

II. Study Area Findings

The Study area Findings for the Afton Natural Resource Inventory is organized into four parts. The first part referred to herein as *Overview of Landscape Units*, describes key characteristics and management issues of each landscape unit. More detailed descriptions of Landscape Units can be found in Section VI, Natural Community Assessment. The second part of this section is the *Summary of Major Natural Resource Management Issues*. The third part of this section, discusses *Stewardship Strategies* appropriate for the Study area that address major management issues. The final part of this section provides a list of *Key Natural Resource Management Recommendations*. These recommendations are provided to help the City focus resources on key resources identified as part of this Study.

Overview of Areas Inventoried

Table II-1 provides a brief overview for each of the landscape units within the City of Afton. Attributes for each geographic area include overall ecological ranking, wildlife habitat quality and rare features potential. If the reader requires nothing more than a brief overview of the results of this Study and some basis for comparison between landscape units, Table II-1 provides this background. If the reader requires a somewhat more detailed summary, a short description of each landscape unit is provided in Section VI of this report. A detailed evaluation methodology for these attributes is described fully in Section IV of this report.

Table II-1. Overview of Landscape Units

Landscape Unit	Landscape Unit Rankings			
	Ecological Ranking	Wildlife Habitat Rank	Rare Features Potential	Noteworthy Features
1	Low	Low/Mod	Low	Plantations and north area of Belwin Foundation Property. Extensive planted prairie.
2	Mod/High	High	High	Lake Edith area. Natural communities include oak savanna remnant, sand-gravel prairie, rich fen and extensive woodland/forest areas.
3	High	High	High	Shrub swamp/rich fen wetland complex ranks among best in City. Extensive area of moderate quality mesic oak forest and woodland.
4	Low/Mod.	Mod.	Low	Large area of moderate quality oak forest/woodland.
5	Low/Mod.	Low/Mod.	Low	Small rich fen wetland. West dominated by agricultural land uses
6	Low	Low	Low	Agricultural dominated land uses.
7	Low	Low	Low	Agricultural dominated land uses
8	Very High	High	High	Series of three bedrock knobs (Bissell's Mounds) with prairie remnants. Offers one of the best scenic vistas in City.
9	Low	Low	Low	Agricultural dominated land uses
10	Low/Mod.	Mod.	Mod.	Upper reach of North Branch to Valley Branch Creek

Table II-1. Overview of Landscape Units (Cont.)

11	Mod.	High	High	Upper reach of Main Stem of Valley Creek. Moderate quality bedrock bluff prairie, extensive floodplain forest along Valley Creek.
12	High	High	High	Largest concentration of documented rare features in City including four reptiles, two birds, one mammal, three plants and two natural communities.
13	High	High	High	Best quality riparian habitat along Valley Creek in the City. Significant in that this reach provides critical connection between St. Croix River and middle/upper reaches of Valley Creek. This landscape unit contains records for two State Threatened species and four high quality natural communities including floodplain forest, oak forest and two rich fen wetlands.
14	High	High	High	Numerous records of rare features. Includes the lower-most reach of Valley Creek at the confluence of the St. Croix River. This landscape unit contains one of few good quality floodplain forest/wetland complexes along St. Croix River in City.
15	Mod.	High	Mod.	One of the larger tracts of contiguous forest and woodland in the City. Some areas of isolated, interior forest habitat still remain. Landscape characterized by steep topography with high ridges and deep ravines.
16	Low	Mod.	Mod.	Headwaters to Valley Creek. Numerous groundwater discharge points provide major source of groundwater to creek.
17	Low	Low	Low	Landscape unit dominated by agricultural land uses.
18	Low	Low	Low	Landscape unit dominated by agricultural land uses.
19	Low	Low	Low	Landscape unit dominated by residential development
20	Mod.	Mod.	Mod.	Landscape unit dominated by mixture of moderate quality mesic oak forest, dry prairie and lowland hardwood forest.
21	Mod-High	High	High	Bedrock bluff prairie and large contiguous area of forest and woodland. This area important in helping to protect lower reaches of Kelle's Coulee.
22	Low-Mod.	Moderate	High	Large tracts of mostly lower quality oak forest and woodland. One record for a rare plant.
23	Very High	Very High	Very High	Most important and highest quality natural area within City and known locally as Kelle's Coulee. Deep, ravine with native white pine/hardwood forest, mesic oak forest, bedrock bluff prairie and lowland hardwood forest. Small high quality spring creek flows through lower-most section of this ravine. This site contains several documented rare plants, animals and natural communities.
24	High	High	High	Largest single reach of St. Croix River in the City. Contains high quality mesic oak forest on steep ridge above St. Croix River. Although the riverfront contains residential development, good quality river beach communities exist along much of the St. Croix River shoreline.
25	Mod.	Mod.	Mod.	Some good tracts of mesic oak forest containing large-diameter oak trees. Provides good opportunity for landowner-based stewardship activities.
26	Mod.	Mod.	Low Mod.	Two large tracts of moderate quality mesic oak forest.
27	Low	Low	Low	Agricultural land uses dominate
28	Mod.	Mod.	High	Interesting landscape with group of bedrock knobs containing prairie remnants. Moderate quality northern hardwood forest and mesic oak forest. This landscape unit encompasses the headwaters of Trout Brook.
29	Mod.	Mod.	Mod.	Large area of moderate quality mesic oak forests. Good opportunity to engage local residents in stewardship activities.
30	Low Mod.	Mod.	Low	Area of mostly fragmented oak forest and lowland hardwood forest adjacent to Afton State Park

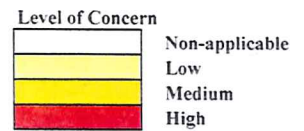
Table II.3. Stewardship Strategies

Landscape Unit	ON-SITE LANDOWNER-BASED											LANDSCAPE-LEVEL											IMPLEMENTATION TOOLS/PROGRAMS										
	Buffer Strips (A, B, C, E)	Invasive/Exotic Species Control (A, B, C, E, F)	Livestock Fencing (A, E, F)	Prairie/Savanna Management (A, B, C, E, F)	Oak Wilt Control (A, B, F)	Timber Stand Improvement (A, D, F)	Minimize Trail/Road Construction (A, E, F)	Protect Standing/Down Snags (A, B, G)	Infiltration Swales/Rain Gardens (A, B)	Water Quality Treatment Pond (A, B, C, E)	Establish Streamside Thermal Cover (A, B, C, E)	Stormwater Bounce Control for Wetlands (A, E)	Woody/Herbaceous Species Management Plan (A, D, F)	Ravine Stabilization (Burn/Herbicide) (A, B, D, F)	Streambank Stabilization (Ephemeral Streams) (A, B, C, E)	Stormwater Rate Control - Subwatershed (A, B, C, E)	Stormwater Volume Control - Subwatershed (A, B, C, E)	Pretreatment of Urban Runoff for Water Quality (A, B, C, E)	Create/Restore Corridors for Water Quality (A, B, C, E)	Conservation Easement (A, B, D)	CREPRIM (A, B, C, E)	Restoration Cost Share Programs (A, E, F)	Deed Restrictions (A, B, D)	Mutual Covenants (A, E, F)	Planning and Zoning (A, B, D)	Purchase/Transfer of Development Rights (A, D, G)	DNR Forest Stewardship (A, B, F)	DNR Neighborhood Wilds (A, B, F)					
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Responsible Party
A. Private Landowner
B. City/Twp
C. Lower St. Croix Watershed
D. Nonprofit Cons. Org.
E. SWCD
F. State/Federal Agency
G. Washington County

Table II-2
Major Management Issues

Landscape Unit	Susceptibility to Erosion (In-stream)	Susceptibility to Erosion (Hill Slopes)	Sedimentation	Water Quality (Eutrophication)	Water Quality (Thermal)	Hydrologic Alterations (Ditching, Tiling, Diversion)	Stormwater Bounce	Protection of Rare/Unique Natural Communities, Plants & Animals	Riparian Buffers	Bluffline Setbacks	Fragmentation of Natural Communities	Invasive/Exotic Species	Livestock/Horse Grazing	ATV/Bike/ORV Use	Wildlife Depredation	Plantation Management (Thinning, Fire Protection, etc.)
1	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
2	Low	Low	High	High	Low	Low	High	High	High	Low	High	High	Low	Low	Low	High
3	High	Low	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low
4	Low	Low	Low	Low	Low	High	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
5	Low	Low	Low	Low	Low	High	Low	Low	Low	Low	Low	High	Low	Low	Low	Low
6	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	High	Low	Low	Low	Low
7	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
8	Low	High	Low	Low	Low	Low	Low	High	Low	High	High	High	Low	Low	Low	Low
9	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
10	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low
11	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low
12	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low
13	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low
14	High	Low	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	High
15	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low
16	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	High
17	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
18	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
19	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
20	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low
21	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	High
22	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	High
23	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	High
24	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	High
25	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
26	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
27	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
28	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low
29	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
30	High	High	High	Low	Low	High	High	High	High	Low	High	High	Low	Low	Low	Low



Key Natural Resource Management Recommendations

Table II-4 summarizes the highest quality/most unique landscape units within the City. As a general rule, these landscape units are ranked high for ecological quality, wildlife habitat and rare features potential. Some of the landscape units that encompass Belwin property would likely be ranked as higher priorities, if not for the current protection and restoration efforts underway on these areas. While other areas of the City also warrant management and protection, it is intended that this list serve as a starting point for moving forward with natural resource management in the City of Afton.

Table II-4 Priority Resources

Landscape Unit	Priority	Site Name	Recommended Action(s)
23	1	Kelles Coulee	<ol style="list-style-type: none"> 1. Conservation easements/acquisition of lower one mile of Kelle's Coulee 2. Bluff setbacks from steep slopes 3. Avoid discharge of stormwater from either direct drainage or upstream watershed 4. Conduct follow-up survey work to better define current condition of plant communities and potential threats from future land uses. 5. Develop detailed management plan of ravine with input from adjoining landowners. 6. Establish corridor linking Kelle's Coulee to St. Croix River.
8	2	Bissels Mounds	<ol style="list-style-type: none"> 1. Work with landowners to establish a corridor between the three knobs, with the western end of the corridor extending just west of Neal Ave and continuing eastward to the knob just south of 15th Street. 2. Restore native bedrock-bluff prairie and oak savanna/woodland. Restoration should emphasize removal of woody invasive shrubs and trees and use of locally derived grass and forb seed. 3. Within the corridor, consider converting existing agricultural land to prairie when feasible. 4. Develop a comprehensive management plan in collaboration with landowners that include a more detailed evaluation of natural communities including vegetation, soils, geology and management concerns. 5. Educate local landowners about the value of this site and how they can minimize impacts to this area.
2 & 3	3	Lake Edith & Wetland Complex to West	<ol style="list-style-type: none"> 1. Develop lake management plan that emphasizes protection of shoreline fringe of lake and associated natural communities, with particular emphasis on the dry prairie, oak savanna and rich fen shoreline areas. 2. Avoid stormwater discharges (both bounce and nutrient loading) to Lake Edith and associated wetlands. 3. Where shoreline buffers are lacking or disturbed, encourage landowners to reestablish native plant communities and keep mown or altered areas to a minimum. 4. Should development occur within the old nursery (to the northeast of the lake), consider encourage developers to remove and control introduced, invasive species such as amur maple and buckthorn. 5. Work with Belwin Foundation to restore and manage area to north of Lake Edith. For property owners abutting this area, encourage them to carry out management in coordination with Belwin.
14	4	Valley Creek/St. Croix R. Confluence	<ol style="list-style-type: none"> 1. Work with landowner to place floodplain wetland complex into conservation easement. If possible, include narrow strip of land between Highway 95 and floodplain (just east of bike trail) 2. Limit stormwater discharges to this area, particularly within the mixed emergent marsh and floodplain forest communities.
24	5	River Road along St. Croix R.	<ol style="list-style-type: none"> 1. Encourage landowners to manage the narrow fringe of floodplain forest between River Rd. and the St. Croix River. Landowners should remove invasive shrubs and other species and manage according to general guidelines for riparian buffers in this report. 2. Require structure setbacks from top of slope and avoid increases in

			<p>stormwater discharges.</p> <p>3. Avoid new trails or roads that fragment the large area of contiguous forest along the slope.</p> <p>4. Discourage landowners from disposing of yard waste in wooded areas and in a similar way, landowners should avoid discharge of fertilizers or pesticides that can run off site.</p> <p>5. The entire bluff line should be managed as a corridor, connecting with Kelle's Coulee to the north and Afton State Park to the south.</p>
28	6	Headwaters of Trout Bk	<p>1. Group of bedrock knobs contains prairie remnants that offer good restoration potential. Further survey should be conducted to determine management approach.</p> <p>2. Evaluate headwaters pond (flood retention pond) to determine thermal impacts to brown trout survival/reproduction. If significant thermal impacts are shown to exist, work with landowner to remove structure, restore seepage wetlands and reestablish thermal/hydrologic regime to Trout Brook.</p>
11	7	Upper Valley Ck	<p>1. Bedrock bluff prairie north of Valley Creek provides good restoration opportunity.</p> <p>2. Bluffline should be protected from further encroachment should new development occur.</p>
12&13	8	Lower Valley Ck	<p><i>Note: Most of this area is part of Belwin Property</i></p> <p>1. The City should work to encourage collaboration between Belwin and adjacent landowners in restoration/management efforts.</p> <p>2. Encourage landowners along Stagecoach Trail to maintain buffers along Valley Creek, including fringe wetlands, seeps and ephemeral streams.</p> <p>3. Belwin should consider removal of the weir at the outlet to the rich fen/bog located to the north of Putnam Blvd. This weir may be causing water levels to rise and negatively impact wetland plant communities.</p>