

### Afton NRI

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



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**Community 17-28-20-13**

Community 17-28-20-13 is a Scotch pine plantation.

**Community 17-28-20-14**

Community 17-28-20-14 is a red pine plantation.

**Community 20-28-20-01**

Community 20-28-20-01 is a mixed deciduous forest dominated by paper birch, American elm, white oak, bur oak, and quaking aspen with an average diameter of 10 to 15 inches, comprising a 60 percent coverage. Buckthorn, prickly gooseberry, wild raspberry, prickly ash, and saplings of black cherry dominate the midstory. The ground layer is moderately dense with such species as wood anemone, yellow avens, lady fern and Pennsylvania sedge common. There is a dry creek bed running north to south through the western edge of this community with the same overstory conditions, some common elder and Tartarian honeysuckle, and in addition includes herbaceous species such as creeping charlie, mint, maidenhair fern, and violets.

*Disturbance Indicators:* This community has recently been thinned, as evidenced by skid trails and cut trees lying around. Invasive shrub species include prickly ash, buckthorn, and Tartarian honeysuckle.

**Landscape Unit #17**

**Summary Table for Landscape Unit #17**

Site ID	Community ID	Community Type	Quality Ranking
201	18282001	Mixed Coniferous/Deciduous Plantation	NA
202	18282002	Conifer Plantation	NA
203	18282003	Deciduous Woodland	NA
204	18282004	Deciduous Woodland	NA
205	18282005	Old Field	NA

**Landscape Unit Rankings**

*Ecological Ranking:* Landscape Unit #17 is dominated by cropland, pasture and scattered woodlots. The ecological ranking for this landscape unit is low.

*Wildlife Habitat Ranking:* Wildlife associated with this landscape unit include "habitat generalist" species that can persist within, or along the edges of agricultural and residential land uses.

*Rare Features Ranking:* There are no rare feature records for this landscape unit nor are they likely to exist.

The rare features ranking for this landscape unit is low.

**Stewardship Recommendations**

1. Reestablishment of native prairie and oak savanna provides landscaping alternatives to existing or new landowners. If reclamation is proposed, use species known to occur locally (see species lists in appendix) and to the degree possible, use local ecotypes.

2. Some of the deciduous woodland communities may provide opportunities for oak savanna restoration. Oak savanna can be restored by removing shade tolerant understory trees and shrubs, treating woody stumps with an approved herbicide and then replanting native trees, shrubs and groundcover species.

### Community Description

#### Community 18-28-20-01

Community 18-28-20-01 is a disturbed deciduous woodland with conifer plantation.

#### Community 18-28-20-02

Community 18-28-20-02 is a conifer plantation.

#### Community 18-28-20-03

Community 18-28-20-03 is a disturbed deciduous woodland with conifer plantation.

#### Community 18-28-20-04

Community 18-28-20-04 is a disturbed deciduous woodland.

#### Community 18-28-20-05

Community 18-28-20-05 is an old field with scattered trees and shrubs.

## Landscape Unit #18

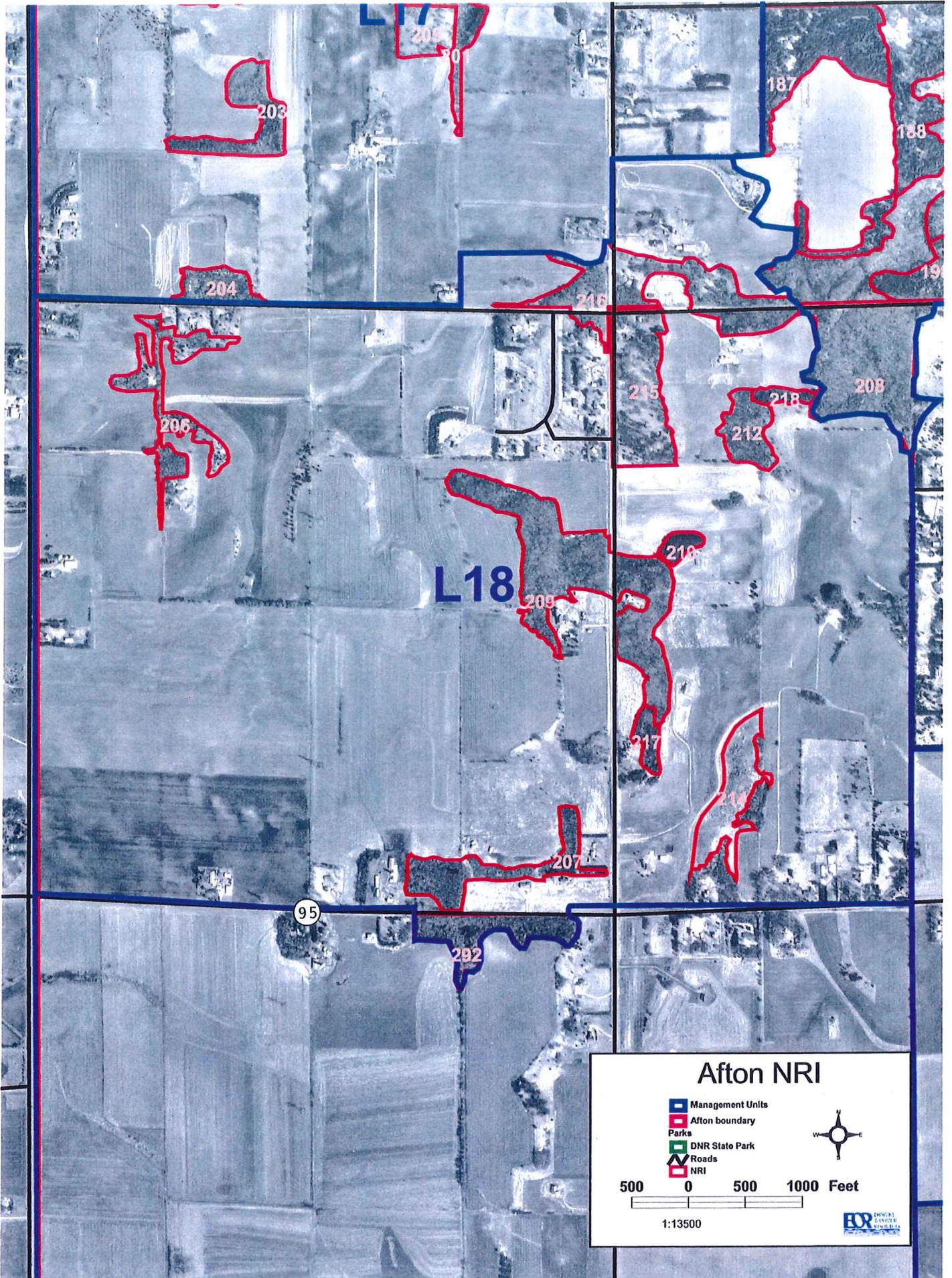
**Summary Table for Landscape Unit #18**

Site ID	Community ID	Community Type	Quality Ranking
206	19282001	Oak Savanna/Pasture	NA
207	19282002	Deciduous Woodland	NA
209	20282002	Mesic Oak Forest	C
210	20282003	Conifer Plantation	NA
212	20282005	Oak Woodland	D
214	20282007	Conifer Plantation	NA
215	20282008	Oak Woodland	D
216	20282009	Deciduous Woodland	NA
217	20282010	Conifer Plantation	NA
218	20282011	Mixed Deciduous Coniferous Plantation	NA
292	30282002	Deciduous Woodland	NA

### Landscape Unit Rankings

*Ecological Ranking:* Landscape unit #18 is dominated by agricultural and large-lot residential land uses. The southeastern portion of the landscape unit includes one large block of moderate quality mesic oak forest (20282002) that is of moderate quality. Otherwise, all other natural communities are either of low quality or are conifer plantation.

*Wildlife Habitat Ranking:* The wildlife habitat ranking for this area is low.

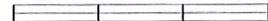


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*Rare Features Ranking:* There are no rare feature records, nor are they likely to be present. The rare features ranking for this landscape unit is low.

## **Community Descriptions**

### **Community 19-28-19-01**

Community 20-28-20-01 is a pasture with large, open grown bur oak. This community may have historically been an oak savanna/woodland. The oak savanna characteristics of this community have likely been maintained by grazing, which favors grasses and forbs and prevents eventual succession towards woodland and forest.

### **Community 19-28-19-02**

Community 20-28-20-01 is a mixed deciduous forest.

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

Community 20-28-20-02 is a mesic oak forest, with an overstory dominated by large (30 inch diameter) bur and pin oak. The lower canopy is composed of mixed deciduous species, including hackberry, American elm, black cherry, boxelder, and big-toothed aspen. Together the canopy comprises an 80 percent tree cover. The tall shrub layer is generally dense and includes such species as buckthorn, common elder, prickly gooseberry, wild raspberry, and wild grape. Understory species include sweet cicely, carrion flower, largeflower bellwort, common pyrola, and lady fern. This community includes a fair number of down/dead snag trees, providing high quality wildlife habitat.

*Disturbance Indicators:* Although there are invasive shrubs throughout this community, the large size of oak trees and fair diversity of shrub and ground cover species warrants a quality ranking of C.

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

Community 20-28-20-03 is a conifer plantation.

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

Community 20-28-20-05 is an oak woodland.

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

Community 20-28-20-07 is a conifer plantation.

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

Community 20-28-20-01 is an oak woodland.

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

Community 20-28-20-01 is a disturbed deciduous woodland.

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

Community 20-28-20-08 is a conifer plantation.

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

Community 20-28-20-11 is a mixed deciduous coniferous forest plantation.

### **Community 30-28-20-02**

Community 30-28-20-02 is disturbed deciduous woodland.

## Landscape Unit #19

Summary Table for Landscape Unit #19

Site ID	Community ID	Community Type	Quality Ranking
211	20282004	Conifer Plantation	NA
213	20282006	Mesic Oak Forest	D

### Landscape Unit Rankings

*Ecological Ranking:* This landscape unit lacks both diversity and quality of natural communities. The ecological ranking is low.

*Wildlife Habitat Ranking:* Wildlife associated with this landscape unit includes “habitat generalist” species that can persist within, or along the edges of agricultural and residential land uses. The ranking assigned to this landscape unit is low.

*Rare Features Ranking:* There are no rare feature records for this landscape unit; therefore, a low rare features ranking is assigned.

### Stewardship Recommendations

There are no recommendations for this landscape unit.

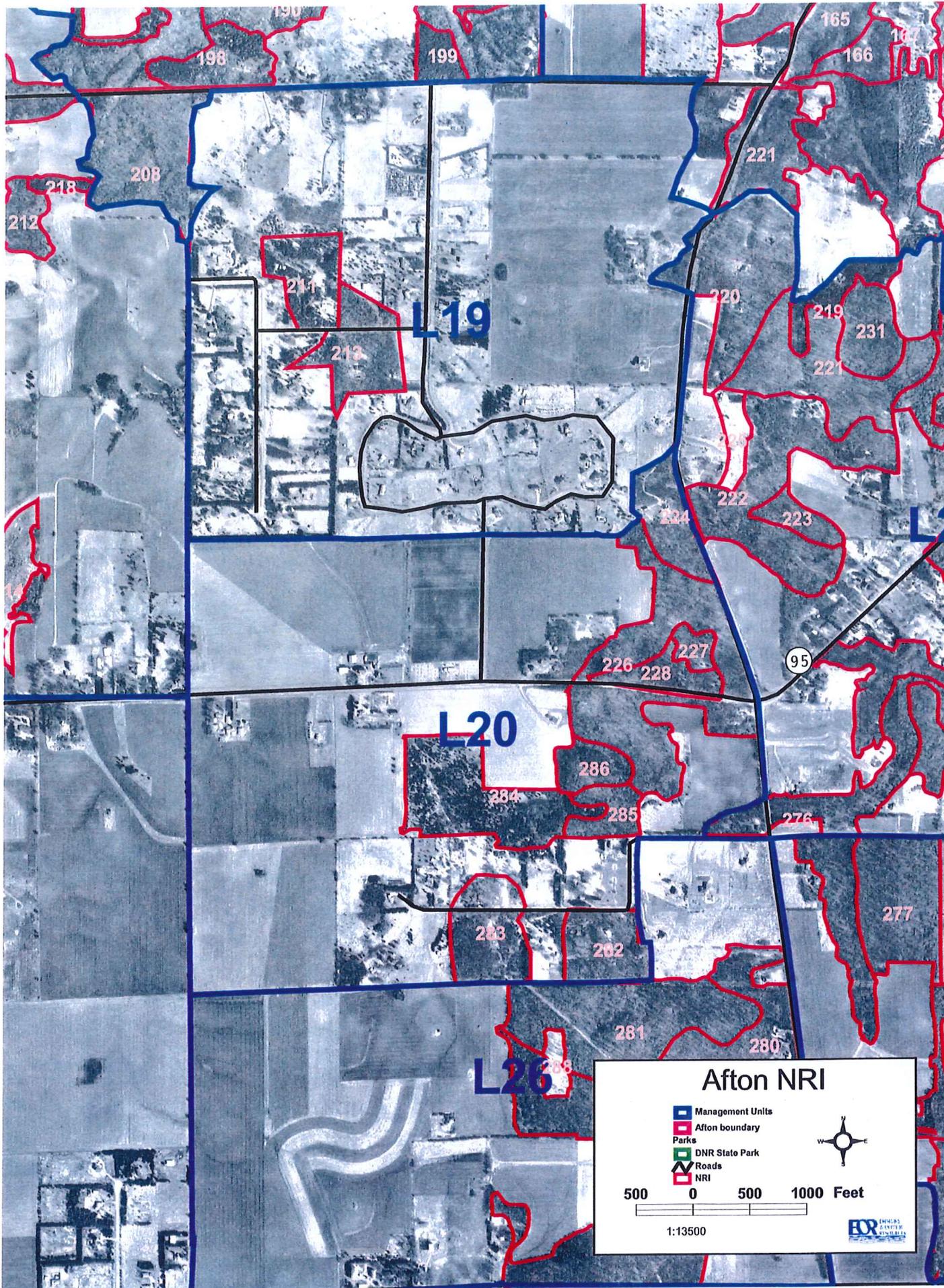
### Community Description

#### Community 20-28-20-04

Community 20-28-20-04 is a conifer plantation.

#### Community 20-28-20-06

Community 20-28-20-06 is an oak forest.



L19

L20

L26

**Afton NRI**

- Management Units
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- DNR State Park
- Roads
- NRI

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## Landscape Unit #20

Summary Table for Landscape Unit #20

Site ID	Community ID	Community Type	Quality Ranking
224	21282006	Lowland Hardwood Forest	D
226	21282008	Mesic Oak Forest	C
227	21282009	Dry Prairie (Bedrock Bluff Subtype)	CD
228	21282010	Juniper Woodland	NA
282	28282007	Deciduous Woodland	NA
283	28282008	Aspen Woodland	D
284	28282009	Dry Prairie (Bedrock Bluff Subtype)	CD
285	28282010	Deciduous Plantation	NA
286	28282011	Mixed Coniferous/Deciduous Plantation	NA

### Landscape Unit Rankings

*Ecological Ranking:* This landscape unit encompasses the upper ravine reach of Kelles Coulee, which in the lower reaches ranks among the highest quality natural areas within the City. Because of some fairly extensive areas of forest and connectivity to Kelles Coulee, this landscape unit is assigned a moderate ecological ranking.

*Wildlife Habitat Ranking:* This landscape unit includes some fairly large tracts of forest, some with limited interior areas. In addition, there are good quality connections to the lower portion of Kelles Coulee. There is a fair diversity of natural communities; however, most are fairly low in quality. The wildlife habitat ranking is moderate.

*Rare Features Ranking:* This landscape unit includes DNR MCBS Site #59. This site includes Community 21-28-20-09, of moderate quality bedrock bluff prairie. Although no other rare features are documented for this landscape unit, it is probable that additional rare species are present due to the connection of this area to Kelles Coulee.

### Stewardship Recommendations

1. The two dry prairie communities (21282009, 282820290) contain considerable woody shrub invasion. Buckthorn, Tartarian honeysuckle, eastern red cedar, smooth sumac and prickly ash are all present on these prairies and in time, will gradually become the dominant species in a few short years. Starting with the largest and best quality prairie openings, all shrubs and small trees (except for oak species) should be cut and removed. Within a few years, enough fuel should develop to enable prescribed burns. Prescribed burns should be conducted during the spring or fall to control cool season grasses such as Kentucky blue grass.

### Community Description

#### Community 21-28-20-06

Community 21-28-20-06 is a lowland hardwood forest. Cottonwood, hackberry, boxelder, and elm dominate the upper canopy, with dense buckthorn dominating the mid- and understory layers. Other shrub species include wild raspberry, prickly gooseberry, and greenbrier. Understory cover is very low due to heavy shading from buckthorn.

*Disturbance Indicators:* There is much blowdown at the base of this stand's northeast facing slope, which is bordered by Trading Post Road. Although this disturbance has created a patchy tree distribution and shrubby invasion, the downed material does provide good wildlife habitat. Along with the dense buckthorn cover, most of the disturbed ground is bare with little to no organic layer. Therefore, this site was ranked D in quality.

#### **Community 21-28-20-08**

Community 21-28-20-08 is a mesic oak forest dominated by large diameter (average 20-25 inch) bur, white, and red oak trees. Other tree species present include: sugar maple, American elm, hackberry, trembling aspen, basswood, and black cherry. Although several native shrub species including common elder and prickly gooseberry are present, buckthorn is generally dominant. Herbaceous species include mostly weedy species such as white snakeroot. This community is located on hilly terrain, and toward the upper slope areas there is a larger component of red cedar.

*Disturbance Indicators:* This community is surrounded by agricultural fields to the east and west, with a residential development to the north and 40<sup>th</sup> Street (Highway 95) to the south. As a general rule, edges adjacent to these areas have been invaded by buckthorn. In the more interior areas, this community still retains some of its native shrub cover, and is dominated by large-diameter oak trees. This community is assigned C-quality ranking.

#### **Community 21-28-20-09**

Community 21-28-20-09 is a dry, bedrock-bluff prairie. This prairie, which is located within DNR MCBS Site #60, occurs on a very dry, sandy slope of dolomite over St. Peter sandstone, which was exposed in a roadcut for 40<sup>th</sup> Street (Highway 95). When this site was originally surveyed by the DNR in 1971, it was estimated that grazing had occurred for 40+ years. Since the topography of this area is quite steep in some parts (10 to 20 degree slopes with a south aspect), past grazing pressures were kept low enough to allow some native prairie species to persist. Native prairie grass and forb species present include side oats grama, hairy grama, little bluestem, and big bluestem. Native forb species include horse-gentian, bee balm, pearly everlasting, yarrow, common St. John's-wort, and cinquefoil.

*Disturbance Indicators:* Since cattle grazing has ceased, many invasive, armed shrub species have taken over. Shrubs and trees such as eastern red cedar, buckthorn, prickly ash, Tartarian honeysuckle, and wild raspberry generally dominate this community with small, open patches of native prairie species. The original quality ranking (DNR, 1971) for this community was BC. Today, with the encroachment of woody shrubs and the resulting smaller size of this prairie, a quality ranking of CD is assigned.

*Management Issues:* This area has good potential for native prairie restoration. A managed regime of prescribed burning could be implemented to control woody plant invasion and reestablish habitat favorable for native prairie species.

#### **Community 21-28-20-10**

Community 21-28-20-10 is a young juniper forest located within MCBS site #60, and was once part of the old bluff prairie of 21-28-20-09. It is located on dolomite over St. Peter sandstone, which was exposed in a roadcut for 40<sup>th</sup> Street (Highway 95). Since cattle grazing has ceased in the past thirty years, it has become dominated by 90 percent coverage of 10-15 foot tall red cedar, with a thick midstory of young juniper, buckthorn, prickly ash, and wild raspberry. A few open patches of herbaceous species persist, including common St. John's-wort, evening nightshade, pearly everlasting, and Pennsylvania sedge.

**Community 28-28-20-07**

Community 28-28-20-07 is a deciduous woodland, probably originating from an old farmstead or apple orchard. The canopy is dominated by red maple, crab-apple, red oak, boxelder, and American elm. One unique feature is the occurrence of very large ironwood in the canopy, some exceeding 12 inches in diameter. The shrub layer is patchy and consists of buckthorn, American elm seedlings, round leaved dogwood, prickly gooseberry, and red maple seedlings. The groundcover is mostly bare due to the dense canopy and shrub layer.

**Community 28-28-20-08**

Community 28-28-20-08 is an aspen woodland dominated by scattered, small, quaking aspen, black ash, red cedar, crab-apple, and black cherry. Most of this area is covered by a thick shrub layer composed of amur maple, northern swamp-dogwood, sweet viburnum, buckthorn, wild raspberry, smooth sumac, prickly ash, wild grape, Virginia creeper, and red oak and red maple regeneration. Portions of this community occur along bedrock outcroppings that were likely once bedrock bluff prairie. Once grazing was discontinued, this area succeeded to the dense thicket of woody vegetation seen today. A close inspection of this area revealed a few native prairie species such as little bluestem grass. Otherwise the ground layer is thick with herbaceous species such as Canada anemone, yellow avens, agrimony, common St. John's-wort, greenbrier, giant goldenrod, tall meadow rue, tick-trefoil, and sweet scented bedstraw. This community has potential for prairie restoration.

**Community 28-28-20-09**

Community 28-28-20-09 is low quality bedrock bluff prairie located on a south to southeast facing slope of exposed rock outcrops. The setting for this community is geologically similar to Bissel's Mounds and historically, would have supported an oak/oak savanna community. Today, this community is covered by a dense thicket of young trees and shrubs, along with scattered oak openings. Within these openings, native prairie graminoids such as Indian grass, side oats grama, prairie dropseed, Muhly grass, and little bluestem are common. Prairie forbs present include leadplant, thimbleweed, heath aster, gray goldenrod, prairie coreopsis, milkweed, and dotted blazing star. This survey, which was conducted in early October, likely missed many other early blooming species. Tree species present include eastern red cedar, planted silver maple, and planted red pine. Buckthorn dominates the shrub layer, along with eastern red cedar, smooth sumac, green ash, amur maple, Tartarian honeysuckle, wild raspberry, wild rose, and wild grape.

*Disturbance Indicators:* As already indicated, this community is mostly overgrown by dense thickets of eastern red cedar, shrubs and planted trees. It is likely that this community was originally grazed and upon abandonment, became invaded by woody species. This site offers an excellent opportunity for restoration of oak. A quality ranking of CD is assigned to the prairie openings; however, the red cedar thickets would be better mapped as red cedar scrub.

**Community 28-28-20-10**

Community 28-28-20-10 is a green ash plantation, dominated by evenly spaced, 17-inch diameter green ash. The age of these green ash were determined to be about 65 years based on growth rings. Other trees present include black cherry and silver maple. The shrub layer is dominated by buckthorn, Tartarian honeysuckle and regeneration of American elm and silver maple. The sparse ground layer is heavily shaded with only a few species such as sweet scented bedstraw present. This plantation was likely established to correct a severe erosion problem following heavy grazing and the drought of the 1930's.

### Community 28-28-20-11

Community 28-28-20-11 is a mixed coniferous/deciduous plantation dominated by large (18 inch average diameter) scotch pine, green ash and eastern red cedar. Other species scattered throughout the canopy include quaking aspen and black cherry. During recent wind storms, large pockets of this plantation blew down, with most of the damage suffered by scotch pine, a European species that tends to be susceptible to storm damage in Minnesota. The shrub layer is generally dense and getting more so. Canopy gaps created by the wind damage are quickly being filled in by mostly invasive shrubs, such as buckthorn. A sparse groundcover layer includes few herbaceous species such as sweet cicely.

## Landscape Unit #21

Summary Table for Landscape Unit #1

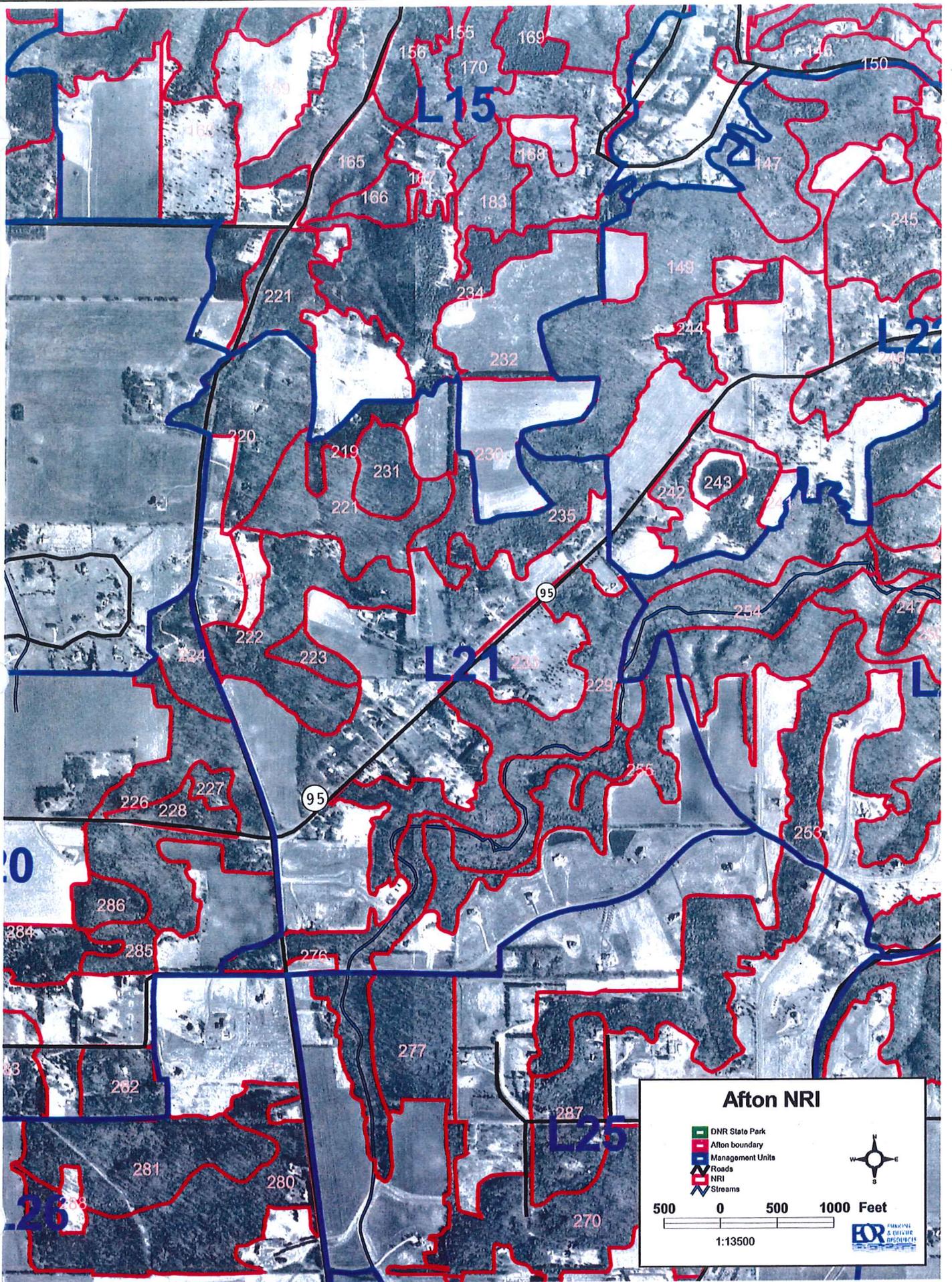
Site ID	Community ID	Community Type	Quality Ranking
219	21282001	Conifer Plantation	NA
220	21282002	Mesic Oak Forest	CD
221	21282003	Mesic Oak Forest	CD
222	21282004	Oak Woodland	CD
223	21282005	Mesic Oak Forest	C
225	21282007	Mixed Deciduous Coniferous Plantation	NA
229	21282011	Mesic Oak Forest	CD/C
231	21282013	Oak Woodland/Conifer Plantation	NA
233	21282015	Old Field	NA
235	21282019	Oak/Juniper Woodland /Bedrock Bluff Prairie	CD
255	22282024	Mesic Oak Forest	BC
276	28282001	Lowland Hardwood Forest	C

### Landscape Unit Rankings

*Ecological Ranking:* Landscape unit #21 is bisected by Afton Boulevard. To the north, is a large, contiguous area of mostly low to moderate quality oak forest. To the south of Afton Trail, is the upper part of Kelles Coulee, which consists of a narrow ravine of moderate to good quality oak and lowland hardwood forest. The ecological ranking for this landscape unit ranges from moderate on the north side of Afton Boulevard to high in the upper reaches of Kelles Coulee.

*Wildlife Habitat Ranking:* The upper and lower portions of Kelles Coulee are not severed by roads or residential development, making this one of the better corridors within the City. The high quality natural communities, within the upper portion of Kelles Coulee coupled with the extensive oak forest north of Afton Boulevard, give this landscape unit a high wildlife habitat ranking.

*Rare Features Ranking:* This landscape unit includes DNR MCBS site #119, which includes a small dry, bedrock bluff prairie. There are no other records within this landscape unit; however, the potential is high for species associated with the lower portion of Kelles Coulee, such as the Louisiana Waterthrush (*Seiurus motacilla*), a State Special Concern Species. This landscape unit is assigned a high rare features ranking.

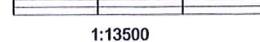


### Afton NRI

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



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## Stewardship Recommendations

1. The most significant management concern for this landscape unit is stormwater runoff into Kelles Coulee. Several residential homes along steep bluffs currently are contributing to erosion on ravine hill slopes. Thus far, the creek channel within the ravine bottom does not appear to be significantly eroded. The high quality natural communities in lower Kelles Coulee depend on effective upstream stormwater management, especially stormwater rate control. Stormwater runoff rate should be maintained at existing conditions to reduce the potential for channel scour.
2. The site conditions along Kelles Coulee favor rapid leaching of nutrients and a relatively low soil pH. Many of the plants found on this site compete best under relatively low nutrient, low pH conditions. For this reason, landowners along the bluff top should use lawn/garden fertilizers carefully to avoid discharge of nutrients into Kelles Coulee.
3. Many of the slopes within Kelles Coulee are exceedingly steep, including some sections with vertical escarpments. For this reason, not only should caution be exercised when walking in this ravine, but also on the steeper slopes, foot or bike travel should be avoided.

## Community Description

### Community 21-28-20-01

Community 21-28-20-01 is a conifer plantation containing red pine and blue spruce. The age of this plantation is estimated at approximately 27 years. The shrub layer consists of mostly invasive species including amur maple, buckthorn, and some green ash regeneration.

### Community 21-28-20-02

Community 21-28-20-02 is a moderate quality mesic oak forest. Large red oaks (ranging in size from 15 to 20 inches DBH) dominate the upper canopy of this community along with red maple and black cherry. A dense understory of smaller sugar maple is present with tree diameters ranging from sapling size to over 15 inches in DBH. The shrub and understory layers in this community are very sparse. The shrub layer includes buckthorn along with hackberry and black ash regeneration. The groundcover includes pyrola and Pennsylvania Sedge.

*Disturbance Indicators:* This community is a highly disturbed area being located just adjacent to residential homes and 32<sup>nd</sup> Street, and has been invaded by fruiting buckthorn. The understory layer in this community is relatively sparse of herbaceous species, mainly due to the high disturbance factor. Therefore we ranked this community as CD.

### 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, and 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 21-28-20-04**

Community 21-28-20-04 is an oak woodland with a substantial proportion of aspen. Scattered, large diameter, bur oak (generally 25 inches dbh) along with 10 to 15-inch trembling aspen, dominate the canopy. Additional canopy species include: black cherry, American elm and eastern red cedar. The shrub layer is dominated by buckthorn, prickly gooseberry and prickly ash. The ground layer is depauperate, with a few, scattered sedges present.

*Disturbance Indicators:* This community contains, many large diameter oak trees, but lacks shrub and ground cover diversity. Buckthorn is generally dominant throughout. This community is given a CD quality ranking.

#### **Community 21-28-20-05**

Community 21-28-20-05 is a mesic oak forest with a deciduous species dominated mid to lower canopy. White oaks dominate the upper canopy, with hackberry, cottonwood, elm, and black cherry comprising the mid-canopy. There is some buckthorn in the lower canopy, as well as some scattered hardwood tree regeneration. Rich mesic understory species dominate the understory, including maidenhair fern, lady fern, greater lady bells, false Solomon's seal, and Pennsylvania sedge. This community was evaluated by the DNR MCBS as part of Site #59, but was eliminated due to buckthorn invasion.

*Disturbance Indicators:* This community is more disturbed near homes on the northern portion, and buckthorn is present in enough abundance to shade out and reduce understory diversity. In spite of the buckthorn, fair regeneration of native tree species is occurring. This community is assigned a quality ranking of C.

#### **Community 21-28-20-07**

Community 21-28-20-07 is a mixed hardwood/conifer woodland that has been planted with a diversity of trees, shrubs, and non-native grasses. A majority of the area is located behind residential homes, and includes a small red pine plantation and thick patches of smooth sumac, wild raspberry, and prickly ash. The ground layer is dominated by non-native grass species with a small patch of planted Indian grass.

#### **Community 21-28-20-11**

Community 21-28-20-11 is a good quality mesic oak forest dominated by large (15 to 25 inch diameter) red oak. Bur and white oak also comprise the upper canopy with oak species comprising approximately 70 percent of the canopy. An understory of other hardwood tree species is composed of hackberry, boxelder, aspen, paper birch, silver maple and black cherry. The shrub layer is composed of Tartarian honeysuckle, buckthorn, common elder, and saplings of hackberry and black cherry. The groundcover is rich with such species as sensitive fern, lady fern, wood anemone, wood nettle, yellow avens, Pennsylvania sedge, sweet scented bedstraw, and creeping charlie. There is a creek bed running southeast through this community that joins with a larger northeast-running creek/black ash seepage swamp draining to the St. Croix River. Toward the northwest portion of this community near the creek bed, understory conditions become richer, and include maidenhair fern and wild ginger. There is a good deal of wind-damaged trees throughout this community. Many of these trees provide valuable snag habitat for wildlife.

*Disturbance Indicators:* The quality of this community is variable, with lower quality areas generally near residential homes. More disturbed areas generally contain greater densities of buckthorn and Tartarian honeysuckle with a correspondingly lower diversity of herbaceous species. The quality of this community ranges from CD to C.

**Community 21-28-20-13**

Community 21-28-20-13 is a mixed oak woodland/conifer plantation.

**Community 21-28-20-15**

Community 21-28-20-15 is an old field.

**Community 21-28-20-19**

Community 21-28-20-19 is an oak woodland/juniper scrub along a southwest-facing hillside. This overgrown woodland is adjacent to residential homes along Afton Boulevard. There is a record for a bedrock bluff prairie (MCBS site # 119) within this community. During our survey, we were unable to relocate this community. According to the survey work conducted by the DNR in 1987, this oak was dominated by hairy gramma grass, side-oats gramma grass, little bluestem, plains muhly. The forb diversity was found to be poor in 1987 with only a few species present such as *Anemone patens* and *Viola pedatifida*. This prairie was given a C ranking by the MNDNR County Biological Survey. Overall, this community is assigned a CD ranking.

**Community 22-28-20-24**

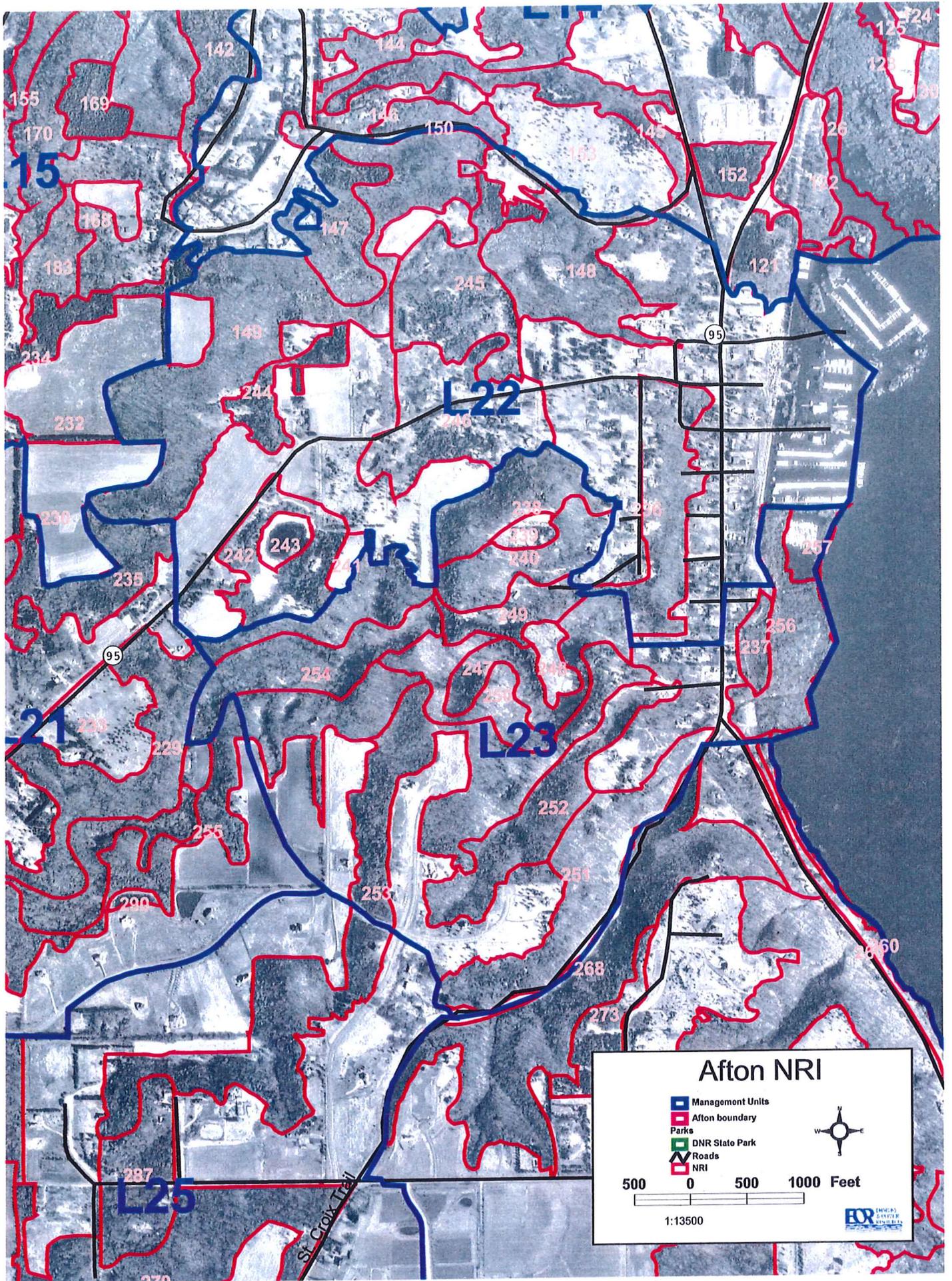
Community 22-28-20-24 is a mesic oak forest dominated by red oak and sugar maple averaging 16 to 20 inches in diameter. Other canopy species include basswood, bur oak, paper birch, white pine and red pine. Subcanopy species include ironwood and blue beech. Shrub layer species include common elder, fly-honeysuckle, beaked hazelnut, ironwood, high-bush cranberry, round leaved dogwood, prickly ash, and Virginia creeper. The ground layer includes a diversity of herbaceous species, including horsetail, pale touch-me-not, zig-zag goldenrod, wild ginger, lady fern, sweet cicely, sharp-lobed hepatica, early meadow rue, common yellow wood-sorrel, tick-trefoil, wild sarsaparilla, big leaved aster, and showy goldenrod along with the graminoid wild rye. This community contains large numbers of large diameter, standing snags that provide excellent wildlife habitat.

*Disturbance Indicators:* Several residential homesites that are located near this community have potential issues with stormwater runoff. In general, the canopy contains a nice mix of large oaks and mesic hardwoods, the shrub layer is not dominated by invasive species, and the ground layer contains a good diversity of herbaceous species. Therefore we have assigned this community a BC quality ranking.

**Community 28-28-20-01**

Community 28-28-20-01 is a moderate quality, lowland hardwood forest dominated by 12-inch diameter red elm. This community is part of a wooded ravine. Other canopy and subcanopy trees include boxelder, American elm, black willow, silver maple, hackberry, and bur oak. A fairly diverse shrub layer includes common elder, sweet viburnum, red-berried elder, buckthorn, and wild grape. A high diversity of herbaceous species exist in the ground layer, including false Solomon's seal, common burdock, wood nettle, white snakeroot, Virginia waterleaf, sweet cicely, stinging nettle, swamp buttercup, common motherwort, yellow avens, violets, lady fern, jack in the pulpit, and hog peanut. Associate graminoids in the ground layer include Pennsylvania sedge, rice cut grass, and Virginia wild rye.

*Disturbance Indicators:* Dutch Elm disease appears to have killed off most elm trees over 10 to 12 inches in diameter. Buckthorn, while present, does not dominate the shrub layer, but rather, the shrub layer has retained much of its native diversity. Likewise, while the ground layer contains some weedy species such as *Laportea* and stinging nettle, this community, overall, contains a rich mix of herbaceous species. A quality ranking of C is assigned to this community.



**Afton NRI**

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

500 0 500 1000 Feet

1:13500



## Landscape Unit #22

Summary Table for Landscape Unit #22

Site ID	Community ID	Community Type	Quality Ranking
147	15282018	Aspen Forest/Conifer Plantation	NA
148	15282019	Mesic Oak Forest	CD
149	15282020	Oak Woodland	CD
236	22282001	Oak Woodland	D
241	22282009	Old Field	NA
242	22282010	Conifer Plantation	NA
243	22282011	Mixed Emergent Marsh	C
244	22282012	Mixed Coniferous/Deciduous Plantation	NA
245	22282014	Aspen Forest/Conifer Plantation	NA
246	22282015	Mixed Coniferous/Deciduous Plantation	NA

### Landscape Unit Rankings

*Ecological Ranking:* This landscape unit is dominated by mostly low to moderate quality oak forest and woodland along with scattered mixed deciduous/coniferous plantation. The ecological ranking is low to moderate.

*Wildlife Habitat Ranking:* This area contains some fairly large tracts of forest; however, most of these are fragmented by a network of residential homes, driveways, roads and trails. This area provides excellent habitat for "habitat generalist" that favor oak forest and other dry upland natural communities. A moderate wildlife habitat ranking is assigned.

*Rare Features Ranking:* There is one record for a rare feature in this landscape unit; the lilia-leaved twayblade (*Liparis lilifolia*), which although not formally listed is tracked by the DNR Natural Heritage Program. The rare features ranking for this landscape unit is high.

### Stewardship Recommendations

#### Community Description

##### Community 15-28-20-18

Community 15-28-20-18 is an aspen forest/conifer plantation. This community is dominated by 14-inch diameter red, white, and scotch pines along with blue and white spruce. Scattered throughout this plantation are patches of brushy woodland with such species as quaking aspen, eastern red cedar, black cherry, and bur oak. The canopy trees comprise an 80% total cover. The shrub layer is generally dominated by buckthorn, red raspberry, and young black cherry. The ground layer is generally covered with a thick mat of needle duff and does not support very many forb species. The topography within this community is in places, quite steep, with major gullies, some of which are 20 to 30 feet deep. The trees in this community appear to have been established to control erosion.

##### Community 15-28-20-19

This community occurs to the south of Afton Hills Drive, near an open field and some conifer plantations. Community 15-28-20-19 is a mesic oak forest dominated by 18 to 20 inch red and white oaks. Other canopy species include bur oak, basswood, big-toothed aspen, trembling aspen, paper birch, and pin oak. Although oak species are common throughout, the rugged

topography that characterizes this community results in considerable variation in canopy tree species composition. For example, within the north portion of this community, quaking aspen is dominant, while within several small ravines, sugar maple is locally common. Throughout this entire community; however, buckthorn is the dominant shrub species along with occasional raspberry and pin cherry. The sparse ground cover includes yellow avens, lady fern, and Pennsylvania sedge. This community offers excellent wildlife habitat with the numerous dead and downed oak snags.

*Disturbance Indicators:* The quality of this community is variable depending on proximity to roads and residential development and slope position. In general, the small ravines with sugar maple are the highest quality. Overall, this community is assigned a quality ranking of CD.

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

Community 15-28-20-20 is an oak woodland dominated by 20 inch diameter red oak, and scattered paper birch. One 30-inch red oak was cored and estimated at about 154 years of age. Other canopy species include pin oak, American elm, basswood, green ash, and boxelder. This site occurs along moderately steep, north facing slopes above (to the south) of Afton Hills Drive. Buckthorn generally dominates the shrub/subcanopy, and is accompanied by choke-cherry, black cherry, and wild grape.

A fair to good diversity of ground flora is present including: yellow avens, lady fern, maidenhair fern, interrupted fern, sweet scented bedstraw, *Aster sp.*, rattlesnake fern, moonseed, sensitive fern, and ostrich fern. This area provides good wildlife habitat because of the number of large-diameter oak trees providing mast for wildlife as well as the high abundance of dead and downed snags.

*Disturbance Indicators:* This oak woodland has recently been logged. During the logging operation, large, high quality trees seemed to be targeted, while smaller trees were left. Perhaps as a result of the logging (or was the logging a salvage operation), a number of trees have blown down from recent high winds. Fortunately, these gaps are filling in with mostly native trees, shrubs and groundcover species. Because of the disturbance attributable to logging operations, presence of buckthorn and recent wind damage, community is given a ranking of CD.

#### **Community 22-28-20-01**

Community 22-28-20-01 is an oak woodland, dominated by large, open grown, 30 to 40 inch average diameter bur oak, estimated to be about 175 years old. A subcanopy of mixed mesic deciduous trees include American elm, green ash, black ash, basswood, black cherry, slippery elm, and sugar maple. Thick buckthorn dominates the shrub layer accompanied by red cedar, prickly gooseberry, Virginia creeper, and young sugar maple and hackberry trees. The ground layer is very shaded, resulting in only a few species such as white snake root, bedstraw, and enchanter's nightshade.

*Disturbance Indicators:* Historically, this community was oak woodland that would have included large, open grown bur and pin oak with a high diversity of woodland shrub species along with a mixture of woodland and prairie grasses and forbs. Today, the woody trees and shrubs that dominate this community have all but shaded out the native species; the exception being the remnant bur and pin oak that are still present today. The primary disturbance indicators are buckthorn and to some degree, the young, hardwood species, that along with buckthorn, have filled in the canopy. This condition is also supported by the largely depauperate ground layer, which may not contain viable vegetative or seed material to promote colonization of woodland or forest species.

Community 22-28-20-01 would make a good demonstration site for oak woodland/savanna restoration, as it exists next to the City Park. Major buckthorn removal would be part of this management program.

**Community 22-28-20-09**

Community 22-28-20-09 is an old pasture dominated by non-native grasses and smooth brome. Associate ground layer herbaceous species include common St. John's-wort, common milkweed, and mint.

**Community 22-28-20-10**

Community 22-28-20-10 is a conifer plantation dominated by 12 to 18-inch average diameter red, scotch, and white pines. One 16-inch red pine was found to have 51 rings, indicating this plantation is about 55-60 years old. The western portion of this community contains younger pine, mostly Scotch pine. Patches of mature quaking aspen and paper birch with 12 to 14 inch average diameters also occur scattered throughout the canopy. Shrub layer species include younger black cherry, pin oak, green ash, and paper birch, with wild grape, Virginia creeper, and buckthorn. Much conifer and hardwood seedling regeneration occurs in the ground layer, along with herbaceous species such as bedstraw, enchanter's nightshade, sweet cicely, daisy fleabane, hog peanut, and white snake root.

This community provides excellent winter cover for species such as deer and wild turkeys as well as daytime roosting areas for secretive wildlife species such as hawks and owls.

**Community 22-28-20-11**

Community 22-28-20-11 is a mixed emergent marsh with a grassy fringe dominated by reed canary grass. The marsh has a mudflat center that is generally inundated in the spring, with mudflat colonizers such as water plantain, common arrowhead, beggar-ticks, and needle rush. River bulrush, soft-stem bulrush and cattail are the dominant species within central portion of the wetland. Large black willows are scattered along the wetland fringe.

*Disturbance Indicators:* This community is located to the southeast of Afton Blvd and is bordered on the south, east and west by community 22-28-20-10, a conifer plantation. The primary invasive species is reed canary grass, which generally is dominant within the wetland/upland transition zone. This wetland has a quality ranking of C.

**Community 22-28-20-12**

Community 22-28-20-12 is located to the northwest of Afton Blvd and adjacent open fields and residential areas. Community 22-28-20-12 is a mixed coniferous - deciduous forest dominated by cottonwood, quaking aspen, and planted Scotch pine. Subcanopy species include red oak, green ash, boxelder and black cherry. Shrub layer species include common elder, buckthorn, American gooseberry, poison ivy, Tartarian honeysuckle, wild grape, and Virginia creeper. The ground cover, which is sparse, is dominated by false Solomon's seal, moonseed, white snakeroot, and enchanter's nightshade. Some scattered pockets of old field openings also exist and include herbaceous species such as gray-headed coneflower, gray goldenrod, bush-headed prairie clover, daisy fleabane, bee balm, thimbleweed, and graminoids such as smooth brome, orchard grass, and timothy.

*Disturbance Indicators:* Although buckthorn, Tartarian honeysuckle, and other invasive species are present, they do not dominate the otherwise native species-rich shrub layer. Since this is not a natural community, no quality ranking is given.

**Community 22-28-20-14**

Community 22-28-20-14 is an aspen forest/conifer plantation with a canopy cover of approximately 90%. Patches of quaking aspen and cottonwood averaging 10-inches in diameter are interspersed with planted conifers including balsam fir, red pine, and white spruce. The subcanopy consists of smaller paper birch, red cedar, aspen and pines. Scattered shrub layer species include black cherry, wild rose, choke-cherry, wild raspberry, and Virginia creeper. The groundcover is sparse, with mostly weedy herbaceous species such as enchanter's nightshade and northern bedstraw.

**Community 22-28-20-15**

Community 22-28-20-15 is a residential area with a variety of native and introduced trees including silver maple, Chinese elm, American elm, amur maple, scotch pine, white spruce, and red pine.

## Landscape Unit #23

Summary Table for Landscape Unit #23

Site ID	Community ID	Community Type	Quality Ranking
237	22282002	Mixed Emergent Marsh	C
238	22282003	Maple Basswood Forest	CD
239	22282004	Old Field	NA
240	22282005	Lowland Hardwood Forest/Deciduous Woodland	NA
247	22282016	Lowland Hardwood Forest	B
248	22282017	Dry Prairie (Bedrock Bluff Subtype)/Dry Cliff	C/AB
249	22282018	Mixed Pine-Hardwood Forest	C
250	22282019	Maple Basswood Forest	B
251	22282020	Mesic Oak Forest	CD
252	22282021	Mesic Oak Forest	BC
253	22282022	Oak Woodland/Forest	D
254	22282023	Lowland Hardwood Forest	BC
256	23282001	Floodplain Forest	C
257	23282002	Deep Open Water/Emergent Marsh	CD

### Landscape Unit Rankings

*Ecological Ranking:* Landscape unit #23 ranks as one of the most ecologically significant areas in Afton. This landscape unit, which includes the middle and lower reaches of Kelles Coulee includes a unique mixture of high quality maple basswood, mesic oak, mixed pine-hardwood and lowland hardwood forest. In addition, this landscape unit encompasses some small bedrock bluff prairies, dry cliff and a small ephemeral stream. The ecological quality of this landscape unit is very high.

*Wildlife Habitat Ranking:* This landscape unit includes one of the most inaccessible tracts of forest with substantial interior habitat. The combination of rich, mesic pine/hardwood forest and riparian areas coupled with extensive oak forest provides excellent wildlife habitat.

*Rare Features Ranking:* This landscape unit encompasses several MCBS mapped natural communities including oak forest, maple basswood forest, lowland hardwood forest, bedrock bluff prairie and dry cliff. In addition two records for birds are noted for this landscape unit including Louisiana waterthrush (*Seiurus motacilla*) and Bald Eagle (*Haliaeetus leucocephalis*). The rare feature ranking for this landscape unit is very high.

### Stewardship Recommendations

1. Community 22-28-20-01 would make a good demonstration site for oak woodland/savanna restoration, as it exists next to the City Park. Major buckthorn removal would be part of this management program.

Near residential areas in the City of Afton, deer numbers appear to be high. Many of the forest communities, especially mesic oak and maple-basswood, are heavily browsed by deer. In some cases, little groundcover flora or tree regeneration is left. Where public safety is not compromised, deer numbers could be reduced through special hunts or seasons. Private landowners who presently do not allow hunters on their land may be

more willing to provide access if they could benefit from reduced depredation of vegetation.

2. Community 22-28-20-17 is one of the more unique natural communities in the City. Although generally isolated, there is limited foot traffic by local residents. This community contains a very shallow mantle of soil that is very sensitive to even foot traffic. Nearby residents should be informed about the value of this area.
3. There is erosion on the upper slopes of community 27-28-20-01, much of it originating from residential areas on the bluff top. The City should work with landowners to develop a drainage plan that reduces stormwater runoff from residential homes and driveways along the bluff top.

## **Community Description**

### **Community 22-28-20-01**

Community 22-28-20-01 is an oak woodland, dominated by large, open grown, 30 to 40 inch average diameter bur oak, estimated to be about 175 years old. A subcanopy of mixed mesic deciduous trees include American elm, green ash, black ash, basswood, black cherry, slippery elm, and sugar maple. Thick buckthorn dominates the shrub layer accompanied by red cedar, prickly gooseberry, Virginia creeper, and young sugar maple and hackberry trees. The ground layer is very shaded, resulting in only a few species such as white snake root, bedstraw, and enchanter's nightshade.

*Disturbance Indicators:* Historically, this community was oak woodland that would have included large, open grown bur and pin oak with a high diversity of woodland shrub species along with a mixture of woodland and prairie grasses and forbs. Today, the woody trees and shrubs that dominate this community have all but shaded out the native species; the exception being the remnant bur and pin oak that are still present today. The primary disturbance indicators are buckthorn and to some degree, the young, hardwood species, that along with buckthorn, have filled in the canopy. This condition is also supported by the largely depauperate ground layer, which may not contain viable vegetative or seed material to promote colonization of woodland or forest species.

### **Community 22-28-20-02**

Community 22-28-20-02 is a mixed emergent marsh.

### **Community 22-28-20-03**

Community 22-28-20-03 is a maple basswood forest dominated by large sugar maple and red oak, averaging 14 to 20 inches in diameter. The MNDNR Natural Heritage Program has designated this community as being part of MCBS site 58, and mapped it as maple basswood forest. This community occurs near the top of a steep, east-facing slope with rock outcrop, above the City of Afton. Subcanopy species include bitternut hickory, bur oak, black ash, paper birch, ironwood, pin oak, and red cedar. Patchy buckthorn dominates the shrub layer, accompanied by American elm. Very few herbaceous species occur in the ground layer other than a few weedy species such as moonseed and white snake root.

*Disturbance Indicators:* This community is located to the south of Afton Blvd, and to the west of community 22-28-20-06, an old field/pine plantation. Invasive species include buckthorn in the shrub layer, and although not dominant may contribute to the low abundance of ground layer

flora. Major deer browsing is also a problem in this community. During the MCBS survey of this community in 1987, many of the same disturbance indicators were noted; however, today they appear to be much more pronounced. This community has been given a CD quality ranking.

#### **Community 22-28-20-04**

Community 22-28-20-04 is an old field dominated by non-native grasses and scattered pine trees. The upper canopy consists of scattered quaking aspen, cottonwood, and green ash. Most white and red pines occur in the subcanopy along with smooth sumac, boxelder, and buckthorn. Boxelder seems to be filling in this subcanopy to shrub layer. Graminoids in the ground layer include smooth brome and timothy. An interesting note for this community is the Mount Hope Cemetery, a historical site containing grave markers dating to the mid-1800's.

#### **Community 22-28-20-05**

Community 22-28-20-05 is a dry oak forest, grazed, and now grown over. This area was most likely a mixture of oak savanna and bedrock bluff prairie and then following grazing, woody species, particularly eastern red cedar, invaded. Today, scattered pin and bur oak dominate the tree canopy along with paper birch, green ash, and eastern red cedar. The shrub layer is often dense, and dominated by buckthorn, prickly ash, prickly gooseberry, and Virginia creeper. The ground layer is sparse, and includes such species such as enchanter's nightshade, moonseed, and false Solomon's seal.

*Disturbance Indicators:* This community is located just south of community 22-28-20-04, an old field dominated by non-native grasses and scattered pine trees. Invasive species include heavy buckthorn, which seems to contribute to the low abundance of ground layer flora. This area is also subject to heavy deer browsing. We assigned a D quality ranking to this community.

#### **Community 22-28-20-16**

Community 22-28-20-16 is a good quality, lowland hardwood forest characterized by an upper canopy of cottonwood, black ash and black willow. Some of these canopy trees are quite large, and one 24-inch diameter black ash had 130 growth rings, indicating this stand is over 140 years of age. Subcanopy trees average 10 to 12 inches in diameter and include such species as basswood, American elm, sugar maple, and hackberry. Shrub layer species include buckthorn, pagoda dogwood, and prickly ash.

An unnamed stream that forms from a series of groundwater discharge areas flows through this community. The stream is approximately 8-feet in width, about 2 inches deep, although occasional pools are present. The stream substrate consists of medium to large sized limestone/sandstone fragments embedded in fine sand and cobble. The valley floor around this stream is dominated by wood nettle. The herbaceous layer is very diverse and contains some wetland species along the stream margins as well as a good mix of mesic species typical of lowland hardwood forest conditions. Some of the more common species include wild ginger, common burdock, zig-zag goldenrod, enchanter's nightshade, white avens, pale touch-me-not, blue cohosh, fringed loosestrife, daisy fleabane, Virginia waterleaf, maidenhair fern, lady fern, ostrich fern, and scouring rush. Common graminoids include bottle-brush grass, Virginia wild rye, reed canary grass, giant manna grass, and sedge species.

This community is located within an area mapped by the MNDNR Natural Heritage Program as MCBS site 58. MCBS Site 58 contains the best quality forest complex within the City of Afton. Our survey confirmed that this lowland hardwood forest is of very high quality. During both the DNR MCBS and our survey, a quality ranking of B was assigned.

*Disturbance Indicators:* This community is surrounded by community 22-28-20-18, a mixed pine-hardwood forest; community 22-28-20-19, an excellent quality maple basswood/pine forest, and community 22-28-20-22, an oak forest/woodland. These high quality natural communities serve as excellent buffers. Perhaps the greatest threat to this community is stormwater runoff (both direct drainage and upstream). Stormwater runoff has the potential to significantly increase erosion/sedimentation, which is currently not a major management issue. There are presently several residential home driveways and small ravines which drain distant residential areas discharging directly into the ravine.

### **Community 22-28-20-17**

Community 22-28-20-17 encompasses one of the more unusual natural areas within the City of Afton. This community features a bedrock bluff prairie with a dry cliff on the west side of a very steep, north to south running ridge. Although this community is quite small, it includes an unusual assemblage of woodland, dry cliff and bluff prairie within close proximity to other high quality natural communities that comprise MCBS Site #58. This entire community occurs on a very narrow, bedrock knob of dolomite overlain by a thin mantle of sandy, friable soil. The west side of the knob contains a 20 to 30 foot high rock face that rises out of the valley bottom, with weathered sandstone exposed under the dolomite.

This bedrock bluff prairie is of moderate, to high quality and dominated by a sparse cover of prairie graminoids and forbs. Some of the more common forb species include lead plant, gray goldenrod thimbleweed, bee balm, purple prairie clover, harebell, early meadow rue, wild columbine, false Solomon's seal, heart leaved aster, hairy goldenrod, wild ginger, prairie bird-foot violet, white lettuce, pussytoes, Lindley's aster, smooth aster, arrow-leaved aster, prairie coreopsis, tick-trefoil, foxglove, bluets, hoary puccoon, purple prairie-clover, and common polypody fern. Graminoids noted include: little bluestem, side oats grama, Pennsylvania sedge, poverty grass, Kentucky bluegrass, plains muhly grass, and Canada wild rye. The shrub layer of this community is fairly diverse with such species as snowberry, round leaved dogwood, and bush honeysuckle common. Unfortunately, woody encroachment by red cedar and buckthorn also occurs.

The west side of this community consists of a steep, (20-30 foot) sandstone escarpment with numerous overhangs and at the base of the cliff, a short talus slope down to the stream. On the cliff itself, bulblet fern, smooth cliffbrake and *Prenanthes alba* grow among fissures and ledges.

The east side of this community consists of a very steep slope that appears to have been planted and or naturally colonized by red pine, white pine, red cedar, paper birch, pin oak, basswood, and American elm. The shrub layer consists of red cedar, pin oak, buckthorn, and prickly gooseberry. The ground cover under this pine-dominated canopy is quite bare due to shade and the acidic conditions associated with conifer needle duff.

*Disturbance Indicators:* Primary disturbance indicators are planted conifers, buckthorn and nonnative grasses such as Kentucky bluegrass. This community is assigned a quality ranking of C for the prairie and AB for the dry cliff. This community could benefit from management to remove woody invasive species from choking out native prairie species. Caution should be taken when walking on the thin, friable soils that characterize this community.

### **Community 22-28-20-18**

Community 22-28-20-18 is a mixed pine-hardwood forest on a west-facing slope. This community is located upslope from the small, unnamed creek flowing through Kelles Coulee.

The canopy contains uneven aged species of oak, basswood, red and white pine with diameters averaging about 20 inches on mature oak and pine. One 15-inch diameter red pine had 116 rings, indicating that the pines are over 125 years old. Mesic hardwood species dominate the subcanopy, with such shade-tolerant species as basswood and ironwood common. The shrub layer is tall and consists of red cedar, pagoda dogwood, and prickly ash. A sparse ground cover with heavy needle duff is dominated by zig-zag goldenrod, Jack in the pulpit, bloodroot, and grass species.

*Disturbance Indicators:* It is difficult to discern how much of the pine in this community is planted or native. At least some of the pine near the lower slopes appears native due to the old age, while pine on the top of the slope appears younger and shows evidence of rows. This community is variable in quality, with disturbance such as firewood cutting and dumping of yard debris common near residential areas. Where the canopy is more open, buckthorn is common. A quality ranking of C is assigned to this community.

### **Community 22-28-20-19**

Community 22-28-20-19 is an excellent quality maple basswood/pine forest located on an east-facing slope in lower Kelles Coulee. This community also contains areas of dry cliff as described previously in community 22-28-20-17. Several of these cliffs could be considered quite hazardous with escarpments exceeding fifty feet. As a general rule, the hill slopes are very steep, with sandy soils that are extremely vulnerable to erosion. This community ranks as one of the best quality natural areas within the City of Afton.

The MN DNR Natural Heritage Program describes this community as a maple basswood forest within MCBS Site #58. The upper slopes contain large-diameter white pine, red pine, red oak, bur oak, and paper birch. Based on the fact that many of the pine are growing out of rocky outcrops and their age (one 20-inch diameter white pine had 106 rings, indicating an age of over 115 years), it would appear that the pine is naturally occurring. The lower slopes are generally much steeper, and often covered with a loose, mixture of sand and talus. Common tree species include: sugar maple, basswood and white pine in the canopy along with regeneration of sugar maple, basswood, and ironwood. Near the top of the ravine slope, red oak replaces sugar maple as the dominant tree species. The shrub layer is diverse with such species as American hazel, chokecherry, wild rose, common low blueberry and black huckleberry, a shrub species not commonly found in this part of the state.

Although occasional buckthorn is present, it is not dominant. The ground layer is rich with a high diversity of herbaceous species such as sharp-lobed hepatica, hog peanut, wild ginger, early meadow rue, lady fern, ostrich fern, maidenhair fern, jack in the pulpit, spikenard, zig-zag goldenrod, moonseed, big leaved aster, wild sarsaparilla, and Canada mayflower, Pennsylvania sedge and the graminoid, bottle-brush grass.

*Disturbance Indicators:* This community occurs on very steep slope that is subject to frequent "tip-over". Tip-over occurs as trees reach a large enough size that their weight causes them to fall downward, into the ravine. Such sites often lack old growth trees because they are constantly falling over. This condition exemplifies just how unstable the slopes are, suggesting that any disturbances (primarily from residential home sites above) could have major impacts to this ravine. Although buckthorn is present, it only appears to be invading areas at the very top of the ravine slope. This community has a very high diversity of herbaceous species and is unique in that it contains native pine as well as some unusual species. The DNR MCBS assigned a quality ranking of B for this community.

### **Community 22-28-20-20**

Community 22-28-20-20 is a moderate quality mesic oak forest dominated by sugar maple, basswood, red oak, big-toothed aspen, butternut, bur oak, and pin oak. Subcanopy species include American elm, bitternut hickory, and ironwood. This community also contains several patches of planted white and red pine. The shrub layer is diverse and although generally dominated by buckthorn, also contains black berry, sugar maple regeneration, prickly gooseberry, black cherry, poison ivy, prickly ash, round leaved dogwood, pagoda dogwood, and Virginia creeper. Ground layer herbaceous species include tick-trefoil, maidenhair fern, lady fern, false Solomon's seal, hog peanut, zig-zag goldenrod, wild geranium, black snakeroot, and the graminoid Pennsylvania sedge.

This community provides excellent wildlife and amphibian habitat with its moist conditions and diverse structure. Evidence of this included sighting of a large turkey flock and presence of numerous deer trails.

*Disturbance Indicators:* The eastern border of this community runs along St. Croix Trail and to the south of some open residential areas. There has been some firewood cutting and selective clearing along the hillslope, contributing to erosion problems and invasive species such as buckthorn. The quality of this oak forest varies from D, where buckthorn is more common to C, along steeper slopes above St. Croix Trail.

### **Community 22-28-20-21**

Community 22-28-20-21 is a moderate quality mesic oak forest dominated by large red and pin oaks. Other tree species present include: paper birch, sugar maple, butternut, American elm and ironwood. A deep ravine cuts through the middle of this community. Within the ravine, large diameter white pine and white oak occur along with scattered plantings of red pine on the upper ravine slope. The slopes of this ravine have recently been cut exposing already eroding areas to further erosion. Common shrubs include buckthorn, prickly gooseberry and bitternut hickory regeneration. The ground layer is fairly rich with such species as sharp-lobed hepatica, zig-zag goldenrod, maidenhair fern, lady fern, tick-trefoil, hog peanut, jack in the pulpit, interrupted fern, and Pennsylvania sedge.

*Disturbance Indicators:* Where logging has occurred on steep slopes, there is significant soil erosion. Although buckthorn is present, it is generally not dominant. This community is assigned a quality ranking of BC.

### **Community 22-28-20-22**

Community 22-28-20-22 is an oak forest/woodland dominated by invasive shrubs and mostly bur-fruited herbaceous species. The patchy canopy includes red oak, pin oak, bur oak, hackberry, butternut, basswood, bitternut hickory, black cherry, American elm, cottonwood, paper birch, red pine, and red cedar. Some of those canopy oaks are larger, but most canopy trees average between 10 and 12 inches in diameter. The subcanopy includes patches of planted red pine, and scattered red cedar. Buckthorn, prickly ash, boxelder, prickly gooseberry, Virginia creeper, poison ivy, and moonseed dominate the shrub layer, accompanied by red osier dogwood and Tartarian honeysuckle. In addition to Pennsylvania sedge, ground layer species include white snakeroot, tick-trefoil, false Solomon's seal, lady fern, *Aster sp.*, and sweet cicely.

*Disturbance Indicators:* The western boundary of this community occurs along Pasture Ridge Road. Although the eastern portion of this community has been recently cut over, it is of higher quality than the western area that has been grazed. This area contains mostly invasive species. We assigned an overall D quality ranking to this community.

**Community 22-28-20-23**

Community 22-28-20-23 is a moderate quality lowland hardwood forest with small inclusions of black ash seepage swamp. Soils vary from sandy/silty alluvium to raised domes of peat on the seep areas. Common tree species include black ash, black cherry, butternut, basswood, black willow, and white oak. The shrub layer is dominated by buckthorn, but also contains a good diversity of native species including: speckled alder, blue beech, wild raspberry, common elder, and sweet viburnum. A rich diversity of herbaceous species exist in the ground layer, including marsh marigold, marsh fern, yellow avens, wood nettle, Virginia stickseed, jack in the pulpit, saw toothed sunflower, hog peanut, maidenhair fern, wild ginger, horsetail, rice cut grass, giant manna grass, and Canada wild rye. This lowland hardwood forest contains many snags, standing and down provides excellent wildlife habitat for species depending on good quality riparian forest communities.

*Disturbance Indicators:* In spite of buckthorn invasion and presence of weedy herbaceous species such as *Laportea* and Burdock, this community has good diversity of native shrub species and a rich diversity of ground layer herbaceous species. In addition, the black ash seepage swamps, which were never common to Afton, enhance the richness and diversity of this site. This community is assigned a quality ranking of BC.

**Community 23-28-20-01**

Community 23-28-20-01 is a Floodplain forest (silver maple subtype) located just south of the City Marina. This community was not surveyed due to high water conditions.

**Community 23-28-20-02**

Community 23-28-20-02 is a deep open water/emergent marsh within the St. Croix River floodplain. This area was not surveyed due to high water conditions.

## Landscape Unit #24

Summary Table for Landscape Unit #24

Site ID	Community ID	Community Type	Quality Ranking
258	26282001	Mesic Oak Forest	C
259	26282003	Floodplain Forest	CD
260	26282004	River Beach	CD
261	26282005	Old Field	NA
262	26282006	Lowland Hardwood Forest/Deciduous Woodland	NA
263	26282007	Lowland Hardwood Forest	CD
264	26282008	Mesic Oak Forest	C
265	26282009	Floodplain Forest	D
266	26282010	Old Field	NA
268	27282001	Mesic Oak Forest	C
269	27282002	Mesic Oak Forest	B
271	27282005	Old Field	NA
272	27282006	Conifer Plantation	NA
273	27282007	Conifer Plantation	NA
274	27282008	Conifer Plantation	NA
332	35282003	Aspen Woodland	NA
333	35282004	Norway Pine Plantation	NA
334	35282005	Old Field/Conifer Plantation	NA

### Landscape Unit Rankings

*Ecological Ranking:* This landscape unit contains one of the better quality tracts of oak forest. In particular, several ravines cut down to the St. Croix River and harbor high quality mesic oak forest with some small inclusions of maple-basswood forest.

The river beach, although crossed by numerous docks is a significant feature with a good diversity of plant species. Although some portions of this landscape unit are of lower quality, the majority of this area contains good quality natural communities; therefore, this landscape unit is assigned a ranking of high.

*Wildlife Habitat Ranking:* Wildlife habitat values are high for this landscape unit due to the extensive area of good quality forest, extensive river beach/floodplain forest habitat along the St. Croix River, and proximity to Afton State Park. In addition, this landscape unit lies within a locally important area for bird migrations along the St. Croix River Valley.

*Rare Features Ranking:* This landscape unit lies to the north of Afton State Park. Minnesota County Biological Survey Site #51 includes an oak forest that extends along the St. Croix River bluff, north along River Road (up on bluff) to St. Croix Trail. Although no rare plants or animals are listed for this area, there are numerous records within Afton State Park for a variety of plant and animal species. Presumably, rare species associated with good quality oak forest and possibly river beach/floodplain forest communities that are present in Afton State Park are also present in this landscape unit. The rare features ranking for this landscape unit is high.

### Stewardship Recommendations