy. The shrub layer consists of scattered gray dogwood, red cedar, and young red pine. Smooth brome and Kentucky bluegrass dominate the ground layer of graminoids, while herbaceous species include gray goldenrod, Canada goldenrod, white sweet clover, and bee balm.

#### **Community 16-28-20-08**

Community 16-28-20-08 is a mesic oak forest dominated by large (15 inch average diameter) bur, red, and pin oak. One 12-inch diameter bur oak had 176 growth rings, indicating that the average age of oaks in this forest is close to 200 years old. Based on the open grown form of these oaks, this community was once a woodland or savanna. In the absence of fire, smaller hardwood species including paper birch, ironwood, American elm, black ash and quaking aspen have significantly filled in the once semi-open canopy. The younger understory trees are estimated to be about 50 years of age and average about 10 inches in diameter. There is considerable regeneration of hardwood species on the forest floor, including oak, birch, and elm, especially upslope from the ravine. The shrub layer seems patchy, with some more open areas dominated by amur maple and Tartarian honeysuckle. Other scattered shrub layer species include wild raspberry, buckthorn, pagoda dogwood, American elm, prickly gooseberry, and moonseed. Ground layer species include a diversity of herbaceous plants, such as yellow avens, lady fern, wood strawberry, sweet cicely, maidenhair fern, and white snake root. Scattered graminoids in the ground layer include Pennsylvania and rosy sedges.

This community contains a north-south trending ravine, with large outcrops of Jordan sandstone, containing unusual depositions of silicon oxides. The ravine bottom is fairly stable, with little erosion. This large area of contiguous forest provides good wildlife habitat as evidenced by many signs of deer and turkey.

*Disturbance Indicators:* This oak forest community is relatively undisturbed, and has retained a high diversity of deciduous trees in the canopy along with good regeneration of native trees in the shrub layer. This community has above average herb diversity in the ground layer, and although invasive shrubs are present, good diversity of native shrubs are also present. This community is assigned a quality ranking of C.

#### **Community 16-28-20-09**

Community 16-28-20-09 is a very high quality mesic oak forest dominated by red and white oaks, with average diameters of 15 to 20 inches. These two species comprise about 75% of the canopy cover. One 18-inch red oak had 142 growth rings, indicating this stand is over 150 years of age. The subcanopy has scattered paper birch and red maple throughout. There is much oak regeneration on south facing slopes. The shrub layer is mostly devoid of invasive species, with some localized patches of buckthorn. Dominant shrub and tree species in the shrub layer include prickly ash, black cherry, Tartarian honeysuckle, wild raspberry, red maple, prickly gooseberry, and American elm. The groundlayer includes a good diversity of species such as common pyrola, interrupted fern, maidenhair fern, shining clubmoss, common strawberry, pointed-leaved tick-trefoil, white snake root, yellow avens, and field horsetail. On dryer slopes, the graminoid Pennsylvania sedge is present.

The MNDNR Natural Heritage Program mapped as oak forest as MCBS Site #65. This area; however, is not shown on the Washington County Map of Rare Features, perhaps due to overall quality or size criteria. This community contains an east-west trending ravine.

*Disturbance Indicators:* This oak forest would rank among the better quality oak forest communities in the City. Due to the large diameter and relatively old age of oak trees, low abundance of invasive species in the shrub layer, and good diversity of herb species, a BC quality ranking is assigned to this community.

#### **Community 16-28-20-10**

Community 16-28-20-10 is an aspen woodland dominated by quaking aspen, paper birch, and red oak. These three species comprise approximately 50% of the tree canopy. The aspen and birch are estimated to be about 50 years old, with average aspen diameters of 15 inches and average birch

diameters of 10 inches. Other tree species present are big-toothed aspen and ironwood. The shrub layer is generally sparse with such species as buckthorn, wild raspberry, Tartarian honeysuckle, choke-cherry, prickly gooseberry, beaked hazelnut, along with red oak, red cedar, and black cherry regeneration. A diverse ground layer of herbaceous species includes field horsetail, harebell, white snake root, agrimony, sweet cicely, common scouring rush, yellow avens, asters, and common pyrola, with a scattered graminoid coverage of Pennsylvania sedge.

*Disturbance Indicators:* This community is located at the north end of ravine outletting from Communities 16-28-20-08 and 16-28-20-09 on what appears to be an alluvial fan of sediment deposition. Most of the species present in this community are considered "pioneer species", and would have been the first to colonize such a disturbed site. The age of this community (approximately 50 years) coincides well with other sites across the City that appear to have experienced major erosion/sedimentation events and have subsequently succeeded to forest, or in many cases, where planted with trees in an attempt to stabilize the soil. This community is currently succeeding to an oak forest or woodland community. Although this is a young woodland, diversity of native species is fair and invasive species, while present, do not dominate the site. This community is assigned a ranking of C.

#### **Community 16-28-20-11**

Community 16-28-20-11 is a sand gravel prairie, located on a steep, south-facing slope within Community 16-28-20-10. This community was mapped as part of DNR MCBS Site #65, but was not included on the Washington County Map of Rare Features, probably due to low quality. Dominant graminoids include little bluestem, prairie dropseed, hairy grama, side oats grama, and switchgrass.

Herbaceous species include both prairie and woodland species such as bush-headed prairie clover, white sage, Common St. John's-wort, yellow avens and wood sorrel. Blue grass is generally present throughout.

*Disturbance Indicators:* This community, like 16-28-20-10, appears to be the product of fairly recent erosional events. However; rather than the result of sediment deposition, this community appears to have colonized a steeply eroded hillslope. This community may have greater diversity than our survey indicates due to the time of year that work was completed. Based on the fairly low diversity that currently exists, as well as the presence of bluegrass, we have assigned this community a ranking of CD.

#### **Community 16-28-20-12**

Community 16-28-20-12 is a lowland hardwood forest dominated by boxelder, silver maple, eastern cottonwood, basswood and occasionally, more upland areas of red oak and quaking aspen. Buckthorn and common elder dominate the dense and patchy shrub layer, along with wild raspberry, wild grape, and prickly gooseberry. Mostly weedy herbaceous species dominate the ground layer, and include creeping charlie, common yellow wood-sorrel, stinging nettle, common burdock, yellow avens, and white snake root, but also includes some Jack in the Pulpit and lady fern.

*Disturbance Indicators:* This community is dissected by a very steep ravine, and has actively eroding areas. There are also numerous old trails and some abandoned building sites (old farmstead?). This community also received a considerable amount of windthrow during recent storms. Invasive shrub species generally create a dense, sometimes impenetrable shrub layer and will probably increase within the newly created openings created by the windstorm. Because of the existing poor condition of the ravine and deteriorating condition of vegetation in this area,

erosion could become a significant problem in this area. We have assigned this community a D quality ranking.

#### **Community 16-28-20-13**

Community 16-28-20-13 is an oak woodland dominated by large white and red oak, with average diameters between 10 and 20 inches. Other species in the subcanopy include black cherry, elm, black ash, and paper birch. Large fruiting buckthorn dominates the dense shrub canopy, accompanied by prickly gooseberry, common elder, wild raspberry, and wild grape. The sparse ground layer includes lady fern, yellow avens, stinging nettle, white snake root, and Pennsylvania sedge.

*Disturbance Indicators:* This community is located in a very disturbed area to the east of Trading Post Trail and near some residential areas. The shrub layer retains some of its native diversity but is dominated by invasive species such as buckthorn and does not include much tree regeneration. For these reasons we have assigned a D quality ranking.

#### **Community 16-28-20-14**

Community 16-28-20-14 is an oak woodland dominated by white and bur oaks. Other common tree species include quaking aspen, silver maple, boxelder, and big-toothed aspen. There is a ravine running through the area, with several areas planted to a mix of black locust, scotch pine, white pine and blue spruce to control erosion. Large fruiting buckthorn dominates the shrub layer, along with black cherry, choke-cherry, prickly gooseberry, wild raspberry, and young green ash. A sparse ground layer includes lady fern, yellow avens, and Pennsylvania sedge.

*Disturbance Indicators:* This area is located in back of a residential home, and was probably once an old farmstead as evidenced by much debris and old building foundations. A road that comes off of Trading Post Trail borders the northern and eastern boundaries of this community. The shrub layer has traditionally contained some native species, but has come to be dominated by invasive species such as buckthorn. Due to this dominance by buckthorn and the planted conifers, we have assigned a D quality ranking to this community.

#### **Community 16-28-20-15**

Community 16-28-20-15 is a mixed coniferous-deciduous woodland dominated by a variety of planted hardwoods and conifers. Together, these plantings comprise a 30 to 50% canopy cover. Common tree species include: silver maple, black cherry, boxelder, red oak, paper birch, as well as white pine, red pine, white spruce, and red cedar. The shrub layer consists of scattered buckthorn, wild raspberry, prickly ash, smooth sumac, and wild grape. The ground layer is dominated by non-native grass species that have been mowed and include herbaceous species such as dandelion, sweet scented bedstraw, common St. John's-wort, yellow avens, wood fern, Canada goldenrod, white clover, common milkweed, bee balm, and yarrow.

#### **Community 16-28-20-16**

Community 16-28-20-16 is a conifer plantation dominated on the south end by densely stocked white spruce, and on the north end by two different age classes of red pine, all with average diameters of 10 inches. The white spruce portion is approximately 35 years old, since one 9-inch diameter white spruce had 31 growth rings. The white spruce portion contains very little shrub or ground layer component due to the high density of planted trees. The red pine portion contains some young paper birch and buckthorn in the shrub layer.

#### **Community 16-28-20-17**

Community 16-28-20-17 is a medium quality oak woodland, dominated by 15 inch average diameter red and bur oaks. This community is located on a northwest-facing slope, including very steep and irregular topography as the result of a ravine running through it. This community includes a range of site conditions from the dry top that is much more exposed, to the more mesic bottom of the slope with larger trees. Paper birch, butternut, black cherry, basswood, and American elm form a fairly continuous subcanopy. The shrub layer is comprised of buckthorn, prickly ash, wild grape, and some regenerating red oak, black cherry, and black ash. The sparse ground cover includes such species as hog peanut, Canada anemone, and Pennsylvania sedge.

*Disturbance Indicators:* Although invasive species such as buckthorn and prickly ash compose part of the patchy shrub cover, there is presence of tree regeneration in this shrub layer as well. This community contains fairly large-diameter oak trees. We assigned this community a C quality ranking.

#### **Community 16-28-20-18**

Community 16-28-20-18 is a conifer plantation dominated by 40 to 50 year old red pine and white spruce. Also scattered throughout the subcanopy are occasional big-toothed aspen. The patchy shrub layer contains buckthorn, boxelder, and some regenerating bur oak and black cherry. The groundcover, which is covered by needle duff, includes common pyrola, liverleaf wintergreen, white snake root, and sweet scented bedstraw.

#### **Community 16-28-20-19**

Community 16-28-20-19 is a moderate quality mesic oak forest dominated by large red oak and a good diversity of other deciduous species. The canopy also contains bur oak, red oak, boxelder, cottonwood, quaking aspen, green ash, hackberry, elm, black cherry, and paper birch. Older, mature trees generally average about 16 to 30 inches in diameter, with other subcanopy species averaging about 10 to 12 inches in diameter. The patchy shrub layer has low to moderate diversity and includes buckthorn, choke-cherry, prickly gooseberry, common elder, wild raspberry, poison ivy, black berry, and some regenerating stems of red and bur oaks. The ground cover is rather diverse, including herbaceous species such as stinging nettle, interrupted fern, lady fern, white snake root, maidenhair fern, *Aster sp.*, Canada anemone, moonseed, common motherwort, pointed-leaved tick-trefoil, and agrimony. A ravine bisects this community and is generally free of major erosion problems.

*Disturbance Indicators:* This community is located to the northwest of Afton Hills Lane and south of Valley Creek Trail, but does not adjoin any major residential areas. Although buckthorn and other invasive species occur, they do not dominate the shrub layer, and much of the native shrub diversity has been retained, as well as rich herbaceous species persisting in the ground layer. For these reasons we have assigned a C quality ranking.

#### **Community 16-28-20-29**

Community 16-28-20-29 is an oak forest near stagecoach trail.

#### **Community 16-28-20-30**

Community 16-28-20-29 is residential homes/planted white pine along valley creek.

#### **Community 21-28-20-03**

Community 21-28-20-03 is a mesic oak forest dominated by medium to large sized red and bur oak along with sugar maple, red maple, black cherry, ironwood, green ash, paper birch. The shrub layer is dominated by buckthorn, prickly gooseberry and chokecherry along with black

cherry and hackberry regeneration. The groundcover is sparse and includes ostrich fern lady fern, white snakeroot, and yellow avens.

*Disturbance Indicators:* There are several ATV trails through this community, as well as recent fuelwood cutting taking place. These activities in addition to a road and homes nearby, have created a situation where black locust and Siberian elm have started to invade, and buckthorn has already taken hold of the understory. Therefore this community was given a CD ranking.

**Community 21-28-20-12**

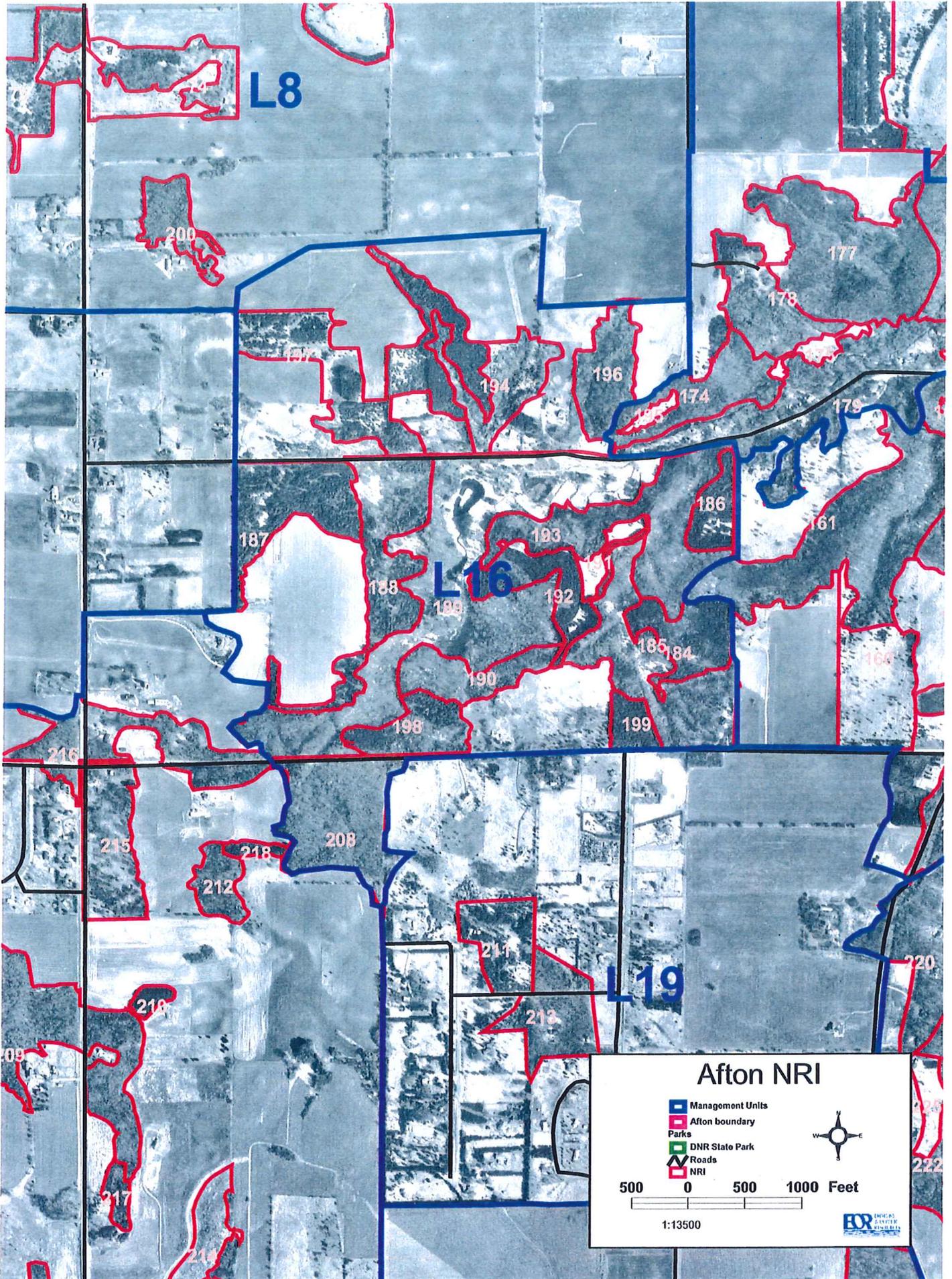
Community 21-28-20-12 is an old field dominated by introduced grasses.

**Community 21-28-20-14**

Community 21-28-20-14 is a conifer plantation dominated by red pine and white spruce. The trees in this plantation are approximately 10 years old and cover about 40% of the area. In between the planted trees, introduced grasses and Canada goldenrod are dominant.

**Community 21-28-20-16**

Community 21-28-20-16 is an old field.



L8

L16

L19

**Afton NRI**

- Management Units
- Afton boundary
- Parks
- DNR State Park
- Roads
- NRI



500 0 500 1000 Feet



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## Landscape Unit #16

Summary Table for Landscape Unit #16

Site ID	Community ID	Community Type	Quality Ranking
184	16282032	Conifer Plantation	NA
185	17282008	Dry Oak Forest	C
186	16282034	Conifer Plantation	NA
187	17282001	Conifer Plantation	NA
188	17282002	Mixed Deciduous/Coniferous Woodland	NA
189	17282003	Lowland Hardwood Forest	CD
190	17282004	Oak Woodland	D
191	17282005	Old Field/Conifer Plantation	NA
192	17282006	Conifer Plantation	NA
193	17282007	Oak Woodland	CD
194	17282009	Floodplain Forest	CD
196	17282011	Oak Woodland/Savanna	D
197	17282012	Conifer Plantation	NA
198	17282013	Conifer Plantation	NA
199	17282014	Conifer Plantation	NA
208	20282001	Mixed Deciduous Forest	NA

### Landscape Unit Rankings

*Ecological Ranking:* This landscape unit is dominated by low to moderate quality oak forest and woodland interspersed with conifer plantations and old fields. The most significant aspect of this landscape unit is the numerous springs and seeps, that although mostly altered through excavation, serve as an important source of groundwater baseflow to Valley Creek. This landscape unit is assigned a low ecological ranking.

*Wildlife Habitat Ranking:* This landscape unit comprises the western extent of a large, contiguous floodplain forest extending along Valley Creek from the St. Croix River to the central portion of the City. Wildlife species associated with oak forest/woodland and floodplain forest would be associated with this area. Because most of this landscape unit contains low to moderate quality natural communities and lacks significant interior habitat a wildlife habitat ranking of moderate is assigned.

*Rare Features Ranking:* There are no records of rare features for this landscape unit. There is; however, a physical link to documented rare features to the east. In particular, the Blanding's Turtle (*Emydoidea blandingii*) State Threatened, and Louisiana Waterthrush (*Seiurus motacilla*), a State Special Concern species could use riparian areas along Valley Creek. The rare features ranking is moderate for this area.

### Stewardship Recommendations

1. Throughout this landscape unit, numerous trails and driveways fragment what otherwise is a fairly large block of contiguous forest and woodland. Reducing construction of new roads and trails and reclamation of other areas will help to reduce further fragmentation.

## Community Descriptions

### Community 16-28-20-32

Community 16-28-20-32 is a conifer plantation.

### Community 16-28-20-34

Community 16-28-20-34 is a conifer plantation.

### Community 17-28-20-01

Community 17-28-20-01 is a conifer plantation dominated by red and white pine. The age of this plantation was estimated to be about 50 years and with average diameter of 16 inches. A scattered subcanopy of American elm and black cherry is present throughout. The shrub layer contains a mixture of shrubs and tree regeneration with the following species present: buckthorn, Tartarian honeysuckle, black cherry, red oak, quaking aspen, wild raspberry, white spruce, prickly ash and American elm. Portions of this plantation appear to have been cut (thinned) and as a result, there are numerous, small openings. Because of these openings, there is greater density and diversity of groundcover flora with such species as sweet scented bedstraw, dandelion, Canada goldenrod, sulfur cinquefoil, white clover, sweet cicely, and yellow avens present.

### Community 17-28-20-02

This community is located south of Valley Creek Trail, and is bordered along its western boundary by a cornfield. Community 17-28-20-02 is a mixed oak woodland/conifer plantation dominated by scattered, large diameter red oak (20-inch average diameter) and red pine (15-inch average diameter). Other trees species present include: paper birch, black cherry, big-toothed aspen, bur oak and red cedar. Thorny invasive shrubs such as buckthorn, wild raspberry, black berry, and Tartarian honeysuckle dominate most of the area. Some of the shrub layer also includes American hazelnut, gooseberry, wild grape, and regenerating stems of big-toothed aspen, quaking aspen, and red maple trees. The patchy canopy has created gaps where a diversity of herbaceous species exists. This ground layer includes common mullein, evening primrose, pearly everlasting, Canada anemone, giant goldenrod, yarrow, sweet scented bedstraw, white sage, common strawberry, yellow avens, aster, common pyrola, lady fern, agrimony, sweet cicely, wood nettle, and horsetail. This community includes an old creek bed running east to west through the middle of it.

*Disturbance Indicators:* This community is an oak woodland with openings planted to conifers. In spite of this partial conversion, many native species persist. As with most oak woodlands in the City of Afton, invasive/thorny shrubs such as buckthorn are present and suggest some history of grazing. We have assigned a CD quality ranking to this community.

### Community 17-28-20-03

Community 17-28-20-03 is a lowland hardwood forest dominated by a patchy distribution of 20-inch diameter eastern cottonwood. Other canopy species include American elm, black willow, quaking aspen, black cherry, and hackberry. Buckthorn dominates the patchy shrub layer, along with amur maple, wild raspberry, Tartarian honeysuckle, prickly ash, prickly gooseberry, and wild grape. Common ground cover species include species such as sweet cicely, yellow avens, water scorpion-grass, aster, lady fern, white snakeroot, wood nettle and creeping charlie.

This community also includes a stream complex running east into what eventually is Valley Branch Creek, with several small (less than one acre) ponds along the streams. Duckweed

dominates the open water portions of these ponds and one of these ponds has been dammed. The steep slopes leading down to the creek bed are sandy and eroded.

*Disturbance Indicators:* The northern border of this community runs along Valley Creek Trail where there are several residential homes and fenced off portions of Valley Branch Creek. There are many trails throughout this area as well, and evidence of logging persists throughout. Although invasive species dominate the shrub layer, there are some native species still present. A CD quality ranking is assigned to this area.

#### **Community 17-28-20-04**

This community is a north-facing slope above the creek bed complex of community 17-28-20-03 with sandy soil, which is eroded in steep areas. Community 17-28-20-04 is an oak woodland-brushland dominated by 15 to 20-inch red oak and pin oak. The canopy also contains localized patches of quaking aspen and paper birch, and subcanopy species include American elm and red cedar. Buckthorn and prickly ash dominate the shrub layer although other species such as wild raspberry and black cherry are present. Common pyrola and Pennsylvania sedge dominate some areas of the ground layer along with sweet scented bedstraw, aster, common strawberry, and agrimony.

*Disturbance Indicators:* The patchy canopy has remained open partially due to many cut and downed trees. Although invasive species dominate the shrub layer, and parts of the steep banks are quite eroded, some native ground layer species such as common pyrola and Pennsylvania sedge still persist. We assigned a D quality ranking to this community.

#### **Community 17-28-20-05**

Community 17-28-20-05 is an old field/pine plantation dominated by rows of medium sized red pine. Other scattered subcanopy species include quaking aspen and black cherry. There are also some areas of about 5-year-old red pine scattered throughout. The remaining area is old field, dominated by giant goldenrod, accompanied by other weedy ground layer species such as aster, white sage, yarrow, thistle, common milkweed, dandelion, and pearly everlasting.

#### **Community 17-28-20-06**

Community 17-28-20-06 is a pine plantation dominated red pine with an average diameter of 10 inches. This community is very open due to widely spaced plantings, narrow strips of trees, and recent thinning and cutting operations. Other species include quaking aspen and some planted white pine. Considerable buckthorn dominates the patchy shrub layer, along with black berry and black cherry. Ground layer herbaceous species include thistle, sweet scented bedstraw, sweet cicely, violets, white sage, and agrimony, and the graminoid smooth brome.

#### **Community 17-28-20-07**

This community borders the floodplain of Valley Branch Creek (community 17-28-20-03), and is located to the south of Valley Creek Trail Community. Community 17-28-20-07 is an oak woodland dominated by red oak, with average diameters of 15 inches. There are a few patches of pole size sugar maple by these creek beds. Other subcanopy species include white oak, paper birch, quaking aspen, hackberry, and bur oak. Some patches have more of an open canopy, where black cherry and buckthorn dominate the shrub layer. Other species throughout the entire shrub layer include pagoda dogwood, wild raspberry, prickly gooseberry, and prickly ash. The ground layer includes a moderate diversity of herbaceous species such as maidenhair fern, lady fern, yellow avens, Canada mayflower, wood fern, rough bedstraw, common strawberry, and agrimony. Graminoids such as Pennsylvania sedge and other sedges also persist in the ground layer.

*Disturbance Indicators:* The steep banks leading down to the creek beds are on dry sandy soil, and are quite eroded. There has been some recent logging of large oaks throughout the western portion of this community. These openings have provided opportunities for buckthorn establishment. The eastern portion of this community has somewhat greater species diversity and correspondingly less dominance by invasive species such as buckthorn as compared to the western portion. The overall quality ranking for this community is CD.

#### **Community 17-28-20-08**

Community 17-28-20-08 is a dry oak forest dominated by large red oak, having average diameters of 15 inches. Other subcanopy species include large (10 to 12 inch diameter) ironwood, as well as paper birch, bur oak, basswood, and quaking aspen. Buckthorn dominates the shrub layer along with black cherry regeneration. There is a dry creek bed running through this community that supports a more mesic ground cover flora composition than in the adjacent, and dryer, community 17-28-20-07. Ground cover species include lady fern, common pyrola, yellow avens, white snakeroot, and Pennsylvania sedge.

*Disturbance Indicators:* This community is a small patch of higher quality oak forest between a pine plantation (community 17-28-20-06) and patchy oak woodland (community 17-28-20-07). Although buckthorn persists throughout the shrub layer, a fair diversity of native ground cover species are present; therefore, a quality ranking of C is assigned to this community.

#### **Community 17-28-20-09**

Community 17-28-20-09 is a floodplain forest dominated by silver maple, cottonwood, and paper birch averaging 15 to 20 inches in diameter. This community is variable with numerous, small inclusions of other species including black cherry, red oak, American elm, basswood, quaking aspen and boxelder. In addition, there are small upland areas planted to white spruce and jack pine as well as other areas that would be considered brushland. Near Valley Creek Trail, there are numerous small seeps that collect to form the headwaters to Valley Creek. To the north, an ephemeral creek channel drains a large grassed waterway within an agricultural field. The southern portion of this community, near Valley Creek Trail transitions to a shrubby thicket dominated by thorny, invasive shrubs such as wild raspberry, buckthorn, prickly ash, and amur maple. To the north, the quality improves with a lower density of invasive species and a greater abundance of such species as prickly gooseberry and common elder. Common ground cover species include yellow avens, sweet cicely, common strawberry, white snake root, violets, sweet scented bedstraw, common mullein, creeping charlie, common burdock, and wood nettle.

*Disturbance Indicators:* The quality of this community as measured by density of invasive species ranges from low (D-Quality) near Valley Creek Trail to moderate (C-Quality) on the north side. This community is given a ranking of CD.

#### **Community 17-28-20-11**

Community 17-28-20-11 is a grown over oak woodland/savanna dominated by scattered bur oak and pin oak with dense thickets of eastern red cedar and prickly ash. The ground cover in this community is generally lacking due to the density of shrubs. This community is assigned a ranking of D.

#### **Community 17-28-20-12**

Community 17-28-20-12 is a conifer plantation containing a mixture of red and white pine. These trees are variable in age, size and density and were planted in discreet patches.