St. Croix Bluffs Regional Park
Master Plan

Prepared For:

Washington
County Parks

December 2002

Prepared By:
Brauer & Associates, Ltd.

Acknowledgments

Overview

In January of 2002, the Washington County Board of Commissioners retained Brauer & Associates, Ltd. to collaborate with county staff and local citizens to complete a comprehensive master plan for St. Croix Bluffs Regional Park. This document represents the results of the planning process, which was completed in December, 2002.

Acknowledgments

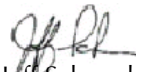
The consultant team would like to thank Washington County for undertaking an open and constructive public participation process for the project. This approach allowed for various perspectives to be considered on important planning issues that affected the master plan for the park. Through this process, it is believed that a responsible balance between human use of the park and its ecological protection was achieved.

The consultant team would also like to thank the Washington County Parks and Open Space Commission and Washington County Board for participating in this project. Their individual and collective insights were instrumental in drawing conclusions that are reasonable, responsible, and insightful.

The consultant team also extends a heartfelt thank you to the Washington staff, especially Jim Luger, Parks Director, and John Elholm, Senior Parks Planner. The openness with which they approached this project paved the way for a constructive public process that considered all opinions to be of equal merit and worthy of due consideration. Their understanding of the larger regional context and pressing park needs and how St. Croix Bluffs Regional Park fits into the larger regional park picture was also of high value as final conclusions were drawn.

Finally, the consultant team extends a thank you to the citizens who took the time to attend meetings, write letters, and make phone calls so that we could understand the issues first hand and find solutions that seemed reasonable and workable.

Sincerely,



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(Barr completed a *Natural Resources Inventory with Stewardship Recommendations for Denmark Township* study. Resource mapping and select recommendations from that study have been incorporated into this report.)

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Section I

Introduction and Planning Framework

Overview

The project focused on the preparation of a comprehensive master plan for St. Croix Bluffs Regional Park. The planning process took into consideration past master plans for the site, the setting, recreational and educational needs of the region, and the natural and cultural resources of the park itself. The master plan establishes a vision for the park and provides the guidelines for its ecological management and physical development to appropriately accommodate public use. The plan is also a tool for public presentations and preparing funding applications.

Although comprehensive, the master plan still remains dynamic. It should be viewed as firm enough to guide park improvements, yet flexible enough to change based on increased knowledge, experience and changing public needs as the plan is implemented.

Interrelationship with the Previous Master Plan

The last master plan for the park was completed in 1996, when it was referred to as the Ceridian Recreation Area. Although a number of the provisions of that master plan remain valid, changes in the park's size, recreational demands, and approaches to natural resource stewardship warranted a complete updating. As of the date of adoption of this plan, the past plans are no longer valid, except from a historical perspective.

Planning Framework

The planning framework provided structure to the process of updating the previous master plan. The framework consisted of a number of components:

- Public involvement
- Washington County involvement
- Public agency involvement
- Planning process

Public and Washington County Involvement

Through formal and informal meetings, members of the community had direct access to the consultant team and County staff.

Given the notable interest in the future development and protection of St. Croix Bluffs Regional Park, the general public and special interest groups were invited to participate in the planning process on a number of occasions. Through formal and informal meetings, members of the community had direct access to the consultant team and County staff. The public's input throughout the planning process proved very fruitful and strengthened the final plan. (Note that the overall project schedule of meetings is defined on page 2.11 in Section II.)

In addition to general public involvement, the Washington County Parks and Open Space Commission provided oversight of the planning process at critical check points. Being familiar with local conditions, public demand for facilities, and the history of the park, Washington County Parks staff inherently played an instrumental role in the master planning process. Under the planning framework , the commission and staff specifically focused on the following key roles:

- Provide perspective and feedback on all planning issues.
- Review and comment on all findings and master plan outcomes.
- Reach consensus on a final master plan.

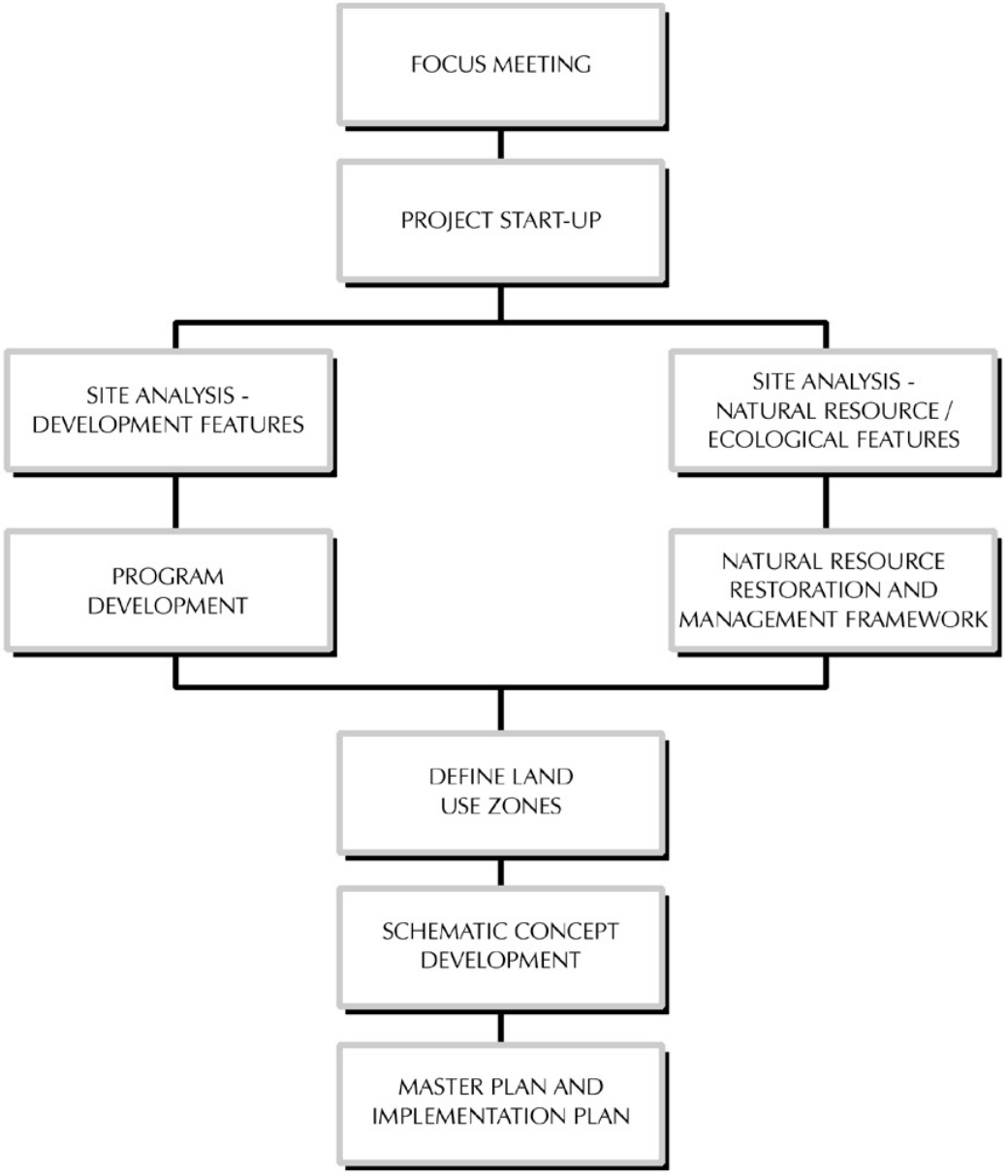
Public Agency Involvement

To ensure congruency between agencies, Washington County invited representatives from the Minnesota Department of Natural Resources (through the Natural Resources Inventory Study), and Denmark Township to participate in the planning process. The master plan takes into consideration the results of meetings with representatives from these agencies.

Planning Process

The planning process followed a step-by-step procedure in which public participation was an integral part. The process was structured to allow for a series of internal checks and balances, which ensured that pertinent issues were considered and addressed in the proper sequence and with due diligence. It also ensured that ecological issues were kept at the forefront of all discussions and land use decisions. Figure 1.1 illustrates the key benchmark steps in the planning process.

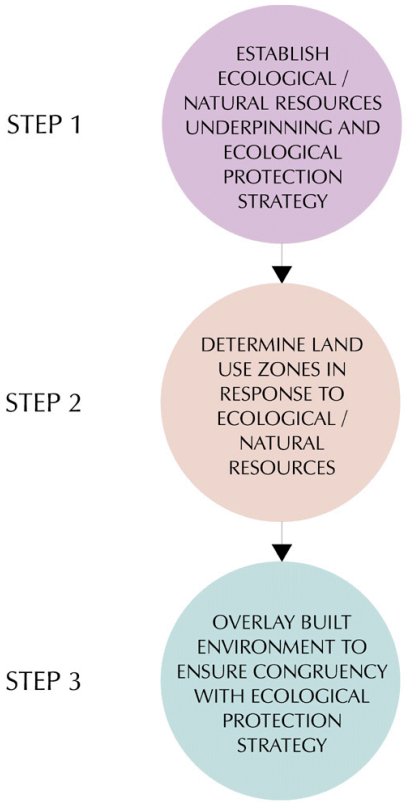
Figure 1.1 - Key benchmark steps in the planning process.



Balancing Human Use and Ecological Protection

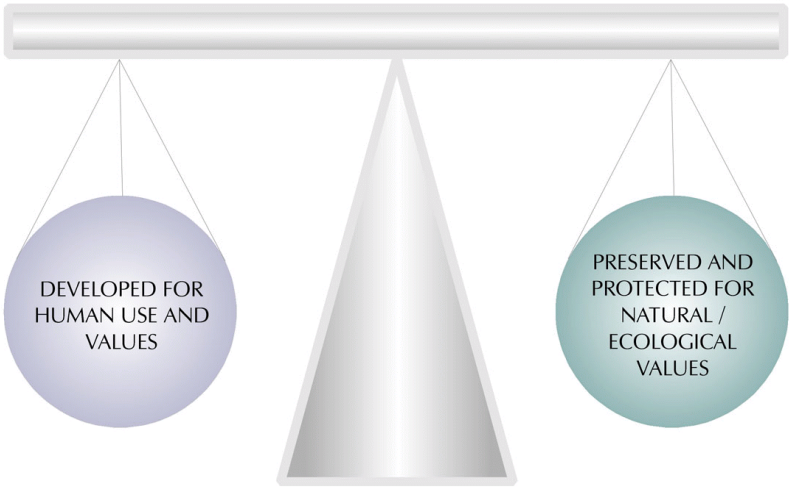
Inherent to this project was finding the right balance between human use of the park and its ecological preservation and protection.

Figure 1.3 – Ensuring that ecological values set the stage for human uses.



Inherent to this project was finding the right balance between human use of the park and its ecological preservation and protection, as illustrated in figure 1.2.

Figure 1.2 – Balancing human use and ecological preservation.



Since regional parks place significant emphasis on preserving ecological values, the planning process went to extensive lengths to ensure that the natural qualities historically present within the park would be restored and become a major aspect of the final master plan. In addition to its intrinsic values, restoring the park's natural landscape will also enrich the human, or cultural, experience for those visiting the park – especially in light of the recreational trends defined in Section II.

Given that the stewardship of the natural landscape is central to the park's vision, establishing its ecological underpinnings was the first fundamental step in the planning process, as shown in figure 1.3. Once this was established, the physical development of the park for recreational uses was considered, as defined by steps 2 and 3 in the illustration. Under this model, the planning strategy recognized the importance of the park in accommodating the public's expectation for pleasure, health, and well-being through the provision of recreational facilities. At the same time, the ecological values of the site would also be respected in determining the type, extent, and location of these facilities.

Section II Setting / Trends / Public Process Findings

Overview

This section of the master plan considers the setting for the park, regional trends affecting its future, and findings from the public process. Considered collectively, these variables played a major role in shaping the master plan and how the decisions made today will affect the park 10, 20, or even 50 years hence.

Setting

Washington County currently operates and maintains several major regional park units, including St. Croix Bluffs Regional Park.

Washington County currently operates and maintains several major regional park units, including St. Croix Bluffs Regional Park, Lake Elmo Park Reserve, and Cottage Grove Ravine Regional Park. Two additional regional parks are also envisioned for Washington County, which are Big Marine Park Reserve and Grey Cloud Island Regional Park. Square Lake Park also provides a special recreation feature under the regional park system.

At nearly 700 acres, St. Croix Bluffs Regional Park would remain one of the smaller regional park units within Washington County, although considerably larger than its current size. In addition to being well situated to provide a wide pallet of recreational opportunities, the park offers the potential to exhibit an impressive cross-section of natural plant communities and ecological systems that provide respite from the burgeoning development pressure that will continue to mount in years to come.

Figure 2.1 illustrates the location of the park relative to the other parks within Washington County.

Figure 2.1 – Location of St. Croix Bluffs Regional Park within Washington County.

Regional Park Context

Under the previous master plan, St. Croix Bluffs was defined as a resource of metropolitan significance, which warranted it being designated as a regional park.

In 1975, the State Legislature passed the Metropolitan Parks Act that established the Regional Park System. Under the previous master plan, St. Croix Bluffs Regional Park was defined as a resource of metropolitan significance, which warranted it being designated as a regional park. As an implementing agency for the regional park system, Washington County was given the responsibility to develop and implement plans for property acquisition and development of a regional park. The master plan presented here updates the past master plan for the park. The update takes into consideration the recreational needs that were defined as part of the public process and regional trend information that is included in this section.

Relationship with Other Regional Parks within Washington County

Within the regional context, St. Croix Bluffs Regional Park interrelates with a number of other regional parks within Washington County, as identified in figure 2.1 on the previous page. Regional Parks within the regional system include:

- **Cottage Grove Ravine Regional Park** – consists of 506 acres of hills and dramatic, heavily wooded ravines. Located in the park is a year round shelter with restrooms, a children's play structure, and a variety of trail experiences. Cottage Grove Ravine Regional Park is a great place to picnic, play, hike, and cross-country ski.
- **Lake Elmo Park Reserve** – is a 3 ½ square mile park with 80 percent of its acreage set aside for preservation and protection. This 80 percent will eventually resemble the land as it was prior to the arrival of the settlers in the mid-1800's. The Reserve offers a wide variety of terrain, including forest and prairie. Developed areas of the Reserve offer opportunities for camping, swimming, fishing, boating, horseback riding, group camping, and other activities.
- **Square Lake Park – Special Recreation Feature** – as designated by the Metropolitan Council. There is a 950 foot sand beach, as well as changing rooms, restrooms, concession stand, picnicking area, fishing pier, and boat launch. The lake also features outstanding fishing, including trout.
- **Big Marine Park Reserve and Grey Cloud Island Regional Park** – two new parks envisioned for the regional park system within Washington County. Both are currently in the acquisition phase.

The regional parks within Washington County are supported by several smaller County parks, nature centers, and State parks as identified in figure 2.1. Of these, **Afton State Park** and the **Carpenter Nature Center** have the most direct interface with St. Croix Bluffs Regional Park. The latter of these is a private, non-profit nature preserve and environmental education facility established in 1981. At 425 acres, the Center offers trails and an Interpretive Center which provides hands-on exhibits and live animals on display. **Lost Valley Prairie Scientific and Natural Area** is also located in the southern oak barrens landscape region west of the park. As a Scientific and Natural Area, its focus is on preserving native remnant landscapes. Development for recreational use is very limited. The park is also part of the **St. Croix National Scenic Riverway**, which adds to its importance as a regional park and recreational amenity.

The functional interrelationship between St. Croix Bluffs Regional Park and these other regional amenities was carefully considered during the master planning process to ensure that each park unit compliments the other.

The functional interrelationship between St. Croix Bluffs Regional Park and these other regional amenities was carefully considered during the master planning process to ensure that each park unit complements the other. The master plan presented here is believed to achieve that goal.

Current Use Patterns

A *Washington County Visitor Survey* that was conducted in 2001 provided some insights into how the regional parks within the County are being used. The following considers the key points of that summary and other trends identified during the analysis phase of the process. In considering the survey information, note that there is the potential for self-stratification simply due to the fact that respondents likely came to the park for a particular interest. For this reason, generalities are provided to highlight some key points that have value to this master plan.

By a relatively wide margin, most of those surveyed came to the parks in Washington County for water-based activities. In St, Croix Bluffs Regional Park, the boating facilities remain very popular. Swimming was also popular, in spite of the limited beach area that is currently provided. Fishing, too, is a popular activity.

Although regional surveys suggest a high participation rate, the use of trails within some of the parks is lower than expected. In St. Croix Bluffs Regional Park, this would be understandable since there are relatively few developed trails to use and thus those in the park are likely not there for that reason. In fact, participants in the visitor survey commented about the lack of trails within the park.

Camping within the park remains a popular weekend activity throughout the summer. On many weekends, the campground is completely full. It is expected that this trend will continue, especially as the activities available within the park are expanded in future years. The picnic facilities also remain popular, with the expectation being that this use will continue to grow in line with population growth.

Currently, the opportunities for enticing more youth and younger families to use the park is limited given the current recreational infrastructure.

Currently, the opportunities for enticing more youth and younger families to use the park is limited given the current recreational infrastructure. As defined in Section VI, many of the new facilities proposed for the park are focused on this demographic profile.

Most survey respondents indicate that their experiences while in the park was very positive.

With respect to quality of facilities that are available, most survey respondents indicate that their experiences while in the park was very positive, ranking many facilities as either good or excellent. The one low point was the quality of portable restrooms, where making improvements seems very important to park users. Park maintenance and park staffing were both rated high, suggesting that the interface between the user and park employees is very positive.

In terms of paying for the use of the parks, most respondents supported and even favored the use of permits and fees that are reasonable. In many cases, an increase in fees would be acceptable if it meant a higher quality experience.

Note that the survey does not take into consideration the multitude of special uses and group gatherings that occur over the course of a year within the park that are equally important in defining overall park uses. In review of park records, group use of the park has grown over the years since it was first designated a regional park. By bringing new facilities on-line, coupled with expanded program offerings and a higher level of marketing, group use of the park is expected to continue to rise as the master plan is implemented.

Regional Trends Forecasting

Inasmuch as current use data provides insights into how well the park has served the public in the past, trends forecasting is also critical to the master planning process to ensure that the park is well positioned to service future generations. Trends related to changes in the population along with evolving recreational trends were taken into consideration during the preparation of the master plan.

As defined by the Metropolitan Council, a variety of trends are expected to impact the use of the regional park system over the next fifty years. The following defines the overarching trends that had a direct impact on master plan outcomes for this park.

Population Trends for the Twin Cities Metropolitan Area and Washington County

One of the more important trends is that the population in the metropolitan area is expected to continue to grow by a substantial amount over the next 20 to 50 years.

One of the more important trends is that the population in the metropolitan area is expected to continue to grow by a substantial amount over the next 20 and 50 years. As shown in figure 2.3, the population forecast reveals that the population in Washington County is expected to be near the top in terms of percentage increase in population over that time period.

Washington County is expected to be near the top in terms of percentage increase in population.

Undoubtedly, this growth trend will put increasing pressure on developing St. Croix Bluffs Regional Park to service an expanding population with a wide range of outdoor recreation pursuits and service expectations.

Figure 2.3 – Population forecasts stratified by regional park agency jurisdiction. (Source: Metropolitan Council System Analysis of the Regional Recreation Open Space System)

	Preliminary Population estimates			Total increase from 2000		% increase from 2000	
County/City	2000	2020	2050	2020	2050	2020	2050
Dakota County	351,240	456,160	579,436	104,920	228,196	30%	65%
Suburban Henn County	646,550	737,480	837,189	90,930	190,639	14%	29%
Washington County	203,120	288,670	377,082	85,550	173,962	42%	86%
Anoka County	295,910	350,410	440,575	54,500	144,665	18%	49%
Scott County	81,990	137,910	187,452	55,920	105,462	68%	129%
Carver County	66,160	104,420	145,144	38,260	78,984	58%	119%
Suburban Ramsey Co.	231,020	243,340	263,916	12,320	32,896	5%	14%
St. Paul	274,500	294,000	301,723	19,500	27,223	7%	10%
Minneapolis	370,000	388,000	392,656	18,000	22,656	5%	6%
Bloomington	88,500	91,000	92,978	2,500	4,478	3%	5%
Total	**2,608,990**	**3,091,390**	**3,618,151**	**482,400**	**1,009,162**	**18%**	**39%**

Note: Suburban Hennepin County does not include Bloomington or Minneapolis
Note: Suburban Ramsey County does not include St. Paul

Trends in Park Visits

With an increasing population comes an increase in the number of park visits. When looking further into park visit trends, the numbers become even more telling as to the demands that will be placed on regional park resources such as St. Croix Bluffs Regional Park.

Figure 2.4 provides an estimate in the number of visits to the regional system for 2020 and 2050, as projected by the Metropolitan Council. With an increase in visits comes a propensity for crowding, with fewer acres available on a per person basis than there are today. From a planning perspective, the challenge lies in developing the park to meet future demands without significantly diminishing the user experience.

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Figure 2.4 – Trends in overall park visits to the regional park system. (Source: Metropolitan Council System Analysis of the Regional Recreation Open Space System))

	1999 Visits (1,000's)	2020 Visits (1,000's)	2050 Visits (1,000's)	2020 % increase	2050 % increase
Scott	187	249	308	33%	65%
Carver	175	225	280	29%	60%
Washington	586	743	908	27%	55%
Dakota	750	925	1,128	23%	50%
Anoka	1,843	2,165	2,610	17%	42%
Hennepin	3,235	3,715	4,240	15%	31%
Ramsey	1,577	1,771	2,004	12%	27%
Bloomington	807	902	1,003	12%	24%
St. Paul	4,588	5,136	5,665	12%	23%
Minneapolis	15,525	16,903	17,994	9%	16%
TOTAL	**29,273**	**32,733**	**36,140**	**12%**	**23%**

Note that a 2001 survey reveals that 647,500 visits were made to Washington County Regional Parks. Of those, about 45% were from the within Washington County. The next highest number of visits came from residents living in St. Paul (16.7%) and Dakota County (13.5%).

Trends in Recreational Demands

Through review of a variety of studies undertaken by the Metropolitan Council, along with other sources, much can be learned about recreational trends influencing decisions about St. Croix Bluffs Regional Park's future development. From a regional perspective on park needs, the following tables provide insight into the interests and perspectives that people have regarding various forms of recreational activities.

Interest in an Outdoor-Based Activity

Source: "Leisure Trends in the Twin Cities" – University of Minnesota Survey Research Center (1996).

Outdoor-Based Activity (Ranked by Column 2, "Have Participated")	**"I am not interested in this activity." (%)**	**"I am interested in this activity and have participated about as often as I wanted to in the last 12 months." (%)**	**"I am interested in this activity but I have NOT participated as often as I would have liked to in the last 12 months." (%)**
Walking (around your neighborhood)	15	72	13
Walking (in natural area, large parks)	22	57	21
Picnicking	27	52	22
Attending sports events as a spectator	35	45	21
Casual sports (catch, frisbee, pickup games, etc.)	43	43	14
Gardening	37	41	22
Visiting playground areas outdoors	49	41	10
Visiting conservatory, arboretum, public gardens	33	39	29
Swimming or sunbathing at a beach	44	35	21
Informal birdwatching, nature study	52	35	14
Biking, 3 miles or less	48	34	19
Camping	42	33	25
Swimming or sunbathing at a pool	52	31	18
Fishing	44	29	27
Biking on paved trails in natural areas, large parks	51	26	23
Power boating, waterskiing, racing, jetskiing	60	23	17
Sledding	60	21	19
Other team sports (basketball, softball, soccer, etc.)	69	20	11
Jogging, running	70	20	10
Non-power boating (canoeing, sailing, sailboarding, etc.)	56	19	25
Biking on unpaved trails in natural areas, large parks	70	16	15
Inline skating, roller skating/skiing, skateboarding	75	14	11
Road biking	76	14	10

Outdoor-Based Activity (continued) (Ranked by Column 2, "Have Participated")	**"I am not interested in this activity." (%)**	**"I am interested in this activity and have participated about as often as I wanted to in the last 12 months." (%)**	**"I am interested in this activity but I have NOT participated as often as I would have liked to in the last 12 months." (%)**
Racquet sports (tennis, squash, racquetball, etc.)	72	13	15
Cross-country skiing	72	12	16
Snowmobiling	78	10	12
Ice skating (figure, speed, etc.)	79	10	11
Horseback riding	76	6	19
Playing ice hockey	89	6	5
Golf	90	6	5
Formal bird watching/nature study	86	5	9

Various Perspectives on Parks

Source: "Leisure Trends in the Twin Cities" – University of Minnesota Survey Research Center (1996).

	Percentage of residents indicating agreement/disagreement with the following:				
Statement	**Strongly Agree (%)**	**Agree (%)**	**Neither Agree nor Disagree (%)**	**Disagree (%)**	**Strongly Disagree (%)**
"I think parks would be valuable even if I didn't actually use them very much."	60	34	5	1	1
"I think more park land will have to be acquired to serve the population of the Twin Cities Metropolitan Area in the year 2010."	26	37	24	11	3
"I think we should improve the maintenance of existing parks before we develop any new ones."	18	38	29	13	2
"I think more park land should be acquired to serve the present population of the Twin Cities Metropolitan Area."	23	31	28	13	4
"I think we should develop the park land we have before we buy any more."	14	34	31	17	4

Looking into the future and forecasting trends in visits to the regional park system is also very telling and important to the master planning process.

Whereas the last two tables provide a snapshot of people's preferences at a given point in time, looking into the future and forecasting trends in visits to the regional park system is also very telling and important to the master planning process. Figure 2.5 provides some insights regarding the estimated increase in activity visits.

Figure 2.5 – Trends in overall park visits to the regional park system. (Source: Metropolitan Council System Analysis of the Regional Recreation Open Space System)

Activity	Base[1] *(1,000's)*	Projected change for 2020 (%)	Projected change for 2050 (%)	Projected visits for 2020 *(1,000's)*	Projected Visits for 2050 *(1,000's)*
Walking/hiking	9,548	23%	48%	11,744	14,131
Biking	5,482	18%	54%	6,469	8,442
Non-pool swimming	4,280	12%	37%	4,794	5,864
Picnicking	3,240	16%	23%	3,759	3,985
Sightseeing	1,020	34%	76%	1,367	1,795
Fishing	1,160	11%	15%	1,288	1,334
Motorboating	540	7%	20%	578	648
Nonconsumptive wildlife activities	360	40%	72%	504	619
nonmotorized boating	300	33%	78%	399	534
Developed camping	280	19%	32%	333	369
Family gathering	220	14%	33%	251	293
Cross-country skiing	217	-1%	18%	215	256
Horseback riding	60	27%	100%	76	120
Snowmobiling	N/A	42%	121%	N/A	N/A
Visiting historic places	N/A	39%	76%	N/A	N/A
Visiting a beach or waterslide	N/A	14%	35%	N/A	N/A
Hiking	N/A	12%	24%	N/A	N/A
Backpacking	N/A	-2%	10%	N/A	N/A
primitive camping	N/A	-4%	-20%	N/A	N/A
Metro Population increase	*N/A*	*18%*	*39%*	*N/A*	*N/A*
Total	*26,707*	*19%*	*44%*	*31,775.5*	*38,391.3*

[1] Base number of visits were determined using the Metropolitan Council's 1999 Annual Use Estimate and 1998/99 Regional Parks Visitor Study. It was not possible to determine the base visits for 1999 for those activities labeled "N/A". For some activities such as "hiking" and "visiting a beach or waterslide", they are partially subsets of broader activity categories ("walking" and "nonpool swimming").

Other Regional Trends of Note

A number of other notable regional trends add insight into the long-term prospects for St. Croix Bluffs Regional Park in terms of user base and challenges. As defined in the *Metropolitan Council System Analysis of the Regional Recreation Open Space System* study, these include:

Education at an early age about the values that regional parks can bring to one's life will be important to changing this trend.

- Current lower than expected use of the regional park system by teens and young adults will be reflected in lowered future use of the regional park system by these groups. Leisure research has shown that recreation habits are formed as children and teenagers. What this means is that if teens and young adults are currently not using the regional park system, it is probable that they will continue through their adult life to not use the regional system. Education at an early age about the values that regional parks can bring to one's life will be important to changing this trend.

The baby boom generation will continue to have a large presence in the regional park system, but their needs will change.

- The baby boom generation will continue to have a large presence in the regional park system, but their needs will change. The baby boom generation is currently using the regional park system at rates that are higher than their actual share of the metropolitan area population. Visitation by people over the age of 60 is expected to increase as the baby boom generation ages and continues their use of the regional park system. Facilities will need to be kept up to Americans with Disabilities Act (ADA) standards, and more opportunities for low impact and educational learning opportunities should be provided to meet the needs of this growing user base.
- The regional park system will see the effects of an increase in population neutralized to a large degree by a major segment of the population that has not developed a leisure routine that includes visiting regional parks. This is a result of the current under-use by teens and young adults, who will also be less likely to take their children to regional parks, which could develop a downward trend in visitation over multiple generations. The Council and implementing agencies are aware of this issue and will be working on assessing potential barriers to participation and identifying ways to increase visitation to the regional park system by these age groups.
- Facilities in regional parks need to be assessed to ensure they help meet the needs of the growing ethnically-diverse segments of the population.

Expect increased interest and markets for packages that combine camping with resource education programs or specific organized events.

- Demand for mini-vacation opportunities in the local area will increase. Camping in regional parks may become more popular among local residents. Expect increased interest and markets for packages that combine camping with resource education programs or specific organized events such as bird banding, astronomy, walking or adventure recreation.
- Increasing oil prices may decrease automobile fuel consumption and long auto-trips to national or state parks may decrease in frequency. As such, demand for local recreation opportunities that involve less travel will increase, as will non-automobile access to regional park system units.
- Over the next ten years, the number of recreational vehicles (RVs) and proportion of households with an RV should rise moderately, to 3.1 % of all households. Regional park units will be challenged with the pressure to develop more RV-oriented sites while trying to meet the needs and desires of local residents.

Park Management Trends

"A new paradigm is emerging in the regional park system that focuses on the benefits obtained from visiting parks. This new approach focuses on providing quality benefits to individuals, social/community benefits, economic benefits and environmental benefits."

As defined by the Metropolitan Council, *"a new paradigm is emerging in the regional park system that focuses on the benefits obtained from visiting parks. This new approach focuses on providing quality benefits to individuals, social/community benefits, economic benefits and environmental benefits."* As stated by the Council, this approach takes on a more holistic attitude than previous management approaches.

Under this approach, the report makes the following points:

- The regional park system needs to have a stronger focus on identifying and quantifying the benefits provided by the system.
- Community and environmental benefits and costs will play an increasingly important role in decisions made about planning, managing and funding the regional park system.
- Quantifying the economic benefits of regional parks will strengthen the ability of the system to compete for funding and will allow for inclusion of parks in the economic models used in making decisions that affect the region.

Affect of Regional Trends on Master Planning St. Croix Bluffs Regional Park

The regional trends clearly suggest that St. Croix Bluffs Regional Park will play an important role in meeting future demands for parks and open spaces at the regional level.

The regional trends clearly suggest that St. Croix Bluffs Regional Park will play an important role in meeting future demands for parks and open spaces at the regional level. When considering the type of recreation that people will be pursuing in future years, virtually all of the top recreational activities (as defined in figure 2.5 on page 2.8) will be accommodated at St. Croix Bluffs Regional Park. As the population of the area continues to grow, yearly increases in park visits within Washington County can also be expected. In addition, the type of activities provided in the park need to appeal to both young and old age groups. This is important in that while the park must appeal to an aging population, it must also appeal to the leisure routines of younger age groups. The balance of recreational opportunities provided under the master plan attempts to bridge this gap.

Findings from the Public Process

The public process was structured to allow all interested parties ample opportunity to participate in developing the master plan.

The public process was structured to allow all interested parties ample opportunity to participate in developing the master plan. In addition to formal meetings with the Washington County Parks Commission and Board of Commissioners, a number of other public meetings were also held to give the public-at-large the chance to voice their opinions and critique planning and design ideas. The following table summarizes these formal points of contact with the public.

Date	Place	Meeting Agenda
11/01/2001	Carpenter Nature Center	Denmark Township NRI Public Meeting (to prepare SCB amendment)
6/11/2002	Carpenter Nature Center	Denmark Township NRI Public Meeting (to prepare SCB amendment)
7/01/2002	Denmark Town Hall	Denmark Town Board - Present NRI - Inform of SCB amendment)
8/05/2002	Denmark Town Hall	SCB Master Plan Amendment Public Meeting / Presentation
9/09/2002	Denmark Town Hall	SCB Master Plan Amendment Public Meeting / Presentation
9/19/2002	WACO Government Center	WACO Park & Open Space Commission Meeting / Update
10/15/2002	WACO Government Center	Washington County Board of Commissioners Meeting / Presentation
10/17/2002	WACO Government Center	WACO Park & Open Space Commission Meeting / Presentation
11/18/2002	Denmark Town Hall	Denmark Township Planning Commission / Public Hearing
12/02/2002	Denmark Town Hall	Denmark Town Board Meeting
1/14/2003	WACO Government Center	Washington County Board of Commissioners - Meeting for approval of master plan
Open Date	St. Paul	Metropolitan Council Park & Open Space Commission - Meeting for approval of master plan

Collectively, these meetings gave interested citizens ample opportunity to express their views, passions, and concerns about the park. In each case, fruitful information came out of the dialogue that helped shape the final master plan for the park.

Findings from the Public Process

In general, the findings from the public process validated the recreational trends forecasts presented in this section. The initial public meetings were also fruitful in defining how well the current park functions and how new uses can best be accommodated. After consideration of a number of conceptual ideas, consensus was gained for the master plan presented in this report. The following summarizes the key points made during the initial public meetings as they relate to major development issues.

Level of Development/Natural Resource Protection:

- Accommodate the recreational activities that address regional needs as defined by recreational trends and that are appropriate for this particular setting.
- The development footprint should be kept as small as possible in order to preserve natural open space areas.
- Ecological stewardship of the park was considered to be of critical importance.
- The park should complement, not duplicate, services provided in other parks and nature centers in the area.

General Issues Raised:

- Strong consensus that paved trails should be used primarily to link major use areas together and keep bicycles off the main road, which was considered hazardous. Developing a more extensive network of natural-surfaced trails received very strong support.
- The current beach is not well-suited to handle the number of visitors it gets on weekends. The location alos conflicts too much with boat traffic.
- The current trails are not all that well used due to the limited mileage and undeveloped condition.
- There was very little support for providing snowmobile trails in the park. Although horse trails were considered, it was agreed that this use could be accommodated in other parks and private open space areas within Washington County.
- Walking with pets is a popular activity in the park, but there was little demand shown for an off-leash facility at this point in time.
- Maintaining the boat access to the river was considered a strong continuing need as it remains a very popular activity.
- Providing more "family-oriented" use areas was thought to be needed to augment the existing facilities.
- Making a trail connection to the proposed regional trail along the County road seemed to make a lot of sense in order to expand visitor recreational opportunities.
- Create a master plan that is aesthetically appealing as viewed from within and outside the park, as well as from the river.
- Maintaining a reasonable buffer between the park and adjoining properties was considered one of the most important issues by those attending the township meetings.

Conclusions

It is clear that St. Croix Bluffs Regional Park is an essential component of the regional park system.

In consideration of the regional trends and findings of the public process, it is clear that St. Croix Bluffs Regional Park is an essential component of the regional park system and will be vital to servicing the recreational needs of residents within Washington County and adjoining counties and cities.

Section III Park Boundary / Acquisition Plan

Overview

St. Croix Bluffs Regional Park was born out of a Washington County purchase of two parcels of land totaling 579 acres from the Ceridian Corporation in October, 1996.

As defined in the previous master plan, St. Croix Bluffs Regional Park was born out of a Washington County purchase of two parcels of land totaling 579 acres from the Ceridian Corporation in October, 1996. The first parcel, which encompasses the southern half of the park, totals 371 acres. This parcel includes the major recreational facilities developed by the previous owner as part of a private recreation area. After the land purchase, the parcel was designated by Washington County, and accepted by the Metropolitan Council, as a regional park to service the growing need for regional-level recreational opportunities in this area.

The second parcel, totaling 208 acres, was also acquired as part of the overall land acquisition agreement between Washington County and the Ceridian Corporation. Although part of the larger purchase, this parcel was not initially designated for inclusion in the regional park, although it was envisioned that it would be used for recreational purposes and operated as one park unit. As of 2002, this parcel continues to be leased for agricultural cultivation.

In the intervening years since its purchase, a number of possible end uses have been considered for the second parcel, both formally and informally. At one point, developing a public golf course was, but is no longer, considered as a possible end use. Recognizing the growing need to preserve open space in response to regional recreational trends and development growth projections, Washington County ultimately concluded that including this parcel as part of the regional park was indeed the most appropriate end use. Amending the regional park boundaries to include the 208 acres is one of the main objectives of updating the master plan.

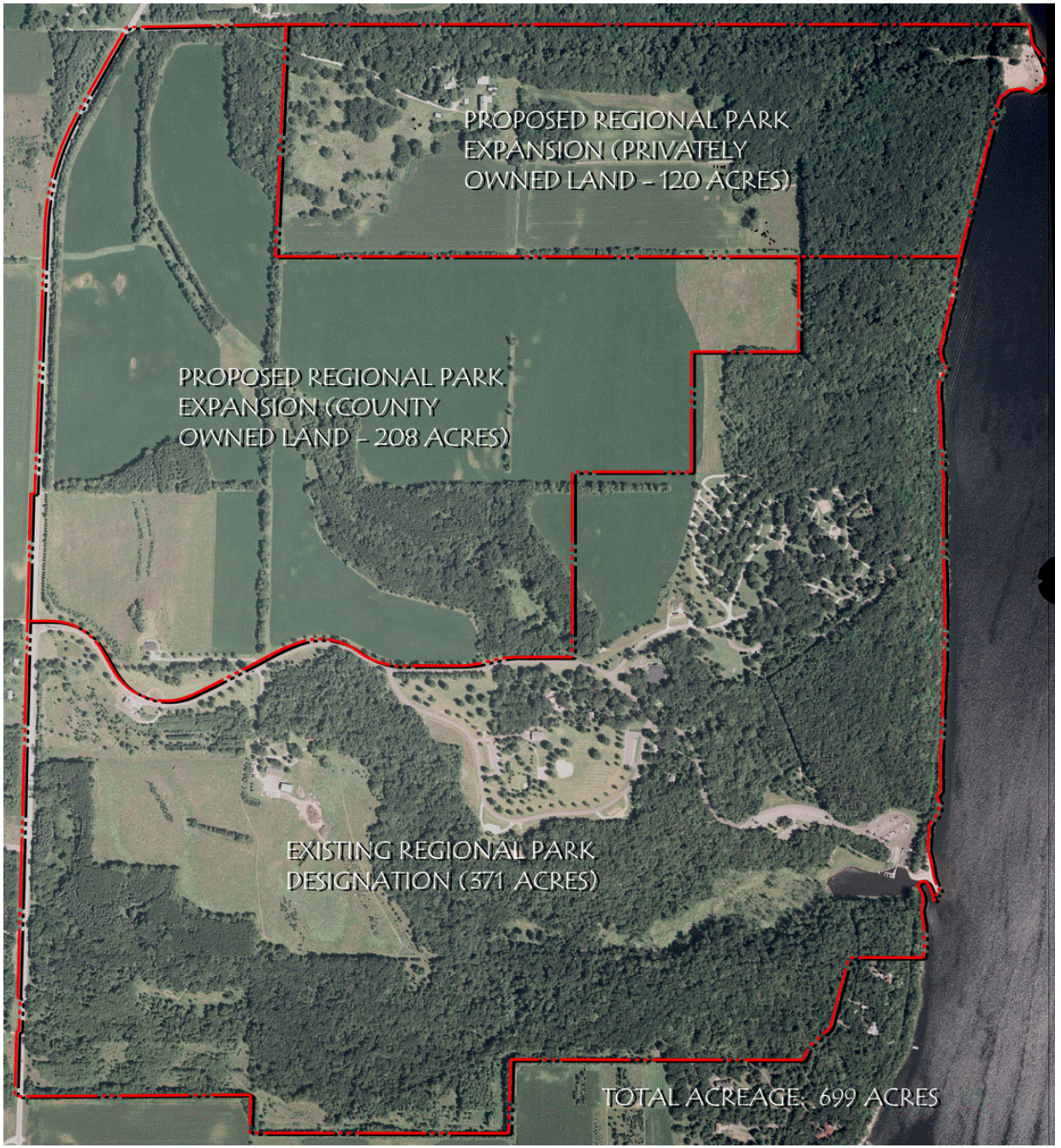
In addition, the master plan also proposes the acquisition of another 120 acres to the north of the County and regional park land to further enhance the long-term regional park opportunities. This section sets forth the parameters and rationale for undertaking this expansion, which would increase the park to a total of 699 acres.

Existing Park Boundary

As previously defined, the existing park boundary encompasses 371 acres of land adjoining the St. Croix River. This includes approximately 4,000 lineal feet of shoreline. Key existing development within the existing park boundaries includes a visitor contact station, group picnic facility, boat launch with harbor, swimming beach, campground, conference cottage, nature trails, and maintenance facility. Although some of these areas will be upgraded and modified as part of the master plan, no major infrastructural changes are expected within the original park boundary. Figure 3.1 on the next page illustrates the boundaries of this parcel of land.

The existing park boundary encompasses 371 acres of land adjoining the St. Croix River. This includes approximately 4,000 lineal feet of shoreline.

Figure 3.1 – Aerial view of St. Croix Bluffs Regional Park existing and proposed property boundaries.



Proposed Park Expansion

St. Croix Bluffs Regional Park plays a vital role in preserving open space and outdoor recreational opportunities within Washington County for future generations to enjoy.

By expanding it to 699 acres as proposed, the park's capacity to serve the public's long-term demand for recreation and preserve meaningful natural open space is greatly enhanced.

As has been well documented, preserving the open space qualities of the undeveloped countryside is an inherently complex challenge facing counties, townships, and cities as development continues its expansion into the outer reaches of the metropolitan area. At the regional park level, St. Croix Bluffs Regional Park plays a vital role in preserving open space and outdoor recreational opportunities within Washington County for future generations to enjoy. Although the park serves many functions at its current size of 371 acres, it does not have the critical mass to truly achieve its highest potential as a regional park. By expanding it to 699 acres as proposed, the park's capacity to serve the public's long-term demand for recreation and preserve meaningful natural open space is greatly enhanced. In addition, there are several other factors that provide justification for park expansion. This includes the opportunity to:

- Meet or exceed the minimal desirable regional park size of 500 acres.
- Expand the natural resource base to a significant-enough scale where a broad cross-section of ecological systems can be more readily exhibited for public observation, appreciation, and education. (Note that the park exhibits one of the eight landscape types as defined by the regional park standards.) With the larger acreage, wildlife protection opportunities will also be greatly enhanced.
- Preserve diminishing cultural resources within this region. This refers to the existing farmstead located on the privately-owned 120 acre parcel being proposed for acquisition. As defined in Section VI, preserving the historically-significant house and farmstead setting is one of the key objections of the master plan.
- Expand protection of the St. Croix shoreline.
- Expand recreational opportunities to a much greater extent than would be achievable within the confines of the current park boundary. Of particular importance is the potential to develop a much more extensive trail system, a group multi-use area with a historic farm theme, a group campground, and a new beach area. Coupled with the existing facilities, these facilities will significantly enhance the functional capacity of the park to accommodate known recreational demands, as well as provide a reasonable degree of flexibility to adapt to evolving trends and uses in future years.
- Ensure that an effective natural buffer can be maintained between the park and adjoining properties. The ravines on both the south and north side of the park provide a very effective buffer as well as preserving major natural features that add value to the park experience.

A significance factor in the expansion discussion is that of timing. Currently, the 120 acres of privately-held property is owned by one landowner, which tends to enhance the prospects for negotiating a fair purchase price for the property. Although there has been no direct negotiations with the landowner to date, time is of the essence since development pressures will surely continue to mount and land prices continue to escalate in line with regional population growth and expansion. Given the context, initiating formal discussions with the property owner is one of the top priorities of the master plan, as defined in *Section VII – Implementation Plan.*

Section IV

Existing Conditions of the Site and Natural Resources

Overview

St. Croix Bluffs Regional Park displays an impressive assemblage of natural landscape features. The existing development provides access to the park and facilities that support common, in-demand recreational activities. Although there are many opportunities for continued enhancement, the innate quality of the site in combination with the existing development provides a strong foundation from which to work. This section provides an overview of the site and its natural resources, including:

- Soils and slopes
- Natural resources and vegetation
- Wildlife habitat
- Existing development

Site Soils and Slopes

Analysis of the soil and slope conditions of the site provide an essential underpinning for understanding historic landscape patterns and determining the buildability of selected sites for developed uses. The following provides a brief overview of these conditions.

Site Soils

As figure 4.1 on the next page illustrates, much of the site is covered with silty loam soils under a number of classifications. These soils range from well-drained to excessively-drained. There is also a loamy sand concentrated along the heads of major ravine branches. Silt loam covers much of the flat land above the bluff lines. Soils associated with the low areas near the river's edge are seasonally inundated with water, especially near the existing boat launch. The bluff lines and ravine sides are composed of steep, well-drained soils and rock outcrops.

From a development stand point, the soils on top of the bluff line do not pose major constraints to development for recreation purposes, as figure 4.2 illustrates. Naturally, the ravines and bluffs do pose severe constraints on development and for the most part are best left undisturbed. In general, the existing development footprint is located in areas where the soils are reasonably conducive to supporting built structures. New facilities are also proposed for areas where soils offer only slight limitations on development.

Figure 4.1 – Soil characteristics found across the park.

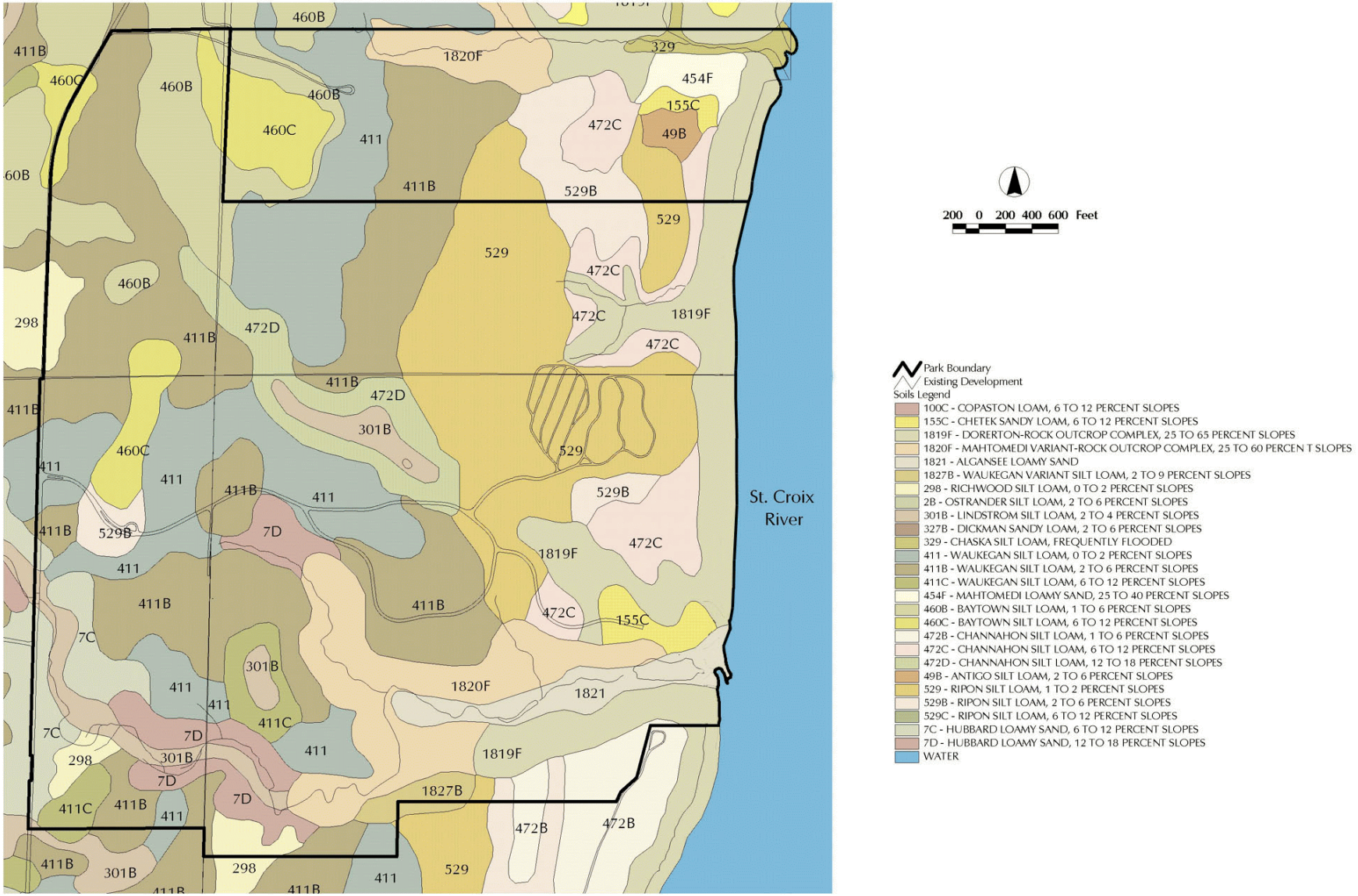
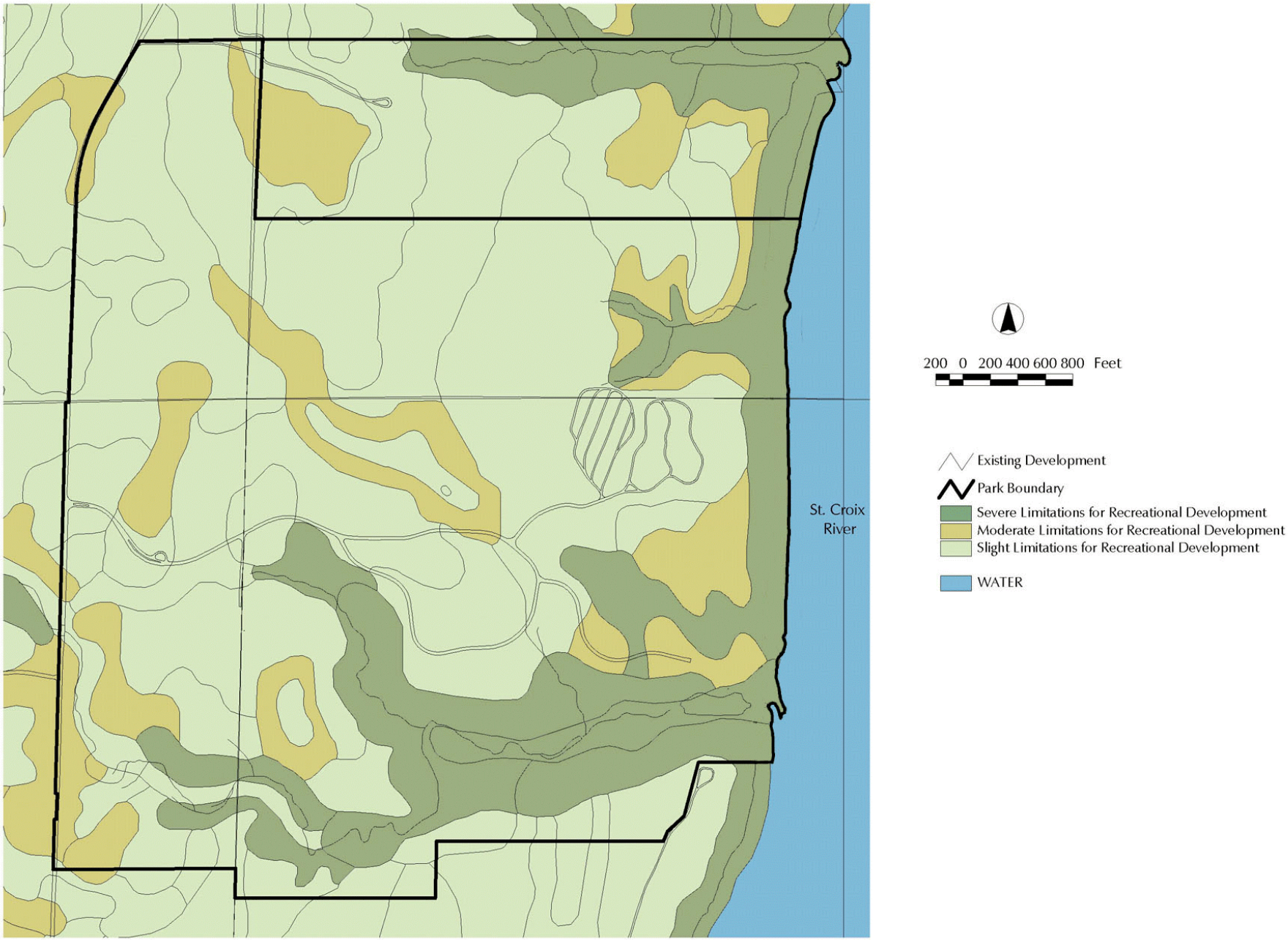


Figure 4.2 – Soils buildability analysis.

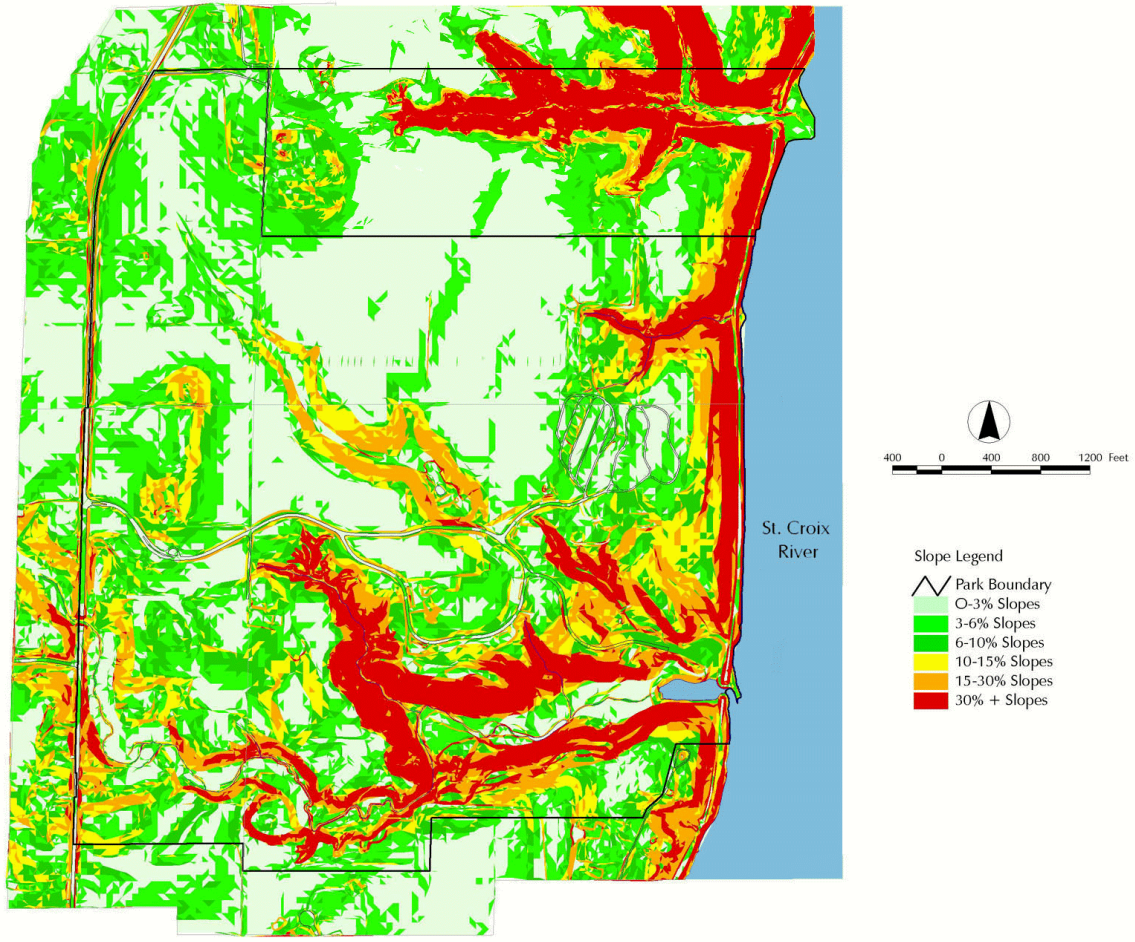


Slopes

As shown in figure 4.3, the landforms along the river are characterized by severe slopes and bluff lines. Elevation change from the river level to the top of the bluff is up to 225 feet, with the slopes well in excess of 30% overall and nearly vertical in areas of rock outcrops. As some of the most outstanding landscape features of the park, the bluff lines and steep ravines will be largely preserved for their innate natural qualities.

Once on top of the bluff line, the slopes flatten out, although with enough grade change remaining to keep the landforms aesthetically interesting.

Figure 4.3 – Slope analysis.



The landforms along the river are characterized by severe slopes and bluff lines.

Natural Resources Inventory

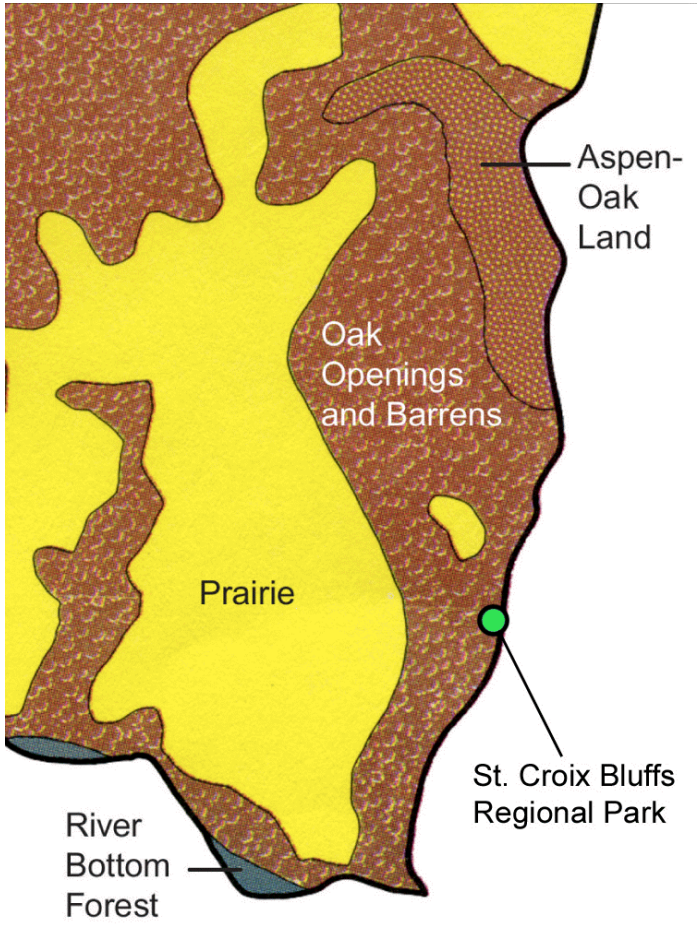
In June of 2002, Washington County completed a *Natural Resource Inventory for Denmark Township*, which included the park site. The following summarizes that inventory as it pertains to this park. Additional findings revealed during field reconnaissance are also provided to provide a complete picture of the current condition of natural resources within St. Croix Bluffs Regional Park.

Historic Perspective

The landscape and natural habitat characteristics within Denmark Township and the park has changed considerably over the last 150 years.

From a historic perspective, the landscape and natural habitat characteristics within Denmark Township and the park has changed considerably over the last 150 years, as illustrated in figure 4.4. As shown, much of the land surrounding the park was once covered by oak openings/barrens and prairie systems prior to settlement. Although much of this diversity has been lost over the years, there are enough remnants remaining to hold the promise that the park can be restored to a sustainable, healthy level through a well-defined stewardship program. (Refer to Section IV for additional information on stewardship.)

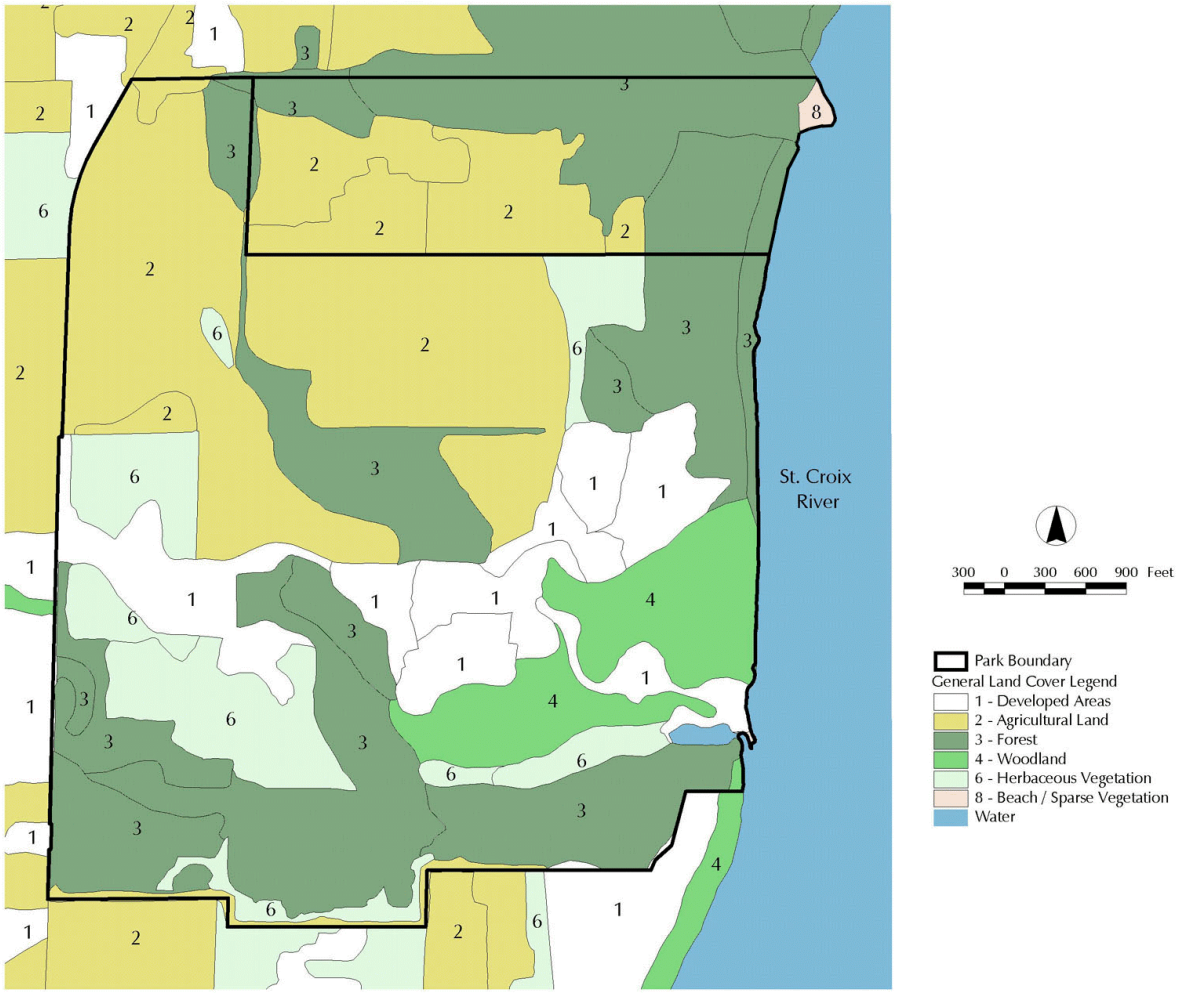
Figure 4.4 – Land cover characteristics – pre-settlement and currently. (Source: Natural Resource Inventory for Denmark Township, Barr Engineering, June 2002)



Mapping of Natural Resources within the Park

The existing site conditions and land cover mapping shown in figure 4.5 represents the findings of field reconnaissance that was conducted in the fall of 2001 as part of the *Natural Resources Inventory*. This investigation proved fruitful in documenting the existing conditions found across the site and the ecological issues being faced. The information and mapping presented in this section was prepared for master planning purposes and to establish an underpinning for the natural resource stewardship plan defined in Section IV.

Figure 4.5 – Land cover mapping. (Source: Brauer & Associates, Ltd. and Natural Resource Inventory for Denmark Township, Barr Engineering, June 2002)



Although much has been learned about the park, much also remains to be learned about its ecological systems.

Although much has been learned about the park, much also remains to be learned about its ecological systems – especially within the context of restoring and managing these resources to more robust natural systems. Given this, the information presented here serves primarily as a primer for developing a stewardship program that will be specifically tailored to the scientific nuances and challenges facing the park. The following provides an overview of the vegetative cover types found within the park and considers the general condition of these ecological systems.

Land Classification Categories: The land cover categories defined in figure 4.5 are based on the Minnesota Land Cover Classification System (MLCCS) developed by the Minnesota Department of Natural Resources. The categories as shown represent a simplification of the detailed cover type analysis prepared as part of the natural resources inventory. The following table provides a brief description on each cover type.

Land Cover Type	Characteristics	Plant Communities	Ecological Quality	Wildlife Habitat Quality
Developed Areas	Areas previously developed for recreational use, including built structures, roadways/parking lots, maintained lawn areas, and storage yards.	Maintained lawn areas and overstory trees, mostly oaks. Also some understory shrub vegetation.	Low ecological quality. Requires routine maintenance. Larger trees are generally healthy, but older age classes.	Little overall wildlife value.
Agricultural Lands	Farm fields, nurseries, windbreaks, and pastures are also included in this category.	Primarily soybeans and corn. Pastures are brome grass and weeds. Windbreaks are mixed woody vegetation.	Low ecological quality, with little overall plant species diversity.	Provides cover during growing season and food for select species, such as deer. Otherwise, low wildlife value.
Woodland	Stands of trees with crowns not usually touching, generally 25 to 60 percent cover.	Remnant oak systems and few other species. Mostly older age classes with significant invasion of buckthorn.	Degrading ecological quality, especially in terms of invasion of non-native invasive species. Limited regeneration of new oaks and other desirable overstory trees. Stable ground cover also lacking due to invasion by buckthorn.	Diminishing habitat value as invasive plant species become more dominant.
Forest	Stands of trees with a closed canopy of 70 to 100 percent cover.	Remnant oak systems, with sugar maples, elm, basswoods, green ash and other species mixed in, including red cedar. Oak system merging with Maple-Basswood forest types.		
Herbaceous Vegetation	Areas dominated by herbaceous vegetation (grasses, wildflowers, and ferns), with trees and shrubs generally constituting less than 25percent cover.	Ranges from grasslands and prairies to wetland systems. Dominated by monocultures of species such as reed canary grass.	Currently low ecological quality, but offers the opportunity for improvement through a sound stewardship program.	Ground cover provides some wildlife habitat value. But the lack of plant diversity limits wildlife species diversity as well.
Beach/Sparse Vegetation	Areas with low plant cover (0 to 25 percent), dominated by bedrock, gravel, sand, mud, or other abiotic substrates.	Few plants present.	Low ecological quality.	Low wildlife habitat quality.

Buckthorn invasion of the woodlands and forests is a major threat to their long-term sustainability.

Light gaps along trails provide another opportunity for invasive species to take hold. Left unchecked, these species take away from the aesthetic and interpretive quality of the trails, as well as limiting viewing opportunities of the St. Croix River.

Current Conditions and Related Threats to Natural Resources

As defined in the previous table, the ecological quality of the park is threatened due to past impacts to the land and the lack of comprehensive stewardship over the years. The following expands upon the previous tables by defining some of the most significant threats facing the natural resources of the park.

Historic Oak Barrens/Savanna Systems: These systems are typically dominated by bur oak, northern pin oak, northern red oak, white oak, and native and introduced forbs, grasses, sedges, and shrubs. These oak systems historically existed in fairly broad areas of the park where topography is higher and drier with excessively to well-drained sand to loam soils and on south and west exposed sites. In most instances, the historic character of the oak savannas has been lost to varying degrees due to the lack of natural disturbances (e.g., fire) and resource management. In many areas of the park, past agricultural and pasture uses have significantly impacted the extent to which upland oak savanna systems still exist in the park. Where these systems do remain, the areas are characterized by relatively isolated oaks within an often dense canopy of other tree and shrub species. Understory vegetation, formerly consisting of native grasses and forbs, has been invaded and replaced by invasive species such as European buckthorn and boxelder. The resulting shade suppression has greatly reduced the existing ground cover and native understory vegetation.

The oak savannas have experienced significant degradation to the point where substantial erosion of the topsoil is occurring due to lack of ground cover vegetation. Topsoil loss is associated with the loss of the long-lived seeds, roots, tubers, bulbs, and other plant stock from the soil. Significant dieback was also observed on lower branches of some of the oaks from the dense shading caused by the associated overstocked canopy. However, in several areas oak regeneration was observed to be occurring, suggesting that through proper management, the oak savanna system can be reinvigorated within the park. Unfortunately, in the majority of cases, the oaks are not regenerating themselves, leaving only older trees that are nearing their pathological maturity, which are more susceptible to disease and wind blow-down.

The deterioration of the park's oak savannas follows a process of degradation that has been documented by previous studies throughout the upper Midwest. The results of such trends include a precipitous decline in native vascular plant and breeding bird species richness, severe erosion, and reduced opportunity for restoring these savanna systems with increasing time since the onset of decline. Prompt attention should be given to halting and reversing this trend of degradation by implementing a well thought-out restoration and management program.

Maple-Basswood Forest: Although historically somewhat less dominant than the oak systems, this forest system is also found within the park, primarily on the east facing slopes and more protected ravine areas. In contrast to the savanna systems, this system offers a more diverse assemblage of tree, shrub, and herbaceous plant species. The canopy is typified by 40 to over 100 year-old red oaks, elms, sugar maples, green ash, basswoods, and red cedar, as well as some ironwood and black cherry in the understory.

As with the savanna systems, European buckthorn and other aggressive species have invaded much of this forest type, resulting in areas of severe shade suppression. This phenomenon results in reduced ground cover vegetation and limits the potential for native plants to compete with invading species. The lack of healthy ground cover vegetation, combined with the moderate to steep slopes, creates conditions where these forest systems are often subject to severe erosion. This erosion not only exposes root systems and removes native seeds and other propagules, but also results in down slope deposition, which may either smother native upland soils or cause sedimentation in wetlands and into river and pond systems. A lack of tree regeneration was also observed in this forest type.

Recently Developed Forest in Degraded Condition: Although not specifically mapped, these systems are comprised of the early invading species such as box elder, green ash and red elm. These areas occupy fallow fields, former wetland soils that had been drained and fallowed from agricultural land uses for 20-50 years, spoil piles along ditches, and wetland margins where successional tree species have invaded and caused shade suppression of the native, soil-stabilizing vegetation. In almost all cases where the early successional forest trees have developed, the ground cover vegetation system has collapsed and is represented by only a few shade tolerant species. Often the canopy, which is usually closed, includes dense growths of European buckthorn and other shrubs that are semi- to completely shade tolerant. The influence of shading by young trees and buckthorn has contributed to the decline of the native, soil-stabilizing vegetation. These are typically depauperate (stunted), low diversity, unstable systems, whereby many of the early successional species found there have short life spans and are beginning to show major senescence or mortality. Where this vegetation occurs along wetlands and along the river bank, it will contribute substantial woody debris to the adjacent aquatic systems, which contributes to bank erosion, and other aquatic maintenance issues that are costly to restore.

Wetland Systems: Given the general character of the land and bluff/ravine topography, wetland systems are relatively limited within the park. Where these do occur, there has been a transition from vibrant and diverse systems to monocultures of plant species that have adapted to changes in surrounding land uses and unnatural fluctuations in water levels. Although remnants of native plants can be found, the wetlands are dominated by species such as reed canary grass, cattails, and black willow. Significant changes in nutrients and biogeochemical cycling in the park's wetlands and low areas is also likely to be occurring. Changes to stormwater runoff patterns and flows associated with past agricultural uses and park development are likely contributing sediments, nutrients, and other contaminants into the limited wetland systems.

Agricultural Land, Pastures, and Open Fields: Prior to the land being set aside for park purposes, much of the open land was cultivated for agriculture or used for pastures. Although there are some limited areas where native prairie species still remain, most of the fields are still cultivated under a lease agreement. Invasion by woody plants is also occurring around the edges of these fields and pastures. In areas within the park where farming is no longer occurring, the fields are generally covered with brome grasses and other weedy species, as well as the occasional remnant of a few prairie species. Fortunately, in most cases, the open field areas can be restored to native prairie systems or transitioned to savanna forest systems through a well-conceived stewardship program.

Restoring open field areas now covered with cultivated crops or brome grass offers great promise to reinvigorate prairie communities and savanna systems that have been lost over the last 150 years.

Habitat Fragmentation: Unfortunately, the landscape within the park is fairly fragmented in terms of its collective ecological quality and transitions from one ecological system to another. As defined in the *Natural Resources Inventory for Denmark Township*, fragmentation refers to "the division of forests, prairies, and other native plant communities into small, isolated habitats by roads, farm fields, and developments." As also defined, "habitat fragmentation not only reduces the *quantity* of food and cover for wildlife, but means less variety and lower *quality* within a given area." Within the context of a resource-based regional park, habitat fragmentation is of significant concern, which cannot be taken lightly in terms of natural resource stewardship *and* planning for future development within the park.

Conclusions: In spite of the current conditions within the park, there are tremendous opportunities for restoring the natural areas and ecological systems to more closely replicate what was present before settlement occurred. Although restoring the park to fully replicate systems that were present in the 1850's is technically and economically unachievable, it is reasonable to expect that through conscientious intervention, a more robust natural ecology can be restored to the park for future generations to enjoy.

Overview of Existing Development

Development of St. Croix Bluffs Regional Park goes back to the early 1970's when a private corporation developed it for private use. The Ceridian Corporation later took ownership of the property until it was sold to Washington County in 1996 for regional park use.

The vast majority of the existing development fits well into the regional park context. The major change that has occurred over the past few years since the County owned the property was the addition of a well-designed Contact Station and improvements to roads and the campground. Section VI – Development Master Plan, covers the existing facilities in detail and should be referred to for additional information.

Conclusions Regarding Existing Conditions

Although there are some significant ecological issues that must be addressed, the land area that the park encompasses is truly impressive and an important respite from the ever encroaching development occurring in this region. Through a well thought-out natural resources stewardship plan, many of the natural systems can be restored to a sustainable level that more closely emulates the park's historic landscape character.

From a redevelopment standpoint, the existing development provides a strong foundation in which to work from in addressing current and future recreational needs at the regional park level without compromising the park's natural qualities. As defined in *Section VI – Development Master Plan*, limiting the development footprint to that which is necessary for serving the public good is instrumental in maintaining a balance between providing human access to a wonderful nature-based park without compromising the qualities that people are coming to the park to enjoy.

Section V

Natural Resources Stewardship and Water Resources Management

Overview

Natural resources stewardship refers to the thoughtful care of ecological systems to preserve their natural qualities and character.

Natural resources stewardship refers to the thoughtful care of ecological systems to preserve or enhance their natural qualities, which are intrinsic to the park's value as a place of natural beauty and respite from the built form. The forthcoming stewardship plan provides a framework for restoring and managing the natural resources within the park.

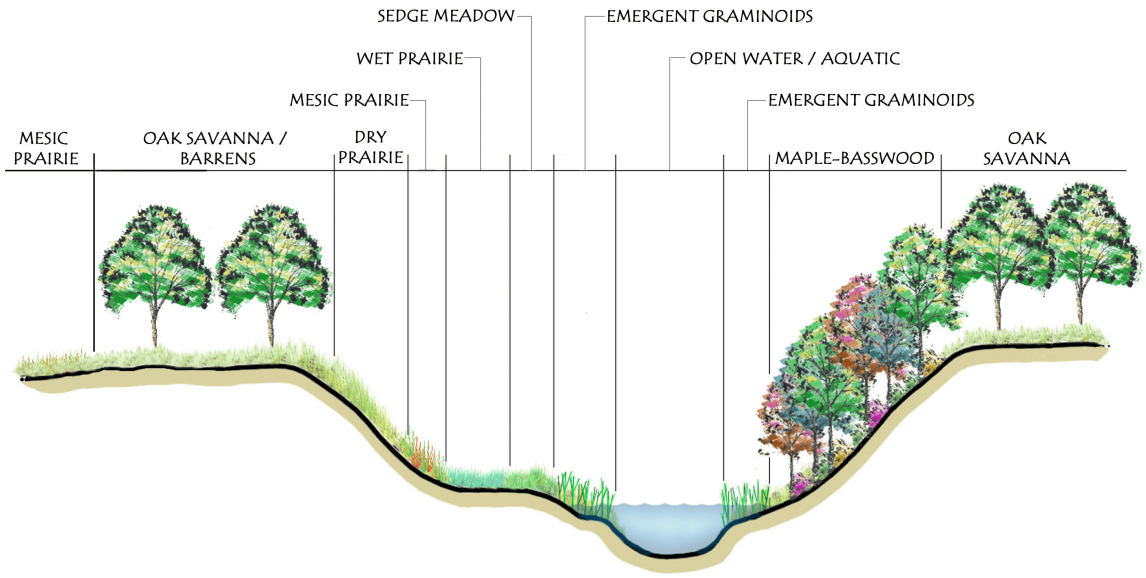
The stewardship plan relies heavily on human intervention as a surrogate for the natural cycles that no longer exist due to past land uses, introduction of invasive alien plants, and cessation of natural phenomenon (e.g., fire) since settlement first occurred. The plan also establishes a vision for water resources management that relies on natural processes, rather than engineered solutions, to manage stormwater runoff.

A Historically Diverse Landscape

Although challenging, realizing a more diverse and healthy natural landscape is achievable and sustainable under a well-defined stewardship program.

Figure 5.1 illustrates the basic relationships between the ecological systems historically found in this region and across the park.

Figure 5.1 – Relationship between selected ecological systems common to the park.



As shown, the diversity of plant assemblages was historically very broad, ranging from aquatic zones along the river and in lowland areas to upland oak savanna and prairie systems. Although challenging, realizing a more diverse and healthy natural landscape is achievable and sustainable under a well-defined stewardship program.

Achievability and Sustainability of Ecological Stewardship Programs

It is important to recognize that restoring and managing ecological systems must be done in a manner that is both achievable and sustainable.

A successful program requires a full understanding of the ecological problems being faced and a defined course of action that is based on science.

From an economic perspective, what is achievable and sustainable is based on the amount of human and economic capital that Washington County and the Metropolitan Council can commit to ecological programs now and in the future.

It is important to recognize that restoring and managing ecological systems must be done in a manner that is both achievable and sustainable. Achievable refers to what is scientifically *and* economically feasible. Sustainable refers to the level to which restoration and management programs can be scientifically *and* economically sustained over an extended period of time. The following considers achievability and sustainability from the two distinct but interrelated perspectives of ecology and economy (human/economic capital).

Ecological Perspective

From an ecological perspective, what is achievable and sustainable is defined in scientific terms based on testing and research. Scientifically, human intervention through well thought-out programs that are carefully implemented over a period of time can help to reverse the current downward trend in the ecological quality of the park's natural systems (as measured by biodiversity and general ecological health). A successful program requires a full understanding of the ecological problems being faced and a defined course of action that is based on science. As defined in this section, human intervention will be required given the current state of alteration that has occurred.

Although dramatic improvements can be made in some cases, restoring the landscape to pre-settlement conditions is not realistic from a scientific perspective. Past impacts to the land since man first settled and introduction of invasive alien plants simply preclude this possibility. However, it is achievable to restore and manage ecosystems to sustainable and productive levels that result in considerable human and ecological value that can be perpetuated for generations to come. The key point here is that Washington County and the regional community must set realistic goals and expectations as to what can be achieved and sustained through restoration and management programs.

Economic (Human/Economic Capital) Perspective

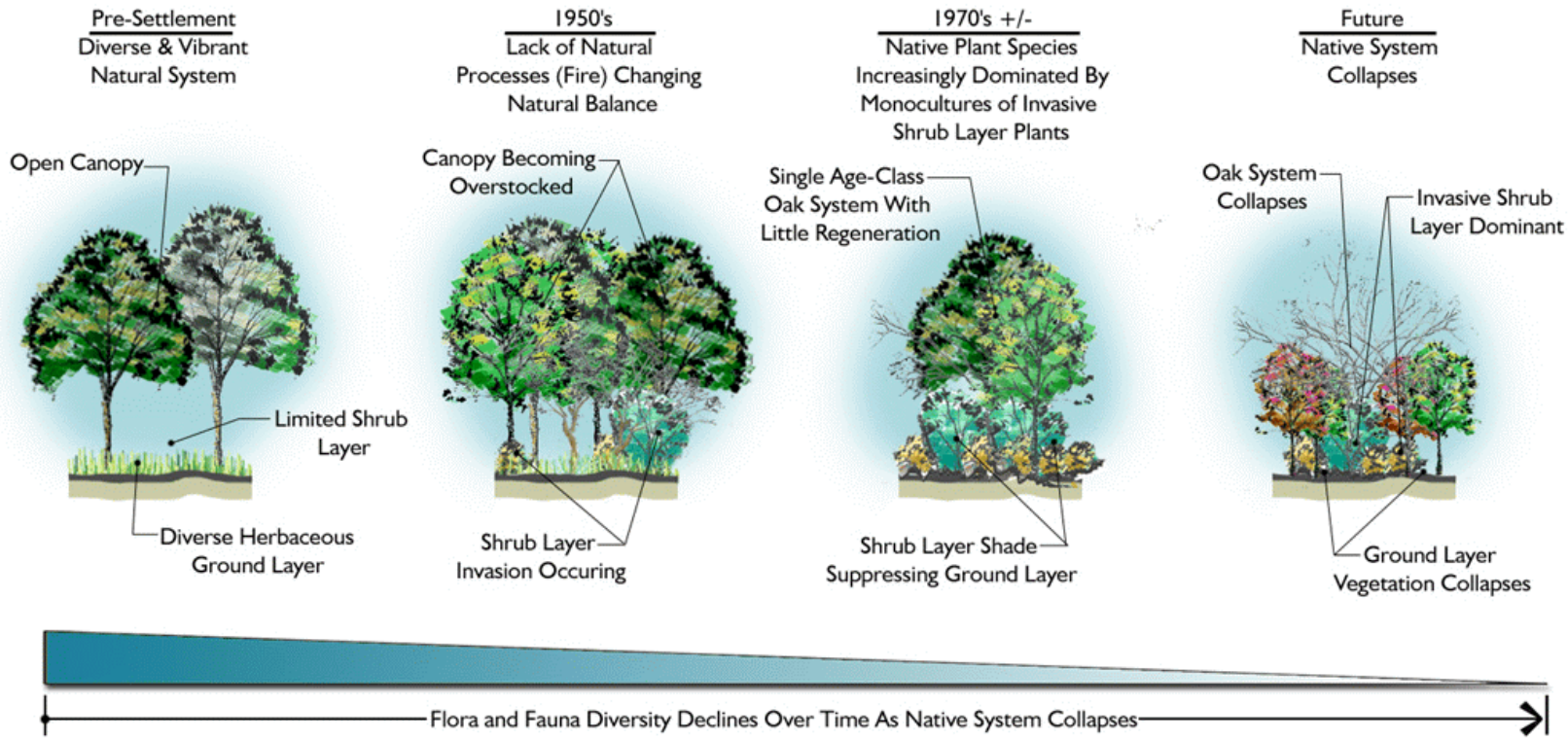
From an economic perspective, what is achievable and sustainable is based on the amount of human and economic capital that Washington County and the Metropolitan Council can commit to ecological programs now and in the future. The importance of this cannot be overstated in that the long-term viability of any ecological program undertaken is directly related to the long-term commitment made to it in terms of human and economic resources. Ultimately, how the collective community values land stewardship and ecological health relative to other quality of life issues will define the extent to which ecological programs can be successfully implemented. Recognizing this, it is critical that Washington County and the Metropolitan Council time ecological programs in a pragmatic and paced manner that keeps pace with available economic resources.

Spectrum of Opportunity for Restoration of Ecological Systems

Without human intervention and conscientious stewardship, it is expected that the overall trend of the ecological systems within the park will be toward continued decline, as measured by bio-diversity and general ecological health. Figure 5.2 graphically illustrates the current trend in a typical oak savanna system found in this and many other midwestern regions.

Without human intervention and conscientious stewardship, it is expected that the overall trend of the ecological systems within the park will be toward continued decline.

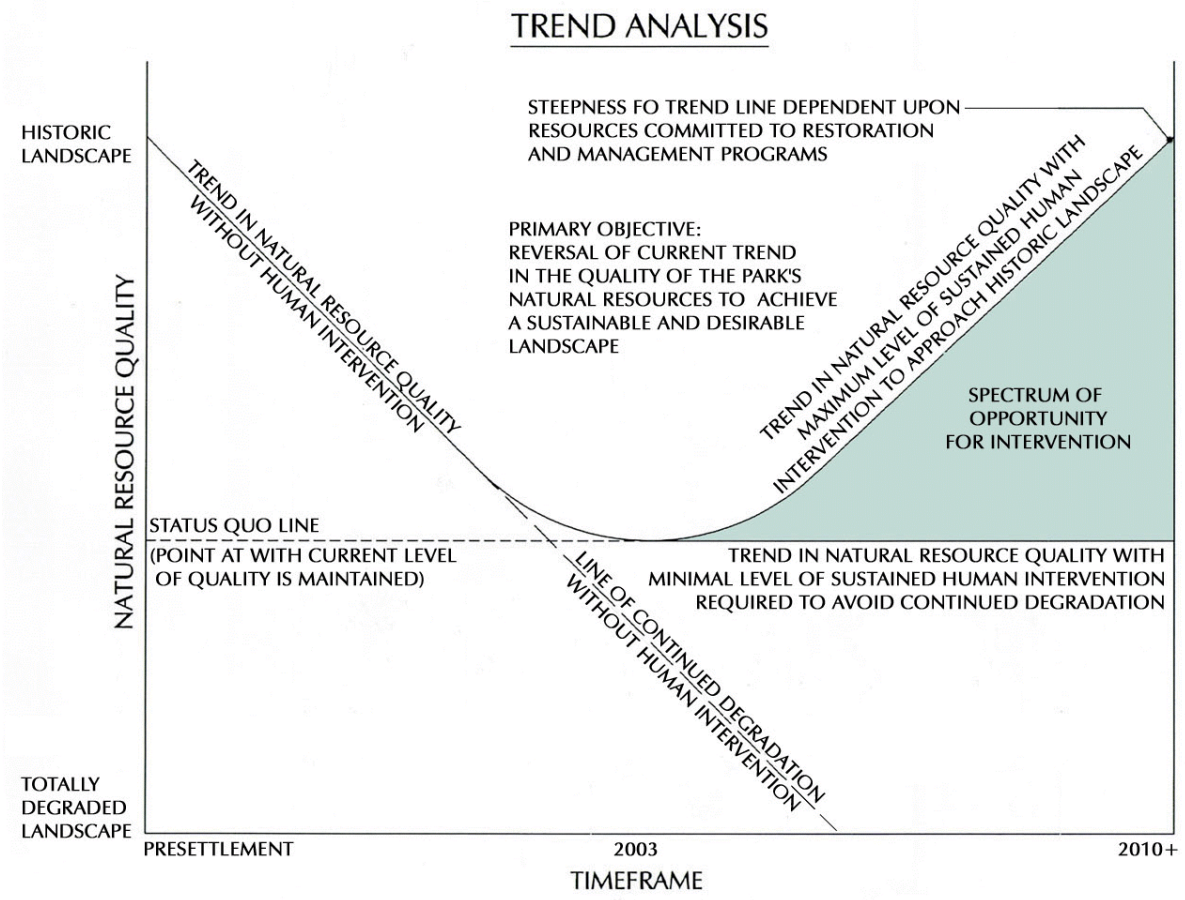
Figure 5.2 – Ecological trend in oak savanna system.



This example is reflective of what is happening to varying degrees in all of the ecological systems found within the park. Although some of the ecological degradation will have lasting affects, there are also many opportunities to forestall further degradation and make substantial progress toward achieving a more sustainable and healthier landscape for future generations to enjoy. Figure 5.3 graphically illustrates the current overall trend in ecological quality, as well as defining the spectrum of opportunity for reversing this trend.

There are many opportunities to forestall further degradation and make substantial progress toward achieving a more sustainable and healthier landscape for future generations to enjoy.

Figure 5.3 - Trend Analysis



The goal of the stewardship program is to first identify restoration and management needs in detailed scientific terms and then define strategies that can reverse these trends. The framework presented here recommends that Washington County seek to achieve a sustainable landscape quality, which is defined as the point at which the parks division can *indefinitely* maintain a certain acceptable level of resource quality within the context of realistic limits – which is contingent upon two primary factors:

- Public understanding of and commitment to natural resource preservation and stewardship programs.
- Undertaking ecological restoration and management programs that are scientifically sound.

Natural Resource Stewardship Philosophy

The plan outlined here promotes an ecosystem-based approach to restoration and management.

The framework presented here promotes an ecosystem-based approach to restoration and management. An ecosystem is essentially where things live and represents an interacting group of physical elements (soils, water, plants, animals, etc.) that inhabit a particular place. All of these elements and their interactions need to be considered in developing goals and plans for management. Ecosystem-based management views people as part of the community, and that maintaining a healthy ecosystem is the best way to meet human needs as well as those of other organisms in the community. General goals of this philosophy are to:

- Protect or enhance the health of the ecosystems in St. Croix Bluffs Regional Park.
- Enhance the biological diversity of its native habitats.
- Provide an appropriate balance between resource preservation and recreational use.

Through a well-defined stewardship program and a concerted, ongoing effort by Washington County, a certain level of confidence can be gained that the current ecological conditions and trends can be reversed and a more sustainable and higher quality landscape achieved. Note, however, that stewardship programs also need to be flexible due to the changing nature of the living systems addressed by the plan. For these reasons, the framework presented here should be viewed as being neither conclusive nor absolute. It is a starting point in an ongoing process that relies on monitoring and research to provide feedback on program effectiveness.

Ecological Prototypes for Unaltered and Altered Ecological Systems

Ecological prototypes are defined along topographic, soil type and hydrological gradients from high-dry uplands to lowlands and river or lake edges.

In this context, ecological prototypes refer to vegetative species models for the various natural systems found within the park. Prototypes assist restoration and management efforts by helping compare existing conditions against measurable criteria for healthy systems and in recognizing possible causative agents that result in ecological changes. By recognizing what a healthy system looks like, specific targets or models for management and restoration programs can be developed and implemented.

Ecological prototypes are defined along topographic, soil type and hydrological gradients from high-dry uplands to lowlands and river or lake edges. Based on an initial review of the park, both unaltered and altered ecological prototypes can be found – although unaltered systems are limited to isolated pockets. In unaltered areas, depending on soil types and hydrology, different plant and animal communities have developed over long periods of time and have persisted even to present day under less than ideal circumstances. On these same soil types, alteration of land use and hydrology along with cessation of natural processes have created changes in the plant (and animal) communities. Each of the unaltered and altered types of plant and animal communities fall within a definable ecological prototype, or in sum cases, in the ecotonal (i.e., transitional) area between prototypes.

The following descriptions define some of the more typical and definable prototypes for healthy (unaltered) and unhealthy (altered) ecological systems found within the park. Figure 5.1 on page 5.1 provided a character sketch of how these selected prototypes relate to each other. Lacking greater technical evaluation and in-field research, the prototypes presented here serve as a starting point as Washington County moves forward with its stewardship program. Although these prototypes are not exhaustive, they do articulate the fundamental qualities between healthy and unhealthy ecological systems found within the park.

Historic Oak Savanna

Healthy Systems

General Structure

- Semi-open to open tree canopy
- Multiple age classes of trees
- Dominant cover of native grasses, sedges, and forbs
- Natural oak regeneration
- Sporadic native shrub layer
- High light levels interspersed with partial/isolated shade

Soils Profile/Topography/Hydrology

- Well drained silt, clay and sand loams, gravelly sands, alluvium glacial features
- Higher and dry sites, and moist, well drained soils

Indicator Species of Healthy System

- Bur oak
- Northern pin oak
- White oak
- Savanna groundlayer species

Associated Species

- Pennsylvania sedge
- Silky and Virginia wild rye
- Bottlebrush grass
- Other sedges
- American hazelnut
- Little bluestem

Unhealthy Systems

General Structure

- Continuous, closed canopy
- Dense layer of non-native shrubs
- Bare, eroding soil
- Low light levels, predominant dense shade
- No oak regeneration
- Few or no young age classes of trees
- Lack of native groundcover vegetation
- Encroachment by development or agriculture

Indicator Species of Unhealthy System

- European buckthorn
- Tartarian honeysuckle
- Black locust
- Boxelder
- European brome, Kentucky bluegrass, and other non-native grasses
- Agricultural weed species and brambles

Protection and Management Considerations

Causes of Change

- Cessation of historic fire regimes
- Destruction due to urban development
- Invasion of competing non-native shrubs
- Encroachment of adjacent development with associated pollutants
- Intensive grazing and agricultural practices
- Change in hydrologic regime (drier or wetter)

Restorative Capacity

- Highly restorable under well-designed and implemented restoration and management program
- Highly disturbed sites may require replanting of native species, especially ground cover, if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection beyond that of existing wetland ordinances
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Maple-Basswood Forest

Healthy Systems

General Structure
- Mixed canopy of oaks, ash, maple, and basswood
- Predominated by cool season grass and sedge ground cover

Soils Profile/Topography/Hydrology
- Found in isolated or protected locations, steep draws, and on landscape islands
- Topography ranges from level ground to rolling and steep grades
- Loam and fine sandy loam

Indicator Species of Healthy System
- Basswood
- Sugar maple
- Red oak
- Green ash
- Ironwood
- Woodland sedges
- Spring wildflowers (trilliums and spring beauty)

Associated Species
- Sedges, such as Pennsylvania sedge
- Shrubs, such as pagoda dogwood

Unhealthy Systems

General Structure
- Shift to even canopy, with limited age groups of trees
- Dense understory
- Bare soil after spring ephemerals die back
- Noticeable soil erosion

Indicator Species of Unhealthy System
- Boxelder
- European buckthorn
- Canary grass
- Motherwort
- Thistles
- Burdock
- Rough bedstraw
- Stinging nettles

Protection and Management Considerations

Causes of Change
- Cessation of light ground fires
- Loss of seedbank and erosion
- Weed invasion and agricultural practices
- Altered hydrology, whether drier or wetter
- Logging disruption of composition, structure, light, and nutrient regimes
- Livestock grazing causing weeds and tree damage

Restorative Capacity
- Highly restorable under well-designed and implemented restoration and management program
- Highly disturbed sites may require replanting of native species if native seed bank is absent

Protection Strategy
- Adopt land development practices that place a high priority on ecological protection
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Upland Prairie Systems

Healthy Systems

General Structure

- High biodiversity – plants, insects, birds, and other animals
- High diversity of native plant species
- Predominance of warm-season grass species
- Natural succession and progression toward conservative species
- Full to nearly full sun
- Drought tolerant

Soils Profile/Topography/Hydrology

- Moderate to well drained, fine textured sands and sandy loams
- Higher and dry sites, most often associated with flat terraces or gentle slopes

Indicator Species of Healthy System

- Big bluestem
- Little bluestem
- Side-oats grama
- Purple prairie clover
- Leadplant
- Sky blue aster
- Prairie coreopsis
- Partridge pea
- Flowering spurge
- Blue giant hyssop
- Compass plant
- Prairie dock

Associated Species

- Literally hundreds of associated species

Unhealthy Systems

General Structure

- Low biodiversity – plants, insects, birds, other animals
- Predominance of weedy, non-native vegetation
- Absence of ecological functions
- Loss of water infiltration
- High soil erosion potential
- Invasion by woody species
- Nutrient enrichment
- Tile drained or ditched, resulting in altered hydrology

Indicator Species of Unhealthy System

- European brome and other non-native grasses
- Ragweed
- Mare's tail
- Queen Anne's lace
- Canada thistle
- Wild parsnip
- Woody species such as sumac, black cherry, boxelder, and Siberian elm

Protection and Management Considerations

Causes of Change

- Introduction of post settlement agriculture practices and livestock grazing
- Soil disturbance from urban development
- Cessation of periodic fire
- Invasion of competitive, non-native plants
- Change in hydrologic regime (wetter or drier)

Restorative Capacity

- Highly restorable under well-designed and implemented restoration and management program
- Highly disturbed sites may require replanting of native species if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection beyond that of existing wetland ordinances
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Wet Prairie Remnants

Healthy Systems

General Structure

- Patchy, patterned plant communities reflecting soil and hydrological gradients
- High biodiversity – plants, insects, birds, and animals
- High diversity of native grasses and forbs
- Predominance of native grass, sedge, and forb species of low, moist-to-wet soils
- Natural succession and progression toward conservative species
- High groundwater table and often groundwater-based hydrology
- Full to nearly full sun

Indicator Species of Healthy System

- Prairie cordgrass
- Canada bluejoint
- New England aster
- Virginia mountain-mint

Associated Species

- Extensive variety of other native grasses, sedges, and forbs

Soils Profile/Topography/Hydrology

- Shallow organic soils
- Soils are saturated in the spring and dry out as year progresses

Unhealthy Systems

General Structure

- Altered hydrology due to de-watering
- Heavy invasion by woody growth
- Invasion by non-native reed canary grass
- Homogenous vegetation and low pattern of diversity

Indicator Species of Unhealthy System

- Reed canary grass
- European buckthorn
- Glossy buckthorn
- Overstocked dogwoods
- Purple loosestrife
- Stinging nettles
- Redtop

Protection and Management Considerations

Causes of Change

- Draining of soils for agriculture tillage
- Cessation of wild fire and overgrazing
- Hydrologic changes due to urban development and a change to surface water rather than groundwater dependent hydrology
- Nutrient enrichment from dewatered substrates and offsite introduction
- Salt and fertilizer loading

Restorative Capacity

- Potential to be restorable under well-designed and implemented restoration and management program in cases where off-site factors can be controlled
- Highly disturbed sites may not be realistically restored due to extent of past degradation and uncontrollable off-site factors
- Restoration may require replanting of native species if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection, with a particular focus on upland buffer systems and natural infiltration systems
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Sedge Meadow Remnants

Healthy Systems

General Structure

- High biodiversity – plants, insects, birds, and animals
- High diversity of native sedges and forbs
- Domination by sedges, rushes, reeds and grasses

Soils Profile/Topography/Hydrology

- High groundwater table
- Shallow to moderate organic substrates

Indicator Species of Healthy System

- Tussock sedge
- Lake sedge
- Canada bluejoint
- Wool grass
- Marsh milkweed
- Swamp aster
- Sawtooth sunflower

Associated Species

- Swamp dock

Unhealthy Systems

General Structure

- Altered hydrology due to de-watering or too much water
- Heavy invasion by woody growth
- Invasion by non-native reed canary grass

Indicator Species of Unhealthy System

- Glossy buckthorn
- Reed canary grass
- Overstocked dogwoods
- Purple loosestrife

Protection and Management Considerations

Causes of Change

- Sediment, nutrient and contaminant loading from disturbed uplands
- Soil disturbance from development
- Cessation of periodic fire
- Invasion of competitive, non-native plants
- Change in hydrologic regime (wetter or drier)

Restorative Capacity

- Potential to be restorable under well-designed and implemented restoration and management program in cases where off-site factors can be controlled or mitigated
- Highly disturbed sites may not be realistically restored due to extent of past degradation and uncontrollable off-site factors
- Restoration may require replanting of native species if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection, with a particular focus on upland buffer systems and natural infiltration systems
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Emergent Graminoids (Sedges, Grasses, and Rushes)

Healthy Systems

General Structure

- Shallow, open water communities
- Water depths less than 2 meters (6.6 feet)
- Emergent, submergent, floating and floating-leaved aquatic vegetation
- Presence of habitat and communities of waterfowl, amphibians, fish, furbearing mammals and invertebrates

Soils Profile/Topography/Hydrology

- Sand and gravels or shallow bedded organic matter

Indicator Species of Healthy System

- Bur-reed
- Arrowhead
- Bulrushes
- Water plantain
- Pondweeds
- Water lilies
- Coontail

Associated Species

- Various sedges and native shrubs

Unhealthy Systems

General Structure

- Sustained high water levels or drastic level changes
- Nutrient, sediment and toxic chemical loading from uplands and roadways
- Dominance by cattail, giant reed grass, and reed canary grass

Indicator Species of Unhealthy System

- Purple loosestrife
- Cattail
- Giant reed grass
- Reed canary grass
- Eurasian water milfoil
- Duckweed
- Excessive bulrushes

Protection and Management Considerations

Causes of Change

- Increased runoff due to upland development
- Damming and impoundment of waters
- Industrial and agricultural runoff
- Nutrient enrichment

Restorative Capacity

- Potential to be restorable under well-designed and implemented restoration and management program in cases where off-site factors can be controlled or mitigated
- Highly disturbed sites may not be realistically restored due to extent of past degradation and uncontrollable off-site factors
- Restoration may require replanting of native species if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection, with a particular focus on upland buffer systems and natural infiltration systems.
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Refinement of Ecological Prototypes

As part of the prototype refinement process, Washington County Parks is encouraged to utilize the Minnesota Department of Natural Resources' Minnesota Land Cover Classification System (MLCCS) where it has application as part of the stewardship program. This classification system, which is very extensive, is useful for defining natural ecosystems (although it is a bit more limiting in addressing developed or agricultural systems). Whereas this classification system was used for the *Natural Resource Inventory for Denmark Township* as defined in Section III and provides the baseline information needed to guide the master planning purposes, additional refinement using the MNDNR system will be required as the master plan moves from planning into implementation.

Effect of Healthy and Unhealthy Ecological Systems on Wildlife

As would be expected, there is a marked affect on the species richness of wildlife when ecological systems become degraded.

As would be expected, there is a marked effect on the species richness of wildlife when ecological systems become degraded. What is perhaps not expected is the degree of decline that can entail. To illustrate this point, the forthcoming table defines the decline of breeding bird species between healthy and unhealthy ecological systems.

Breeding Bird Species Associated with Healthy Ecological Systems

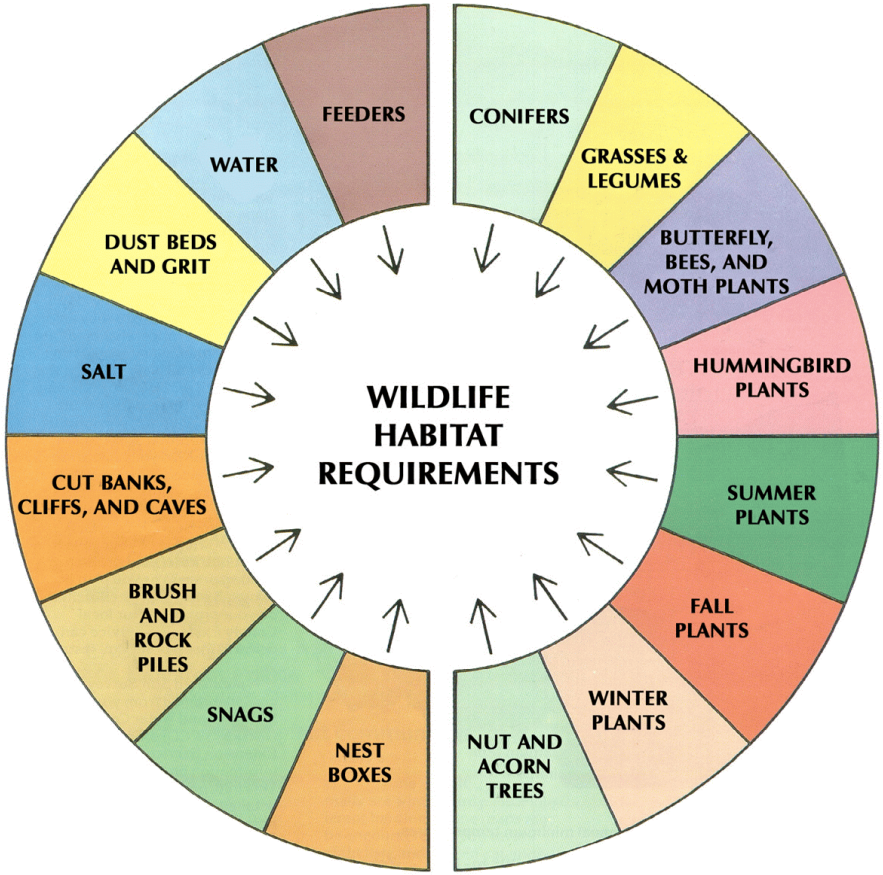
Prairie	Sedge Meadow	Emergent	Savanna	Lakes
Bobolink	Yellow warbler	Herons	Flicker	Tern
Blue bird	Willow fly catcher	Rails	Bluebird	Cormorant
Brown-headed cowbird	Yellow throat	Ducks, grebes	G. crested flycatcher	Merganser
Grasshopper sparrow	Red winged blackbird	Swamp sparrow	Robin	Duck
Vesper sparrow	Goldfinch	Red winged blackbird	Catbird	Grebe
Western meadow lark	Swamp sparrow	Sora rail	Cardinal	Coot
Song sparrow	Short/long billed marsh wren	Mallard	Blue jay	
Gold finch	Kingbird	Grackle	W. B. nuthatch	
King bird		Canada goose	Warbling vireo	
		Yellow headed blackbird		
		Kingbird		
20-30 species	**15-20 species**	**30-40 species**	**20-30 species**	**20-30 species**

Breeding Bird Species Associated with Unhealthy Ecological Systems

Corn Field	Cattail and Canary Grass	Degraded Savanna	Lakes
Horned lark	Red winged blackbird	Robin	Mallard
House sparrow	Mallard	Cardinal	Canada goose
	Canada geese	Starling	Coot
	Herons		
4-6 species	**5-10 species**	**5-10 species**	**5-10 species**

As the last table clearly illustrates, the decline in bird species can be quite steep as ecological systems transition from biologically healthy to unhealthy. When considering the needs of wildlife, healthy, natural ecological systems provide the essential components for wildlife to flourish. Unhealthy systems, on the other hand, do not provide for the basic needs of wildlife because many of these components are lacking,. Figure 5.4 defines the essential components of wildlife habitat.

Figure 5.4 – Sixteen components of wildlife habitat. (Source: Landscaping for Wildlife, published by the MNDNR.)



When these components are lacking or degraded relative to a healthy system, the diversity of wildlife found within the park will be diminished.

When these components are lacking or degraded relative to a healthy system, the diversity of wildlife found within the park will diminish. While certain species of wildlife can flourish under degraded conditions, they often do so at the expense of other species that historically would have frequented the park.

Natural Resources Stewardship Program

The stewardship program establishes the long range vision for restoring and managing the natural ecological systems within the park.

The stewardship program establishes the long range vision for restoring and managing the natural ecological systems within the park. This includes defining:

- The long range vision for natural resources within the park.
- A restoration and management strategy to achieve that vision.
- The typical phases associated with implementing the strategy.
- The standard restoration techniques used within each phase of implementation.

The following considers each of these aspects of the stewardship program – each of which being critical to creating a vibrant natural landscape quality that is indefinitely sustainable.

Long Range Vision for Natural Resources Within the Park

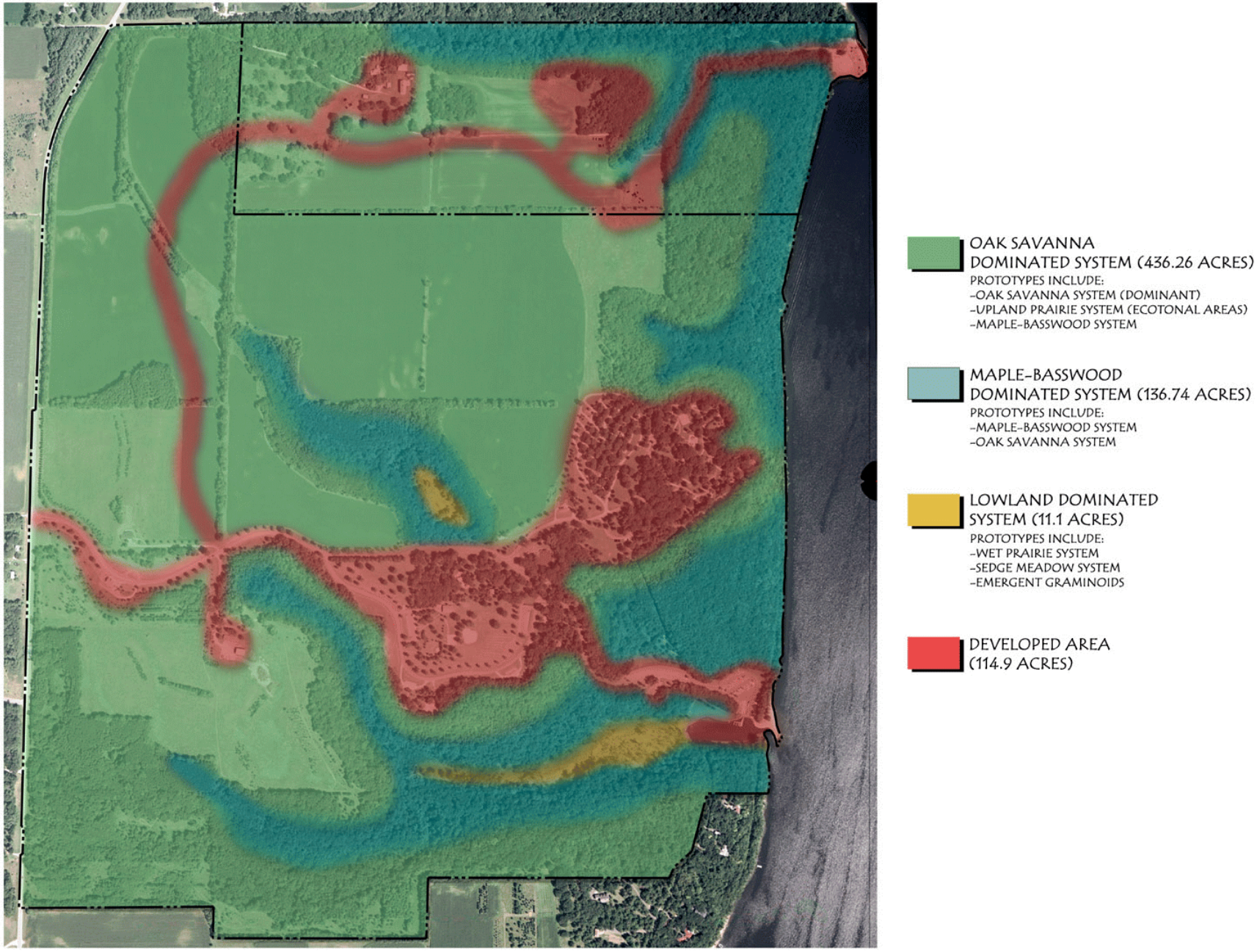
As defined in Section IV, the park was historically dominated by oak savanna (barrens) systems, with several other systems also being common to the area. The long range vision for the park is to reestablish these systems to the extent possible within the context of inherent ecological and economic limitations.

Although there are many ecological nuances within the park, there are three dominant ecological systems that define its overall natural character. This includes:

- **Oak savanna dominated system** – encompasses the upland areas outside of the ravines and steeper slopes down to the river. Prototypes that may be found within this system include:
  - Oak savanna (dominant system).
  - Upland prairie (areas in transition to savanna system).
  - Ecotonal areas (i.e, transition zone between distinct ecological systems) may also include species associated with maple-basswood systems. Wet prairie and sedge meadow systems may also be present where depressions are found within the savanna system.
- **Maple-basswood dominated system** – encompasses the ravines and steeper slopes down to the river. Prototypes that may be found within this system include:
  - Maple-basswood (dominant system).
  - Ecotonal areas may also include species associated with oak savanna and upland prairie systems. Wet prairie and sedge meadow systems may also be present where lowland areas merge with the steeper slopes.
- **Lowland dominated system** – encompasses the limited depressional areas at the base of ravines and drainageways down to the river. Prototypes that may be found within this system include:
  - Wet prairie, sedge meadow, and emergent graminoids are dominant systems.
  - Ecotonal areas may also include species associated with maple-basswood systems. Lowland forest species may also be found in the ecotonal areas.

Figure 5.5 on the next page illustrates these three major systems.

Figure 5.5 – Long range vision for natural resources within the park.



Restoration and Management Strategy

The restoration and management strategy establishes an overall road map toward the realization of a more healthy and vibrant natural landscape. Realistically, implementing the program will require a multi-phased approach spread out over an extended period of time and lock-stepped with funding appropriations and scientific expertise.

The restoration and management strategy establishes an overall road map toward the realization of a more healthy and vibrant natural landscape.

The baseline strategy is to segment the park into manageable units and subunits that can be sequentially restored to higher quality sustainable systems – ultimately resulting in complete restoration of the park. The primary management units are closely aligned with the dominant ecological systems as illustrated in figure 5.1. Within each of these units are subunits of a size that can be effectively managed on a year-to-year basis. This strategy ensures that in any given year restoration activities will be well balanced – ranging from very intensive restoration work in one or two units to less intensive (but vital) ongoing maintenance work in other units that have been previously restored. Importantly, restoration of any new units should only occur when funding for ongoing maintenance of previously restored units can be assured. Otherwise, the value of any new restoration initiatives will be greatly diminished, and perhaps unsuccessful, if the long-term maintenance program is not in place to manage the resource once its been restored.

Phases of the Strategy

The actual restoration of a given unit will occur in phases. Each phase will have distinct objectives toward attaining more diverse and healthy ecological systems within the park. The phased approach also allows for close monitoring of program successes and ensuring that resources invested in the program are appropriately allocated to their greatest value.

In general, three major phases are envisioned for the stewardship program, as defined in the following table.

Phasing Program Table

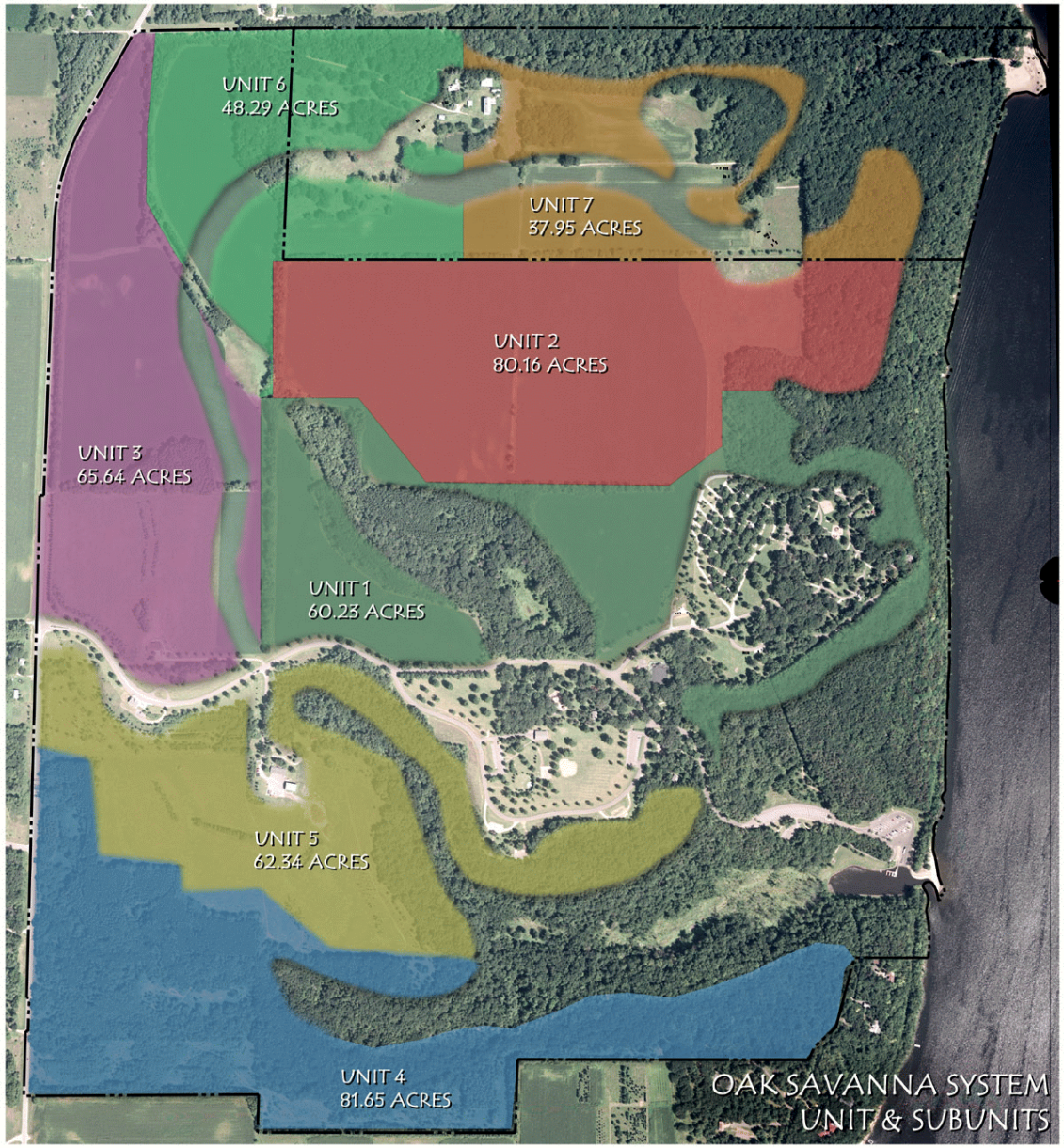
Phase	Overview	Additional Comment
Phase I – Testing and Education Phase	Broadens understanding of restoration needs, options, and opportunities. Also increases local residents' knowledge and understanding of restoration issues. This phase is especially important during the initial implementation phase. As the program matures over time, the need to do extensive testing prior to restoring larger tracks is diminished due to knowledge gained over that time. However, testing of restoration approaches will always remain part of the program as new conditions are encountered.	Small test or demonstration plots are the backbone of the initial testing program. Testing should occur in each ecological unit to test a cross-section of conditions found and to provide wider public exposure to the program. These tests will help determine which restoration practices are best suited for the setting. Likely test and demonstration plots include: ▸ Reduction of invasive shrub cover -- to increase light to the ground layer and stimulate growth. ▸ Regeneration of oak forests -- to stimulate new growth. ▸ Reduction of cool season grasses (and associated duff) -- to stimulate native species soil seed banks. ▸ Reduction of noxious weeds and woody plants -- to give competitive edge to native plant species, instead of invasive, non-native plants (i.e., garlic mustard, buckthorn, tartarian honeysuckle, and reed canary grass). ▸ Reintroduction of ground cover plants and seed -- to reestablish native seeds. ▸ Establishment of native plant nurseries and gardens -- for educational purposes. ▸ Establishment of community outreach programs -- so residents establish a personal stake in the stewardship program. Education plays a key role in the successful implementation of stewardship programs. The public's understanding of what is occurring becomes paramount to their support for the stewardship program. Although primarily for research purposes, the testing programs also serve as in-the-field educational tools. Direct exposure to restoration practices and their impact on the surrounding environment will give park visitors working knowledge of stewardship programs. This approach sets the stage for Phases II and III of the restoration and management plan.
Phase II – Remedial Phase	Involves the major restoration and management tasks and consequently is the more expensive phase. Its focus is on returning the land to the biological and structural conditions necessary for a healthy ecological landscape to emerge and prosper.	The remedial phase employs a variety of restoration techniques in a major effort to restore vegetation and habitat structure and biological diversity and restore ecological and bio-geochemical functions. Tasks undertaken during this phase include reducing introduced nonnative and other undesirable trees and brush, removal of previous debris and substrate fill areas, addressing erosion and other problems, and other general tasks. In some cases, this phase may involve machine/mechanical planting of native plants, including larger trees and other plants. The period of time required to conduct the remedial restoration phase depends on the level of work effort required, condition of the ecological systems, opportunities and constraints (e.g., access, weather, biological response), and level of funding available for the program.
Phase III – Maintenance Phase	Represents the routine tasks that are conducted annually at strategic times to maintain specific ecological and biological objectives set for each unit and subunit.	After significant investments during Phase II, the stewardship program shifts to a lower level of intervention during the maintenance phase. This is inherently less costly and provides an excellent opportunity for long-term citizen and student involvement as volunteers. Once established, the maintenance phase is guided by both regular management techniques and by strategies that are implemented on a rotational basis through identified subunits. It is during the maintenance phase that the restoration plan would become part of the park's general operations and maintenance function. Along with this comes routine training and education of maintenance staff.

Management Units and Subunits

As defined, there are three management units, each of which having a number of subunits, as illustrated in figures 5.6 through 5.8.

436.26 total acres of oak savannas across the site.

Figure 5.6 – Oak savanna management unit and subunits.

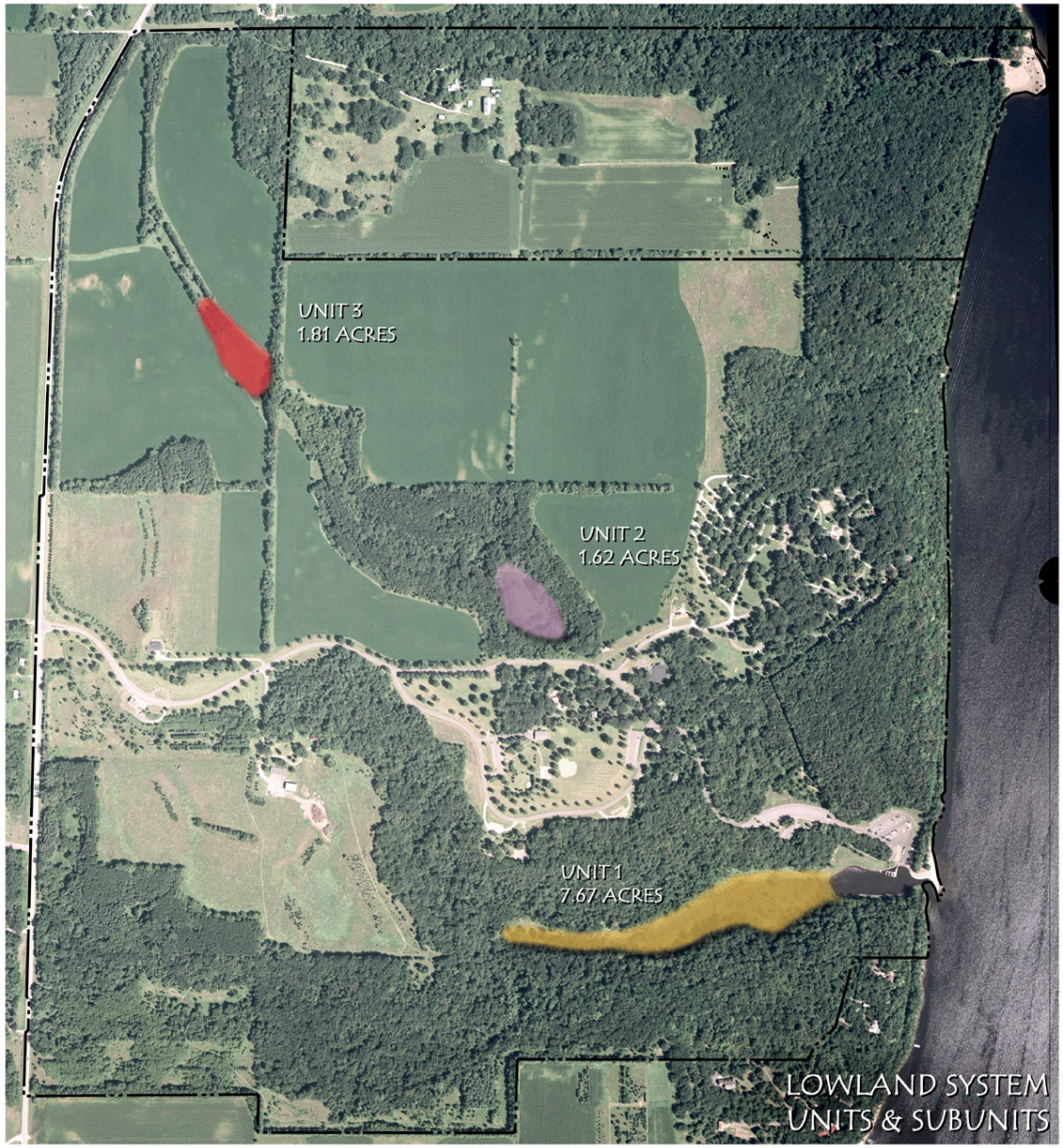


136.74 total acres of maple-basswood forests across the site.

Figure 5.7 – Maple-basswood management unit and subunits.

11.1 total acres of lowlands across the site.

Figure 5.8 – Lowland management unit and subunits.

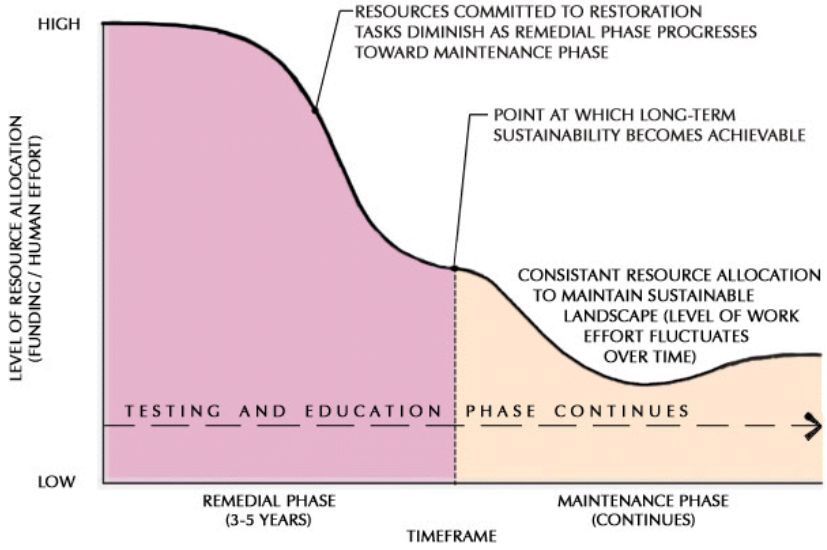


Restoration and Maintenance Strategy for Units and Subunits

For each of these management units and subunits, a specific strategy is envisioned which involves a step-by-step process using a series of restoration and maintenance techniques that are implemented sequentially over a period of time to achieve certain desired results. The techniques are relatively consistent between phases, with the primary distinction between phases lying in the intensity of the work involved to achieve a set of objectives, and the use of one restoration technique over that of another. For example, the initial removal of dense clusters of buckthorn in a given area may require substantial effort during the remedial phase. Under the maintenance phase, continued removal will still be necessary, but require substantially less effort. Figure 5.9 illustrates how the level of restoration effort lessens as the management plan moves from the remedial into the long-term maintenance phase. (Note that the testing/education phase is a precursor to the remedial phase and that it continues indefinitely within the other phases as warranted.)

Figure 5.9 – Work effort required between the remedial and maintenance phases over time.

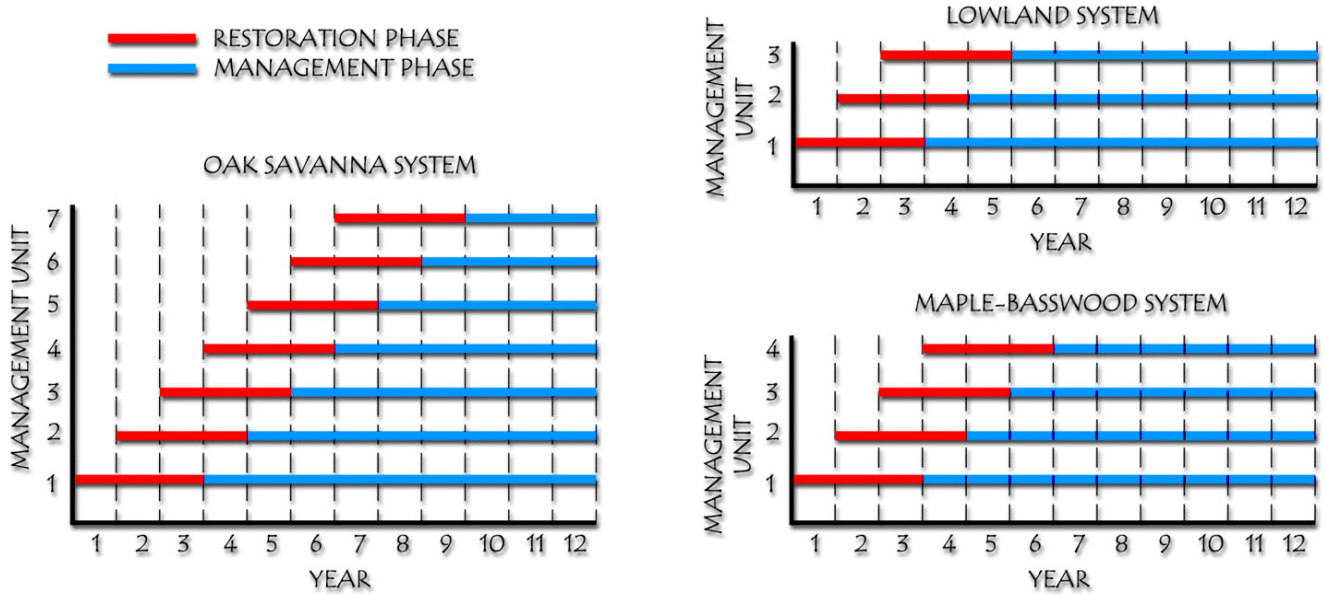
The restoration and management strategy establishes an overall road map toward the realization of a more healthy and vibrant natural landscape.



As figure 5.9 illustrates, the remedial phase can take three to five years to complete. This time frame is highly dependent upon the magnitude of the work involved to complete restoration tasks and the resources committed to this effort. The maintenance phase begins once remedial work is completed and continues on indefinitely at a sustainable level. As illustrated, the work effort under the maintenance phase will fluctuate due to the ever-changing micro conditions found across the site.

The schedule for implementing the stewardship program would be staggered to ensure that the work undertaken in any given year is manageable and affordable. Although the actual timetable would be refined as the program is implemented, the graphs in figure 5.10 illustrate a best case scenario of how the stewardship program for each unit would be staggered over a period of time.

Figure 5.10 – Timetable for restoration of ecological units and subunits. The schedule assumes a three year restoration cycle.



Under this scenario, it would take a minimum of ten years to get all units through the restoration phase, assuming that funding levels would support the level of work effort required each year. In addition, restoration of each ecological system could be concurrent (optimal), consecutive, or staggered.

Restoration and Maintenance Approach for the Dominant Ecological Systems

Although over simplified, the work tasks and techniques involved in restoring and managing the park's natural resources remain relatively consistent between phases and between ecological systems. The following table provides an overview the general restoration approach to each of the dominant ecological systems.

Ecological Unit	Overview of Restoration and Management Approach
Oak Savanna Dominated System	The past use of much of the upland area for agricultural and pastures has left only isolated pockets of remnant oak systems. Even in these areas, non-native species, such as buckthorn, dominate native species to the point where oaks are not regenerating themselves and native grasses are becoming scarce. Under these conditions, reestablishing the oak savanna system can only occur through a well-conceived restoration and management program. It is important that the restoration program focus on restoring an oak savanna system versus a prairie system. The primary issue difference is that caring for the remaining trees and reintroducing oak seedlings and small trees is a top priority in the restoration process and critical to reestablishing a healthy oak system. Given the time frames involved, the earlier this work is completed, the sooner a healthy stand of oaks will be realized. **Generalized Management /Restoration Approach:** 1) Remove invasive non-native and undesirable woody plants and weed species from remaining hedge rows and remnant savanna systems, as well as any non-burnable vegetation. Herbicide treat the stumps of woody plants, especially buckthown, and other non-native grasses to create proper conditions for prescribed burning. Mowing may also be used to prepare area for burning. 2) Undertake prescribed burning on a regular (1-3 year) cycle until native plants respond. 3) Seed with locally collected native plant seeds where native species seed banks are not present or do not respond to the above treatments. Seeding of native prairie grasses and forbs in existing old fields should be conducted by no-till drilling or scattered by hand after prescribed burning. Tillage is not desirable as this could stimulate weed species seeds. 4) Plant seedlings and trees in select locations over a period of time to reestablish a dynamic oak system. 5) Monitor and report results. Adjust program as warranted.
Maple-Basswood Dominated System	The ground cover vegetation in this system is progressively collapsing as time goes on, with fewer and fewer native species being found – especially at the ground level. Native ground cover vegetation in this system is out-competed by an overstocked understory of dense buckthorn. The result is a serious decline in the native soil stabilizing vegetation, which tends to accelerate overland flow of water that causes erosion and poorer water quality in downstream locations. Lack of tree regeneration and virtual dominance by older age classes of oaks, maples, basswoods, and ash is a major ecological concern. The larger trees are beginning to reach pathological maturity and will begin to degenerate rapidly. This is very problematic because these older trees often do not regenerate vegetatively, which leaves little opportunity for the system to "fix itself" through natural processes alone. Human intervention in these systems will be required if they are to be sustainable. **Generalized Management /Restoration Approach:** 1) Herbicide treatment and manual reduction of undesirable introduced woody plants. 2) Remove excessive litter and fallen trees to open up the understory and allow for prescribed burning to take place. 3) Undertake prescribed burning on a regular (1-3 year) rotation. 4) Seed with locally collected native plant seeds where native species seed banks are not present or do not respond to the above treatments. 5) Stimulate hardwood species regeneration through the introduction of acorns and seedlings. 6) Monitor and report results. Adjust program as warranted.
Lowland Dominated System	Significant signs of deterioration of the lowland and wetland systems has been observed, most likely caused by excessive nutrient loading and unnatural fluctuations in water levels from stormwater runoff from upland areas. Of equal importance, the lack of essential management, such as prescribed burning, reduces the diversity of plant life that can compete against more aggressive native and non-native species. As with the other systems, a well-defined and consistent stewardship system is required if the natural qualities of these systems is to be restored. **Generalized Management /Restoration Approach:** 1) Complete a more in-depth investigation of the influences causing these systems to degrade, with specific attention given to managing on-site hydrology and stormwater. 2) Undertake prescribed burning on a regular (1-3 year) rotation. 3) Spray herbicide treatment to reduce existing persistent non-native/undesirable grasses. 4) Seed with locally collected native plant seeds or plugs where native species seed banks are not present or do not respond to the above treatments. 5) Monitor and report results. Adjust program as warranted.

Of the techniques listed, prescribed burning is the single most useful and important management method required for restoring native plant communities.

Overview of Restoration and Maintenance Techniques

As the previous table defines, the stewardship program requires undertaking specific tasks to meet performance criteria and achieve improvements to the ecological systems within the park. Forthcoming is an overview of specialized, yet relatively straightforward, techniques used to carry out specific restoration tasks. Of the techniques listed, prescribed burning is the single most useful and important management method required for restoring native plant communities. The other techniques and strategies are most often used to prepare a site for prescribed burning or as a means to reintroduce proper conditions and species into sites. It is important to underscore that these techniques are used as part of a well-thought out program that considers scientific practicality, costs, and safety.

Prescribed Burning

Prescribed burning is generally defined as: *"the highly controlled use of fire under optimal weather and environmental conditions to achieve specific ecological objectives"*

Wildfire and fires started by indigenous people have for centuries played an important role in the evolution of many biological systems throughout North America. It is now recognized by the scientific community just how essential the role of fire is in maintaining grasslands, wetlands, savannas, barrens, and numerous forest types. It is also recognized that fire suppression can result in gross changes in the aspect, appearance, and ecological functions of these natural systems.

As an example, fire suppression is often followed by a decline in the richness and diversity of native plants and animal species, increased litter, shading, phytotoxin build-up in substrates, decreased availability of essential nutrients and increased homogeneity in habitat structure and spatial heterogeneity. Reduced nutrient cycling and increasing domination by few species often results. In some ecosystems, shifts in wildlife and increases in shade tolerant and less flammable plant species accompany fire suppression, with detrimental effects.

Although prescribed burning has been a primary prairie management tool for some time, it is now recognized that fire also plays a major role in restoring and maintaining other ecological systems as well. Simply stated, no other technique comes close to the impact that this naturally occurring phenomenon has on restoring and preserving natural ecological systems. It is a fundamental component of a restoration program to which there is no reasonable substitute. Conducted by trained personnel, prescribed burning has proven to be very safe and effective.

Weeding and Brushing

Preparing the site for prescribed burning will likely be necessary on sites that have significant restoration needs, especially in locations where invasive species, like buckthorn, are dominant. Weeding and brushing are the primary techniques used where there is dense brush and little combustible fuel. Manual reduction of existing dense shrub growths will be required to open up these areas.

Once the site is opened up, prescribed burning can be used much more effectively. In some systems, weeding and brushing coupled with prescribed burning can successfully liberate long dormant native seed banks and "jump start" the restoration program.

In cases where the direct use of fire is hampered due to non-native cool season grasses being present, pre-burn treatments may be necessary, including:

- Very careful and discriminate use of herbicides -- used where the evergreen growth of some cool season grasses precludes the use of fire. Direct plant contact with a select herbicide has provided quick and safe initial control of these grasses.
- Low mowing of the grasses (0.5 to 1 inch height) -- can reduce green foliage and, after drying, litter can be used as fuel to sustain a low-level fire.

Although the use of herbicides is always kept to a minimum, their use is a fundamental aspect of creating the conditions necessary for restoring native plant communities. Carefully selected herbicides have very low toxicity to humans and wildlife and will not present a threat when used properly. It is applied at prescribed rates by trained and licensed field specialists.

In general, herbicide is applied to cool season grasses after they have reached a height of 5-8 inches and display a new flush of green, actively growing foliage. For invasives like buckthorn, herbicides are applied directly to cut stems and stumps to kill of the root structure. Prescribed fire usually follows 5-15 days after the herbicide treatment or after the mowed grasses are dry enough to burn, which varies depending on weather conditions.

Seed Harvesting and Disbursement / Planting

Field observations suggest that some seed banks may remain present within the park's soils, especially in areas where remnant native plant communities still exist. If carefully fostered, these seed banks can be a major facet of the restoration program and greatly reduce cost and time necessary to reestablish native systems. However, seeds and plants from local sources will also be required to ensure that sufficient quantity and quality exists to undertake a successful restoration program. This is especially the case in the oak savanna and prairie systems, where much of the seed bank may have been lost due to past agricultural uses. In these instances, directly reintroducing native plant species will be necessary to reestablish healthy ecological systems.

For native species that are no longer present within the park, alternative sites for seed harvesting, propagation, cultivation, and collection will have to be identified for eventual redistribution within the park. Wherever possible, seeds and plants should come from sites that are as close to the park as possible, with the outside limit being a 150 mile radius from the park. In the long-term, once native communities are reestablished, the park itself will be its own source for seeds and plants.

Water Resources Management

Fundamentally, the main principle is to manage stormwater using natural infiltration methods.

Water resources management refers to managing stormwater within and adjacent to the park in an ecologically-sound manner that is consistent with the larger ecological vision for the park. Fundamentally, the main principle is to manage stormwater using natural infiltration methods. Under this approach, stormwater runoff from parking lots, roads, buildings, and other built features will be effectively captured and treated prior to reaching downstream wetland, pond, lake, and river systems.

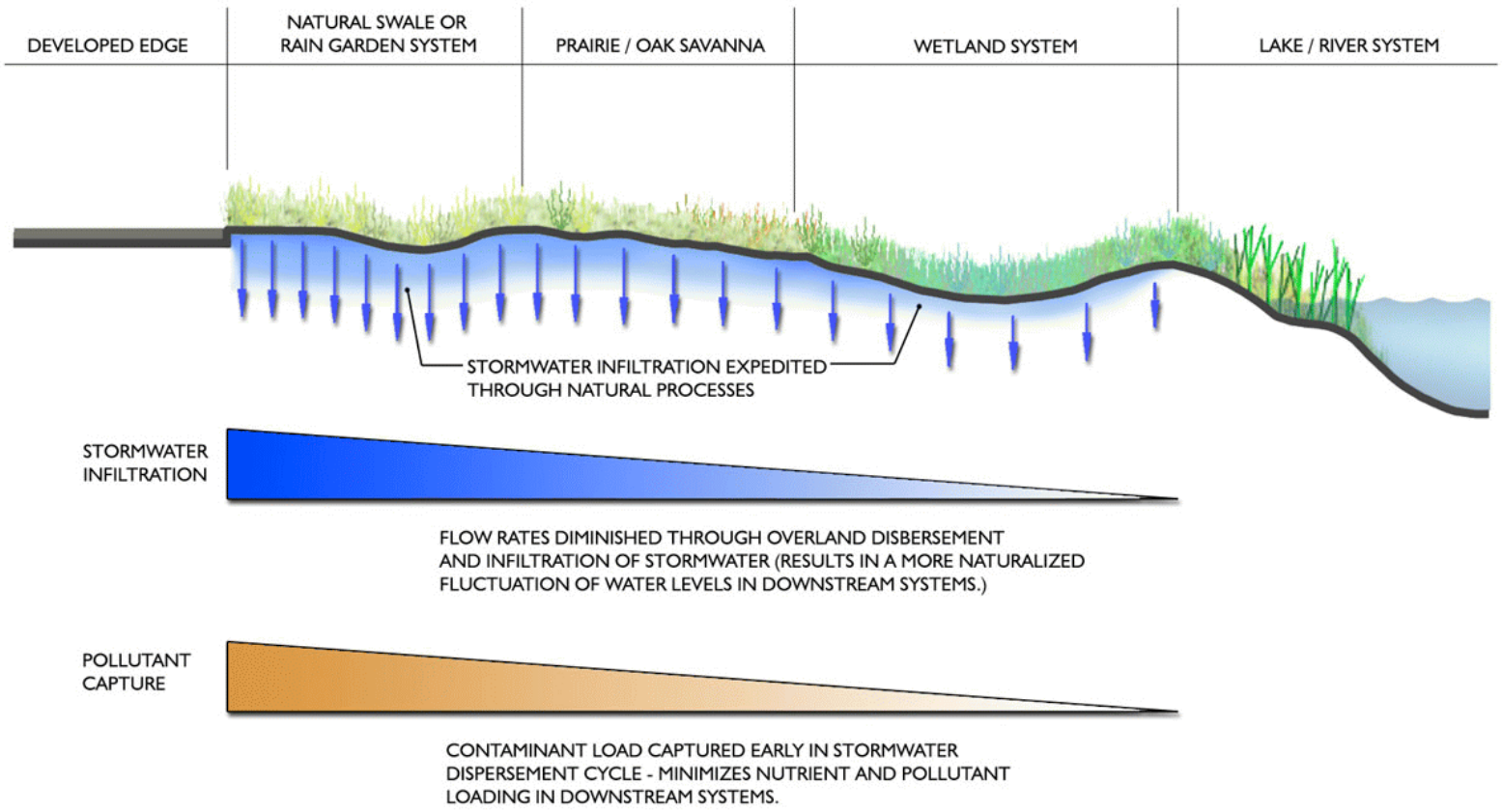
Natural Infiltration Method as an Underpinning for an Ecologically-Based Approach to Stormwater Management

The natural infiltration approach to stormwater management relies on passive, overland routing of runoff, as opposed to storm sewers, engineered ponds, and other built structures. This approach offers a couple of distinct advantages over conventional storm sewer systems:

- Treatment of introduced contaminants picked up by runoff is removed at the initial stages of water flowage rather than being transported to downstream locations and accumulating in wetland, lake, and river systems. This greatly reduces degradation to water quality and vegetative health in downstream systems.
- Stormwater flow rates and volumes more closely emulate natural conditions. This greatly reduces unnatural fluctuations in water levels in downstream systems (wetlands and lakes) and therefore reduces impacts to the natural condition of water systems and vegetation.

Natural infiltration systems typically consist of four primary components, each of which perform in sequence to treat the water before it enters wetlands, lakes, and rivers. Initially, stormwater runoff from the built environment is routed into swales or, more recently, “raingardens”, that are planted with native plants with deep root systems. These swales and raingardens provide initial infiltration and removal of pollutants, as well as convey runoff from developed areas and disburse it across upland and prairie systems. The upland systems (i.e., prairies and oak savannas) are the second component of this method, functioning to convey stormwater as diffused overland flow to the wetland systems that often link directly or indirectly to bordering lakes and rivers. These systems infiltrate a substantial portion of the annual surface runoff volume due to their very deep root system. They also provide additional solids settling and biological treatment. The wetlands are the third component of the natural infiltration method and provide both stormwater detention and biological treatment prior to runoff entering the lake and river systems. The final component is the lake or river, which provides stormwater detention, additional solids settling and biological treatment. Figure 5.11illustrates the principles of the natural infiltration system in graphic form.

Figure 5.11 – Principles of natural infiltration systems.

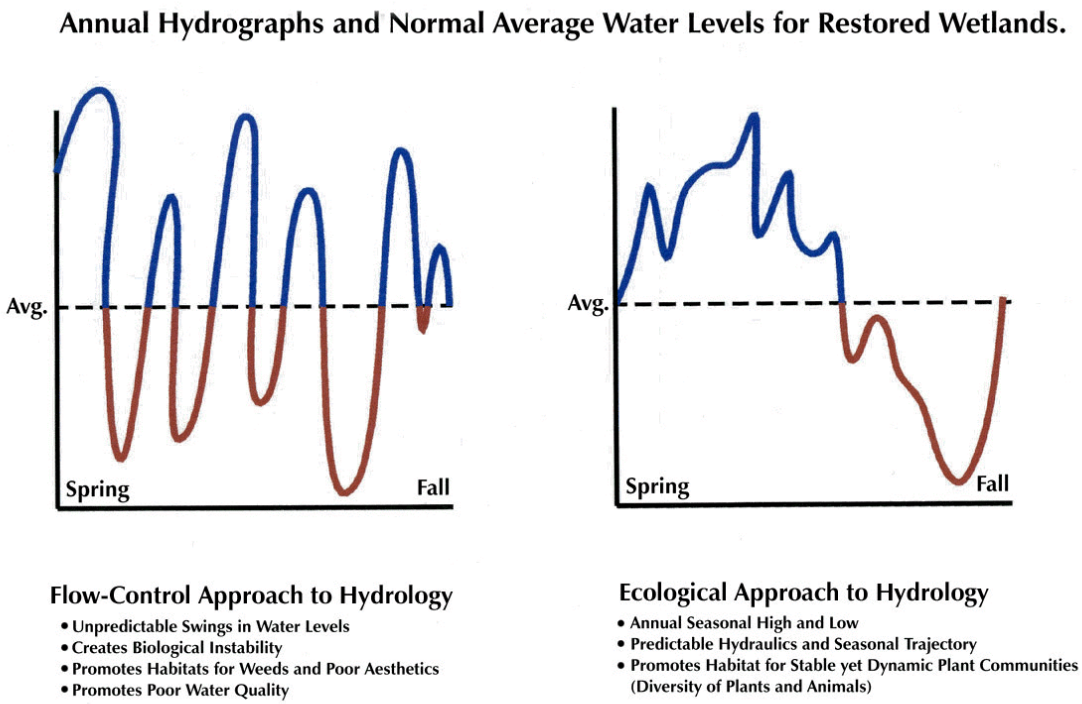


Natural Infiltration Method for Stormwater Management

With respect to stormwater flow rates and volumes, the use of a natural infiltration system produces a much more natural hydrograph with lower peak flows and higher base flows relative to the hydrograph of a typical engineered flow rate control approach. Figure 5.12 is instructive in that it illustrates the difference between a flow rate control and ecological approach to stormwater management.

With respect to stormwater flow rates and volumes, the use of a natural infiltration system produces a much more natural hydrograph with lower peak flows and higher base flows relative to the hydrograph of a typical engineered flow rate control approach.

Figure 5.12 – Annual hydrograph comparison.



Within the context of a regional park, the natural infiltration approach to stormwater management and hydrology is especially desirable given the emphasis placed on maintaining healthy, vibrant natural systems throughout the park.

Application of Best Management Practices for Managing Stormwater

Under the master plan, the natural infiltration approach philosophy to managing stormwater is supported by the application of Best Management Practices that address common development circumstances likely to be encountered as the park is developed/redeveloped. These practices define specific techniques that can be applied to different development scenarios to achieve stated environmental protection objectives. The Metropolitan Council's *"Urban Small Sites Best Management Practice Manual"* provides the basic underpinning for many of the techniques that will be employed wherever applicable as the park development initiatives are undertaken. Note also that newly emerging ecologically-based techniques will also be applied to achieve desired ecological benefits.

The natural infiltration approach philosophy to managing stormwater is supported by the application of Best Management Practices.

Specific techniques envisioned to have application for the park include:

- Minimization of impervious surfacing for parking lots and roadways, including the use of naturally-surfaced areas for overflow/temporary parking.
- Use of infiltration systems (e.g., biofiltration systems, rain gardens, filter strips, swales, and slotted/flat curbs) as part of parking lot and hard surface designs.
- Use of infiltration techniques for managing roof runoff from buildings (e.g., downspout infiltration systems)
- Use of site grading techniques to achieve naturalized infiltration objectives.
- Use of contemporary erosion control techniques to prevent migration of soils during the construction process.
- Limiting the use of maintained turf to the more active use areas.

In addition to the Best Management practices, the master plan is also supported by the Metropolitan Council's *"Model Storm Water Management Ordinance"*, which defines specific approaches to protecting the site's ecological resources, especially wetland systems. The provisions of the model ordinance will be applied to the park's development/redevelopment as applicable.

Conclusions

Preserving natural open space values and ecological health is fundamental to the master plan for St. Croix Bluffs Regional Park.

As a regional park, preserving natural open space values and ecological health is fundamental to the master plan for St. Croix Bluffs Regional Park. Ensuring that these core values are protected, or even enhanced, in future years is of equal importance to developing the park for recreational uses.

The thoughtful development and implementation of natural resource stewardship and water resources management programs is fundamentally important to restoring and preserving natural processes in this park and achieving the vision defined by the master plan and expected by the local citizenry.

Section V

Natural Resources Stewardship and Water Resources Management

Overview

Natural resources stewardship refers to the thoughtful care of ecological systems to preserve their natural qualities and character.

Natural resources stewardship refers to the thoughtful care of ecological systems to preserve or enhance their natural qualities, which are intrinsic to the park's value as a place of natural beauty and respite from the built form. The forthcoming stewardship plan provides a framework for restoring and managing the natural resources within the park.

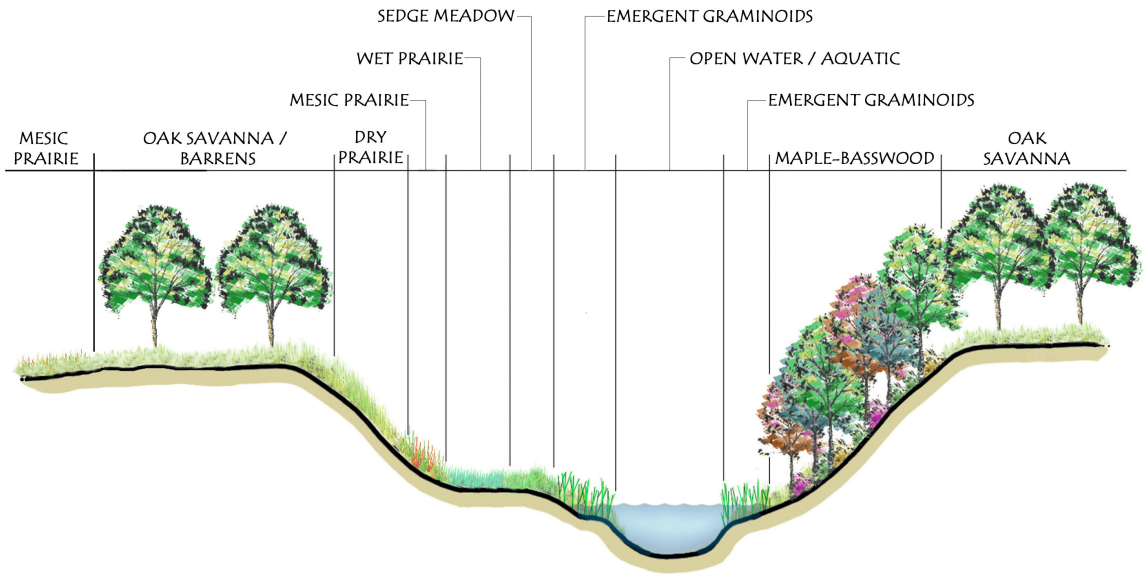
The stewardship plan relies heavily on human intervention as a surrogate for the natural cycles that no longer exist due to past land uses, introduction of invasive alien plants, and cessation of natural phenomenon (e.g., fire) since settlement first occurred. The plan also establishes a vision for water resources management that relies on natural processes, rather than engineered solutions, to manage stormwater runoff.

A Historically Diverse Landscape

Although challenging, realizing a more diverse and healthy natural landscape is achievable and sustainable under a well-defined stewardship program.

Figure 5.1 illustrates the basic relationships between the ecological systems historically found in this region and across the park.

Figure 5.1 – Relationship between selected ecological systems common to the park.



As shown, the diversity of plant assemblages was historically very broad, ranging from aquatic zones along the river and in lowland areas to upland oak savanna and prairie systems. Although challenging, realizing a more diverse and healthy natural landscape is achievable and sustainable under a well-defined stewardship program.

Achievability and Sustainability of Ecological Stewardship Programs

It is important to recognize that restoring and managing ecological systems must be done in a manner that is both achievable and sustainable.

A successful program requires a full understanding of the ecological problems being faced and a defined course of action that is based on science.

From an economic perspective, what is achievable and sustainable is based on the amount of human and economic capital that Washington County and the Metropolitan Council can commit to ecological programs now and in the future.

It is important to recognize that restoring and managing ecological systems must be done in a manner that is both achievable and sustainable. Achievable refers to what is scientifically *and* economically feasible. Sustainable refers to the level to which restoration and management programs can be scientifically *and* economically sustained over an extended period of time. The following considers achievability and sustainability from the two distinct but interrelated perspectives of ecology and economy (human/economic capital).

Ecological Perspective

From an ecological perspective, what is achievable and sustainable is defined in scientific terms based on testing and research. Scientifically, human intervention through well thought-out programs that are carefully implemented over a period of time can help to reverse the current downward trend in the ecological quality of the park's natural systems (as measured by biodiversity and general ecological health). A successful program requires a full understanding of the ecological problems being faced and a defined course of action that is based on science. As defined in this section, human intervention will be required given the current state of alteration that has occurred.

Although dramatic improvements can be made in some cases, restoring the landscape to pre-settlement conditions is not realistic from a scientific perspective. Past impacts to the land since man first settled and introduction of invasive alien plants simply preclude this possibility. However, it is achievable to restore and manage ecosystems to sustainable and productive levels that result in considerable human and ecological value that can be perpetuated for generations to come. The key point here is that Washington County and the regional community must set realistic goals and expectations as to what can be achieved and sustained through restoration and management programs.

Economic (Human/Economic Capital) Perspective

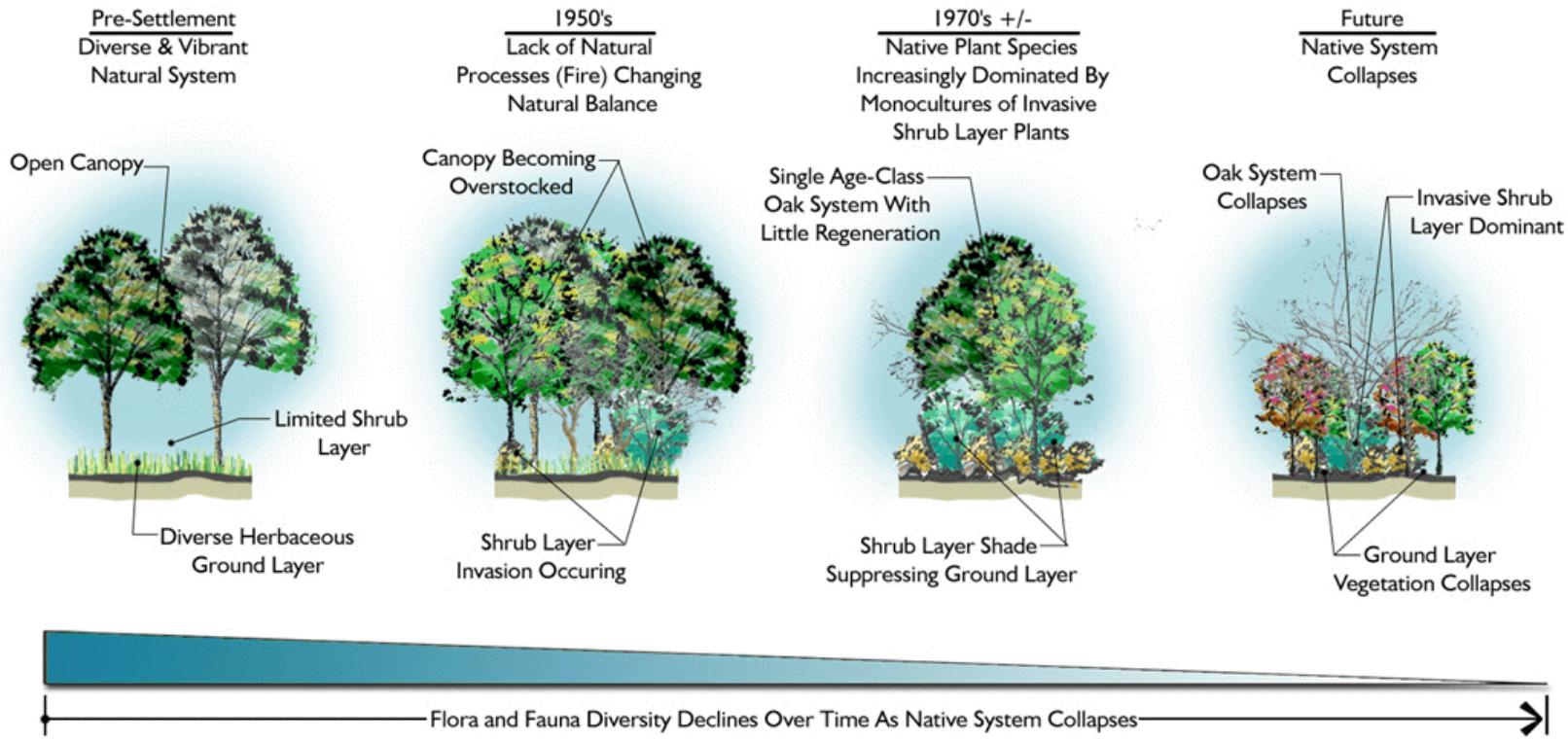
From an economic perspective, what is achievable and sustainable is based on the amount of human and economic capital that Washington County and the Metropolitan Council can commit to ecological programs now and in the future. The importance of this cannot be overstated in that the long-term viability of any ecological program undertaken is directly related to the long-term commitment made to it in terms of human and economic resources. Ultimately, how the collective community values land stewardship and ecological health relative to other quality of life issues will define the extent to which ecological programs can be successfully implemented. Recognizing this, it is critical that Washington County and the Metropolitan Council time ecological programs in a pragmatic and paced manner that keeps pace with available economic resources.

Spectrum of Opportunity for Restoration of Ecological Systems

Without human intervention and conscientious stewardship, it is expected that the overall trend of the ecological systems within the park will be toward continued decline, as measured by bio-diversity and general ecological health. Figure 5.2 graphically illustrates the current trend in a typical oak savanna system found in this and many other midwestern regions.

Without human intervention and conscientious stewardship, it is expected that the overall trend of the ecological systems within the park will be toward continued decline.

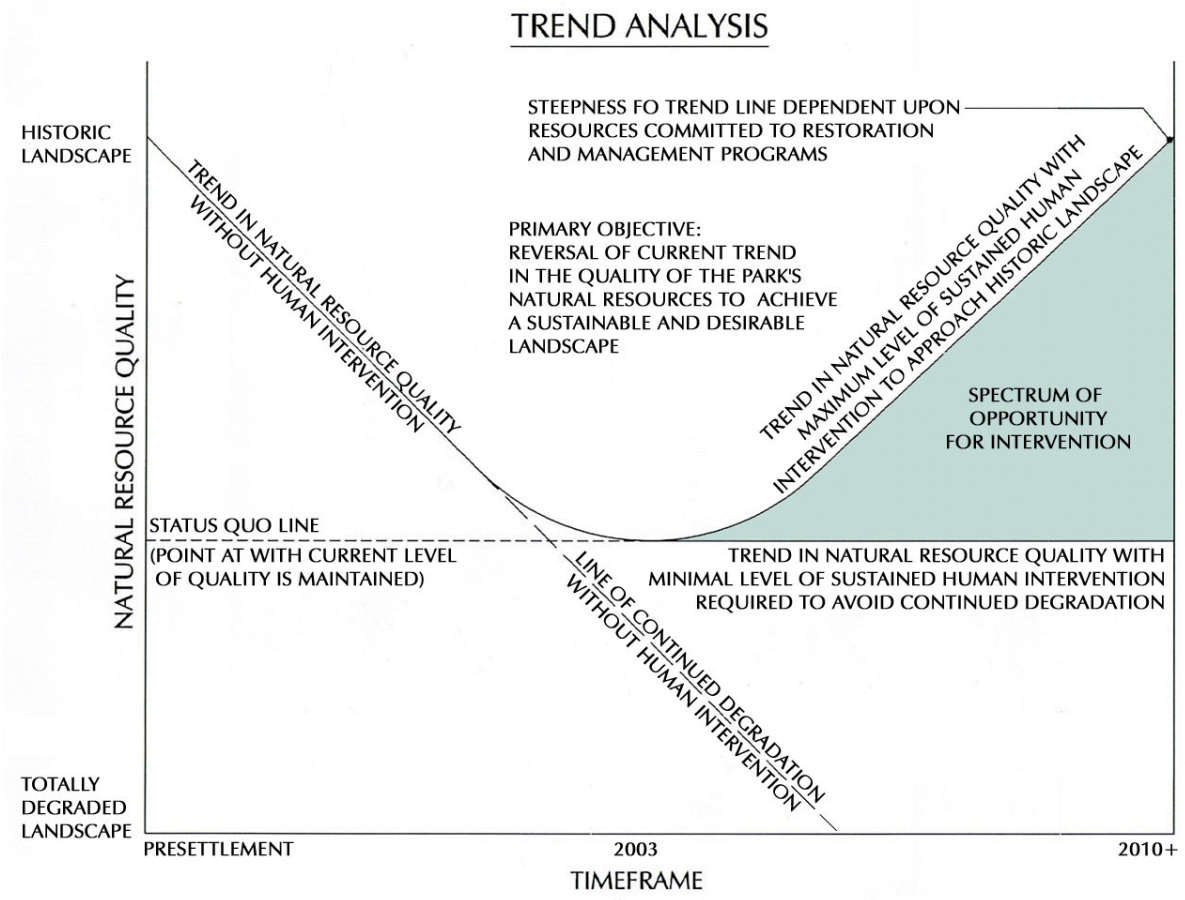
Figure 5.2 – Ecological trend in oak savanna system.



This example is reflective of what is happening to varying degrees in all of the ecological systems found within the park. Although some of the ecological degradation will have lasting affects, there are also many opportunities to forestall further degradation and make substantial progress toward achieving a more sustainable and healthier landscape for future generations to enjoy. Figure 5.3 graphically illustrates the current overall trend in ecological quality, as well as defining the spectrum of opportunity for reversing this trend.

There are many opportunities to forestall further degradation and make substantial progress toward achieving a more sustainable and healthier landscape for future generations to enjoy.

Figure 5.3 - Trend Analysis



The goal of the stewardship program is to first identify restoration and management needs in detailed scientific terms and then define strategies that can reverse these trends. The framework presented here recommends that Washington County seek to achieve a sustainable landscape quality, which is defined as the point at which the parks division can *indefinitely* maintain a certain acceptable level of resource quality within the context of realistic limits – which is contingent upon two primary factors:

- Public understanding of and commitment to natural resource preservation and stewardship programs.
- Undertaking ecological restoration and management programs that are scientifically sound.

Natural Resource Stewardship Philosophy

The plan outlined here promotes an ecosystem-based approach to restoration and management.

The framework presented here promotes an ecosystem-based approach to restoration and management. An ecosystem is essentially where things live and represents an interacting group of physical elements (soils, water, plants, animals, etc.) that inhabit a particular place. All of these elements and their interactions need to be considered in developing goals and plans for management. Ecosystem-based management views people as part of the community, and that maintaining a healthy ecosystem is the best way to meet human needs as well as those of other organisms in the community. General goals of this philosophy are to:

- Protect or enhance the health of the ecosystems in St. Croix Bluffs Regional Park.
- Enhance the biological diversity of its native habitats.
- Provide an appropriate balance between resource preservation and recreational use.

Through a well-defined stewardship program and a concerted, ongoing effort by Washington County, a certain level of confidence can be gained that the current ecological conditions and trends can be reversed and a more sustainable and higher quality landscape achieved. Note, however, that stewardship programs also need to be flexible due to the changing nature of the living systems addressed by the plan. For these reasons, the framework presented here should be viewed as being neither conclusive nor absolute. It is a starting point in an ongoing process that relies on monitoring and research to provide feedback on program effectiveness.

Ecological Prototypes for Unaltered and Altered Ecological Systems

Ecological prototypes are defined along topographic, soil type and hydrological gradients from high-dry uplands to lowlands and river or lake edges.

In this context, ecological prototypes refer to vegetative species models for the various natural systems found within the park. Prototypes assist restoration and management efforts by helping compare existing conditions against measurable criteria for healthy systems and in recognizing possible causative agents that result in ecological changes. By recognizing what a healthy system looks like, specific targets or models for management and restoration programs can be developed and implemented.

Ecological prototypes are defined along topographic, soil type and hydrological gradients from high-dry uplands to lowlands and river or lake edges. Based on an initial review of the park, both unaltered and altered ecological prototypes can be found – although unaltered systems are limited to isolated pockets. In unaltered areas, depending on soil types and hydrology, different plant and animal communities have developed over long periods of time and have persisted even to present day under less than ideal circumstances. On these same soil types, alteration of land use and hydrology along with cessation of natural processes have created changes in the plant (and animal) communities. Each of the unaltered and altered types of plant and animal communities fall within a definable ecological prototype, or in sum cases, in the ecotonal (i.e., transitional) area between prototypes.

The following descriptions define some of the more typical and definable prototypes for healthy (unaltered) and unhealthy (altered) ecological systems found within the park. Figure 5.1 on page 5.1 provided a character sketch of how these selected prototypes relate to each other. Lacking greater technical evaluation and in-field research, the prototypes presented here serve as a starting point as Washington County moves forward with its stewardship program. Although these prototypes are not exhaustive, they do articulate the fundamental qualities between healthy and unhealthy ecological systems found within the park.

Historic Oak Savanna

Healthy Systems

General Structure

- Semi-open to open tree canopy
- Multiple age classes of trees
- Dominant cover of native grasses, sedges, and forbs
- Natural oak regeneration
- Sporadic native shrub layer
- High light levels interspersed with partial/isolated shade

Soils Profile/Topography/Hydrology

- Well drained silt, clay and sand loams, gravelly sands, alluvium glacial features
- Higher and dry sites, and moist, well drained soils

Indicator Species of Healthy System

- Bur oak
- Northern pin oak
- White oak
- Savanna groundlayer species

Associated Species

- Pennsylvania sedge
- Silky and Virginia wild rye
- Bottlebrush grass
- Other sedges
- American hazelnut
- Little bluestem

Unhealthy Systems

General Structure

- Continuous, closed canopy
- Dense layer of non-native shrubs
- Bare, eroding soil
- Low light levels, predominant dense shade
- No oak regeneration
- Few or no young age classes of trees
- Lack of native groundcover vegetation
- Encroachment by development or agriculture

Indicator Species of Unhealthy System

- European buckthorn
- Tartarian honeysuckle
- Black locust
- Boxelder
- European brome, Kentucky bluegrass, and other non-native grasses
- Agricultural weed species and brambles

Protection and Management Considerations

Causes of Change

- Cessation of historic fire regimes
- Destruction due to urban development
- Invasion of competing non-native shrubs
- Encroachment of adjacent development with associated pollutants
- Intensive grazing and agricultural practices
- Change in hydrologic regime (drier or wetter)

Restorative Capacity

- Highly restorable under well-designed and implemented restoration and management program
- Highly disturbed sites may require replanting of native species, especially ground cover, if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection beyond that of existing wetland ordinances
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Maple-Basswood Forest

Healthy Systems

General Structure
- Mixed canopy of oaks, ash, maple, and basswood
- Predominated by cool season grass and sedge ground cover

Soils Profile/Topography/Hydrology
- Found in isolated or protected locations, steep draws, and on landscape islands
- Topography ranges from level ground to rolling and steep grades
- Loam and fine sandy loam

Indicator Species of Healthy System
- Basswood
- Sugar maple
- Red oak
- Green ash
- Ironwood
- Woodland sedges
- Spring wildflowers (trilliums and spring beauty)

Associated Species
- Sedges, such as Pennsylvania sedge
- Shrubs, such as pagoda dogwood

Unhealthy Systems

General Structure
- Shift to even canopy, with limited age groups of trees
- Dense understory
- Bare soil after spring ephemerals die back
- Noticeable soil erosion

Indicator Species of Unhealthy System
- Boxelder
- European buckthorn
- Canary grass
- Motherwort
- Thistles
- Burdock
- Rough bedstraw
- Stinging nettles

Protection and Management Considerations

Causes of Change
- Cessation of light ground fires
- Loss of seedbank and erosion
- Weed invasion and agricultural practices
- Altered hydrology, whether drier or wetter
- Logging disruption of composition, structure, light, and nutrient regimes
- Livestock grazing causing weeds and tree damage

Restorative Capacity
- Highly restorable under well-designed and implemented restoration and management program
- Highly disturbed sites may require replanting of native species if native seed bank is absent

Protection Strategy
- Adopt land development practices that place a high priority on ecological protection
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Upland Prairie Systems

Healthy Systems

General Structure

- High biodiversity – plants, insects, birds, and other animals
- High diversity of native plant species
- Predominance of warm-season grass species
- Natural succession and progression toward conservative species
- Full to nearly full sun
- Drought tolerant

Soils Profile/Topography/Hydrology

- Moderate to well drained, fine textured sands and sandy loams
- Higher and dry sites, most often associated with flat terraces or gentle slopes

Indicator Species of Healthy System

- Big bluestem
- Little bluestem
- Side-oats grama
- Purple prairie clover
- Leadplant
- Sky blue aster
- Prairie coreopsis
- Partridge pea
- Flowering spurge
- Blue giant hyssop
- Compass plant
- Prairie dock

Associated Species

- Literally hundreds of associated species

Unhealthy Systems

General Structure

- Low biodiversity – plants, insects, birds, other animals
- Predominance of weedy, non-native vegetation
- Absence of ecological functions
- Loss of water infiltration
- High soil erosion potential
- Invasion by woody species
- Nutrient enrichment
- Tile drained or ditched, resulting in altered hydrology

Indicator Species of Unhealthy System

- European brome and other non-native grasses
- Ragweed
- Mare's tail
- Queen Anne's lace
- Canada thistle
- Wild parsnip
- Woody species such as sumac, black cherry, boxelder, and Siberian elm

Protection and Management Considerations

Causes of Change

- Introduction of post settlement agriculture practices and livestock grazing
- Soil disturbance from urban development
- Cessation of periodic fire
- Invasion of competitive, non-native plants
- Change in hydrologic regime (wetter or drier)

Restorative Capacity

- Highly restorable under well-designed and implemented restoration and management program
- Highly disturbed sites may require replanting of native species if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection beyond that of existing wetland ordinances
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Wet Prairie Remnants

Healthy Systems

General Structure

- Patchy, patterned plant communities reflecting soil and hydrological gradients
- High biodiversity – plants, insects, birds, and animals
- High diversity of native grasses and forbs
- Predominance of native grass, sedge, and forb species of low, moist-to-wet soils
- Natural succession and progression toward conservative species
- High groundwater table and often groundwater-based hydrology
- Full to nearly full sun

Indicator Species of Healthy System

- Prairie cordgrass
- Canada bluejoint
- New England aster
- Virginia mountain-mint

Associated Species

- Extensive variety of other native grasses, sedges, and forbs

Soils Profile/Topography/Hydrology

- Shallow organic soils
- Soils are saturated in the spring and dry out as year progresses

Unhealthy Systems

General Structure

- Altered hydrology due to de-watering
- Heavy invasion by woody growth
- Invasion by non-native reed canary grass
- Homogenous vegetation and low pattern of diversity

Indicator Species of Unhealthy System

- Reed canary grass
- European buckthorn
- Glossy buckthorn
- Overstocked dogwoods
- Purple loosestrife
- Stinging nettles
- Redtop

Protection and Management Considerations

Causes of Change

- Draining of soils for agriculture tillage
- Cessation of wild fire and overgrazing
- Hydrologic changes due to urban development and a change to surface water rather than groundwater dependent hydrology
- Nutrient enrichment from dewatered substrates and offsite introduction
- Salt and fertilizer loading

Restorative Capacity

- Potential to be restorable under well-designed and implemented restoration and management program in cases where off-site factors can be controlled
- Highly disturbed sites may not be realistically restored due to extent of past degradation and uncontrollable off-site factors
- Restoration may require replanting of native species if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection, with a particular focus on upland buffer systems and natural infiltration systems
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Sedge Meadow Remnants

Healthy Systems

General Structure

- High biodiversity – plants, insects, birds, and animals
- High diversity of native sedges and forbs
- Domination by sedges, rushes, reeds and grasses

Soils Profile/Topography/Hydrology

- High groundwater table
- Shallow to moderate organic substrates

Indicator Species of Healthy System

- Tussock sedge
- Lake sedge
- Canada bluejoint
- Wool grass
- Marsh milkweed
- Swamp aster
- Sawtooth sunflower

Associated Species

- Swamp dock

Unhealthy Systems

General Structure

- Altered hydrology due to de-watering or too much water
- Heavy invasion by woody growth
- Invasion by non-native reed canary grass

Indicator Species of Unhealthy System

- Glossy buckthorn
- Reed canary grass
- Overstocked dogwoods
- Purple loosestrife

Protection and Management Considerations

Causes of Change

- Sediment, nutrient and contaminant loading from disturbed uplands
- Soil disturbance from development
- Cessation of periodic fire
- Invasion of competitive, non-native plants
- Change in hydrologic regime (wetter or drier)

Restorative Capacity

- Potential to be restorable under well-designed and implemented restoration and management program in cases where off-site factors can be controlled or mitigated
- Highly disturbed sites may not be realistically restored due to extent of past degradation and uncontrollable off-site factors
- Restoration may require replanting of native species if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection, with a particular focus on upland buffer systems and natural infiltration systems
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Emergent Graminoids (Sedges, Grasses, and Rushes)

Healthy Systems

General Structure

- Shallow, open water communities
- Water depths less than 2 meters (6.6 feet)
- Emergent, submergent, floating and floating-leaved aquatic vegetation
- Presence of habitat and communities of waterfowl, amphibians, fish, furbearing mammals and invertebrates

Soils Profile/Topography/Hydrology

- Sand and gravels or shallow bedded organic matter

Indicator Species of Healthy System

- Bur-reed
- Arrowhead
- Bulrushes
- Water plantain
- Pondweeds
- Water lilies
- Coontail

Associated Species

- Various sedges and native shrubs

Unhealthy Systems

General Structure

- Sustained high water levels or drastic level changes
- Nutrient, sediment and toxic chemical loading from uplands and roadways
- Dominance by cattail, giant reed grass, and reed canary grass

Indicator Species of Unhealthy System

- Purple loosestrife
- Cattail
- Giant reed grass
- Reed canary grass
- Eurasian water milfoil
- Duckweed
- Excessive bulrushes

Protection and Management Considerations

Causes of Change

- Increased runoff due to upland development
- Damming and impoundment of waters
- Industrial and agricultural runoff
- Nutrient enrichment

Restorative Capacity

- Potential to be restorable under well-designed and implemented restoration and management program in cases where off-site factors can be controlled or mitigated
- Highly disturbed sites may not be realistically restored due to extent of past degradation and uncontrollable off-site factors
- Restoration may require replanting of native species if native seed bank is absent

Protection Strategy

- Adopt land development practices that place a high priority on ecological protection, with a particular focus on upland buffer systems and natural infiltration systems.
- Implement an annual, long-term restoration and management plan
- Protect historic hydrologic regime/systems

Refinement of Ecological Prototypes

As part of the prototype refinement process, Washington County Parks is encouraged to utilize the Minnesota Department of Natural Resources' Minnesota Land Cover Classification System (MLCCS) where it has application as part of the stewardship program. This classification system, which is very extensive, is useful for defining natural ecosystems (although it is a bit more limiting in addressing developed or agricultural systems). Whereas this classification system was used for the *Natural Resource Inventory for Denmark Township* as defined in Section III and provides the baseline information needed to guide the master planning purposes, additional refinement using the MNDNR system will be required as the master plan moves from planning into implementation.

Effect of Healthy and Unhealthy Ecological Systems on Wildlife

As would be expected, there is a marked affect on the species richness of wildlife when ecological systems become degraded.

As would be expected, there is a marked effect on the species richness of wildlife when ecological systems become degraded. What is perhaps not expected is the degree of decline that can entail. To illustrate this point, the forthcoming table defines the decline of breeding bird species between healthy and unhealthy ecological systems.

Breeding Bird Species Associated with Healthy Ecological Systems

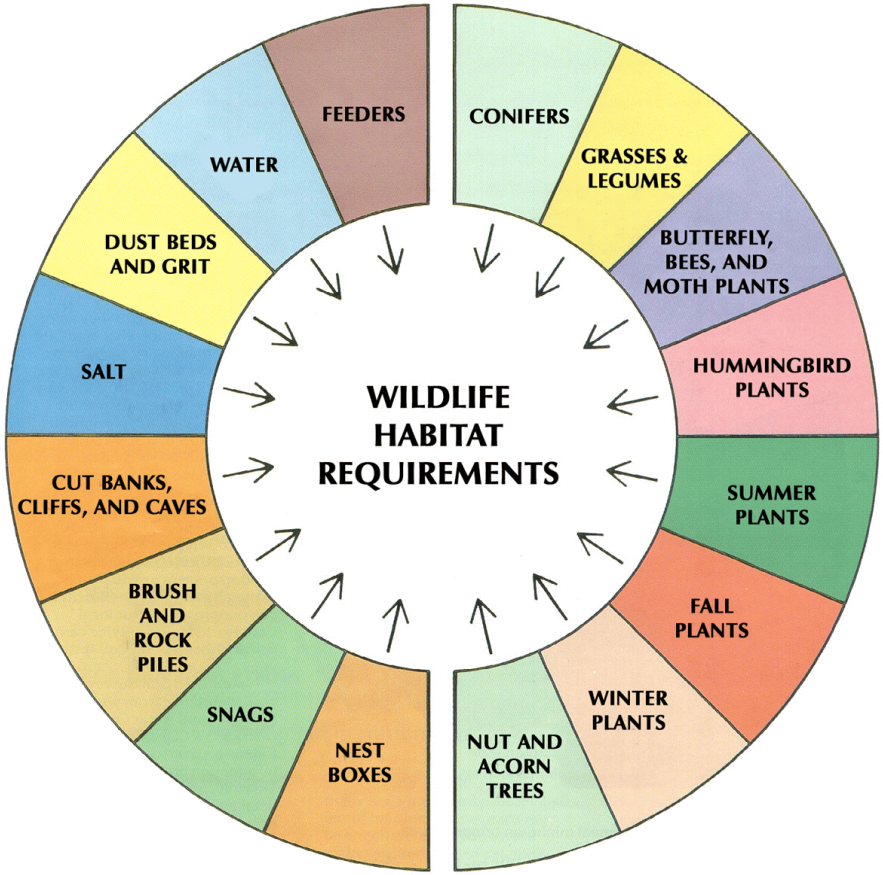
Prairie	Sedge Meadow	Emergent	Savanna	Lakes
Bobolink	Yellow warbler	Herons	Flicker	Tern
Blue bird	Willow fly catcher	Rails	Bluebird	Cormorant
Brown-headed cowbird	Yellow throat	Ducks, grebes	G. crested flycatcher	Merganser
Grasshopper sparrow	Red winged blackbird	Swamp sparrow	Robin	Duck
Vesper sparrow	Goldfinch	Red winged blackbird	Catbird	Grebe
Western meadow lark	Swamp sparrow	Sora rail	Cardinal	Coot
Song sparrow	Short/long billed marsh wren	Mallard	Blue jay	
Gold finch	Kingbird	Grackle	W. B. nuthatch	
King bird		Canada goose	Warbling vireo	
		Yellow headed blackbird		
		Kingbird		
20-30 species	**15-20 species**	**30-40 species**	**20-30 species**	**20-30 species**

Breeding Bird Species Associated with Unhealthy Ecological Systems

Corn Field	Cattail and Canary Grass	Degraded Savanna	Lakes
Horned lark	Red winged blackbird	Robin	Mallard
House sparrow	Mallard	Cardinal	Canada goose
	Canada geese	Starling	Coot
	Herons		
4-6 species	**5-10 species**	**5-10 species**	**5-10 species**

As the last table clearly illustrates, the decline in bird species can be quite steep as ecological systems transition from biologically healthy to unhealthy. When considering the needs of wildlife, healthy, natural ecological systems provide the essential components for wildlife to flourish. Unhealthy systems, on the other hand, do not provide for the basic needs of wildlife because many of these components are lacking,. Figure 5.4 defines the essential components of wildlife habitat.

Figure 5.4 – Sixteen components of wildlife habitat. (Source: Landscaping for Wildlife, published by the MNDNR.)



When these components are lacking or degraded relative to a healthy system, the diversity of wildlife found within the park will be diminished.

When these components are lacking or degraded relative to a healthy system, the diversity of wildlife found within the park will diminish. While certain species of wildlife can flourish under degraded conditions, they often do so at the expense of other species that historically would have frequented the park.

Natural Resources Stewardship Program

The stewardship program establishes the long range vision for restoring and managing the natural ecological systems within the park.

The stewardship program establishes the long range vision for restoring and managing the natural ecological systems within the park. This includes defining:

- The long range vision for natural resources within the park.
- A restoration and management strategy to achieve that vision.
- The typical phases associated with implementing the strategy.
- The standard restoration techniques used within each phase of implementation.

The following considers each of these aspects of the stewardship program – each of which being critical to creating a vibrant natural landscape quality that is indefinitely sustainable.

Long Range Vision for Natural Resources Within the Park

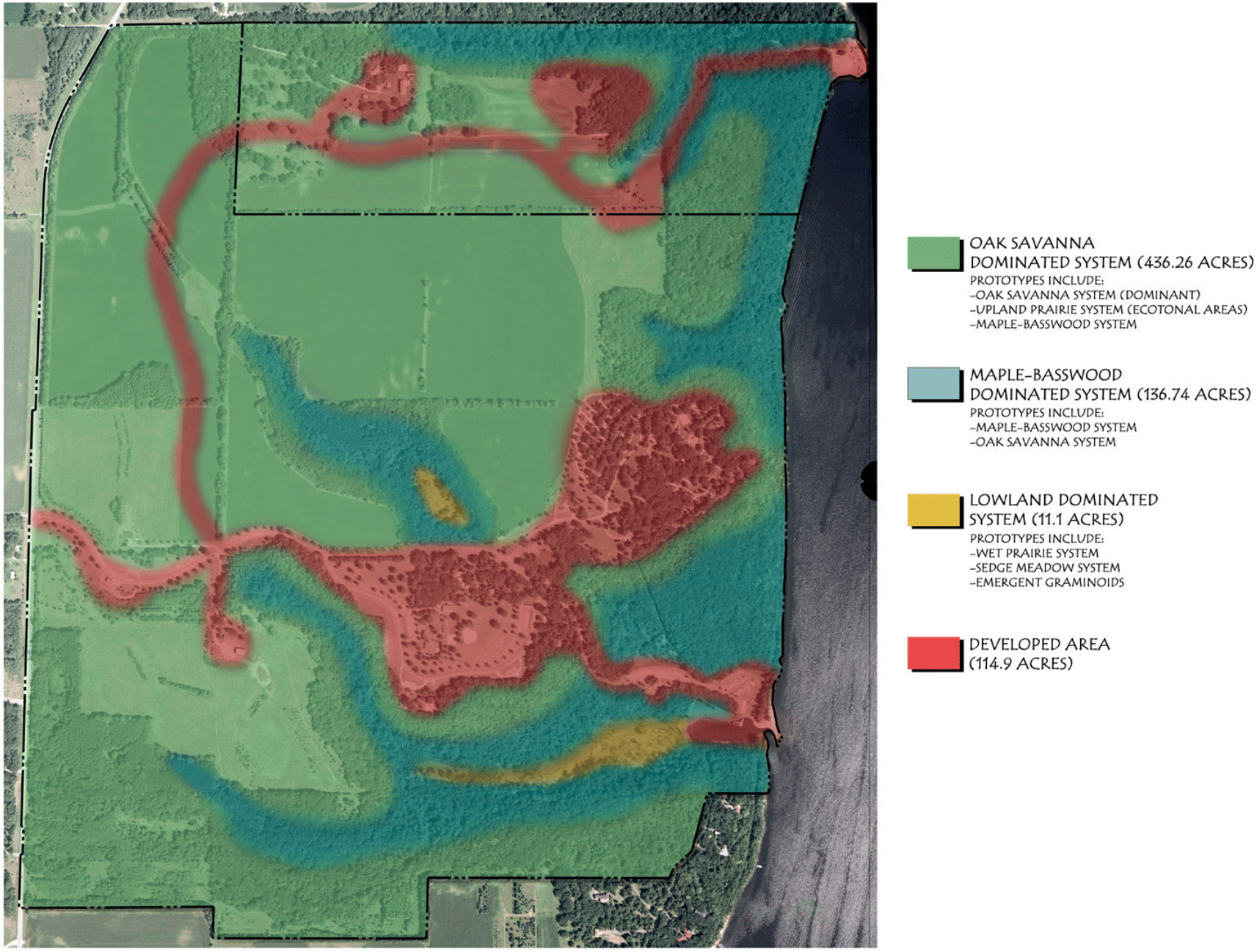
As defined in Section IV, the park was historically dominated by oak savanna (barrens) systems, with several other systems also being common to the area. The long range vision for the park is to reestablish these systems to the extent possible within the context of inherent ecological and economic limitations.

Although there are many ecological nuances within the park, there are three dominant ecological systems that define its overall natural character. This includes:

- **Oak savanna dominated system** – encompasses the upland areas outside of the ravines and steeper slopes down to the river. Prototypes that may be found within this system include:
  - Oak savanna (dominant system).
  - Upland prairie (areas in transition to savanna system).
  - Ecotonal areas (i.e, transition zone between distinct ecological systems) may also include species associated with maple-basswood systems. Wet prairie and sedge meadow systems may also be present where depressions are found within the savanna system.
- **Maple-basswood dominated system** – encompasses the ravines and steeper slopes down to the river. Prototypes that may be found within this system include:
  - Maple-basswood (dominant system).
  - Ecotonal areas may also include species associated with oak savanna and upland prairie systems. Wet prairie and sedge meadow systems may also be present where lowland areas merge with the steeper slopes.
- **Lowland dominated system** – encompasses the limited depressional areas at the base of ravines and drainageways down to the river. Prototypes that may be found within this system include:
  - Wet prairie, sedge meadow, and emergent graminoids are dominant systems.
  - Ecotonal areas may also include species associated with maple-basswood systems. Lowland forest species may also be found in the ecotonal areas.

Figure 5.5 on the next page illustrates these three major systems.

Figure 5.5 – Long range vision for natural resources within the park.



Restoration and Management Strategy

The restoration and management strategy establishes an overall road map toward the realization of a more healthy and vibrant natural landscape. Realistically, implementing the program will require a multi-phased approach spread out over an extended period of time and lock-stepped with funding appropriations and scientific expertise.

The restoration and management strategy establishes an overall road map toward the realization of a more healthy and vibrant natural landscape.

The baseline strategy is to segment the park into manageable units and subunits that can be sequentially restored to higher quality sustainable systems – ultimately resulting in complete restoration of the park. The primary management units are closely aligned with the dominant ecological systems as illustrated in figure 5.1. Within each of these units are subunits of a size that can be effectively managed on a year-to-year basis. This strategy ensures that in any given year restoration activities will be well balanced – ranging from very intensive restoration work in one or two units to less intensive (but vital) ongoing maintenance work in other units that have been previously restored. Importantly, restoration of any new units should only occur when funding for ongoing maintenance of previously restored units can be assured. Otherwise, the value of any new restoration initiatives will be greatly diminished, and perhaps unsuccessful, if the long-term maintenance program is not in place to manage the resource once its been restored.

Phases of the Strategy

The actual restoration of a given unit will occur in phases. Each phase will have distinct objectives toward attaining more diverse and healthy ecological systems within the park. The phased approach also allows for close monitoring of program successes and ensuring that resources invested in the program are appropriately allocated to their greatest value.

In general, three major phases are envisioned for the stewardship program, as defined in the following table.

Phasing Program Table

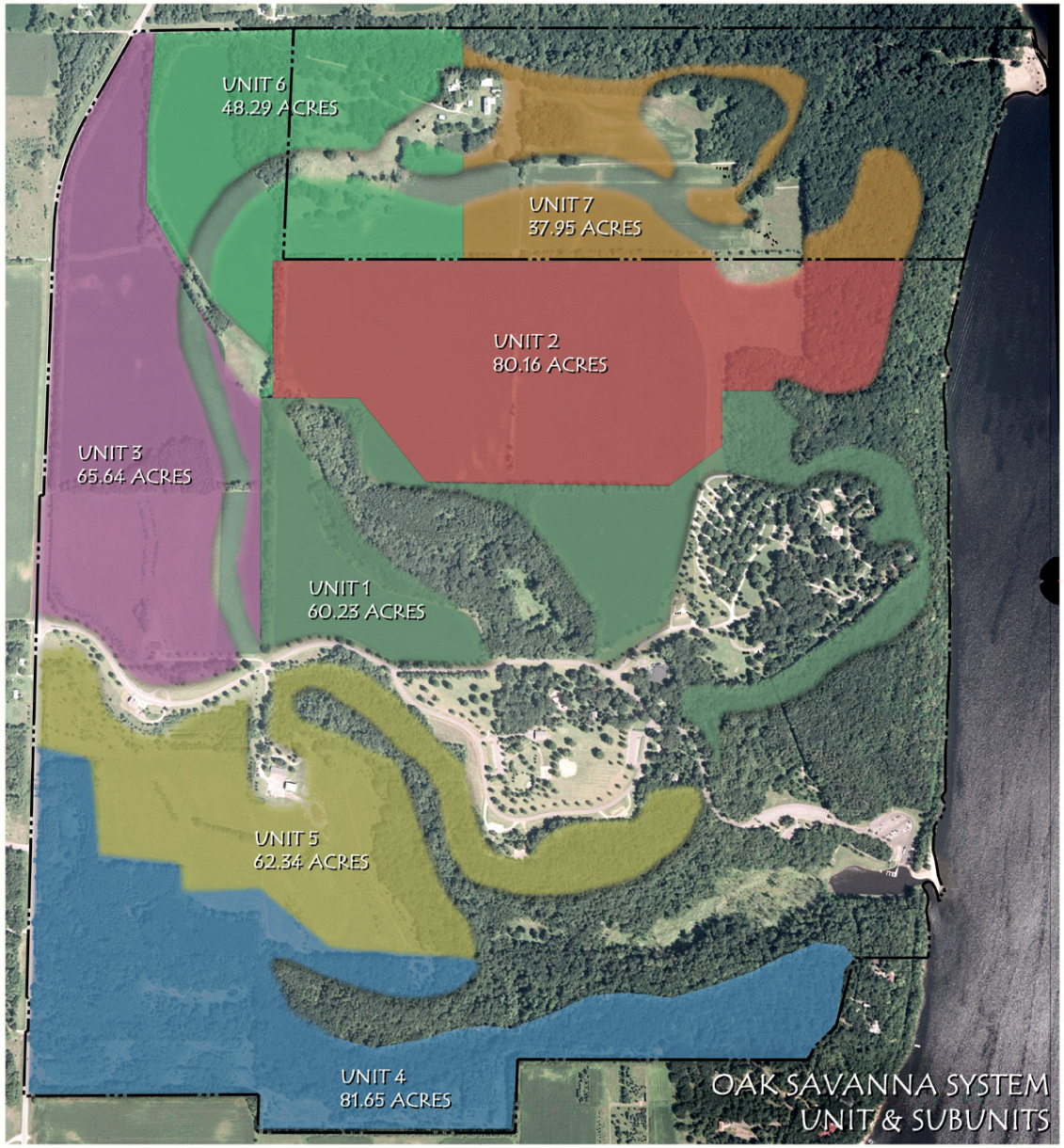
Phase	Overview	Additional Comment
Phase I – Testing and Education Phase	Broadens understanding of restoration needs, options, and opportunities. Also increases local residents' knowledge and understanding of restoration issues. This phase is especially important during the initial implementation phase. As the program matures over time, the need to do extensive testing prior to restoring larger tracks is diminished due to knowledge gained over that time. However, testing of restoration approaches will always remain part of the program as new conditions are encountered.	Small test or demonstration plots are the backbone of the initial testing program. Testing should occur in each ecological unit to test a cross-section of conditions found and to provide wider public exposure to the program. These tests will help determine which restoration practices are best suited for the setting. Likely test and demonstration plots include: ▸ Reduction of invasive shrub cover -- to increase light to the ground layer and stimulate growth. ▸ Regeneration of oak forests -- to stimulate new growth. ▸ Reduction of cool season grasses (and associated duff) -- to stimulate native species soil seed banks. ▸ Reduction of noxious weeds and woody plants -- to give competitive edge to native plant species, instead of invasive, non-native plants (i.e., garlic mustard, buckthorn, tartarian honeysuckle, and reed canary grass). ▸ Reintroduction of ground cover plants and seed -- to reestablish native seeds. ▸ Establishment of native plant nurseries and gardens -- for educational purposes. ▸ Establishment of community outreach programs -- so residents establish a personal stake in the stewardship program. Education plays a key role in the successful implementation of stewardship programs. The public's understanding of what is occurring becomes paramount to their support for the stewardship program. Although primarily for research purposes, the testing programs also serve as in-the-field educational tools. Direct exposure to restoration practices and their impact on the surrounding environment will give park visitors working knowledge of stewardship programs. This approach sets the stage for Phases II and III of the restoration and management plan.
Phase II – Remedial Phase	Involves the major restoration and management tasks and consequently is the more expensive phase. Its focus is on returning the land to the biological and structural conditions necessary for a healthy ecological landscape to emerge and prosper.	The remedial phase employs a variety of restoration techniques in a major effort to restore vegetation and habitat structure and biological diversity and restore ecological and bio-geochemical functions. Tasks undertaken during this phase include reducing introduced nonnative and other undesirable trees and brush, removal of previous debris and substrate fill areas, addressing erosion and other problems, and other general tasks. In some cases, this phase may involve machine/mechanical planting of native plants, including larger trees and other plants. The period of time required to conduct the remedial restoration phase depends on the level of work effort required, condition of the ecological systems, opportunities and constraints (e.g., access, weather, biological response), and level of funding available for the program.
Phase III – Maintenance Phase	Represents the routine tasks that are conducted annually at strategic times to maintain specific ecological and biological objectives set for each unit and subunit.	After significant investments during Phase II, the stewardship program shifts to a lower level of intervention during the maintenance phase. This is inherently less costly and provides an excellent opportunity for long-term citizen and student involvement as volunteers. Once established, the maintenance phase is guided by both regular management techniques and by strategies that are implemented on a rotational basis through identified subunits. It is during the maintenance phase that the restoration plan would become part of the park's general operations and maintenance function. Along with this comes routine training and education of maintenance staff.

Management Units and Subunits

As defined, there are three management units, each of which having a number of subunits, as illustrated in figures 5.6 through 5.8.

436.26 total acres of oak savannas across the site.

Figure 5.6 – Oak savanna management unit and subunits.

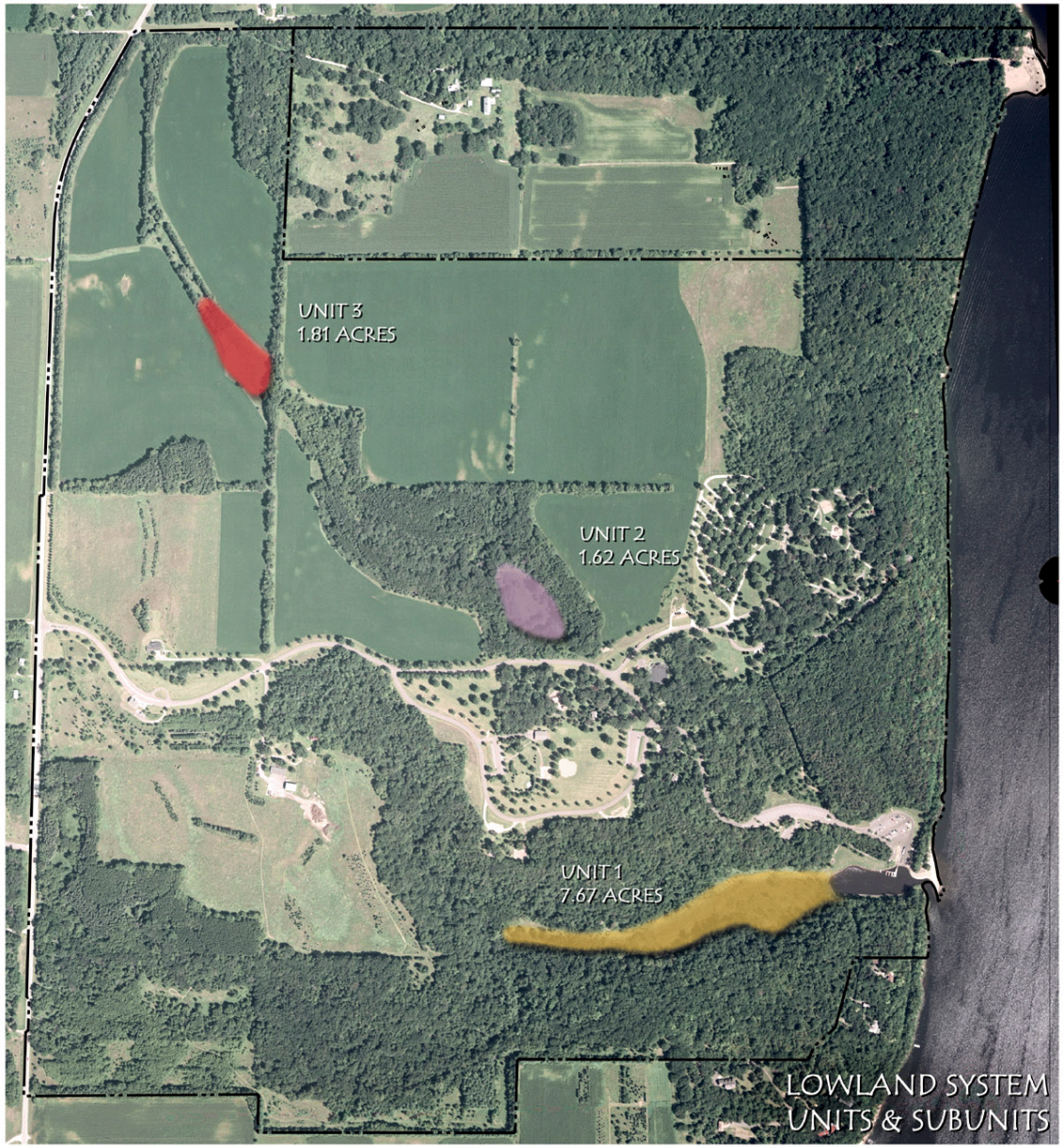


136.74 total acres of maple-basswood forests across the site.

Figure 5.7 – Maple-basswood management unit and subunits.

11.1 total acres of lowlands across the site.

Figure 5.8 – Lowland management unit and subunits.

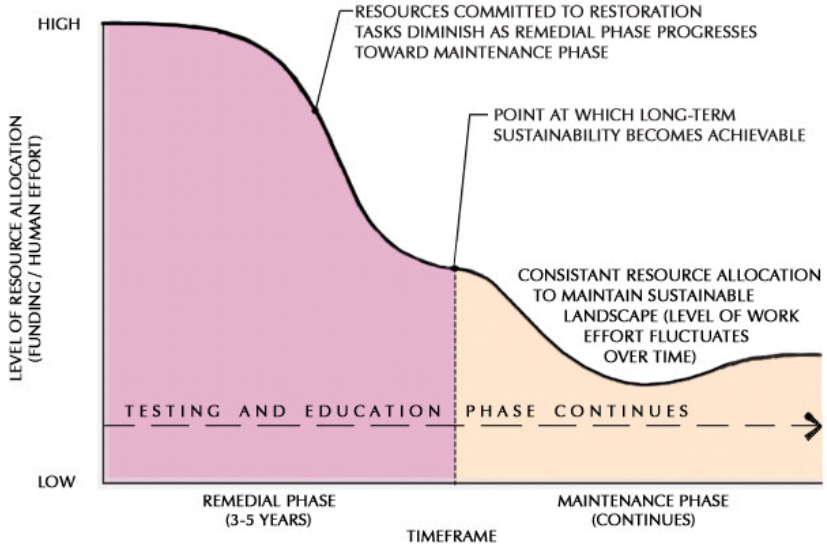


Restoration and Maintenance Strategy for Units and Subunits

For each of these management units and subunits, a specific strategy is envisioned which involves a step-by-step process using a series of restoration and maintenance techniques that are implemented sequentially over a period of time to achieve certain desired results. The techniques are relatively consistent between phases, with the primary distinction between phases lying in the intensity of the work involved to achieve a set of objectives, and the use of one restoration technique over that of another. For example, the initial removal of dense clusters of buckthorn in a given area may require substantial effort during the remedial phase. Under the maintenance phase, continued removal will still be necessary, but require substantially less effort. Figure 5.9 illustrates how the level of restoration effort lessens as the management plan moves from the remedial into the long-term maintenance phase. (Note that the testing/education phase is a precursor to the remedial phase and that it continues indefinitely within the other phases as warranted.)

Figure 5.9 – Work effort required between the remedial and maintenance phases over time.

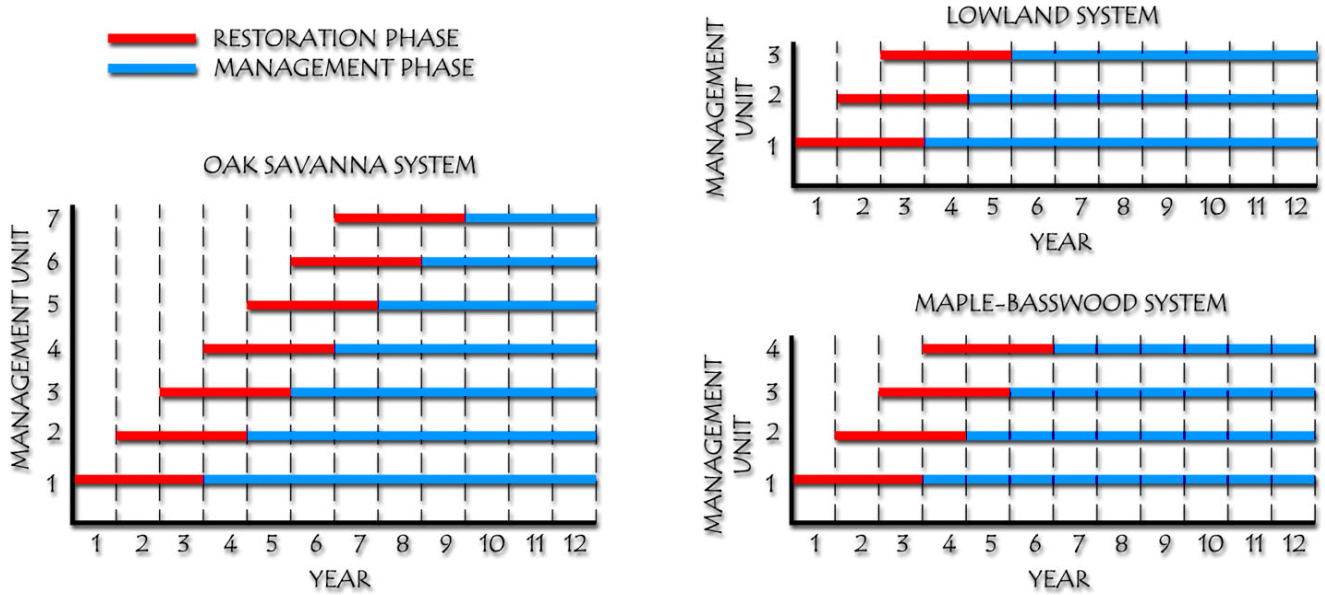
The restoration and management strategy establishes an overall road map toward the realization of a more healthy and vibrant natural landscape.



As figure 5.9 illustrates, the remedial phase can take three to five years to complete. This time frame is highly dependent upon the magnitude of the work involved to complete restoration tasks and the resources committed to this effort. The maintenance phase begins once remedial work is completed and continues on indefinitely at a sustainable level. As illustrated, the work effort under the maintenance phase will fluctuate due to the ever-changing micro conditions found across the site.

The schedule for implementing the stewardship program would be staggered to ensure that the work undertaken in any given year is manageable and affordable. Although the actual timetable would be refined as the program is implemented, the graphs in figure 5.10 illustrate a best case scenario of how the stewardship program for each unit would be staggered over a period of time.

Figure 5.10 – Timetable for restoration of ecological units and subunits. The schedule assumes a three year restoration cycle.



Under this scenario, it would take a minimum of ten years to get all units through the restoration phase, assuming that funding levels would support the level of work effort required each year. In addition, restoration of each ecological system could be concurrent (optimal), consecutive, or staggered.

Restoration and Maintenance Approach for the Dominant Ecological Systems

Although over simplified, the work tasks and techniques involved in restoring and managing the park's natural resources remain relatively consistent between phases and between ecological systems. The following table provides an overview the general restoration approach to each of the dominant ecological systems.

Ecological Unit	Overview of Restoration and Management Approach
Oak Savanna Dominated System	The past use of much of the upland area for agricultural and pastures has left only isolated pockets of remnant oak systems. Even in these areas, non-native species, such as buckthorn, dominate native species to the point where oaks are not regenerating themselves and native grasses are becoming scarce. Under these conditions, reestablishing the oak savanna system can only occur through a well-conceived restoration and management program. It is important that the restoration program focus on restoring an oak savanna system versus a prairie system. The primary issue difference is that caring for the remaining trees and reintroducing oak seedlings and small trees is a top priority in the restoration process and critical to reestablishing a healthy oak system. Given the time frames involved, the earlier this work is completed, the sooner a healthy stand of oaks will be realized. **Generalized Management /Restoration Approach:** 1) Remove invasive non-native and undesirable woody plants and weed species from remaining hedge rows and remnant savanna systems, as well as any non-burnable vegetation. Herbicide treat the stumps of woody plants, especially buckthown, and other non-native grasses to create proper conditions for prescribed burning. Mowing may also be used to prepare area for burning. 2) Undertake prescribed burning on a regular (1-3 year) cycle until native plants respond. 3) Seed with locally collected native plant seeds where native species seed banks are not present or do not respond to the above treatments. Seeding of native prairie grasses and forbs in existing old fields should be conducted by no-till drilling or scattered by hand after prescribed burning. Tillage is not desirable as this could stimulate weed species seeds. 4) Plant seedlings and trees in select locations over a period of time to reestablish a dynamic oak system. 5) Monitor and report results. Adjust program as warranted.
Maple-Basswood Dominated System	The ground cover vegetation in this system is progressively collapsing as time goes on, with fewer and fewer native species being found – especially at the ground level. Native ground cover vegetation in this system is out-competed by an overstocked understory of dense buckthorn. The result is a serious decline in the native soil stabilizing vegetation, which tends to accelerate overland flow of water that causes erosion and poorer water quality in downstream locations. Lack of tree regeneration and virtual dominance by older age classes of oaks, maples, basswoods, and ash is a major ecological concern. The larger trees are beginning to reach pathological maturity and will begin to degenerate rapidly. This is very problematic because these older trees often do not regenerate vegetatively, which leaves little opportunity for the system to "fix itself" through natural processes alone. Human intervention in these systems will be required if they are to be sustainable. **Generalized Management /Restoration Approach:** 1) Herbicide treatment and manual reduction of undesirable introduced woody plants. 2) Remove excessive litter and fallen trees to open up the understory and allow for prescribed burning to take place. 3) Undertake prescribed burning on a regular (1-3 year) rotation. 4) Seed with locally collected native plant seeds where native species seed banks are not present or do not respond to the above treatments. 5) Stimulate hardwood species regeneration through the introduction of acorns and seedlings. 6) Monitor and report results. Adjust program as warranted.
Lowland Dominated System	Significant signs of deterioration of the lowland and wetland systems has been observed, most likely caused by excessive nutrient loading and unnatural fluctuations in water levels from stormwater runoff from upland areas. Of equal importance, the lack of essential management, such as prescribed burning, reduces the diversity of plant life that can compete against more aggressive native and non-native species. As with the other systems, a well-defined and consistent stewardship system is required if the natural qualities of these systems is to be restored. **Generalized Management /Restoration Approach:** 1) Complete a more in-depth investigation of the influences causing these systems to degrade, with specific attention given to managing on-site hydrology and stormwater. 2) Undertake prescribed burning on a regular (1-3 year) rotation. 3) Spray herbicide treatment to reduce existing persistent non-native/undesirable grasses. 4) Seed with locally collected native plant seeds or plugs where native species seed banks are not present or do not respond to the above treatments. 5) Monitor and report results. Adjust program as warranted.

Of the techniques listed, prescribed burning is the single most useful and important management method required for restoring native plant communities.

Overview of Restoration and Maintenance Techniques

As the previous table defines, the stewardship program requires undertaking specific tasks to meet performance criteria and achieve improvements to the ecological systems within the park. Forthcoming is an overview of specialized, yet relatively straightforward, techniques used to carry out specific restoration tasks. Of the techniques listed, prescribed burning is the single most useful and important management method required for restoring native plant communities. The other techniques and strategies are most often used to prepare a site for prescribed burning or as a means to reintroduce proper conditions and species into sites. It is important to underscore that these techniques are used as part of a well-thought out program that considers scientific practicality, costs, and safety.

Prescribed Burning

Prescribed burning is generally defined as: *"the highly controlled use of fire under optimal weather and environmental conditions to achieve specific ecological objectives"*

Wildfire and fires started by indigenous people have for centuries played an important role in the evolution of many biological systems throughout North America. It is now recognized by the scientific community just how essential the role of fire is in maintaining grasslands, wetlands, savannas, barrens, and numerous forest types. It is also recognized that fire suppression can result in gross changes in the aspect, appearance, and ecological functions of these natural systems.

As an example, fire suppression is often followed by a decline in the richness and diversity of native plants and animal species, increased litter, shading, phytotoxin build-up in substrates, decreased availability of essential nutrients and increased homogeneity in habitat structure and spatial heterogeneity. Reduced nutrient cycling and increasing domination by few species often results. In some ecosystems, shifts in wildlife and increases in shade tolerant and less flammable plant species accompany fire suppression, with detrimental effects.

Although prescribed burning has been a primary prairie management tool for some time, it is now recognized that fire also plays a major role in restoring and maintaining other ecological systems as well. Simply stated, no other technique comes close to the impact that this naturally occurring phenomenon has on restoring and preserving natural ecological systems. It is a fundamental component of a restoration program to which there is no reasonable substitute. Conducted by trained personnel, prescribed burning has proven to be very safe and effective.

Weeding and Brushing

Preparing the site for prescribed burning will likely be necessary on sites that have significant restoration needs, especially in locations where invasive species, like buckthorn, are dominant. Weeding and brushing are the primary techniques used where there is dense brush and little combustible fuel. Manual reduction of existing dense shrub growths will be required to open up these areas.

Once the site is opened up, prescribed burning can be used much more effectively. In some systems, weeding and brushing coupled with prescribed burning can successfully liberate long dormant native seed banks and "jump start" the restoration program.

In cases where the direct use of fire is hampered due to non-native cool season grasses being present, pre-burn treatments may be necessary, including:

- Very careful and discriminate use of herbicides -- used where the evergreen growth of some cool season grasses precludes the use of fire. Direct plant contact with a select herbicide has provided quick and safe initial control of these grasses.
- Low mowing of the grasses (0.5 to 1 inch height) -- can reduce green foliage and, after drying, litter can be used as fuel to sustain a low-level fire.

Although the use of herbicides is always kept to a minimum, their use is a fundamental aspect of creating the conditions necessary for restoring native plant communities. Carefully selected herbicides have very low toxicity to humans and wildlife and will not present a threat when used properly. It is applied at prescribed rates by trained and licensed field specialists.

In general, herbicide is applied to cool season grasses after they have reached a height of 5-8 inches and display a new flush of green, actively growing foliage. For invasives like buckthorn, herbicides are applied directly to cut stems and stumps to kill of the root structure. Prescribed fire usually follows 5-15 days after the herbicide treatment or after the mowed grasses are dry enough to burn, which varies depending on weather conditions.

Seed Harvesting and Disbursement / Planting

Field observations suggest that some seed banks may remain present within the park's soils, especially in areas where remnant native plant communities still exist. If carefully fostered, these seed banks can be a major facet of the restoration program and greatly reduce cost and time necessary to reestablish native systems. However, seeds and plants from local sources will also be required to ensure that sufficient quantity and quality exists to undertake a successful restoration program. This is especially the case in the oak savanna and prairie systems, where much of the seed bank may have been lost due to past agricultural uses. In these instances, directly reintroducing native plant species will be necessary to reestablish healthy ecological systems.

For native species that are no longer present within the park, alternative sites for seed harvesting, propagation, cultivation, and collection will have to be identified for eventual redistribution within the park. Wherever possible, seeds and plants should come from sites that are as close to the park as possible, with the outside limit being a 150 mile radius from the park. In the long-term, once native communities are reestablished, the park itself will be its own source for seeds and plants.

Water Resources Management

Fundamentally, the main principle is to manage stormwater using natural infiltration methods.

Water resources management refers to managing stormwater within and adjacent to the park in an ecologically-sound manner that is consistent with the larger ecological vision for the park. Fundamentally, the main principle is to manage stormwater using natural infiltration methods. Under this approach, stormwater runoff from parking lots, roads, buildings, and other built features will be effectively captured and treated prior to reaching downstream wetland, pond, lake, and river systems.

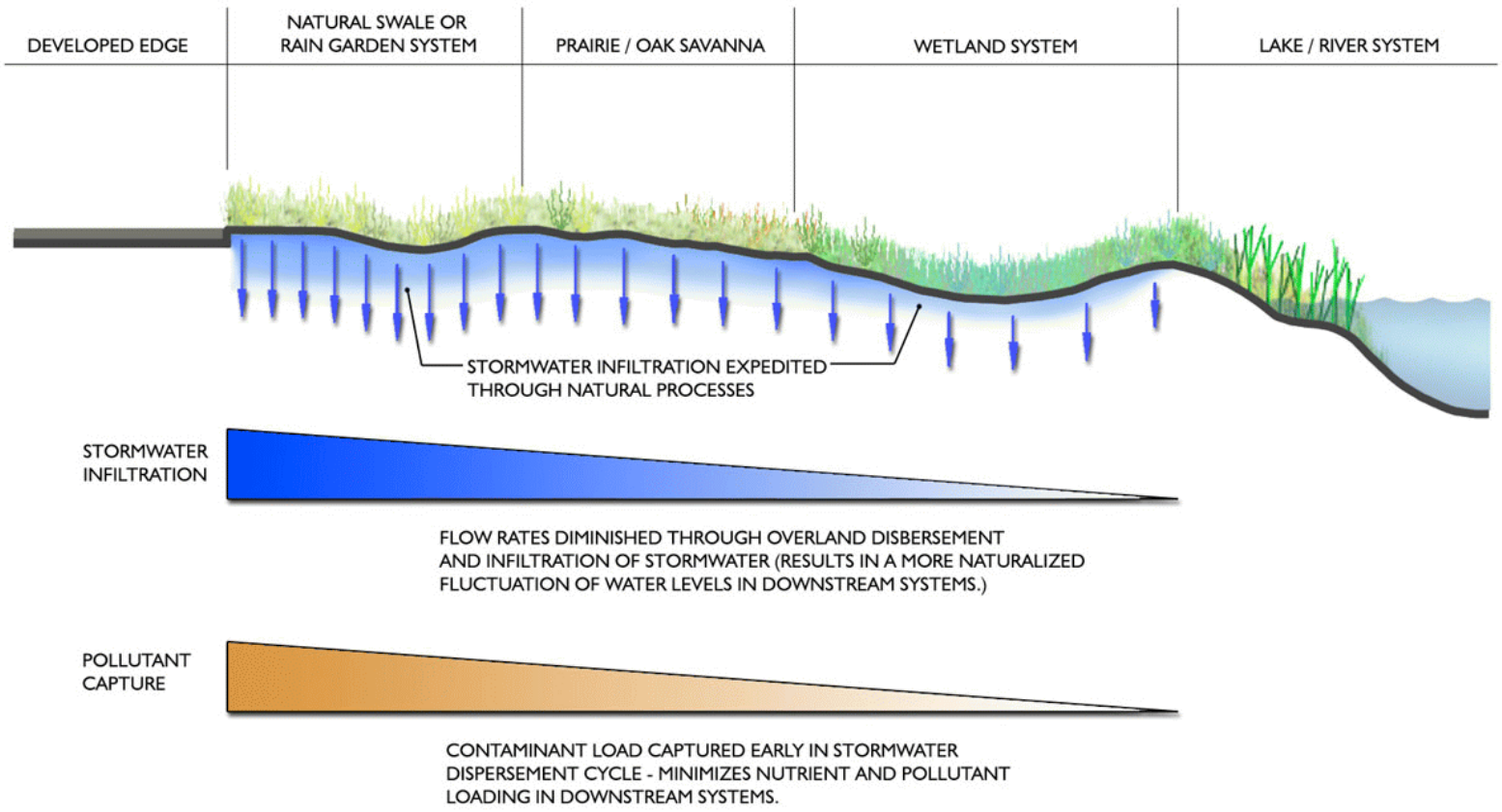
Natural Infiltration Method as an Underpinning for an Ecologically-Based Approach to Stormwater Management

The natural infiltration approach to stormwater management relies on passive, overland routing of runoff, as opposed to storm sewers, engineered ponds, and other built structures. This approach offers a couple of distinct advantages over conventional storm sewer systems:

- Treatment of introduced contaminants picked up by runoff is removed at the initial stages of water flowage rather than being transported to downstream locations and accumulating in wetland, lake, and river systems. This greatly reduces degradation to water quality and vegetative health in downstream systems.
- Stormwater flow rates and volumes more closely emulate natural conditions. This greatly reduces unnatural fluctuations in water levels in downstream systems (wetlands and lakes) and therefore reduces impacts to the natural condition of water systems and vegetation.

Natural infiltration systems typically consist of four primary components, each of which perform in sequence to treat the water before it enters wetlands, lakes, and rivers. Initially, stormwater runoff from the built environment is routed into swales or, more recently, “raingardens”, that are planted with native plants with deep root systems. These swales and raingardens provide initial infiltration and removal of pollutants, as well as convey runoff from developed areas and disburse it across upland and prairie systems. The upland systems (i.e., prairies and oak savannas) are the second component of this method, functioning to convey stormwater as diffused overland flow to the wetland systems that often link directly or indirectly to bordering lakes and rivers. These systems infiltrate a substantial portion of the annual surface runoff volume due to their very deep root system. They also provide additional solids settling and biological treatment. The wetlands are the third component of the natural infiltration method and provide both stormwater detention and biological treatment prior to runoff entering the lake and river systems. The final component is the lake or river, which provides stormwater detention, additional solids settling and biological treatment. Figure 5.11illustrates the principles of the natural infiltration system in graphic form.

Figure 5.11 – Principles of natural infiltration systems.

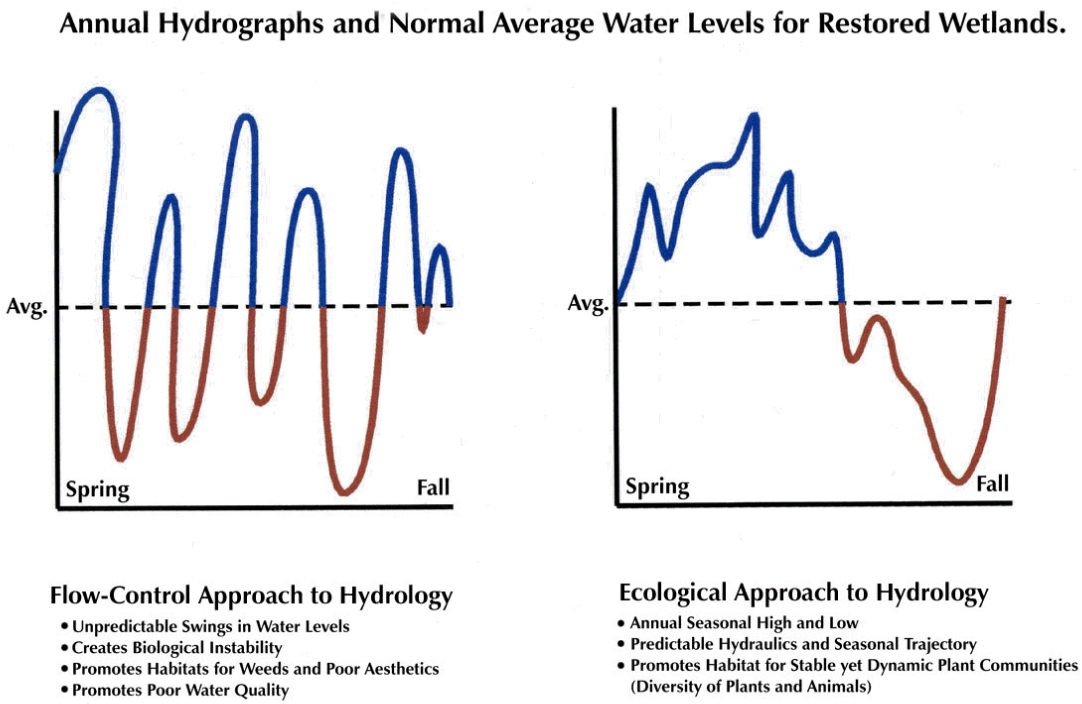


Natural Infiltration Method for Stormwater Management

With respect to stormwater flow rates and volumes, the use of a natural infiltration system produces a much more natural hydrograph with lower peak flows and higher base flows relative to the hydrograph of a typical engineered flow rate control approach. Figure 5.12 is instructive in that it illustrates the difference between a flow rate control and ecological approach to stormwater management.

With respect to stormwater flow rates and volumes, the use of a natural infiltration system produces a much more natural hydrograph with lower peak flows and higher base flows relative to the hydrograph of a typical engineered flow rate control approach.

Figure 5.12 – Annual hydrograph comparison.



Within the context of a regional park, the natural infiltration approach to stormwater management and hydrology is especially desirable given the emphasis placed on maintaining healthy, vibrant natural systems throughout the park.

Application of Best Management Practices for Managing Stormwater

Under the master plan, the natural infiltration approach philosophy to managing stormwater is supported by the application of Best Management Practices that address common development circumstances likely to be encountered as the park is developed/redeveloped. These practices define specific techniques that can be applied to different development scenarios to achieve stated environmental protection objectives. The Metropolitan Council's *"Urban Small Sites Best Management Practice Manual"* provides the basic underpinning for many of the techniques that will be employed wherever applicable as the park development initiatives are undertaken. Note also that newly emerging ecologically-based techniques will also be applied to achieve desired ecological benefits.

The natural infiltration approach philosophy to managing stormwater is supported by the application of Best Management Practices.

Specific techniques envisioned to have application for the park include:

- Minimization of impervious surfacing for parking lots and roadways, including the use of naturally-surfaced areas for overflow/temporary parking.
- Use of infiltration systems (e.g., biofiltration systems, rain gardens, filter strips, swales, and slotted/flat curbs) as part of parking lot and hard surface designs.
- Use of infiltration techniques for managing roof runoff from buildings (e.g., downspout infiltration systems)
- Use of site grading techniques to achieve naturalized infiltration objectives.
- Use of contemporary erosion control techniques to prevent migration of soils during the construction process.
- Limiting the use of maintained turf to the more active use areas.

In addition to the Best Management practices, the master plan is also supported by the Metropolitan Council's *"Model Storm Water Management Ordinance"*, which defines specific approaches to protecting the site's ecological resources, especially wetland systems. The provisions of the model ordinance will be applied to the park's development/redevelopment as applicable.

Conclusions

Preserving natural open space values and ecological health is fundamental to the master plan for St. Croix Bluffs Regional Park.

As a regional park, preserving natural open space values and ecological health is fundamental to the master plan for St. Croix Bluffs Regional Park. Ensuring that these core values are protected, or even enhanced, in future years is of equal importance to developing the park for recreational uses.

The thoughtful development and implementation of natural resource stewardship and water resources management programs is fundamentally important to restoring and preserving natural processes in this park and achieving the vision defined by the master plan and expected by the local citizenry.

Section VI Development Master Plan

Overview

The Development Master Plan is an outgrowth of the public process.

The Development Master Plan is an outgrowth of the public process, which considered all facets of the park's future development. The planning process strived to be exhaustive in its consideration of the issues that were raised during the public meetings and research related to recreation trends at the regional level. After much discussion and synthesis of public comment, the findings presented here represent the consensus reached by the Washington County Parks and Open Space Commission and supported by the Washington County Board.

Note, however, that the master plan still remains a dynamic planning tool that will continue to evolve and be fine-tuned as it moves through implementation steps and benefits from management and operational experiences and a greater understanding of recreational trends in the years to come. It is also recommended that implementation decisions made in future years include additional opportunities for public input to have the greatest level of confidence that what is developed will be in line with public demand and expectations. Through an ongoing commitment to an open public process, it is believed that the true values that the park brings to the region will remain at the forefront of the decision making process.

Balancing Human Use of the Park with Ecological Protection

The master plan represents a thoughtful and responsible balance between recreational uses and preserving open space values. While providing a cross-section of recreational opportunities within the park remained a fundamental goal, showing restraint in the size of the built footprint was also a key objective to preserve the open space character that many people come to the park to enjoy. As appreciation of natural areas as a recreational activity (i.e., nature viewing) continues to grow, expanding the park's acreage and restoring the natural systems historically found within it seems well justified from a both a recreational and ecological perspective.

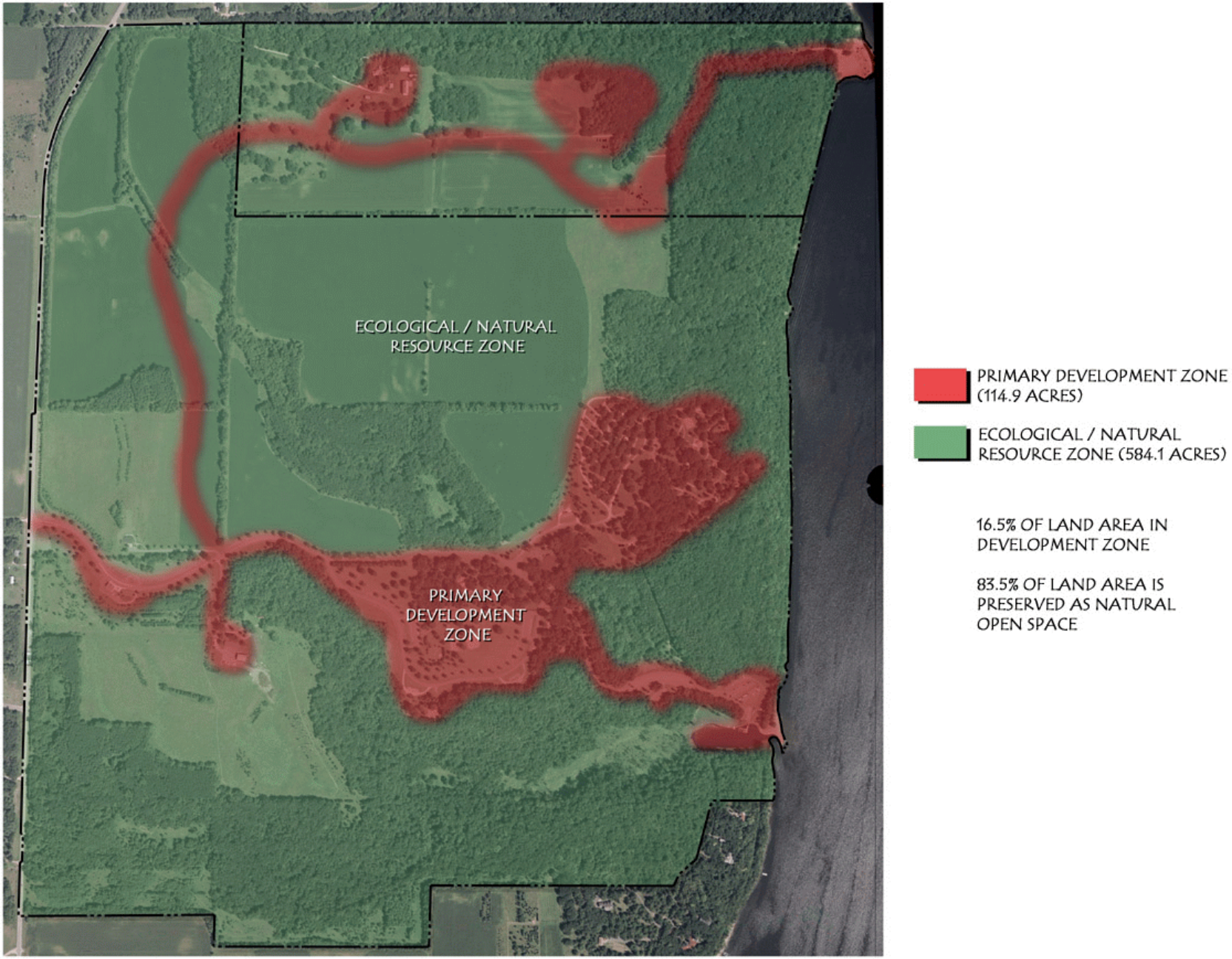
Land Use Zones

Land use zones describe the park by functional uses and overarching ecological characteristics as they relate to the development program.

Land use zones describe the park by functional uses and overarching ecological characteristics as they relate to the development program. By considering the park from this broader perspective, the interrelationship between the ecological resources of the park and the development program can be exhibited. As figure 6.1 illustrates, two distinct land use zones were defined, which includes:

- Primary Development Land Use Zone
- Ecological and Natural Resource Land Use Zone

Figure 6.1 – Land Use Zones.



The following considers each of the defined zones.

Primary Development Land Use Zone

This zone relates to park areas where development is concentrated to service specific infrastructural needs. As illustrated in figure 6.1, the proposed development zone has not changed substantially in and around the existing developed area. Although the new master plan provides additional facilities to support anticipated public demand, the overall development footprint was kept to the minimal size needed to support those facilities. Proposed developments, such as access roads and group use areas, were also located in response to minimizing direct impacts to natural areas and sensitive ecological zones.

Ecological and Natural Resource Land Use Zone

This zone encompasses the largest area of the park and focuses on restoration and preservation of natural open space, ecological diversity, and continuity in wildlife habitat. Although development within this zone is not precluded, it is generally limited to trails, overlooks, sitting areas, and nature interpretive signage. With walking/hiking in a natural area, coupled with nature observation, as some of the highest ranked recreational activities (as defined in Section II), it is expected that the use of this zone for passive recreation will be fairly high even though most of it is preserved as natural open space.

Development Program

The development program defines the recreational uses of the park and the facilities to support those uses.

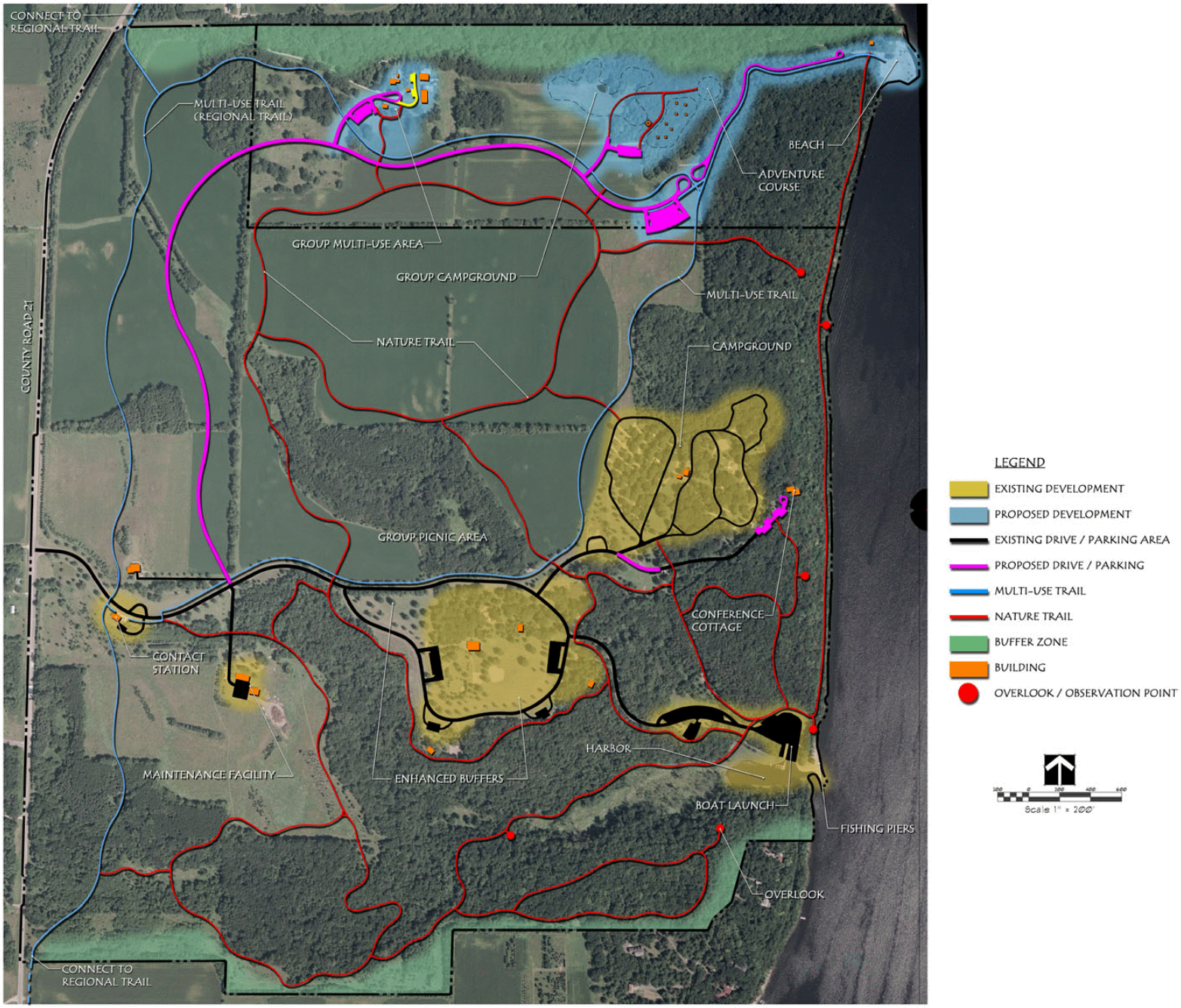
The development program defines the recreational uses within the park and the facilities to support those uses. The program is an outgrowth of research on recreational trends, the findings of the public process, and the development parameters established as part of the previous master plan for the park.

Development Master Plan

The development master plan provides for a cross-section of recreational activities to meet current and anticipated recreational demands. The mix of facilities included in the master plan provides an opportunity for short to day-long stays at the park where one can enjoy a variety of complementary recreational activities in a natural setting.

Figure 6.2 illustrates the overall development master plan for the park. Thereafter is an overview of each element of the development plan.

Figure 6.2 – Development Master Plan.



Park Drive

Restoring native plant communities, including wildflower displays, will add to the natural character of the park and reduce maintenance costs.

The park entrance monument and gate area provides clarity to the park's entrance. Adding wildflower displays in lieu of maintained turf will enhance the appeal of this area.

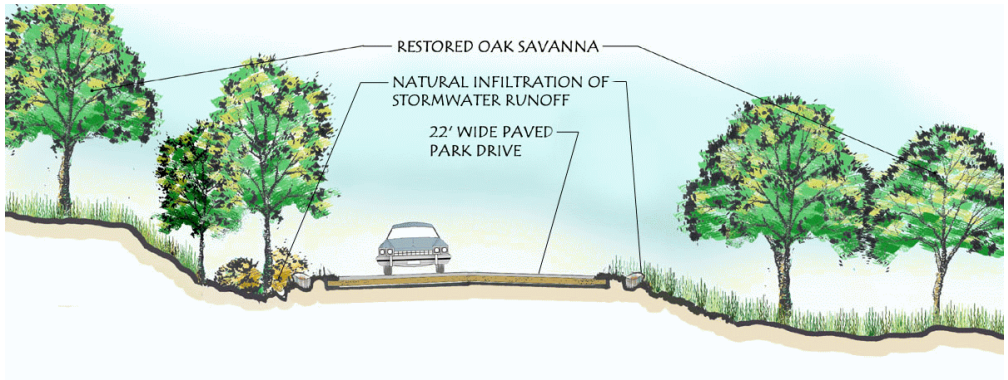
As illustrated on the Master Plan (figure 6.2), vehicular access into the park will continue to be limited to one entrance from County Road 21. This maintains a singular entrance location and point of control. With a few minor exceptions, the existing park drive that services the existing development areas in the southern half of the site will remain unchanged. As defined later in this section (under *Campground*), a relatively minor realignment of the entrance drive is envisioned to clarify the entrance to the campground and conference cottage facilities. The access drive to the boat launch and picnic areas remains unchanged.

The new park drive illustrated on the *Master Plan* ties into the existing drive near the contact station and traverses through the site to service several proposed development areas, including the multi-use group facility, group camp area, and beach. The alignment as shown was selected for several reasons, including:

- Minimizing vehicular traffic through the core of the park.
- Minimizing fragmentation of ecological systems and ecotonal areas between the river edge and the upland areas.
- Distributing traffic into several directions to reduce actual and perceived congestion within the park.

As with the existing park drive, the new drive would be a maximum of 22 feet in width to minimize the built footprint and hard surface area and to control traffic speeds. A rural cross-section is proposed to encourage stormwater infiltration. Asphalt pavement is proposed to control dust, reduce wash-boarding, avoid mud and erosion, and minimize ongoing maintenance costs. As figure 6.3 illustrates, the roadway would also be designed in response to the existing land forms to give it a pleasant, natural character. Careful alignment of the road will also minimize visual overlap between it and the various trails that traverse through the site.

Figure 6.3 – Character sketch of cross-section of new park drive.



Enhancing the visual aesthetic of both the existing and new park drives is also a master plan objective. This includes restoring native plant communities along these corridors, including transitioning some of the non-programmed mowed turf areas into natural grasses and wildflower displays that add visual appeal and interest. These collective improvements will create a more natural character to the roadway corridors and help set the tone for a visitor's overall park experience.

A number of pull-off parking areas are also envisioned along the park drives to service small picnic areas, park overlooks, and trail access points. The final location of these would be determined during plan implementation when specific vistas and other development nuances can be better defined.

The park entrance is currently controlled with an electronically-controlled gate that allows after-hours ingress and egress to the park, which is especially useful to overnight campers. The entrance itself is appealing and well-defined. As with the park drive, reintroducing native plants and wildflowers is proposed to enhance the aesthetic character of the park entrance.

Visitor Contact Station

As illustrated on the *Master Plan* (figure 6.2), the Visitor Contact Station is located near the main entrance to the park, where it serves a number of functions, including providing a:

- Single point of control for park operations and oversight. This ensures that essential visitor services are provided at the initial point of contact using minimal staff.
- High level of security for the park facilities.
- Common point of orientation for park visitors.

The Visitor Contact Station is an architecturally-appealing structure that sets a positive tone for the visitor's experience.

The existing building, which is relatively new, sets an appealing architectural character that is reminiscent of other existing park facilities, such as the picnic shelters. Although the overall size of the building is relatively small at under 1,500 square feet, it readily accommodates the following:

- Visitor contact – related to orientation and collection of park fees
- Administration – related to activities within this park
- Restrooms
- Vending
- Small meeting room and employee lunch room

Although the Visitor Contact Station will remain relatively unchanged, there are a number of external improvements anticipated, including:

- General improvements to pedestrian circulation as the trail interconnections are developed.
- Paving the access drive to the staff and visitor parking lot. (Five parking spaces are provided, which could be expanded if demands warrant as trail activity increases.)

The Visitor Contact Station is located to provide access control and dispense information to park visitor. The newly developed trail (2002) north of the turnaround has already expanded pedestrian access to the facility from the campground and picnic area. Future trail connections will also expand the use of this facility for visitor orientation and information, which may warrant expanding the parking lot as trail use increases. (Note that the home to the north is a County-owned rental unit that will be removed as part of the master plan.)

Group and Family Picnic Areas

Group gatherings are a very popular activity within the park.

Group gatherings are a very popular activity within the park. These gatherings range in size from family get-togethers of a couple dozen people to large, organized events. The current facility has proven very successful and will remain an integral part of the master plan. In all, there are a total of three group picnic shelters in this area, as illustrated on the *Master Plan* (figure 6.2). The aerial below illustrates this area in greater detail.

Aerial (looking north) illustrating the group and family picnic area.

The following provides an overview of the facilities within the picnic area.

The Hilltop Shelter is the largest shelter within the park, with a capacity of 100 to 150 people.

Hilltop Shelter

This shelter is the largest of the three shelters and is centrally located in the picnic area. Amenities include:

- Capacity of 100 to 150 people (2,770 square feet.)
- Picnic tables under roof
- 24 electrical outlets
- Water spigot
- Kitchen facilities, including a ten foot serving counter and ten burner stove with double oven.
- Large BBQ grill and storage rack.

The nearby parking lot accommodates 39 cars, with overflow parking nearby.

The architectural character of the structure is very appealing, especially the limestone columns and walls. No major changes are proposed for this facility.

Eagle Ridge and Hilltop Shelters

Eagle Ridge and Hilltop Shelters are smaller, simpler shelters with a capacity of 35 to 70 people each.

These are two smaller shelters that are located central to the picnic area. Amenities included at both shelters include:

- Capacity of 35 to 70 people (1,080 square feet.)
- Picnic tables under roof
- 4 electrical outlets
- Water spigot
- Two charcoal grills
- Portable restrooms

The nearby parking lot for each of these accommodates 20 cars, with overflow parking nearby.

The architectural character of these structures is more simple than the Hilltop Shelter. Being nestled into the woods, the setting itself, versus architectural character, makes these shelters very appealing. The only significant changes to these shelters is possibly paving the parking lot for the Birch Hollow shelter if erosion becomes an issue. Maintaining an accessible path to this shelter may also be required. Improving the enclosure for the portable restrooms is also proposed to enhance their aesthetic qualities. No other significant changes are proposed for these facilities.

The restroom building, which is nestled in the trees, serves the picnic and play area.

Support Facilities in the Picnic Area

In addition to the shelters, there are a number of support facilities in the picnic area that enhance the level of service to the park visitor. These include:

- Restroom facility – appealing exterior materials blends well with the large picnic shelter. Although this facility supports all of the picnic shelters, it best serves the large structure and play area.
- Play area – modestly sized, well-used structure that supports all of the shelters. Modest expansion of the structure is proposed to better serve the picnic area.
- Ballfield – well maintained field and open area that can be used for a variety of field games.
- Small amphitheater – although not extensively used, the facility does serve a select group of people. Since maintenance costs are low, the amphitheater will continue to be provided.
- Basketball court – upgrading of the surface will be needed at some point. Otherwise, the court provides a simple amenity for picnic area users.
- Double tennis court – recently renovated facility that supports the picnic areas.
- Volleyball courts – adjacent to the two smaller shelters, these are popular amenities for groups.

Note that these support facilities are also available to the campers in the nearby campground. Aside from general upkeep and the upgrades noted above, no major changes or additions are envisioned for these facilities.

Aesthetic Enhancements to the Picnic Area

As shown in the aerial on page 6.7, there are several areas on the periphery of the picnic area that are mowed. As part of the general restoration of the park, some of these areas will be transitioned back to a natural character that is more consistent with the regional park aesthetic. Within the context of a natural theme, placing greater emphasis on the use of wildflowers and showy grasses is also envisioned to create a compelling transition between the natural open spaces and the manicured turf areas within the picnic area. In addition to its ecological value, these re-naturalized areas will also help reduce maintenance costs to some degree.

Independent Family Picnic Areas

Several small family-oriented picnic areas are also envisioned.

Although not specifically defined on the master plan, several small family-oriented picnic areas are also envisioned. Amenities within these areas would be limited to a few picnic tables and, at select locations, a grill. Each location would be selected based on their scenic qualities, views, ease of access, and proximity to other activity areas. In each case, a couple of parallel parking spaces would be provided. Maintained green space around these picnic areas would be very limited.

Boat Launch and Harbor Facilities

The boat launch and harbor facilities are two of the most popular amenities within the park.

The boat launch and docks are very popular features of the park.

The boat launch and harbor facilities are two of the most popular amenities within the park, often being well-used during the week and virtually always full on the weekends during the boating season. As shown in the aerials, the parking lot is spread out due to its location along a ravine that extends from the picnic area down to the river. Key existing features within this area include:

- 50 car-trailer parking spaces.
- An adjacent car parking lot.
- Three-slip boat launch that can accommodate watercraft up to 19 fee.
- Boat dock and slips for unloading and loading.
- Harbor area for boat maneuvering.
- Portable restrooms – a new enclosure is envisioned for these to screen them from the parking lot and provide a dependable level platform for them to sit on.

Aerial (looking north) illustrating car and boat/trailer parking lots just up from the boat launch.

Aerial (looking north) illustrating the boat launch facilities.

With the development of a new beach facility as shown on the *Master Plan*, the existing one located on the river on the north side of the harbor entrance will be redeveloped as a river overlook and for fishing. The most significant feature would be the addition of fishing piers. The river overlook would be located at the end of the old railroad grade, which is elevated above the water by 10 to 15 feet.

With respect the existing parking lots and entrance drive, the entire asphalt surface acts as a large flume in which stormwater is directed overland into the harbor and river. From a stormwater infiltration perspective, this approach is not very desirable. Unfortunately, in this situation there are no practical or economically-viable ways to alter this water management approach. However, the master plan proposes an alternative stormwater management approach for all new facilities, as defined in Section V.

Campground Area

During the camping season it is common for the campground to be completely full, especially on weekends and holidays.

The campground is expected to continue to be one of the most popular facilities within the park. During the camping season it is common for the campground to be completely full on weekends and holidays. In total, there are 73 sites that provide a range of camping experiences. Tents, small campers, and larger RV units can all be accommodated within the campground. More specifically, there are:

- 21 pull-through sites with water and electrical hookups for larger RV's (30 amp service).
- 5 pull-though sites with electrical hookups for larger RV's.(50 amp service).
- 36 back-in sites with electrical hookups for smaller RV's, a range of campers, and tents (20 amp service).
- 11 back-in sites with no utilities for tents and small camper trailers.

Figure 6.4 illustrates the layout of the campground, including proposed upgrades.

Figure 6.4 – Campground layout.

Improving the natural buffering between sites is envisioned to create a greater sense of privacy.

In addition to water and electric service at some sites, all sites have a picnic table and fire ring/grill. Other campground features and associated upgrades include:

- Expanding the existing modern restroom/shower facility to include more toilets and showers to improve service during peak times.
- Adding a new outdoor classroom facility for group activities. A simple open clearing area with grass or bench seats and a small stage is envisioned to accommodate a group of 50 to 70 people for campground programs.
- Relocating and upgrading the dumpstation so that it is more convenient to exiting RV's and campers and less intrusive to the camping experience than its current location near the bathroom/shower facility.
- Maintaining the play structure feature in a central location. Currently, a sand volleyball and horseshoe pit are also provided and will continue to exist as long as there is a demand for them. Note that the County will continue to monitor the use of these types of features, leaving open the potential to either add to or remove them as warranted to serve the public need.
- Improving trail links from within the campground area to the larger trail system that exists and is proposed. Linking the campground to both the nature trail and multipurpose trail system is envisioned.
- Reconfiguring the entrance drive into the campground to better differentiate access to the campground versus the conference cottage.
- Providing additional parking in select locations within the campground to accommodate the occasional extra vehicle.
- General upgrade of utilities and basic site amenities as required over time.

In addition to the noted improvements, emphasis will also be placed on enhancing the natural aesthetic qualities of the campground and improving the buffer/screening between campsites. Notably, this includes a significant reduction in the extent of mowed turf outside the campsites and other defined use areas. Re-naturalizing the campground will also help reduce maintenance costs.

As with all areas of the park, restoring and managing the natural areas within the campground will be part of the overall stewardship program.

As with all areas of the park, restoring and managing the natural areas within the campground will be part of the overall stewardship program. This would include removal of undesirable species such as buckthorn and phasing out species such as silver maples and cedars in favor of oaks and other native trees and shrubs. Note also that it would be appropriate to place greater emphasis on the use of wildflowers within the campground to maximize the aesthetic appeal of the area within the context of a natural setting.

Conference Cottage

Under the master plan, several improvements are envisioned for this facility.

The existing conference cottage is a simple structure that prominently overlooks the St. Croix Valley. Formally a summer home, the conference cottage currently offers a variety of amenities, including:

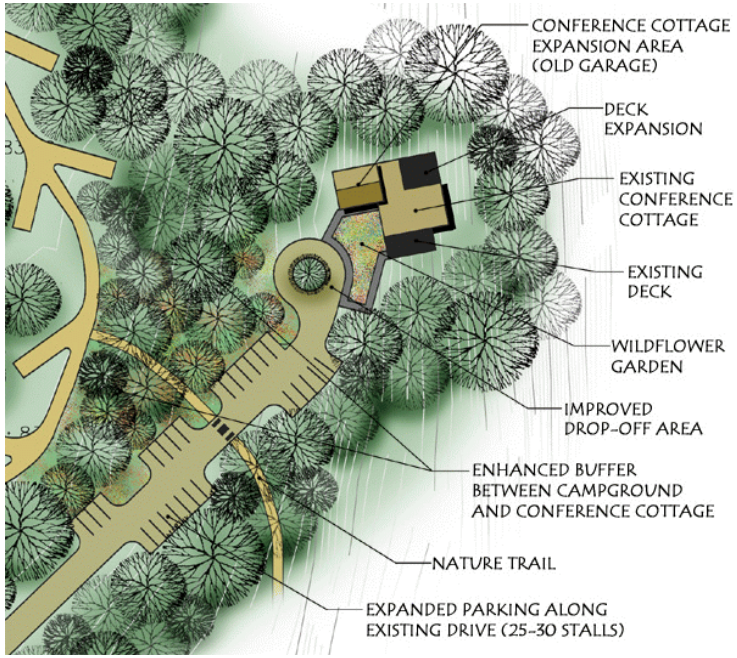
- Casual meeting room with comfortable seating, extensive windows overlooking the river, and a fireplace
- Conference table in an old dining room
- Full kitchen facilities
- Break-off meeting room
- Outdoor deck area
- Two bathrooms
- Storage garage (400 square feet)

At 1,400 square feet (exclusive of the garage), the limiting factor with the cottage is its size. With 15 to 20 people being the maximum comfortable capacity, the number of groups that find the facility to be of adequate size is relatively limited, with small business groups being the most frequent user. Inadequate parking near the facility also hampers its convenience, especially for business groups.

The conference cottage offers a charming and peaceful place for small group gatherings.

Under the master plan, several improvements are envisioned for this facility. The first one is to convert the garage area into a larger meeting room, which will augment the existing meeting rooms. By making this upgrade, the capacity of the cottage will be increased to 40 or 50 persons.

Figure 6.5 – Character sketch of conference cottage area improvements.



The second improvement relates to parking, in which additional parking would be provided much nearer the cottage. As figure 6.5 illustrates, the parking would be spread out along the existing road in bays to preserve existing trees and landforms. Improvements to the turnaround and drop-off area are also envisioned. Handicap parking near the entrance would be provided.

Aesthetically, the master plan calls for improving the buffer between the cottage and the adjoining campground to enhance the sense of separation between these uses. Managing the trees and native vegetation around the cottage as part of the larger stewardship program is also important, including removal of buckthorn and other invasive tree species that take away from the views to the river. Maintaining the small wild plant garden near the cottage entrance is also envisioned.

Group Multi-Use Area

This facility will be specifically designed to be highly adaptable in order to accommodate a wide range of recreational, social, and educational activities and programs with varying group sizes.

The group multi-use area is a newly proposed year-round facility that complements other park features and broadens the park's capacity to provide services to the public. From a use perspective, this facility will be specifically designed to be highly adaptable in order to accommodate a wide range of recreational, social, and educational activities and programs with varying group sizes. This flexible-use approach is especially important to attracting larger groups, families, and youth to the park all seasons of the year. The latter of these is of particular importance in that attracting more use of this and other regional parks by younger age classes is fundamental to instilling life-long outdoor recreational values.

The flexible-use approach to this facility also grants a high level of confidence that the year-round group activity needs of today and those that will emerge in the future can all be readily accommodated by a single, well-designed and appealing facility.

In addition to its functional design characteristics, the group multi-use area also serves to preserve the cultural and historical values of a traditional farmstead of the St. Croix River Valley, which is becoming an increasingly rare sight in this region. As illustrated on the aerial, the farmstead is also well-sited to provide a pleasant and unique setting that is reflective of the regional park experience.

The historic house has many unique features and detailing reflective of a bygone era. Preserving this treasure is one of the objectives of the master plan.

As the aerial illustrates, there are three existing structures that could play a role in the development of this use area, including the:

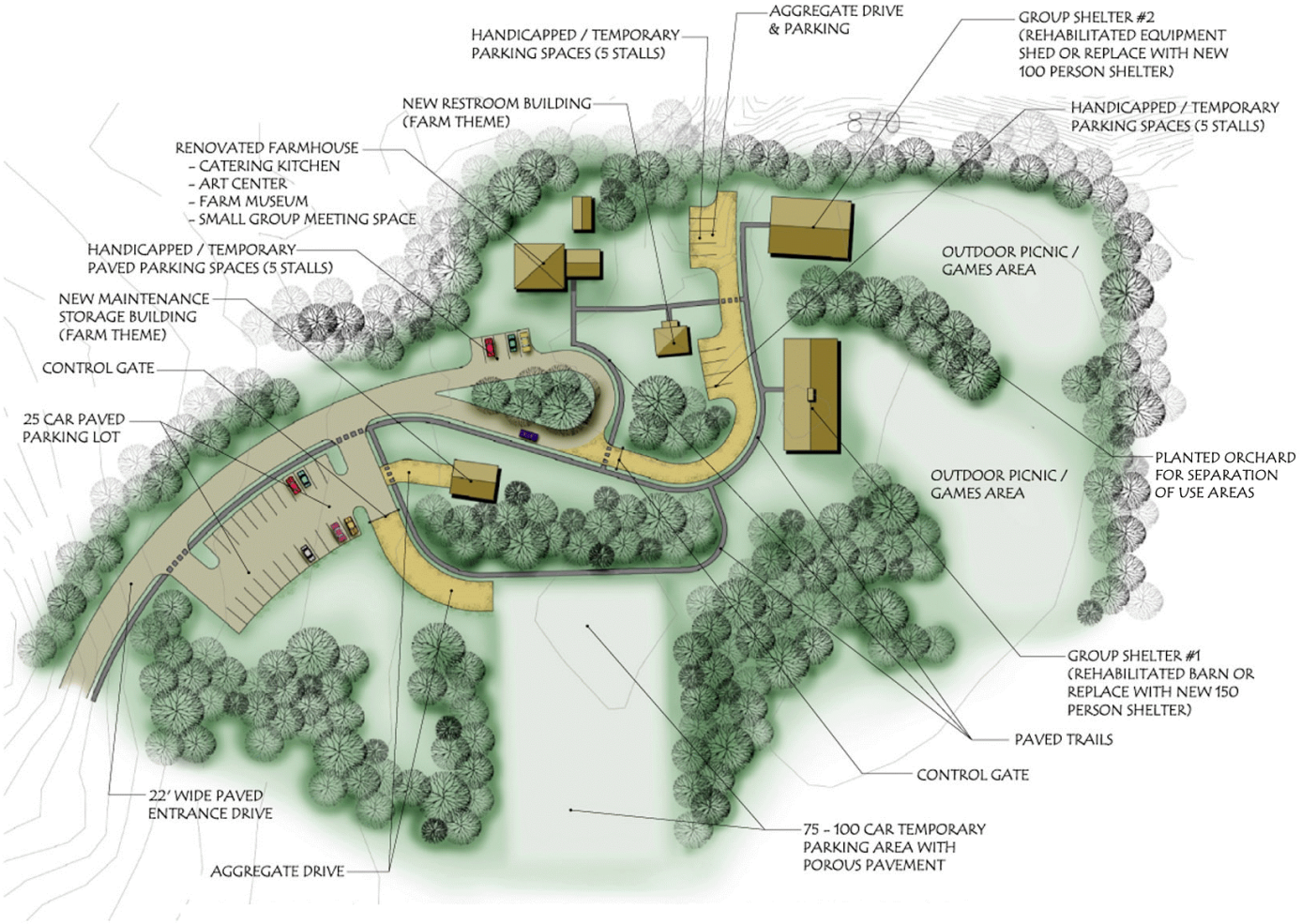
- Farmhouse – which is currently being considered for inclusion in the historic register.
- Barn – which is the red structure.
- Equipment shed – which sits behind (to the north) of the barn.

There are also a few out-buildings that may also be of some value in the final development scheme.

Using the farmstead as the underlying theme for the development, a number of key facilities are envisioned as part of this use area, as figure 6.6 illustrates.

Aerial (looking north) illustrating the group and family picnic area. (The farmhouse sits in the trees on the left side (west) of the photo, with only part of the roof being visible.)

Figure 6.6 – Character sketch of the group multi-use area with a historic farmstead theme.



As figure 6.6 illustrates, each of the primary existing structures would be renovated where possible as part of the development plan. The existing farmhouse would serve several functions, including:

- Art Center and Farm Museum – for exhibiting artifacts of the farming history along with local arts and crafts displays.
- Small group meeting space – to complement the conference cottage and provide a unique venue for business, non-profit organizations, and local associations to meet.
- Catering kitchen – to support the two group shelters.

The two four-season shelters would take advantage of the two farm structures that currently exist, assuming that their structural integrity allows for this conversion. The barn, which is the larger structure, would have a capacity of approximately 150 to 200 people. The shed, which is a smaller structure, would have a capacity of 100 to 125 people. The intent is to maintain the aesthetic qualities of these structures as part of the overall design theme. Note, however, that should these structures prove to be unsound for renovation, new structures would be built that carry forward the same overall farmstead theme.

The "old red barn" also has its charm and is worth trying to save as part of developing this area.

The two four-season shelters are specifically proposed in order to maximize use flexibility and be able to accommodate a wide range of groups of varying size and need. Depending on the situation, the shelters could be used together to serve one ground or independently to serve two on any given day. It also allows some groups, such as the Boy and Girl Scouts, to have a number of activities going on that require independent spaces even though it is one large group.

As figure 6.6 illustrates, a common, stand alone restroom facility is also a consideration, as is including them within each of the shelters. Both options would be further considered at the point of implementation. Other features of the shelters would possibly include kitchenettes, audio-visual equipment, room dividers, and storage space. As also illustrated, providing a maintenance storage shed is also a consideration, with the final size being determined once a more refined program is developed.

As for the site features, an access road, drop-off area, and some hard surfaced parking is envisioned. As shown in figure 6.6, the use of porous pavement is being promoted to reduce the extent of hard surface in the park. Using newly emerging ecological-based engineering techniques, a stable and reliable parking surface will be created, with the surface most likely being a mixture of hardy native prairie grasses.

Adjacent to each of the shelters will be an open outdoor picnic and games area. These areas will be separated by a planted orchard or grove of trees. In addition, the surrounding natural landscape, especially the oak savanna and maple-basswood systems, will be enhanced to strengthen the sense of place and privacy of the facility. These same features will help buffer this use from the larger open space areas to the south.

Group Camping/Activity Area (with Adventure Course)

The group camping and activity area is a new facility that replaces the existing group camp area located near the campground.

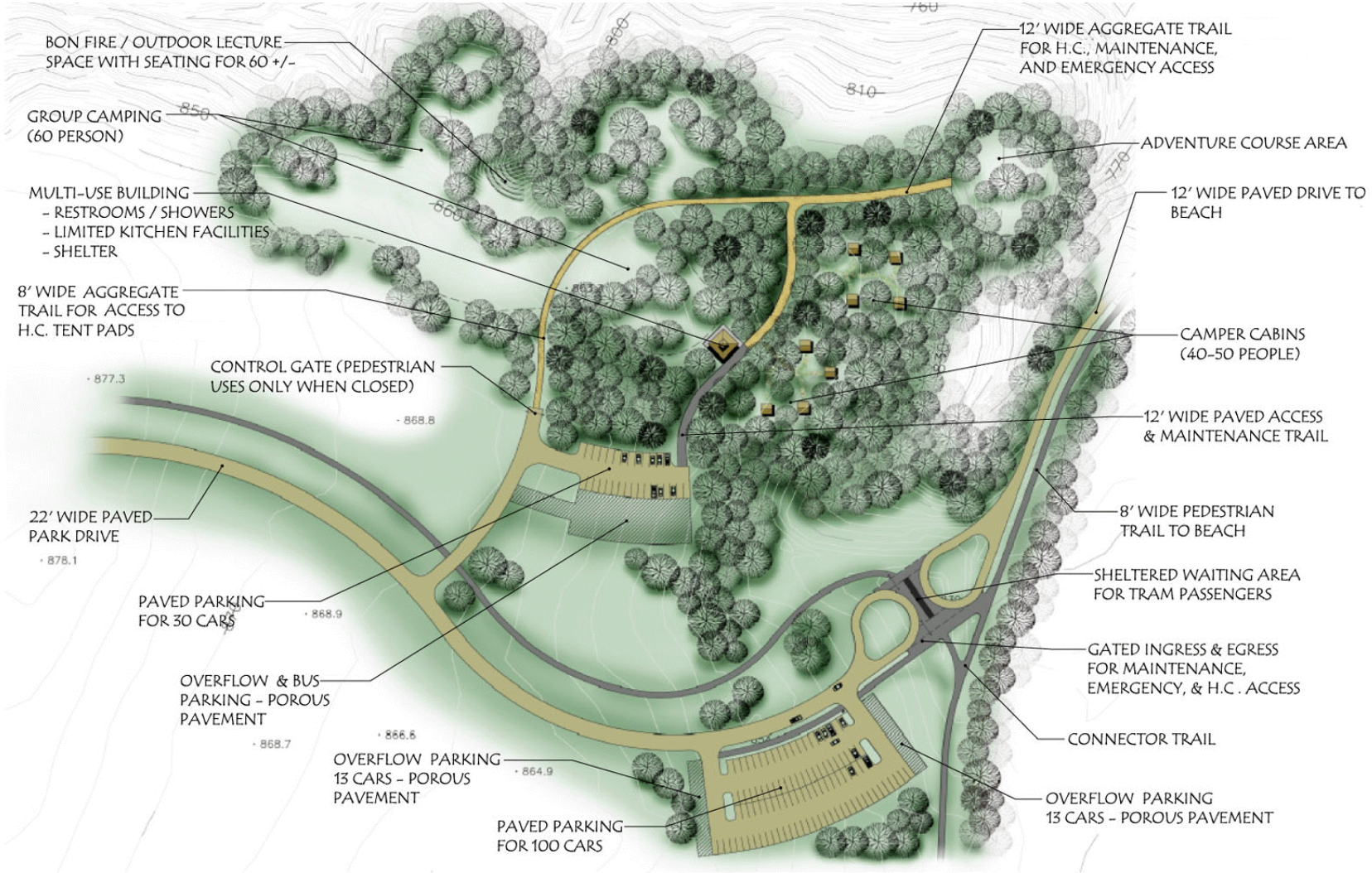
The group camping and activity area is a new facility that replaces the existing group camp area located near the campground, which has been outgrown and is also not well-sited for its expanding level of use. As shown on the overall master plan, the new location for this facility is on the north side of the park in an accessible yet isolated area that serves the purpose well without encroaching on other park uses and open space. From a group-use standpoint, the new location provides the needed privacy and site security for activities that often include younger children under the supervision of adults.

As with the previous group camp, the traditional uses of this facility – from youth day camps to overnight group camping and other group uses – will be continued and expanded upon. Scheduled group picnics could also be accommodated at this location under a permit system if demand warrants. The introduction of the camper cabins will add a new dimension to this use area, extending the season of use to nearly year-round.

As figure 6.7 illustrates, the group camp area takes advantage of the existing land forms and natural vegetation patterns to create a compelling natural setting that is easy to control. As illustrated, there are four primary use areas within the camp, which includes:

- Informal group camp area
- Camper cabin camp area
- Bon fire/outdoor lecture space
- Adventure course area

Figure 6.7 – Character sketch of group camp area, with camper cabins and other support facilities.



The group camping and outdoor use area consists of several acres of open space within the open area and edge of the woods. A combination of hardy native grasses and maintained turf would cover this area to allow for tent setup and for general field activities. Accommodating group sizes of up to 60 is envisioned, although the site has some flexibility to expand if warranted. At several acres in size, there is also adequate space to rotate camp areas for turf maintenance purposes.

The camper cabins expand upon the overnight camping theme by providing a unique opportunity for groups and individual families to enjoy the park all seasons of the year.

The camper cabins expand upon the overnight camping theme by providing a unique opportunity for groups and individual families to enjoy the park all seasons of the year. It also provides those that are less inclined to "rough it" the chance to experience and enjoy the park in ways that they would otherwise not have the chance to do. Overall, a total capacity of 40 to 50 people is envisioned, with several cabins being built initially and others added as demand warrants. As with the open camping area, there is some room for expansion. However, care should also be taken not to cross the threshold of site capacity since doing so would change the essence of the experience.

From a design standpoint, the cabins would be simple, rustic-style frame structures that can accommodate four on up to eight people depending on the dimensions of an individual cabin. A variety of sizes would be an appropriate consideration as well. In addition to bunk-style beds, typical amenities would include a table, chairs, reading lights, and a warming stove.

Both the group camp and the camper cabins would be supported by a multi-use building that houses a restroom and showers, seasonal shelter, and limited kitchen facilities. The shelter could be either enclosed or open air, depending on the final architectural program. A bon fire/outdoor lecture area with seating for 60 would also be provided, including a small stage and grass or bench-style seating. Other amenities in this area includes simple items such as a drinking fountain, picnic tables, and trash containers.

A controlled entrance drive and parking lot would be provided to ensure a sense of security. The parking lot would be sized to accommodate approximately 30 vehicles. Both the drive and parking lot could be either asphalt paved or gravel-surfaced depending on the level of expected use. As with some of the other use areas, the porous pavement would be used for overflow parking to reduce the extent of hard surface within the park.

As illustrates shown in figure 6.7, the proposed group campground is set in the "V" of two ravines that come up from the river. These natural landforms and treed vegetation pattern create an excellent buffer between this and other use areas and open spaces within the park. Importantly, the ravine and wooded buffer on the north side of the group camp provides needed separation between this use and the adjoining private property.

An adventure course is also proposed in the group camp area.

An adventure course is also proposed in the group camp area. Typically, this type of facility is designed to support programs that help build participant's aptitudes in a variety of outdoor activities, skill development, and teamwork. Although a program has not been formalized, potential features include a ropes course and climbing apparatus. Along with practical layout considerations, blending these facilities into the natural surroundings is also an important design consideration.

Beach Area

The beach area is a new facility that replaces the existing one located near the boat launch.

The beach area is a new facility that replaces the existing one located near the boat launch, which has proven to be too small to accommodate the use. The existing beach site also conflicts with boating and fishing activities.

The proposed location for the beach provides an exceptional opportunity to create a unique facility that accommodates more use without compromising the natural characteristics offered by the river and park. As illustrated in figure 6.8, development of the beach area will be limited to that which is required to provide reasonable access and support of the beach activity. As shown, emphasis was placed on keeping built structures out of the viewshed of the river to respect the river's scenic natural qualities.

Figure 6.8 – Character sketch of the proposed beach area.

The existing "natural beach" offers outstanding recreational potential within the context of a natural setting.

As illustrated in figure 6.8, a paved drive lane for tram service and other permitted vehicles and a paved pedestrian trail are provided from the upper parking lot (refer to figure 6.7) to the beach area following a ravine. Although driven by practical as much as design reasons, keeping the parking remote from the beach actually adds to the sense of place that is unique to the river and adds to the appeal of the area. Although traffic will be light on the road, separation between vehicles and pedestrians is considered necessary for safety.

At the end of the access drive, a small parking area for permitted vehicles is provided, along with a waiting area. A family picnic area is also nestled nearby between the waiting area and the beach. A connection from the beach to the riverfront trail is also provided to maintain a link between the beach and other facilities along the river.

On a higher beach above flood elevations and setback from the river sits the only building proposed for this area. The building will accommodate restrooms, vending area, storage, lifeguard facilities, and a first-aid station. A simple design in keeping with the character of the river and the other buildings in the park is envisioned.

The beach area itself will also be unobtrusive in design and basically take advantage of the natural beach that already exists. Amenities on the beach will include lifeguard chairs and a small beachside picnic area with a few seasonal tables. A capacity of around 250 people is anticipated given the current size of the beach area.

To protect the beach, some restoration and stabilization of the rivers edge will be necessary. Redirecting the ravine channel that flows into the river will also be required to prevent future erosion of the shoreline in this area. Both the restoration and stabilization of the area will be consistent with sound ecological principles to ensure consistency with the stewardship program for the park and the requirements of other agencies trying to preserve the river's natural character.

Internal Trail System

The trail system that exists and is planned for within the park is expected to be one of the most highly regarded development features in future years.

Consistent with regional recreational trend data, the trail system that exists and is planned for within the park is expected to be one of the most highly regarded development features in future years. The natural landscapes, overall setting, diversity of trail character, and overall trail length add up to a very compelling experience for the trail user. As the trail mileage expands and the regional population grows, it is anticipated that trail use numbers will grow substantially over the current levels. Preserving the overall quality of the trail experience while accommodating more trail users becomes the overriding challenge. Fortunately, the land forms of the park, coupled with a variety of vegetation types, minimizes the extent of visual overlap between trail segments and between trails and other built features.

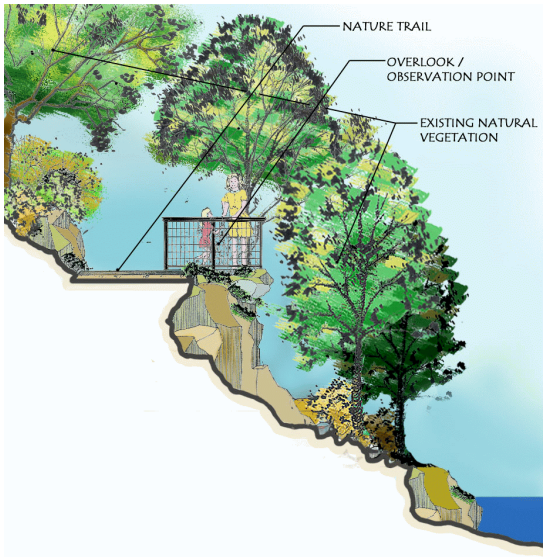
As illustrated in figure 6.2, the *Master Plan* highlights the proposed general alignment of the two trail types proposed for the park, which include:

- Natural trails – soft-surfaced trails that traverse through the natural areas of the park.
- Multipurpose trails – hard-surfaced trails that connect the major park features together internal to the park and the park to the regional trail system.

The following considers each of these trail types in greater detail.

The existing informal trail along the river is likely to become very popular once it is improved for general use.

Providing select overlooks to the river will also add to the value of the river trail, as illustrated in this character sketch.



Nature (Cross-Country Ski) Trails

One of the hallmarks of the park is the diversity of experience that can be gained by simply walking through the different sections, each of which having its own unique qualities, especially once the restoration program has matured. As illustrated on the master plan, the nature trail network traverses through all reaches of the park. Overall, nearly eight miles of nature trails is envisioned. For the most part, the existing nature trail system functions very well and will continue to be part of the trail system. Notable additions to the existing trails will be a more developed nature trail along the river and a much more extensive system on the upland areas of the park. This expanded system will also help spread out use across a larger area so that the personal experience of using the trail will be preserved while still accommodating considerably more users.

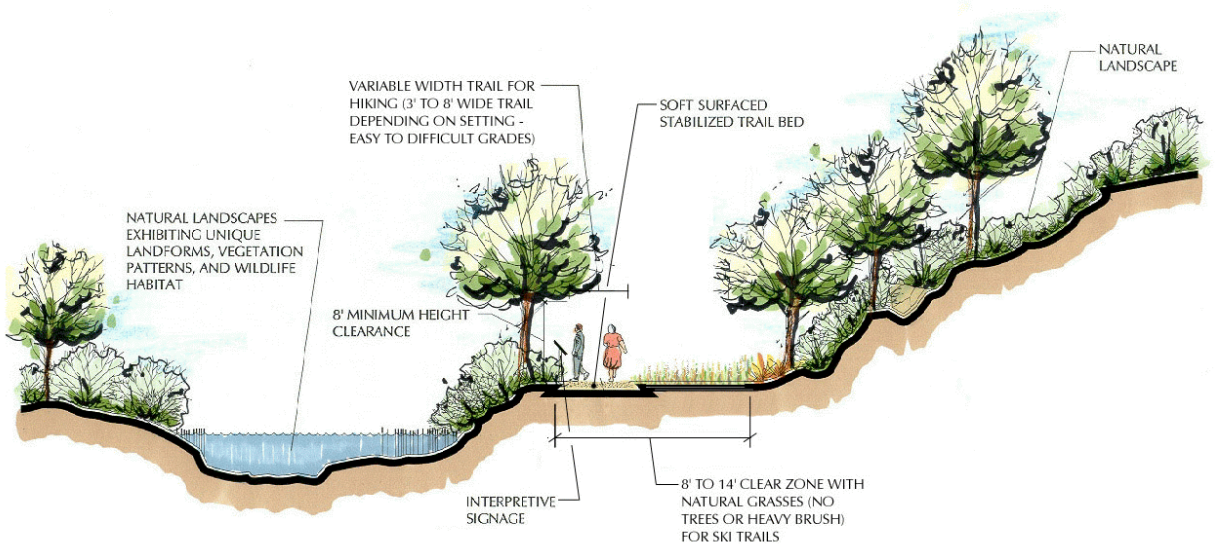
The degree of difficulty of the nature trails will vary considerably to appeal to the varying expectations of trail users. In some cases, universal accessibility will be achievable. On the other end of the spectrum, some of the trails will be steeper and narrower to appeal to the more adventurous and able-bodied individual. The intent is to maintain the diversity of experience to which park users have become accustomed.

From a design perspective, the natural trails will continue to be soft-surfaced. Where feasible, grass or compacted native soils remain desirable, especially in areas of less use. Pragmatically, increasing levels of use will undoubtedly require a more aggressive approach to trail stabilization in select areas as time goes on. This will likely include the use of compacted aggregate in heavily used areas or areas prone to erosion. Although this may seem quite undesirable to many trail users, the careful selection of surfacing materials (color, texture, etc.) and the use of organic-based stabilizers can substantially reduce many of the visual characteristics often associated with a more "developed" trail while still reaping the benefits. A more stabilized trail can actually result in *reduced* ecological and visual impacts by reducing erosion, keeping the trailbed narrower, and helping to prevent trail "creep" and trampling of adjacent plant life.

In terms of width, the overall clear zone will have to be wide enough to accommodate cross-country skiing on select trails. This will range from an eight foot minimum to 14 foot for double-tracked or skate-ski trails. For summer use, a stable trail bed of as little as three or four feet on up to about eight feet is anticipated. Figure 6.9 illustrates these design concerns.

From a cross-country skiing perspective, the existing trail experience is held in very high regard by skiers, even though the length of trails is still limited. Whereas the new master plan suggests some functional improvements, maintaining the essence of the current system is an important underpinning to the winter trail system.

Figure 6.9 – Character sketch of nature trail setting.



The nature trails connect to virtually every major facility within the park.

As illustrated on the master plan, the nature trails connect to virtually every major facility within the park. This approach serves two primary purposes:

- Provide easy access to the nature trail system from other popular facilities.
- It creates a more dispersed approach to trailhead parking. This increases the propensity for spreading out the trail use to more areas of the park. (Although this has not been an issue in the past, there is a greater likelihood of this occurring as trail use increases in future years.) Dispersed trailheads, where parking lots are shared with other functions, is also a more efficient, less space-consuming, and a less imposing design approach than creating single-purpose parking lots.

Multipurpose Trails

The primary function of the multipurpose trail is to link major development areas together into a cohesive whole.

The primary function of the multipurpose trail is to link major development areas together into a cohesive whole. While the natural setting for these trails remains very important, emphasis is also placed on providing a higher degree of accessibility for the less able, with greater consistency in terms of grades, trail width, and surfacing. By design, these trails will provide a higher level of service to those that still desire a “walk in the woods”, but prefer to do so on a less physically challenging trail. In addition, multipurpose trails expand the user base to include other user groups, like recreational bicyclists, whose opportunity in the past to enjoy the park has been very limited. These trails will also serve the needs of families, small groups, and older individuals that want to enjoy the park, but are less inclined or unable to use the inherently more difficult and less consistent nature trails.

As shown on the right side of this photo, development of the multipurpose trail between the Contact Station and the campground is already underway.

As illustrated on the master plan, the multipurpose trail provides a linear connection through the park that begins at the Contact Station – where it would also connect to a planned regional trail corridor. Overall, approximately 3.5 miles of multipurpose trails are anticipated. In as much as possible, these trails will also traverse through natural areas to provide a pleasant experience for the user similar to that found along the nature trails.

From a design perspective, the multipurpose trail will be hard-surfaced to accommodate a variety of users, including walkers, bicyclists, and in-line skaters. In terms of width, a ten foot tread width is proposed, which is consistent with generally accepted standards in regional parks. As illustrated in the master plan, crossing of the park roads is kept to a minimum to avoid conflicts. All crossings will be purposefully located where traffic is expected to be moving slower or stopping at an intersection.

Regional and Local Trail Interface

As defined in Section II, making connections to regional trail systems was an important master planning consideration in order to expand trail opportunities for park visitors and to provide opportunities for alternative forms of transportation to the park. As shown on the master plan, the multipurpose trail that traverses along County Road 21 will also be part of a regional trail link being considered for this area of Washington County under a separate master plan.

Trailhead and Trailside Amenities, Points of Interest, Overlooks, and Fishing Piers

At the point on entry, the Visitor Contact Station will serve as a primary trailhead facility within the park, although secondary trailheads will also be provided at each of the parking lots.

At the point of entry, the Visitor Contact Station will serve as a primary trailhead facility within the park, although secondary trailheads will also be provided at each of the parking lots. An information kiosk, restrooms, vending, and resting area will be provided for trail users at that location. Additional trailhead information will be provided where the multipurpose and nature trails interconnect with development areas, parking lots, and points of entrance into open space areas.

With respect to trailside amenities, the park's location along the river and the highly variable terrain and vegetation provides numerous points of interest and overlook opportunities. The master plan graphic illustrates a number of potential locations for overlooks and observation areas based on field review. Note, however, that these are preliminary only and will need to be field adjusted at the time of actual implementation – with the objective being to use the trails, trailside amenities, and overlooks to put people in a position to enjoy the beauty of the park.

To avoid taking away from the experience itself, the design for all of trailside amenities will be simple in keeping with the natural landscape. Important to siting these features is controlling the field of view from specific points of interest to preserve the aesthetic value of what is being observed. The careful placement of trails and trailside amenities is critical to preserving the experience that the park visitor is seeking.

Maintenance Building

This facility will continue to support the maintenance function as part of the master plan.

As illustrated on the master plan graphic, an on-site maintenance facility currently exists within the park. This facility will continue to support the maintenance function as part of the master plan. If used only for upkeep of this park, the facility would be limited to that which is specifically needed for day-to-day functions.

Although a storage yard is needed for storing materials, its size would be more limited and located to be more out of sight than is currently the case. The storage area would be fenced for security purposes as visits to the park grows. Upgrades to the existing facilities would be undertaken on an as-needed basis. It is expected that the current facilities will be suitable for a number of years.

Note that the master plan provides the flexibility to expand the maintenance facility to service regional trails in addition to the park should that be considered advantageous by Washington County as part of its overall maintenance function. Although the extent to which the facility would have to be expanded has yet to be defined under this scenario, expectations are that it would be modest.

Aerial (looking north) illustrating the maintenance area. The master plans calls for consolidating outdoor yard activities to a smaller area and restoring some the area to native vegetation.

Buffering Adjacent Properties and Control of Borders

With respect to control of the park boundary from encroachment and unauthorized access, Washington County Parks typically installs a three-strand barbless wire fence around park properties to prevent encroachment. The County also relies on enforcement of local park ordinances to control park borders. In some instances, an existing fence is already in place and will be maintained (i.e., on the southeast corner of the park).

In some areas, informal footpaths already exist from private property into the park. Although some of these may remain in select locations, these are the exceptions rather than the rule. For the vast majority of the park, informal footpaths will not be allowed in order to maintain control of the park boundary and avoid conflicts between private and public property from occurring. Where footpaths occur over time, Washington County Parks staff will work directly with property owners to review the situation and determine the best course of action to avoid conflicts.

The use of a natural infiltration system produces a much more natural hydrograph.

With respect to formal pedestrian-level access, the trail access points defined by the park master plan will be the established points of entry into the park. These represent the locations that either currently exist or are planned. Beyond these, no additional defined entry points are envisioned unless expressly approved by the Washington County Parks and Open Space Commission and the County Board.

The one issue that a wire fence cannot successfully control is free-roaming domestic animals. Enforcement of animal control laws is the most reasonable approach in spite of its inherent limitations. Consistency in applying ordinances and public education about the County's policies to take action where abuses are found will be important to controlling this often unnoticed, but often destructive, occurrence from becoming a problem.

With respect to buffering of adjacent properties, Washington County Parks will work directly with property owners on an as-needed basis to address detail concerns about maintaining natural buffers that are mutually beneficial. Whereas the intent is to maintain reasonable distance and physical screening between properties, Washington County Parks will on occasion have to make decisions that are in the best interest of the park. As an example, the upland area suitable for a trail in the southeast corner of the park is fairly limited. In this case, there may be instances where the trail will have to be closer to a property than otherwise desired. Washington County Parks will still remain committed to working with property owners in these cases to find a successful solution that buffers private properties while still meeting facility needs.

Park and Trail Signage Program

One of the more important communications tools is a comprehensive signage program that is carried uniformly throughout the park.

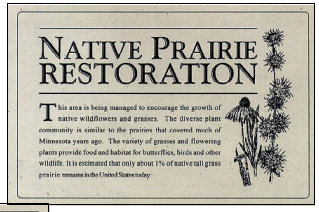
One of the more important communication tools is a comprehensive signage program that is carried uniformly throughout the park. The signage should provide a consistent message to park and trail users and provide information related to facility locations, trail routes, park rules and regulations, and other pertinent information.

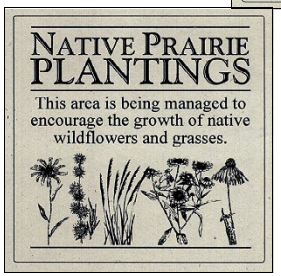
The signage program is of particular value with respect to the ecological stewardship program, where providing interpretive information to park and trail users at the point of contact has proven to be one of the most effective forms of education. The main benefit is that the park user can apply new knowledge immediately and begin to internalize its significance based on first hand experience.

Key Components of a Comprehensive Signage Program

The park signage program consists of a hierarchy of signs that give the park visitor needed information in an unobtrusive manner. From a design standpoint, a strong overall theme that is consistent with the natural qualities of the park is important. As with the buildings, signage should be considered an architectural element that adds to the aesthetic qualities of the park.

Examples of signage related to nature interpretation and education. (Source: Vacker Inc.)





Key components of the signage program include:

- Park identification sign – located at the main point of entry. This sign sets the design theme for the entire signage program.
- Park directional signage – located along the entrance drive and provides basic directional information.
- Main information signs/kiosks – located at the major use area. This sign provides a park map, general information and rules, and an overview of the ecological stewardship program.
- Trailhead sign – located at the start of a trail and provides a trail map and ecological stewardship program overview.
- Trailside exhibit sign – located along trails and provides information on ecological restoration and management activities and plant identifications.
- Trail intersection sign – located at trail intersections and provides a map of the trail system and "you are here" designation. Given the size of the park, intersection signs will be most advantageous where the park trails interlink with the local and regional trails outside of the park.

Although many of these components are commonplace, giving greater attention to ecological stewardship as part of the signage program is recommended to raise visitor's consciousness about this important issue.

Public Services/Utilities

Public utilities, such as sanitary sewer and municipal water, are currently not available to service park facilities, nor is that anticipated in the future. Given this, the park will continue to be serviced by traditional wells and septic systems. However, new approaches, such as wetland-based septic systems, will be considered to be in keeping with the ecological principles and spirit of the master plan.

Development Conflicts

The level of existing or potential conflict encountered during the planning process was minimal. From a land area perspective, the expansion of the park as proposed was well received by majority of those that participated in the process. Aside from buffering and boundary control issues as previously considered, even adjacent property owners were in favor of the park's expansion.

From a development perspective, conflicts between user groups were minimal and not considered a significant issue for the future. The development program defined in this section is considered by the public to represent a reasonable balance between recreational use and natural area preservation. Based on the results of the public process, no notable conflicts are anticipated.

Washington County currently rents out a single family residence near the Visitor Contact Station. This is considered to be in conflict with the master plan vision and thus the master plan calls for it to be phased out. The Washington County Board will make the determination as to the timing of this.

Universal Design/Special Needs Framework

In recent years, extensive public debate has been focused on equal access to indoor and outdoor public spaces for all individuals. The Americans with Disabilities Act of 1991 (ADA) turned past guidelines and standards into law, forever changing the way accessibility issues are to be addressed. But the ADA is not an end unto itself. It is simply another step toward a design philosophy that ensures accessibility for all. The challenge is to move beyond the ADA to a more encompassing approach to design. The following defines how that challenge will be addressed in this park setting.

The Principle of Universal Design

As stated in the published design guide *Universal Access to Outdoor Recreation* (PLAE, Inc. 1993), past criteria for barrier-free design (elimination of barriers to access) were based upon the needs of average human beings or the needs of the wheelchair user (which was often thought to represent the broadest spectrum of disabling conditions). In reality, the range of abilities and disabilities goes well beyond that limited definition. It has become evident that design philosophy must continue to evolve if a barrier-free environment is to be realized in the design of parks.

Universal design is an approach to design that achieves this philosophy by combining the basic principles of barrier-free design with a more comprehensive view of human beings. Under this paradigm, universal design attempts to consider all degrees of sensory awareness, all types of locomotion, and all levels of physical and intellectual function. By doing so, the needs of individuals with varying desires, abilities, and expectations can be reasonably accommodated.

The philosophical underpinnings of universal design as defined by *Universal Access to Outdoor Recreation* includes:

- People purposely choose settings for their recreation activities.
- Choices are made with the expectation of achieving specific recreational experiences.
- Desire is to provide as broad of a spectrum of activities and recreational settings as practical for a given site.

The recreation opportunity spectrum (ROS) classifications serve as a means to achieve this end. These are flexible guidelines that set the framework for making appropriate accessibility decisions that permit universal access within the context of the public's expectation for a certain type of setting.

Recreation Opportunity Spectrum (ROS)

The ROS is a recreation management approach used by the USDA Forest Service that is in keeping with the principles of universal design. The ROS framework is based on a continuum of possible combinations of recreation settings, activities, and experiential opportunities, as well as the resulting benefits that can accrue to the individual (by improving physical and mental well-being) and society.

To be manageable, the recreation opportunity spectrum is divided into four classifications that cover the full spectrum of outdoor recreation environments. These classifications are divided primarily in terms of perceivable modifications to the natural environment and the related influences these modifications have upon visitor expectations. The following briefly defines the four ROS classifications:

- **Urban/rural areas** – are highly developed and evoke expectations of easy access.
- **Roaded natural areas** – are less developed than urban settings, but still contain a relatively high number of modifications to the environment. These areas evoke an expectation for a moderate level of accessibility and a reasonable expectation for "like" experiences.
- **Semi-primitive areas –** are rarely developed, and evoke an expectation of difficult access.
- **Primitive areas** – have few, if any, modifications. These evoke expectations for the most difficult access that require specific skills and capabilities.

Under the ROS framework, it is not necessary, nor even desirable, to develop all recreation equally. From the ROS perspective, each site should be developed or modified in a manner that achieves harmony between recreation expectations and the environmental setting. What is important is that the level of access be in line with what is expected by the public – whether they are able-bodied or disabled – for a particular setting

Application of Universal Design Principles

The objective with universal design is to consciously apply the principles to this park setting to determine what is most appropriate given the circumstances. At the very least, the outcome would be that more people of different levels of ability will have life-enriching experiences in the park. At the very most, the park will serve as an example for others to follow, ultimately furthering the cause of making universal access an integral part of all park designs.

Of the four ROS classifications defined above, the **roaded natural area classification** has the most utility given the park' location and physical characteristics.

Involvement of Representative Populations in the Design Process

Since universal design is still an evolving approach to design, achieving universal access is often simpler in concept than in practice. Anticipating the needs of people with varying degrees of abilities is a formidable task since it is often very difficult to understand the specific needs of individuals with certain disabilities when one does not share those limitations. Therefore, it is imperative that the design process include individuals that represent a cross-section of people with and without disabilities. As the project moves into design implementation phases, efforts should be made to involve representatives of divergent populations in the detail design of specific facilities. This approach helps to ensure that the design for any given facility will actually serve the intended populations.

Section VI Development Master Plan

Overview

The Development Master Plan is an outgrowth of the public process.

The Development Master Plan is an outgrowth of the public process, which considered all facets of the park's future development. The planning process strived to be exhaustive in its consideration of the issues that were raised during the public meetings and research related to recreation trends at the regional level. After much discussion and synthesis of public comment, the findings presented here represent the consensus reached by the Washington County Parks and Open Space Commission and supported by the Washington County Board.

Note, however, that the master plan still remains a dynamic planning tool that will continue to evolve and be fine-tuned as it moves through implementation steps and benefits from management and operational experiences and a greater understanding of recreational trends in the years to come. It is also recommended that implementation decisions made in future years include additional opportunities for public input to have the greatest level of confidence that what is developed will be in line with public demand and expectations. Through an ongoing commitment to an open public process, it is believed that the true values that the park brings to the region will remain at the forefront of the decision making process.

Balancing Human Use of the Park with Ecological Protection

The master plan represents a thoughtful and responsible balance between recreational uses and preserving open space values. While providing a cross-section of recreational opportunities within the park remained a fundamental goal, showing restraint in the size of the built footprint was also a key objective to preserve the open space character that many people come to the park to enjoy. As appreciation of natural areas as a recreational activity (i.e., nature viewing) continues to grow, expanding the park's acreage and restoring the natural systems historically found within it seems well justified from a both a recreational and ecological perspective.

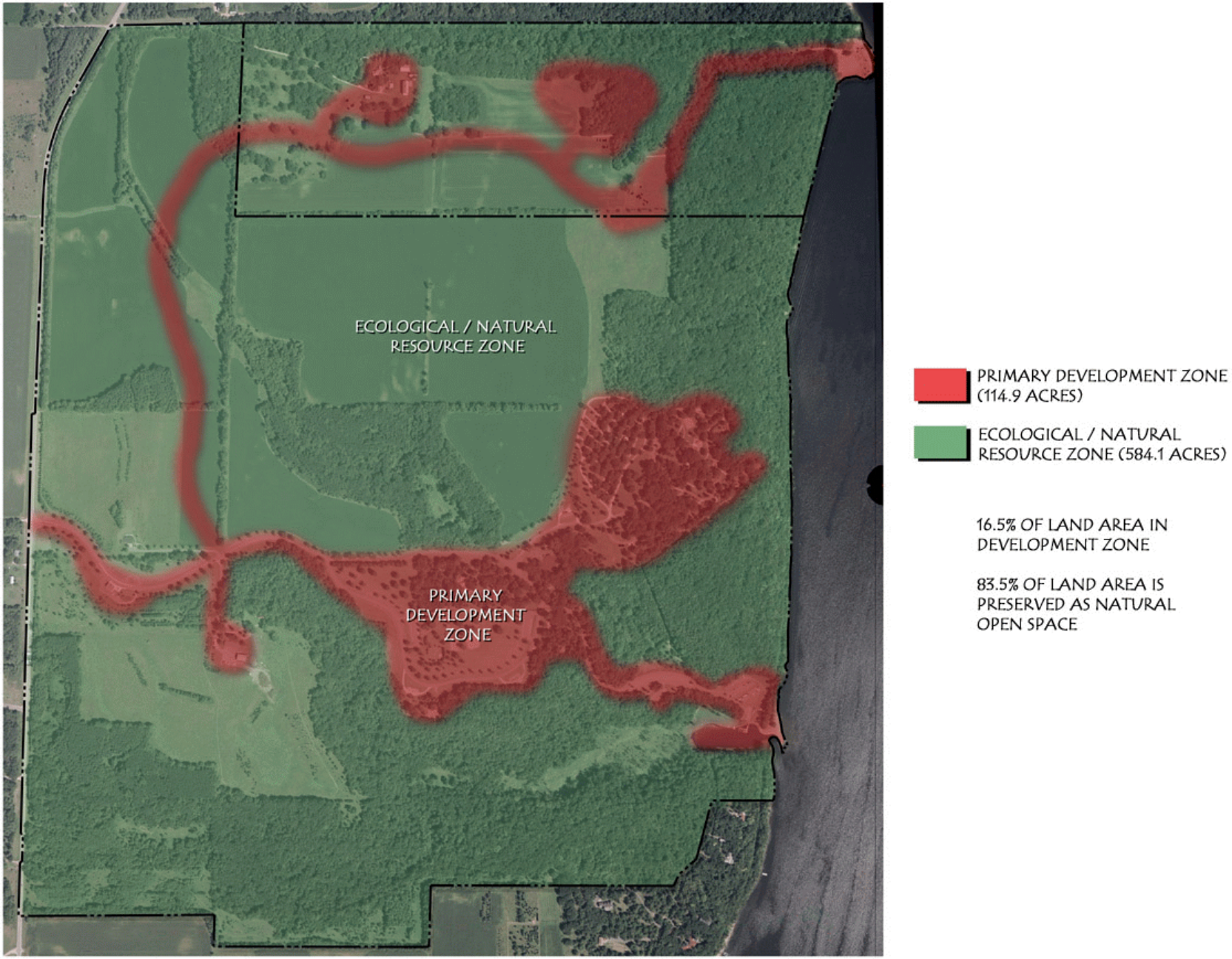
Land Use Zones

Land use zones describe the park by functional uses and overarching ecological characteristics as they relate to the development program.

Land use zones describe the park by functional uses and overarching ecological characteristics as they relate to the development program. By considering the park from this broader perspective, the interrelationship between the ecological resources of the park and the development program can be exhibited. As figure 6.1 illustrates, two distinct land use zones were defined, which includes:

- Primary Development Land Use Zone
- Ecological and Natural Resource Land Use Zone

Figure 6.1 – Land Use Zones.



The following considers each of the defined zones.

Primary Development Land Use Zone

This zone relates to park areas where development is concentrated to service specific infrastructural needs. As illustrated in figure 6.1, the proposed development zone has not changed substantially in and around the existing developed area. Although the new master plan provides additional facilities to support anticipated public demand, the overall development footprint was kept to the minimal size needed to support those facilities. Proposed developments, such as access roads and group use areas, were also located in response to minimizing direct impacts to natural areas and sensitive ecological zones.

Ecological and Natural Resource Land Use Zone

This zone encompasses the largest area of the park and focuses on restoration and preservation of natural open space, ecological diversity, and continuity in wildlife habitat. Although development within this zone is not precluded, it is generally limited to trails, overlooks, sitting areas, and nature interpretive signage. With walking/hiking in a natural area, coupled with nature observation, as some of the highest ranked recreational activities (as defined in Section II), it is expected that the use of this zone for passive recreation will be fairly high even though most of it is preserved as natural open space.

Development Program

The development program defines the recreational uses of the park and the facilities to support those uses.

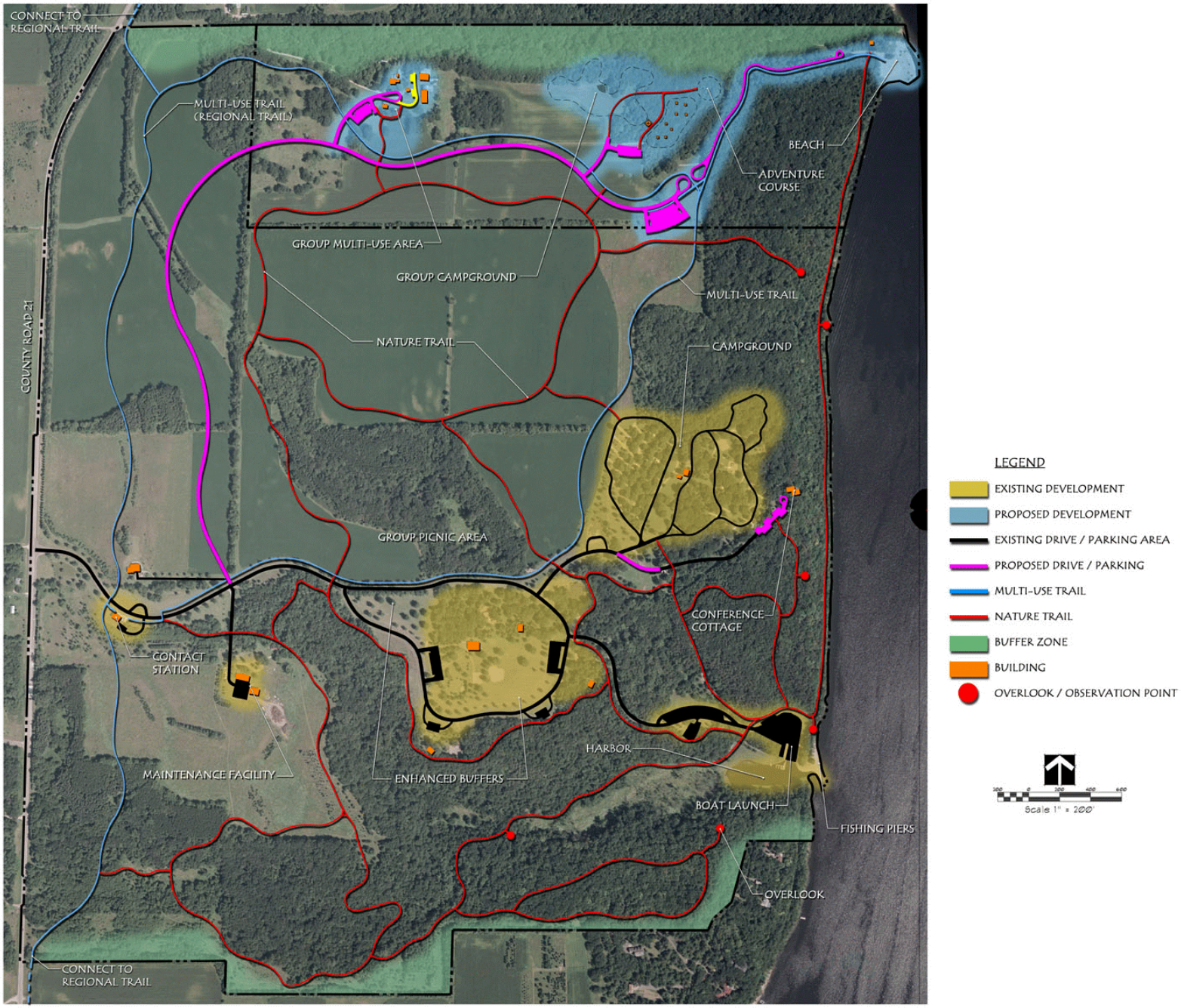
The development program defines the recreational uses within the park and the facilities to support those uses. The program is an outgrowth of research on recreational trends, the findings of the public process, and the development parameters established as part of the previous master plan for the park.

Development Master Plan

The development master plan provides for a cross-section of recreational activities to meet current and anticipated recreational demands. The mix of facilities included in the master plan provides an opportunity for short to day-long stays at the park where one can enjoy a variety of complementary recreational activities in a natural setting.

Figure 6.2 illustrates the overall development master plan for the park. Thereafter is an overview of each element of the development plan.

Figure 6.2 – Development Master Plan.



Park Drive

Restoring native plant communities, including wildflower displays, will add to the natural character of the park and reduce maintenance costs.

The park entrance monument and gate area provides clarity to the park's entrance. Adding wildflower displays in lieu of maintained turf will enhance the appeal of this area.

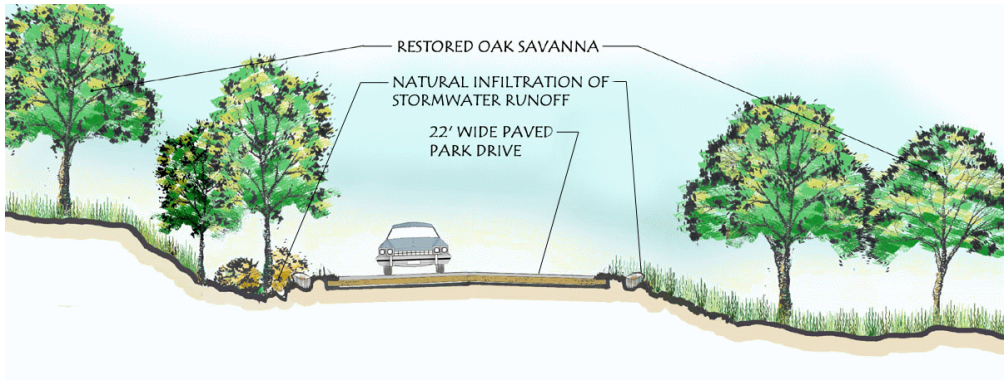
As illustrated on the Master Plan (figure 6.2), vehicular access into the park will continue to be limited to one entrance from County Road 21. This maintains a singular entrance location and point of control. With a few minor exceptions, the existing park drive that services the existing development areas in the southern half of the site will remain unchanged. As defined later in this section (under *Campground*), a relatively minor realignment of the entrance drive is envisioned to clarify the entrance to the campground and conference cottage facilities. The access drive to the boat launch and picnic areas remains unchanged.

The new park drive illustrated on the *Master Plan* ties into the existing drive near the contact station and traverses through the site to service several proposed development areas, including the multi-use group facility, group camp area, and beach. The alignment as shown was selected for several reasons, including:

- Minimizing vehicular traffic through the core of the park.
- Minimizing fragmentation of ecological systems and ecotonal areas between the river edge and the upland areas.
- Distributing traffic into several directions to reduce actual and perceived congestion within the park.

As with the existing park drive, the new drive would be a maximum of 22 feet in width to minimize the built footprint and hard surface area and to control traffic speeds. A rural cross-section is proposed to encourage stormwater infiltration. Asphalt pavement is proposed to control dust, reduce wash-boarding, avoid mud and erosion, and minimize ongoing maintenance costs. As figure 6.3 illustrates, the roadway would also be designed in response to the existing land forms to give it a pleasant, natural character. Careful alignment of the road will also minimize visual overlap between it and the various trails that traverse through the site.

Figure 6.3 – Character sketch of cross-section of new park drive.



Enhancing the visual aesthetic of both the existing and new park drives is also a master plan objective. This includes restoring native plant communities along these corridors, including transitioning some of the non-programmed mowed turf areas into natural grasses and wildflower displays that add visual appeal and interest. These collective improvements will create a more natural character to the roadway corridors and help set the tone for a visitor's overall park experience.

A number of pull-off parking areas are also envisioned along the park drives to service small picnic areas, park overlooks, and trail access points. The final location of these would be determined during plan implementation when specific vistas and other development nuances can be better defined.

The park entrance is currently controlled with an electronically-controlled gate that allows after-hours ingress and egress to the park, which is especially useful to overnight campers. The entrance itself is appealing and well-defined. As with the park drive, reintroducing native plants and wildflowers is proposed to enhance the aesthetic character of the park entrance.

Visitor Contact Station

As illustrated on the *Master Plan* (figure 6.2), the Visitor Contact Station is located near the main entrance to the park, where it serves a number of functions, including providing a:

- Single point of control for park operations and oversight. This ensures that essential visitor services are provided at the initial point of contact using minimal staff.
- High level of security for the park facilities.
- Common point of orientation for park visitors.

The Visitor Contact Station is an architecturally-appealing structure that sets a positive tone for the visitor's experience.

The existing building, which is relatively new, sets an appealing architectural character that is reminiscent of other existing park facilities, such as the picnic shelters. Although the overall size of the building is relatively small at under 1,500 square feet, it readily accommodates the following:

- Visitor contact – related to orientation and collection of park fees
- Administration – related to activities within this park
- Restrooms
- Vending
- Small meeting room and employee lunch room

Although the Visitor Contact Station will remain relatively unchanged, there are a number of external improvements anticipated, including:

- General improvements to pedestrian circulation as the trail interconnections are developed.
- Paving the access drive to the staff and visitor parking lot. (Five parking spaces are provided, which could be expanded if demands warrant as trail activity increases.)

The Visitor Contact Station is located to provide access control and dispense information to park visitor. The newly developed trail (2002) north of the turnaround has already expanded pedestrian access to the facility from the campground and picnic area. Future trail connections will also expand the use of this facility for visitor orientation and information, which may warrant expanding the parking lot as trail use increases. (Note that the home to the north is a County-owned rental unit that will be removed as part of the master plan.)

Group and Family Picnic Areas

Group gatherings are a very popular activity within the park.

Group gatherings are a very popular activity within the park. These gatherings range in size from family get-togethers of a couple dozen people to large, organized events. The current facility has proven very successful and will remain an integral part of the master plan. In all, there are a total of three group picnic shelters in this area, as illustrated on the *Master Plan* (figure 6.2). The aerial below illustrates this area in greater detail.

Aerial (looking north) illustrating the group and family picnic area.

The following provides an overview of the facilities within the picnic area.

The Hilltop Shelter is the largest shelter within the park, with a capacity of 100 to 150 people.

Hilltop Shelter

This shelter is the largest of the three shelters and is centrally located in the picnic area. Amenities include:

- Capacity of 100 to 150 people (2,770 square feet.)
- Picnic tables under roof
- 24 electrical outlets
- Water spigot
- Kitchen facilities, including a ten foot serving counter and ten burner stove with double oven.
- Large BBQ grill and storage rack.

The nearby parking lot accommodates 39 cars, with overflow parking nearby.

The architectural character of the structure is very appealing, especially the limestone columns and walls. No major changes are proposed for this facility.

Eagle Ridge and Hilltop Shelters

Eagle Ridge and Hilltop Shelters are smaller, simpler shelters with a capacity of 35 to 70 people each.

These are two smaller shelters that are located central to the picnic area. Amenities included at both shelters include:

- Capacity of 35 to 70 people (1,080 square feet.)
- Picnic tables under roof
- 4 electrical outlets
- Water spigot
- Two charcoal grills
- Portable restrooms

The nearby parking lot for each of these accommodates 20 cars, with overflow parking nearby.

The architectural character of these structures is more simple than the Hilltop Shelter. Being nestled into the woods, the setting itself, versus architectural character, makes these shelters very appealing. The only significant changes to these shelters is possibly paving the parking lot for the Birch Hollow shelter if erosion becomes an issue. Maintaining an accessible path to this shelter may also be required. Improving the enclosure for the portable restrooms is also proposed to enhance their aesthetic qualities. No other significant changes are proposed for these facilities.

The restroom building, which is nestled in the trees, serves the picnic and play area.

Support Facilities in the Picnic Area

In addition to the shelters, there are a number of support facilities in the picnic area that enhance the level of service to the park visitor. These include:

- Restroom facility – appealing exterior materials blends well with the large picnic shelter. Although this facility supports all of the picnic shelters, it best serves the large structure and play area.
- Play area – modestly sized, well-used structure that supports all of the shelters. Modest expansion of the structure is proposed to better serve the picnic area.
- Ballfield – well maintained field and open area that can be used for a variety of field games.
- Small amphitheater – although not extensively used, the facility does serve a select group of people. Since maintenance costs are low, the amphitheater will continue to be provided.
- Basketball court – upgrading of the surface will be needed at some point. Otherwise, the court provides a simple amenity for picnic area users.
- Double tennis court – recently renovated facility that supports the picnic areas.
- Volleyball courts – adjacent to the two smaller shelters, these are popular amenities for groups.

Note that these support facilities are also available to the campers in the nearby campground. Aside from general upkeep and the upgrades noted above, no major changes or additions are envisioned for these facilities.

Aesthetic Enhancements to the Picnic Area

As shown in the aerial on page 6.7, there are several areas on the periphery of the picnic area that are mowed. As part of the general restoration of the park, some of these areas will be transitioned back to a natural character that is more consistent with the regional park aesthetic. Within the context of a natural theme, placing greater emphasis on the use of wildflowers and showy grasses is also envisioned to create a compelling transition between the natural open spaces and the manicured turf areas within the picnic area. In addition to its ecological value, these re-naturalized areas will also help reduce maintenance costs to some degree.

Independent Family Picnic Areas

Several small family-oriented picnic areas are also envisioned.

Although not specifically defined on the master plan, several small family-oriented picnic areas are also envisioned. Amenities within these areas would be limited to a few picnic tables and, at select locations, a grill. Each location would be selected based on their scenic qualities, views, ease of access, and proximity to other activity areas. In each case, a couple of parallel parking spaces would be provided. Maintained green space around these picnic areas would be very limited.

Boat Launch and Harbor Facilities

The boat launch and harbor facilities are two of the most popular amenities within the park.

The boat launch and docks are very popular features of the park.

The boat launch and harbor facilities are two of the most popular amenities within the park, often being well-used during the week and virtually always full on the weekends during the boating season. As shown in the aerials, the parking lot is spread out due to its location along a ravine that extends from the picnic area down to the river. Key existing features within this area include:

- 50 car-trailer parking spaces.
- An adjacent car parking lot.
- Three-slip boat launch that can accommodate watercraft up to 19 fee.
- Boat dock and slips for unloading and loading.
- Harbor area for boat maneuvering.
- Portable restrooms – a new enclosure is envisioned for these to screen them from the parking lot and provide a dependable level platform for them to sit on.

Aerial (looking north) illustrating car and boat/trailer parking lots just up from the boat launch.

Aerial (looking north) illustrating the boat launch facilities.

With the development of a new beach facility as shown on the *Master Plan*, the existing one located on the river on the north side of the harbor entrance will be redeveloped as a river overlook and for fishing. The most significant feature would be the addition of fishing piers. The river overlook would be located at the end of the old railroad grade, which is elevated above the water by 10 to 15 feet.

With respect the existing parking lots and entrance drive, the entire asphalt surface acts as a large flume in which stormwater is directed overland into the harbor and river. From a stormwater infiltration perspective, this approach is not very desirable. Unfortunately, in this situation there are no practical or economically-viable ways to alter this water management approach. However, the master plan proposes an alternative stormwater management approach for all new facilities, as defined in Section V.

Campground Area

During the camping season it is common for the campground to be completely full, especially on weekends and holidays.

The campground is expected to continue to be one of the most popular facilities within the park. During the camping season it is common for the campground to be completely full on weekends and holidays. In total, there are 73 sites that provide a range of camping experiences. Tents, small campers, and larger RV units can all be accommodated within the campground. More specifically, there are:

- 21 pull-through sites with water and electrical hookups for larger RV's (30 amp service).
- 5 pull-though sites with electrical hookups for larger RV's.(50 amp service).
- 36 back-in sites with electrical hookups for smaller RV's, a range of campers, and tents (20 amp service).
- 11 back-in sites with no utilities for tents and small camper trailers.

Figure 6.4 illustrates the layout of the campground, including proposed upgrades.

Figure 6.4 – Campground layout.

Improving the natural buffering between sites is envisioned to create a greater sense of privacy.

In addition to water and electric service at some sites, all sites have a picnic table and fire ring/grill. Other campground features and associated upgrades include:

- Expanding the existing modern restroom/shower facility to include more toilets and showers to improve service during peak times.
- Adding a new outdoor classroom facility for group activities. A simple open clearing area with grass or bench seats and a small stage is envisioned to accommodate a group of 50 to 70 people for campground programs.
- Relocating and upgrading the dumpstation so that it is more convenient to exiting RV's and campers and less intrusive to the camping experience than its current location near the bathroom/shower facility.
- Maintaining the play structure feature in a central location. Currently, a sand volleyball and horseshoe pit are also provided and will continue to exist as long as there is a demand for them. Note that the County will continue to monitor the use of these types of features, leaving open the potential to either add to or remove them as warranted to serve the public need.
- Improving trail links from within the campground area to the larger trail system that exists and is proposed. Linking the campground to both the nature trail and multipurpose trail system is envisioned.
- Reconfiguring the entrance drive into the campground to better differentiate access to the campground versus the conference cottage.
- Providing additional parking in select locations within the campground to accommodate the occasional extra vehicle.
- General upgrade of utilities and basic site amenities as required over time.

In addition to the noted improvements, emphasis will also be placed on enhancing the natural aesthetic qualities of the campground and improving the buffer/screening between campsites. Notably, this includes a significant reduction in the extent of mowed turf outside the campsites and other defined use areas. Re-naturalizing the campground will also help reduce maintenance costs.

As with all areas of the park, restoring and managing the natural areas within the campground will be part of the overall stewardship program.

As with all areas of the park, restoring and managing the natural areas within the campground will be part of the overall stewardship program. This would include removal of undesirable species such as buckthorn and phasing out species such as silver maples and cedars in favor of oaks and other native trees and shrubs. Note also that it would be appropriate to place greater emphasis on the use of wildflowers within the campground to maximize the aesthetic appeal of the area within the context of a natural setting.

Conference Cottage

Under the master plan, several improvements are envisioned for this facility.

The existing conference cottage is a simple structure that prominently overlooks the St. Croix Valley. Formally a summer home, the conference cottage currently offers a variety of amenities, including:

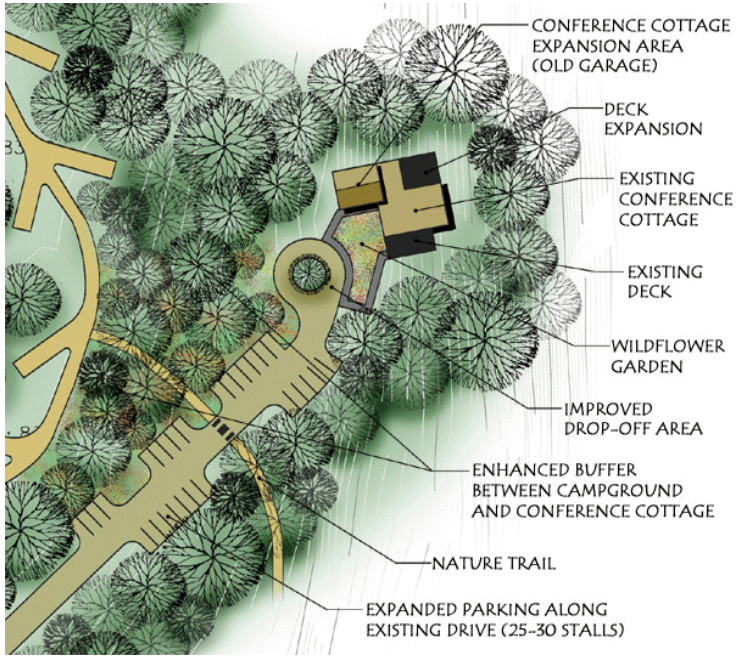
- Casual meeting room with comfortable seating, extensive windows overlooking the river, and a fireplace
- Conference table in an old dining room
- Full kitchen facilities
- Break-off meeting room
- Outdoor deck area
- Two bathrooms
- Storage garage (400 square feet)

At 1,400 square feet (exclusive of the garage), the limiting factor with the cottage is its size. With 15 to 20 people being the maximum comfortable capacity, the number of groups that find the facility to be of adequate size is relatively limited, with small business groups being the most frequent user. Inadequate parking near the facility also hampers its convenience, especially for business groups.

The conference cottage offers a charming and peaceful place for small group gatherings.

Under the master plan, several improvements are envisioned for this facility. The first one is to convert the garage area into a larger meeting room, which will augment the existing meeting rooms. By making this upgrade, the capacity of the cottage will be increased to 40 or 50 persons.

Figure 6.5 – Character sketch of conference cottage area improvements.



The second improvement relates to parking, in which additional parking would be provided much nearer the cottage. As figure 6.5 illustrates, the parking would be spread out along the existing road in bays to preserve existing trees and landforms. Improvements to the turnaround and drop-off area are also envisioned. Handicap parking near the entrance would be provided.

Aesthetically, the master plan calls for improving the buffer between the cottage and the adjoining campground to enhance the sense of separation between these uses. Managing the trees and native vegetation around the cottage as part of the larger stewardship program is also important, including removal of buckthorn and other invasive tree species that take away from the views to the river. Maintaining the small wild plant garden near the cottage entrance is also envisioned.

Group Multi-Use Area

This facility will be specifically designed to be highly adaptable in order to accommodate a wide range of recreational, social, and educational activities and programs with varying group sizes.

The group multi-use area is a newly proposed year-round facility that complements other park features and broadens the park's capacity to provide services to the public. From a use perspective, this facility will be specifically designed to be highly adaptable in order to accommodate a wide range of recreational, social, and educational activities and programs with varying group sizes. This flexible-use approach is especially important to attracting larger groups, families, and youth to the park all seasons of the year. The latter of these is of particular importance in that attracting more use of this and other regional parks by younger age classes is fundamental to instilling life-long outdoor recreational values.

The flexible-use approach to this facility also grants a high level of confidence that the year-round group activity needs of today and those that will emerge in the future can all be readily accommodated by a single, well-designed and appealing facility.

In addition to its functional design characteristics, the group multi-use area also serves to preserve the cultural and historical values of a traditional farmstead of the St. Croix River Valley, which is becoming an increasingly rare sight in this region. As illustrated on the aerial, the farmstead is also well-sited to provide a pleasant and unique setting that is reflective of the regional park experience.

The historic house has many unique features and detailing reflective of a bygone era. Preserving this treasure is one of the objectives of the master plan.

As the aerial illustrates, there are three existing structures that could play a role in the development of this use area, including the:

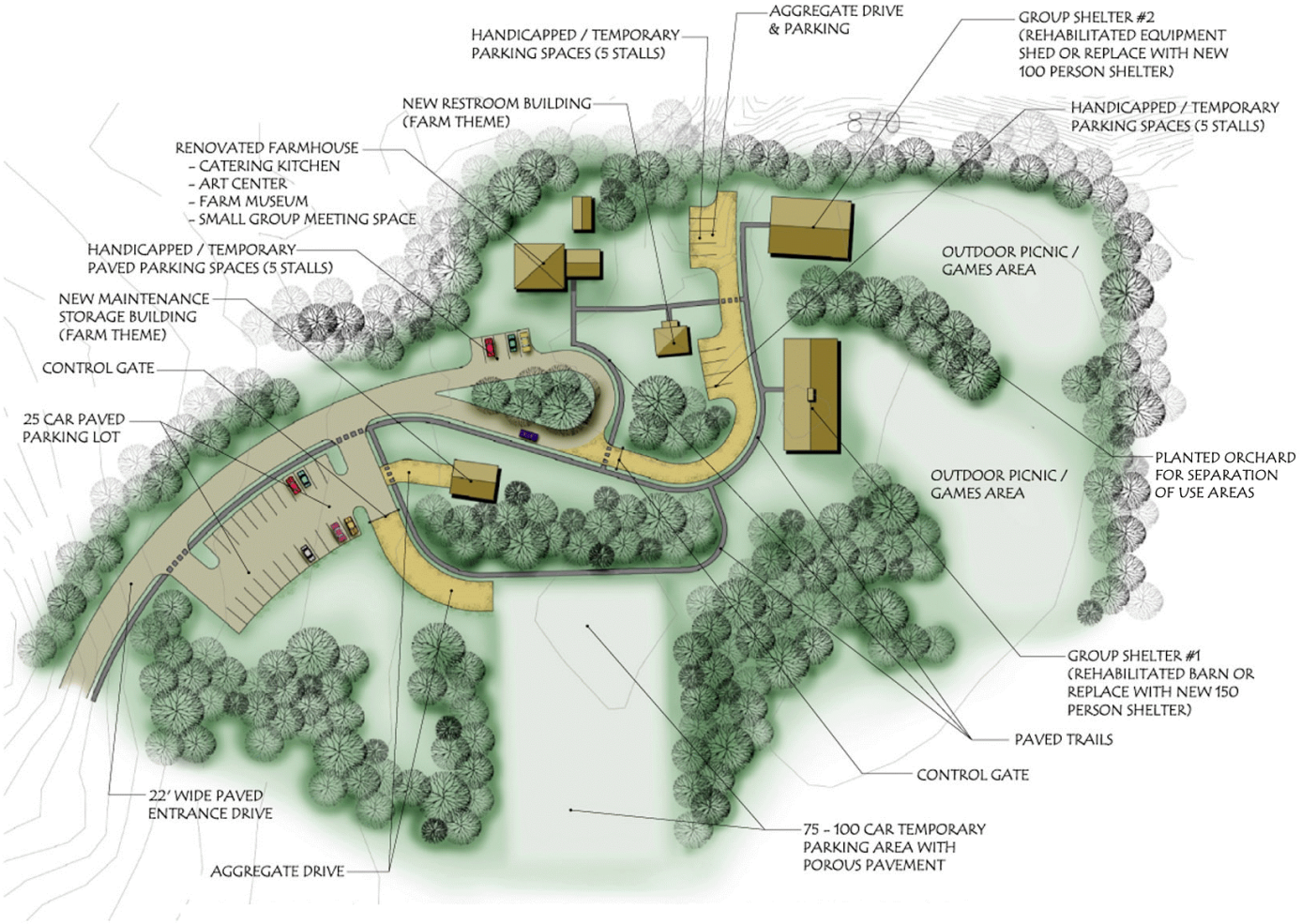
- Farmhouse – which is currently being considered for inclusion in the historic register.
- Barn – which is the red structure.
- Equipment shed – which sits behind (to the north) of the barn.

There are also a few out-buildings that may also be of some value in the final development scheme.

Using the farmstead as the underlying theme for the development, a number of key facilities are envisioned as part of this use area, as figure 6.6 illustrates.

Aerial (looking north) illustrating the group and family picnic area. (The farmhouse sits in the trees on the left side (west) of the photo, with only part of the roof being visible.)

Figure 6.6 – Character sketch of the group multi-use area with a historic farmstead theme.



As figure 6.6 illustrates, each of the primary existing structures would be renovated where possible as part of the development plan. The existing farmhouse would serve several functions, including:

- Art Center and Farm Museum – for exhibiting artifacts of the farming history along with local arts and crafts displays.
- Small group meeting space – to complement the conference cottage and provide a unique venue for business, non-profit organizations, and local associations to meet.
- Catering kitchen – to support the two group shelters.

The two four-season shelters would take advantage of the two farm structures that currently exist, assuming that their structural integrity allows for this conversion. The barn, which is the larger structure, would have a capacity of approximately 150 to 200 people. The shed, which is a smaller structure, would have a capacity of 100 to 125 people. The intent is to maintain the aesthetic qualities of these structures as part of the overall design theme. Note, however, that should these structures prove to be unsound for renovation, new structures would be built that carry forward the same overall farmstead theme.

The "old red barn" also has its charm and is worth trying to save as part of developing this area.

The two four-season shelters are specifically proposed in order to maximize use flexibility and be able to accommodate a wide range of groups of varying size and need. Depending on the situation, the shelters could be used together to serve one ground or independently to serve two on any given day. It also allows some groups, such as the Boy and Girl Scouts, to have a number of activities going on that require independent spaces even though it is one large group.

As figure 6.6 illustrates, a common, stand alone restroom facility is also a consideration, as is including them within each of the shelters. Both options would be further considered at the point of implementation. Other features of the shelters would possibly include kitchenettes, audio-visual equipment, room dividers, and storage space. As also illustrated, providing a maintenance storage shed is also a consideration, with the final size being determined once a more refined program is developed.

As for the site features, an access road, drop-off area, and some hard surfaced parking is envisioned. As shown in figure 6.6, the use of porous pavement is being promoted to reduce the extent of hard surface in the park. Using newly emerging ecological-based engineering techniques, a stable and reliable parking surface will be created, with the surface most likely being a mixture of hardy native prairie grasses.

Adjacent to each of the shelters will be an open outdoor picnic and games area. These areas will be separated by a planted orchard or grove of trees. In addition, the surrounding natural landscape, especially the oak savanna and maple-basswood systems, will be enhanced to strengthen the sense of place and privacy of the facility. These same features will help buffer this use from the larger open space areas to the south.

Group Camping/Activity Area (with Adventure Course)

The group camping and activity area is a new facility that replaces the existing group camp area located near the campground.

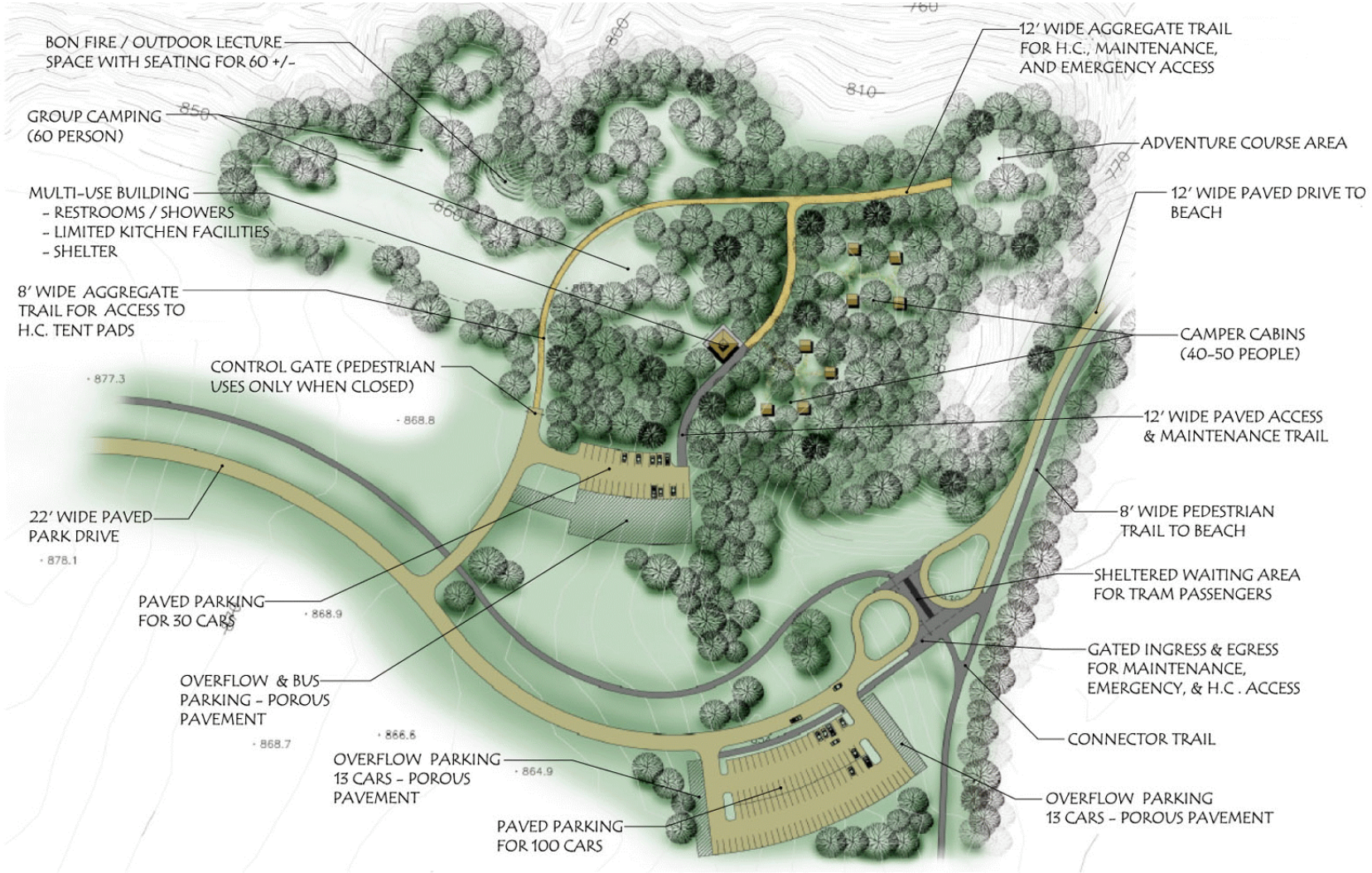
The group camping and activity area is a new facility that replaces the existing group camp area located near the campground, which has been outgrown and is also not well-sited for its expanding level of use. As shown on the overall master plan, the new location for this facility is on the north side of the park in an accessible yet isolated area that serves the purpose well without encroaching on other park uses and open space. From a group-use standpoint, the new location provides the needed privacy and site security for activities that often include younger children under the supervision of adults.

As with the previous group camp, the traditional uses of this facility – from youth day camps to overnight group camping and other group uses – will be continued and expanded upon. Scheduled group picnics could also be accommodated at this location under a permit system if demand warrants. The introduction of the camper cabins will add a new dimension to this use area, extending the season of use to nearly year-round.

As figure 6.7 illustrates, the group camp area takes advantage of the existing land forms and natural vegetation patterns to create a compelling natural setting that is easy to control. As illustrated, there are four primary use areas within the camp, which includes:

- Informal group camp area
- Camper cabin camp area
- Bon fire/outdoor lecture space
- Adventure course area

Figure 6.7 – Character sketch of group camp area, with camper cabins and other support facilities.



The group camping and outdoor use area consists of several acres of open space within the open area and edge of the woods. A combination of hardy native grasses and maintained turf would cover this area to allow for tent setup and for general field activities. Accommodating group sizes of up to 60 is envisioned, although the site has some flexibility to expand if warranted. At several acres in size, there is also adequate space to rotate camp areas for turf maintenance purposes.

The camper cabins expand upon the overnight camping theme by providing a unique opportunity for groups and individual families to enjoy the park all seasons of the year.

The camper cabins expand upon the overnight camping theme by providing a unique opportunity for groups and individual families to enjoy the park all seasons of the year. It also provides those that are less inclined to "rough it" the chance to experience and enjoy the park in ways that they would otherwise not have the chance to do. Overall, a total capacity of 40 to 50 people is envisioned, with several cabins being built initially and others added as demand warrants. As with the open camping area, there is some room for expansion. However, care should also be taken not to cross the threshold of site capacity since doing so would change the essence of the experience.

From a design standpoint, the cabins would be simple, rustic-style frame structures that can accommodate four on up to eight people depending on the dimensions of an individual cabin. A variety of sizes would be an appropriate consideration as well. In addition to bunk-style beds, typical amenities would include a table, chairs, reading lights, and a warming stove.

Both the group camp and the camper cabins would be supported by a multi-use building that houses a restroom and showers, seasonal shelter, and limited kitchen facilities. The shelter could be either enclosed or open air, depending on the final architectural program. A bon fire/outdoor lecture area with seating for 60 would also be provided, including a small stage and grass or bench-style seating. Other amenities in this area includes simple items such as a drinking fountain, picnic tables, and trash containers.

A controlled entrance drive and parking lot would be provided to ensure a sense of security. The parking lot would be sized to accommodate approximately 30 vehicles. Both the drive and parking lot could be either asphalt paved or gravel-surfaced depending on the level of expected use. As with some of the other use areas, the porous pavement would be used for overflow parking to reduce the extent of hard surface within the park.

As illustrates shown in figure 6.7, the proposed group campground is set in the "V" of two ravines that come up from the river. These natural landforms and treed vegetation pattern create an excellent buffer between this and other use areas and open spaces within the park. Importantly, the ravine and wooded buffer on the north side of the group camp provides needed separation between this use and the adjoining private property.

An adventure course is also proposed in the group camp area.

An adventure course is also proposed in the group camp area. Typically, this type of facility is designed to support programs that help build participant's aptitudes in a variety of outdoor activities, skill development, and teamwork. Although a program has not been formalized, potential features include a ropes course and climbing apparatus. Along with practical layout considerations, blending these facilities into the natural surroundings is also an important design consideration.

Beach Area

The beach area is a new facility that replaces the existing one located near the boat launch.

The beach area is a new facility that replaces the existing one located near the boat launch, which has proven to be too small to accommodate the use. The existing beach site also conflicts with boating and fishing activities.

The proposed location for the beach provides an exceptional opportunity to create a unique facility that accommodates more use without compromising the natural characteristics offered by the river and park. As illustrated in figure 6.8, development of the beach area will be limited to that which is required to provide reasonable access and support of the beach activity. As shown, emphasis was placed on keeping built structures out of the viewshed of the river to respect the river's scenic natural qualities.

Figure 6.8 – Character sketch of the proposed beach area.

The existing "natural beach" offers outstanding recreational potential within the context of a natural setting.

As illustrated in figure 6.8, a paved drive lane for tram service and other permitted vehicles and a paved pedestrian trail are provided from the upper parking lot (refer to figure 6.7) to the beach area following a ravine. Although driven by practical as much as design reasons, keeping the parking remote from the beach actually adds to the sense of place that is unique to the river and adds to the appeal of the area. Although traffic will be light on the road, separation between vehicles and pedestrians is considered necessary for safety.

At the end of the access drive, a small parking area for permitted vehicles is provided, along with a waiting area. A family picnic area is also nestled nearby between the waiting area and the beach. A connection from the beach to the riverfront trail is also provided to maintain a link between the beach and other facilities along the river.

On a higher beach above flood elevations and setback from the river sits the only building proposed for this area. The building will accommodate restrooms, vending area, storage, lifeguard facilities, and a first-aid station. A simple design in keeping with the character of the river and the other buildings in the park is envisioned.

The beach area itself will also be unobtrusive in design and basically take advantage of the natural beach that already exists. Amenities on the beach will include lifeguard chairs and a small beachside picnic area with a few seasonal tables. A capacity of around 250 people is anticipated given the current size of the beach area.

To protect the beach, some restoration and stabilization of the rivers edge will be necessary. Redirecting the ravine channel that flows into the river will also be required to prevent future erosion of the shoreline in this area. Both the restoration and stabilization of the area will be consistent with sound ecological principles to ensure consistency with the stewardship program for the park and the requirements of other agencies trying to preserve the river's natural character.

Internal Trail System

The trail system that exists and is planned for within the park is expected to be one of the most highly regarded development features in future years.

Consistent with regional recreational trend data, the trail system that exists and is planned for within the park is expected to be one of the most highly regarded development features in future years. The natural landscapes, overall setting, diversity of trail character, and overall trail length add up to a very compelling experience for the trail user. As the trail mileage expands and the regional population grows, it is anticipated that trail use numbers will grow substantially over the current levels. Preserving the overall quality of the trail experience while accommodating more trail users becomes the overriding challenge. Fortunately, the land forms of the park, coupled with a variety of vegetation types, minimizes the extent of visual overlap between trail segments and between trails and other built features.

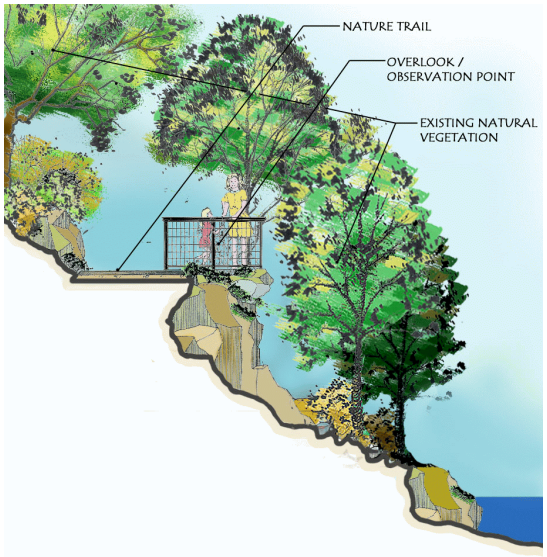
As illustrated in figure 6.2, the *Master Plan* highlights the proposed general alignment of the two trail types proposed for the park, which include:

- Natural trails – soft-surfaced trails that traverse through the natural areas of the park.
- Multipurpose trails – hard-surfaced trails that connect the major park features together internal to the park and the park to the regional trail system.

The following considers each of these trail types in greater detail.

The existing informal trail along the river is likely to become very popular once it is improved for general use.

Providing select overlooks to the river will also add to the value of the river trail, as illustrated in this character sketch.



Nature (Cross-Country Ski) Trails

One of the hallmarks of the park is the diversity of experience that can be gained by simply walking through the different sections, each of which having its own unique qualities, especially once the restoration program has matured. As illustrated on the master plan, the nature trail network traverses through all reaches of the park. Overall, nearly eight miles of nature trails is envisioned. For the most part, the existing nature trail system functions very well and will continue to be part of the trail system. Notable additions to the existing trails will be a more developed nature trail along the river and a much more extensive system on the upland areas of the park. This expanded system will also help spread out use across a larger area so that the personal experience of using the trail will be preserved while still accommodating considerably more users.

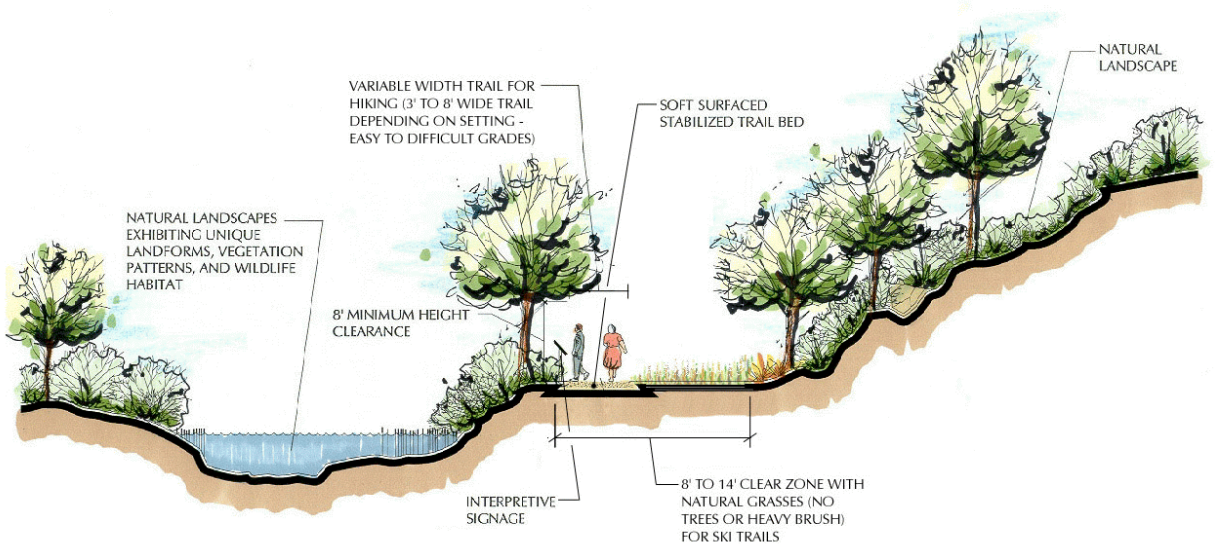
The degree of difficulty of the nature trails will vary considerably to appeal to the varying expectations of trail users. In some cases, universal accessibility will be achievable. On the other end of the spectrum, some of the trails will be steeper and narrower to appeal to the more adventurous and able-bodied individual. The intent is to maintain the diversity of experience to which park users have become accustomed.

From a design perspective, the natural trails will continue to be soft-surfaced. Where feasible, grass or compacted native soils remain desirable, especially in areas of less use. Pragmatically, increasing levels of use will undoubtedly require a more aggressive approach to trail stabilization in select areas as time goes on. This will likely include the use of compacted aggregate in heavily used areas or areas prone to erosion. Although this may seem quite undesirable to many trail users, the careful selection of surfacing materials (color, texture, etc.) and the use of organic-based stabilizers can substantially reduce many of the visual characteristics often associated with a more "developed" trail while still reaping the benefits. A more stabilized trail can actually result in *reduced* ecological and visual impacts by reducing erosion, keeping the trailbed narrower, and helping to prevent trail "creep" and trampling of adjacent plant life.

In terms of width, the overall clear zone will have to be wide enough to accommodate cross-country skiing on select trails. This will range from an eight foot minimum to 14 foot for double-tracked or skate-ski trails. For summer use, a stable trail bed of as little as three or four feet on up to about eight feet is anticipated. Figure 6.9 illustrates these design concerns.

From a cross-country skiing perspective, the existing trail experience is held in very high regard by skiers, even though the length of trails is still limited. Whereas the new master plan suggests some functional improvements, maintaining the essence of the current system is an important underpinning to the winter trail system.

Figure 6.9 – Character sketch of nature trail setting.



The nature trails connect to virtually every major facility within the park.

As illustrated on the master plan, the nature trails connect to virtually every major facility within the park. This approach serves two primary purposes:

- Provide easy access to the nature trail system from other popular facilities.
- It creates a more dispersed approach to trailhead parking. This increases the propensity for spreading out the trail use to more areas of the park. (Although this has not been an issue in the past, there is a greater likelihood of this occurring as trail use increases in future years.) Dispersed trailheads, where parking lots are shared with other functions, is also a more efficient, less space-consuming, and a less imposing design approach than creating single-purpose parking lots.

Multipurpose Trails

The primary function of the multipurpose trail is to link major development areas together into a cohesive whole.

The primary function of the multipurpose trail is to link major development areas together into a cohesive whole. While the natural setting for these trails remains very important, emphasis is also placed on providing a higher degree of accessibility for the less able, with greater consistency in terms of grades, trail width, and surfacing. By design, these trails will provide a higher level of service to those that still desire a “walk in the woods”, but prefer to do so on a less physically challenging trail. In addition, multipurpose trails expand the user base to include other user groups, like recreational bicyclists, whose opportunity in the past to enjoy the park has been very limited. These trails will also serve the needs of families, small groups, and older individuals that want to enjoy the park, but are less inclined or unable to use the inherently more difficult and less consistent nature trails.

As shown on the right side of this photo, development of the multipurpose trail between the Contact Station and the campground is already underway.

As illustrated on the master plan, the multipurpose trail provides a linear connection through the park that begins at the Contact Station – where it would also connect to a planned regional trail corridor. Overall, approximately 3.5 miles of multipurpose trails are anticipated. In as much as possible, these trails will also traverse through natural areas to provide a pleasant experience for the user similar to that found along the nature trails.

From a design perspective, the multipurpose trail will be hard-surfaced to accommodate a variety of users, including walkers, bicyclists, and in-line skaters. In terms of width, a ten foot tread width is proposed, which is consistent with generally accepted standards in regional parks. As illustrated in the master plan, crossing of the park roads is kept to a minimum to avoid conflicts. All crossings will be purposefully located where traffic is expected to be moving slower or stopping at an intersection.

Regional and Local Trail Interface

As defined in Section II, making connections to regional trail systems was an important master planning consideration in order to expand trail opportunities for park visitors and to provide opportunities for alternative forms of transportation to the park. As shown on the master plan, the multipurpose trail that traverses along County Road 21 will also be part of a regional trail link being considered for this area of Washington County under a separate master plan.

Trailhead and Trailside Amenities, Points of Interest, Overlooks, and Fishing Piers

At the point on entry, the Visitor Contact Station will serve as a primary trailhead facility within the park, although secondary trailheads will also be provided at each of the parking lots.

At the point of entry, the Visitor Contact Station will serve as a primary trailhead facility within the park, although secondary trailheads will also be provided at each of the parking lots. An information kiosk, restrooms, vending, and resting area will be provided for trail users at that location. Additional trailhead information will be provided where the multipurpose and nature trails interconnect with development areas, parking lots, and points of entrance into open space areas.

With respect to trailside amenities, the park's location along the river and the highly variable terrain and vegetation provides numerous points of interest and overlook opportunities. The master plan graphic illustrates a number of potential locations for overlooks and observation areas based on field review. Note, however, that these are preliminary only and will need to be field adjusted at the time of actual implementation – with the objective being to use the trails, trailside amenities, and overlooks to put people in a position to enjoy the beauty of the park.

To avoid taking away from the experience itself, the design for all of trailside amenities will be simple in keeping with the natural landscape. Important to siting these features is controlling the field of view from specific points of interest to preserve the aesthetic value of what is being observed. The careful placement of trails and trailside amenities is critical to preserving the experience that the park visitor is seeking.

Maintenance Building

This facility will continue to support the maintenance function as part of the master plan.

As illustrated on the master plan graphic, an on-site maintenance facility currently exists within the park. This facility will continue to support the maintenance function as part of the master plan. If used only for upkeep of this park, the facility would be limited to that which is specifically needed for day-to-day functions.

Although a storage yard is needed for storing materials, its size would be more limited and located to be more out of sight than is currently the case. The storage area would be fenced for security purposes as visits to the park grows. Upgrades to the existing facilities would be undertaken on an as-needed basis. It is expected that the current facilities will be suitable for a number of years.

Note that the master plan provides the flexibility to expand the maintenance facility to service regional trails in addition to the park should that be considered advantageous by Washington County as part of its overall maintenance function. Although the extent to which the facility would have to be expanded has yet to be defined under this scenario, expectations are that it would be modest.

Aerial (looking north) illustrating the maintenance area. The master plans calls for consolidating outdoor yard activities to a smaller area and restoring some the area to native vegetation.

Buffering Adjacent Properties and Control of Borders

With respect to control of the park boundary from encroachment and unauthorized access, Washington County Parks typically installs a three-strand barbless wire fence around park properties to prevent encroachment. The County also relies on enforcement of local park ordinances to control park borders. In some instances, an existing fence is already in place and will be maintained (i.e., on the southeast corner of the park).

In some areas, informal footpaths already exist from private property into the park. Although some of these may remain in select locations, these are the exceptions rather than the rule. For the vast majority of the park, informal footpaths will not be allowed in order to maintain control of the park boundary and avoid conflicts between private and public property from occurring. Where footpaths occur over time, Washington County Parks staff will work directly with property owners to review the situation and determine the best course of action to avoid conflicts.

The use of a natural infiltration system produces a much more natural hydrograph.

With respect to formal pedestrian-level access, the trail access points defined by the park master plan will be the established points of entry into the park. These represent the locations that either currently exist or are planned. Beyond these, no additional defined entry points are envisioned unless expressly approved by the Washington County Parks and Open Space Commission and the County Board.

The one issue that a wire fence cannot successfully control is free-roaming domestic animals. Enforcement of animal control laws is the most reasonable approach in spite of its inherent limitations. Consistency in applying ordinances and public education about the County's policies to take action where abuses are found will be important to controlling this often unnoticed, but often destructive, occurrence from becoming a problem.

With respect to buffering of adjacent properties, Washington County Parks will work directly with property owners on an as-needed basis to address detail concerns about maintaining natural buffers that are mutually beneficial. Whereas the intent is to maintain reasonable distance and physical screening between properties, Washington County Parks will on occasion have to make decisions that are in the best interest of the park. As an example, the upland area suitable for a trail in the southeast corner of the park is fairly limited. In this case, there may be instances where the trail will have to be closer to a property than otherwise desired. Washington County Parks will still remain committed to working with property owners in these cases to find a successful solution that buffers private properties while still meeting facility needs.

Park and Trail Signage Program

One of the more important communications tools is a comprehensive signage program that is carried uniformly throughout the park.

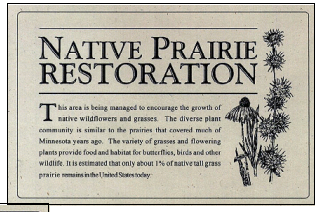
One of the more important communication tools is a comprehensive signage program that is carried uniformly throughout the park. The signage should provide a consistent message to park and trail users and provide information related to facility locations, trail routes, park rules and regulations, and other pertinent information.

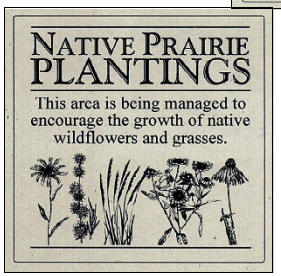
The signage program is of particular value with respect to the ecological stewardship program, where providing interpretive information to park and trail users at the point of contact has proven to be one of the most effective forms of education. The main benefit is that the park user can apply new knowledge immediately and begin to internalize its significance based on first hand experience.

Key Components of a Comprehensive Signage Program

The park signage program consists of a hierarchy of signs that give the park visitor needed information in an unobtrusive manner. From a design standpoint, a strong overall theme that is consistent with the natural qualities of the park is important. As with the buildings, signage should be considered an architectural element that adds to the aesthetic qualities of the park.

Examples of signage related to nature interpretation and education. (Source: Vacker Inc.)





Key components of the signage program include:

- Park identification sign – located at the main point of entry. This sign sets the design theme for the entire signage program.
- Park directional signage – located along the entrance drive and provides basic directional information.
- Main information signs/kiosks – located at the major use area. This sign provides a park map, general information and rules, and an overview of the ecological stewardship program.
- Trailhead sign – located at the start of a trail and provides a trail map and ecological stewardship program overview.
- Trailside exhibit sign – located along trails and provides information on ecological restoration and management activities and plant identifications.
- Trail intersection sign – located at trail intersections and provides a map of the trail system and "you are here" designation. Given the size of the park, intersection signs will be most advantageous where the park trails interlink with the local and regional trails outside of the park.

Although many of these components are commonplace, giving greater attention to ecological stewardship as part of the signage program is recommended to raise visitor's consciousness about this important issue.

Public Services/Utilities

Public utilities, such as sanitary sewer and municipal water, are currently not available to service park facilities, nor is that anticipated in the future. Given this, the park will continue to be serviced by traditional wells and septic systems. However, new approaches, such as wetland-based septic systems, will be considered to be in keeping with the ecological principles and spirit of the master plan.

Development Conflicts

The level of existing or potential conflict encountered during the planning process was minimal. From a land area perspective, the expansion of the park as proposed was well received by majority of those that participated in the process. Aside from buffering and boundary control issues as previously considered, even adjacent property owners were in favor of the park's expansion.

From a development perspective, conflicts between user groups were minimal and not considered a significant issue for the future. The development program defined in this section is considered by the public to represent a reasonable balance between recreational use and natural area preservation. Based on the results of the public process, no notable conflicts are anticipated.

Washington County currently rents out a single family residence near the Visitor Contact Station. This is considered to be in conflict with the master plan vision and thus the master plan calls for it to be phased out. The Washington County Board will make the determination as to the timing of this.

Universal Design/Special Needs Framework

In recent years, extensive public debate has been focused on equal access to indoor and outdoor public spaces for all individuals. The Americans with Disabilities Act of 1991 (ADA) turned past guidelines and standards into law, forever changing the way accessibility issues are to be addressed. But the ADA is not an end unto itself. It is simply another step toward a design philosophy that ensures accessibility for all. The challenge is to move beyond the ADA to a more encompassing approach to design. The following defines how that challenge will be addressed in this park setting.

The Principle of Universal Design

As stated in the published design guide *Universal Access to Outdoor Recreation* (PLAE, Inc. 1993), past criteria for barrier-free design (elimination of barriers to access) were based upon the needs of average human beings or the needs of the wheelchair user (which was often thought to represent the broadest spectrum of disabling conditions). In reality, the range of abilities and disabilities goes well beyond that limited definition. It has become evident that design philosophy must continue to evolve if a barrier-free environment is to be realized in the design of parks.

Universal design is an approach to design that achieves this philosophy by combining the basic principles of barrier-free design with a more comprehensive view of human beings. Under this paradigm, universal design attempts to consider all degrees of sensory awareness, all types of locomotion, and all levels of physical and intellectual function. By doing so, the needs of individuals with varying desires, abilities, and expectations can be reasonably accommodated.

The philosophical underpinnings of universal design as defined by *Universal Access to Outdoor Recreation* includes:

- People purposely choose settings for their recreation activities.
- Choices are made with the expectation of achieving specific recreational experiences.
- Desire is to provide as broad of a spectrum of activities and recreational settings as practical for a given site.

The recreation opportunity spectrum (ROS) classifications serve as a means to achieve this end. These are flexible guidelines that set the framework for making appropriate accessibility decisions that permit universal access within the context of the public's expectation for a certain type of setting.

Recreation Opportunity Spectrum (ROS)

The ROS is a recreation management approach used by the USDA Forest Service that is in keeping with the principles of universal design. The ROS framework is based on a continuum of possible combinations of recreation settings, activities, and experiential opportunities, as well as the resulting benefits that can accrue to the individual (by improving physical and mental well-being) and society.

To be manageable, the recreation opportunity spectrum is divided into four classifications that cover the full spectrum of outdoor recreation environments. These classifications are divided primarily in terms of perceivable modifications to the natural environment and the related influences these modifications have upon visitor expectations. The following briefly defines the four ROS classifications:

- **Urban/rural areas** – are highly developed and evoke expectations of easy access.
- **Roaded natural areas** – are less developed than urban settings, but still contain a relatively high number of modifications to the environment. These areas evoke an expectation for a moderate level of accessibility and a reasonable expectation for "like" experiences.
- **Semi-primitive areas –** are rarely developed, and evoke an expectation of difficult access.
- **Primitive areas** – have few, if any, modifications. These evoke expectations for the most difficult access that require specific skills and capabilities.

Under the ROS framework, it is not necessary, nor even desirable, to develop all recreation equally. From the ROS perspective, each site should be developed or modified in a manner that achieves harmony between recreation expectations and the environmental setting. What is important is that the level of access be in line with what is expected by the public – whether they are able-bodied or disabled – for a particular setting

Application of Universal Design Principles

The objective with universal design is to consciously apply the principles to this park setting to determine what is most appropriate given the circumstances. At the very least, the outcome would be that more people of different levels of ability will have life-enriching experiences in the park. At the very most, the park will serve as an example for others to follow, ultimately furthering the cause of making universal access an integral part of all park designs.

Of the four ROS classifications defined above, the **roaded natural area classification** has the most utility given the park' location and physical characteristics.

Involvement of Representative Populations in the Design Process

Since universal design is still an evolving approach to design, achieving universal access is often simpler in concept than in practice. Anticipating the needs of people with varying degrees of abilities is a formidable task since it is often very difficult to understand the specific needs of individuals with certain disabilities when one does not share those limitations. Therefore, it is imperative that the design process include individuals that represent a cross-section of people with and without disabilities. As the project moves into design implementation phases, efforts should be made to involve representatives of divergent populations in the detail design of specific facilities. This approach helps to ensure that the design for any given facility will actually serve the intended populations.

Section VII

Implementation, Operations, and Management Plan

Overview

The implementation of the master plan for St. Croix Bluffs Regional Park will require significant initial and long-term capital investments.

The implementation of the master plan for St. Croix Bluffs Regional Park will require significant initial and long-term capital investments for physical development, ecological stewardship, operations, and maintenance. Undoubtedly, implementation will occur over a number of years as funding and other resources become available and plans become refined and ready for implementation. The following considers an overall strategy for implementation of the plan. This section also considers Washington County's approach to operations and management as it pertains to this park.

Implementation Cost Projections

The cost analysis is based on a combination of site-specific development requirements and projects of similar size and complexity.

Site Preparation and Development Program Cost Projections

The following cost analysis defines the potential costs associated with each development component of the master plan. It is based on a combination of site-specific development requirements and projects of similar size and complexity. The costs are also based on having the work completed by private contractors and specialists. It does not take into consideration work that could be performed by County staff, volunteer groups or other means.

The cost figures are intended to be used for budgeting purposes, project phasing, and comparing the relative cost of one item to that of another. The costs are in 2002 dollars. Although intended to be conservative, it should be recognized that actual costs will vary depending on the year that each aspect of the master plan is implemented, economic conditions affecting bidding, and the actual site conditions found in the field during construction.

The cost analysis defines the potential costs associated with each development component of the master plan.

Development Program Cost Projections

Master Plan Component	General Description of Cost Items Included in Estimate	Cost Estimate (In Dollars)
New Park Drive, Beach/Trailhead Parking Lot	1) Rural-section asphalt park drive road, turn lanes and pull-off areas 2) Development of stormwater convenience systems – natural systems and built systems (culverts, storm sewer, etc.) 3) Beach area parking lot (100 spaces) and turnaround with concrete curb (does not include sheltered waiting area, beach drive, or trails) 4) Porous pavement overflow parking area (26 spaces) 5) General roadway signage 6) Miscellaneous roadway-related site amenities 7) Restoration & landscape enhancements	510,000
Visitor Contact Station	1) Pave existing parking lot access drive 2) Expand parking lot (additional 20 spaces) 3) New access walks and trails in immediate area 4) Restoration & landscape enhancements 5) Miscellaneous site improvements.	20,000
Group Picnic Areas	1) Small parking lot paving (asphalt with curb) for Eagle Ridge shelter 2) Restoration & landscape enhancements 3) Miscellaneous enhancements (play structure expansion, additional benches and picnic tables, upgrade basketball court, etc.	130,000
Independent Family Picnic Areas	1) Misc. improvements (picnic tables, grills, etc.) 2) Restoration & landscape enhancements	50,000
Boat Launch Area	1) Asphalt overlay of existing access drive and parking areas 2) New enclosure for portable restrooms 3) Two new fishing piers with universal access 4) Miscellaneous enhancements (walks, benches, picnic tables, etc.)	50,000
Conference Cottage Expansion	1) Expand parking and redesign of drop-off/turnaround area 2) Expand cottage (800 s.f.) 3) Miscellaneous enhancements (walks, benches, picnic tables, etc.) 4) Restoration and landscape enhancements	150,000

Master Plan Component	General Description of Cost Items Included in Estimate	Cost Estimate (In Dollars)
Campground Area	1) Asphalt pavement on drive lanes in R.V. campground area 2) New entrance drive alignment, small parking areas, and access drive to dumpstation (asphalt pavement) 3) Outdoor classroom (small wood stage and wood bench seating for 50-70 people) 4) Expand existing restroom and shower facility 5) Upgrade well and septic system 6) Improved trails through campground that link to larger trail system 7) Relocate and improve dumpstation 8) Miscellaneous enhancements (benches, picnic tables, grills, etc.) 9) Restoration and landscape enhancements	330,000
Group Multi-Use Area	1) Renovation of historic home 2) Conversion of barn into four-season shelter (3,000 s.f.) 3) Conversion of equipment shed into four-season shelter (2500 s.f.) 4) Restroom facilities (either standalone or within shelters) 5) Parking lot development (asphalt with curb) 6) Porous parking lot development 7) Development of stormwater convenience systems – natural systems and built systems (culverts, storm sewer, etc.) 8) Asphalt/concrete trails and walks 9) Miscellaneous site amenities 10) Utilities (well, septic system, etc.) 11) Restoration & landscape enhancements	1,200,000
Group Camp Area (with Adventure Course)	1) Shelter structure with restrooms (does not include pilings) 2) Entrance road and parking lot (asphalt with curb) 3) Overflow parking with porous pavement 4) Camper cabins (10) 5) Utilities (well, septic system, and electric) 6) Adventure course 7) Outdoor lecture area (wooden stage with bench seating for 60) 8) Restoration & landscape enhancements 9) Asphalt trails and walks 10) Misc. improvements (picnic tables, grills, trash containers, etc.)	450,000

Master Plan Component	General Description of Cost Items Included in Estimate	Cost Estimate (In Dollars)
Beach Area	1) Access drive from upper parking lot to beach area (asphalt with curb) (Note: Upper parking lot is not included under this line item) 2) Parking lot by beach (asphalt with curb 3) Waiting area at upper and lower parking lots (sitting area, arbor, paving, etc.) 4) Beach building (700-800 s.f.) 5) Beach improvements (lifeguard stations, picnic tables, etc.) 6) Redirect drainage flow from ravine 7) Restoration and landscape enhancements (including stabilizing delta edge/shoreline) 8) Asphalt trail from upper parking lot to beach 9) Concrete walks in beach area 10) Misc. improvements (retaining walls, benches, picnic tables, etc.) 11) Utilities (well, septic system, and electric)	585,000
Multipurpose Trails	1) Trail development (asphalt surfaced) – 3.5 miles at 10' wide 2) Trailhead and trailside amenities (benches, kiosks, etc.) 3) Storm sewer systems (culverts, diversions). 4) Misc. improvements (retaining walls, etc.)	250,000
Nature Trails	1) Trail development/improvements – 7.8 miles of soft-surfaced trail 2) Trailhead and trailside amenities (overlooks, benches, decks, etc.) 3) Footbridges 4) Storm sewer systems (culverts, diversions). 5) Misc. improvements (retaining walls, etc.)	150,000
Maintenance Building	1) General maintenance building upgrades 2) Landscape screening and site restoration	10,000
Signage Program	1) Internal park signage program.	25,000
	Total Master Plan Cost Estimate	**3,910,000**
	Professional Fees and Charges (Surveying, Design, Engineering, Etc.) (15%)	586,500
	Total Master Plan Cost Estimate and Professional Fees and Charges*	**4,496,500**

* Contingency is not factored into cost estimate.

Ecological Stewardship Program Cost Projections

Restoration and management of the ecological resources within the park will be a significant cost factor as the master plan is implemented.

Restoration and management of the ecological resources within the park will be a significant cost factor as the master plan is implemented. Since the ecological stewardship program is in its infancy, Washington County Parks does not have any data that could be used for projecting costs associated with ecological restoration and management. Given the circumstances, projecting these costs offers certain practical limitations, especially given the fact that a living environment has many nuances that will take years to completely understand.

Lacking baseline data, a unit-basis cost projection was completed to define the potential cost magnitude of restoring and managing the park's ecological resources. The following provides a breakdown of potential costs for both initial restoration and long-term stewardship. The unit costs were derived from past projects in this region of a similar nature. The cover type categories are limited to those that represent a cross-section of the plant communities that would be restored within the park. The critical difference between each category is the propensity for trees versus grasses, upland versus lowland, and hydrologic and soil variables that affect restoration efforts, timeframes, and costs.

Potential Initial Restoration Costs

Cover Type	Acres*	Range of Cost/Acre			Total Cost		
Maple-Basswood System	136.74	1,500	to	4,000	205,110	to	546,960
Oak Savanna System	436.26	1,500	to	4,000	654,390	to	1,745,040
Wetland Systems	11.10	1,500	to	3,500	16,650	to	38,850
		Total Potential Cost for Remedial Work			876,150	to	2,330,850

Potential Yearly Long-Term Maintenance and Management Costs

Cover Type	Acres*	Range of Cost/Acre			Total Cost		
Maple-Basswood System	136.74	75	to	150	10,256	to	20,511
Oak Savanna System	436.26	75	to	150	32,720	to	65,439
Wetland	11.10	100	to	200	1,110	to	2,220
		Total Potential Cost for Yearly Maintenance Work			44,085	to	88,170

* Acreage does not include developed areas.

As the tables define, the range of potential costs at this level of evaluation is quite broad simply due to the uncertainties of what will be encountered. Since restoration will be extensive, economies of scale may come into play. However, highly disturbed areas that require extensive restoration may exceed the average per acre cost as listed. Note that these cost projections relate to the actual restoration of the native plant communities and do not include any grading and site preparation that may be necessary prior to that activity.

Property Acquisition Cost Projection

The purchase price for the County-owned property that is being proposed for inclusion within the regional park was $1,130,202 for 208 acres, which averages out to $5,434 per acre. The purchase was made in 1996.

The acquisition cost for privately-owned property has not been determined since it will be based on cost appraisals and negotiations with the current property owner at the appropriate time. To date, the property owner has given permission to walk the property and consider its inclusion in the regional park. However, there has been no discussion as to the owner's interest in selling the property in any given time frame.

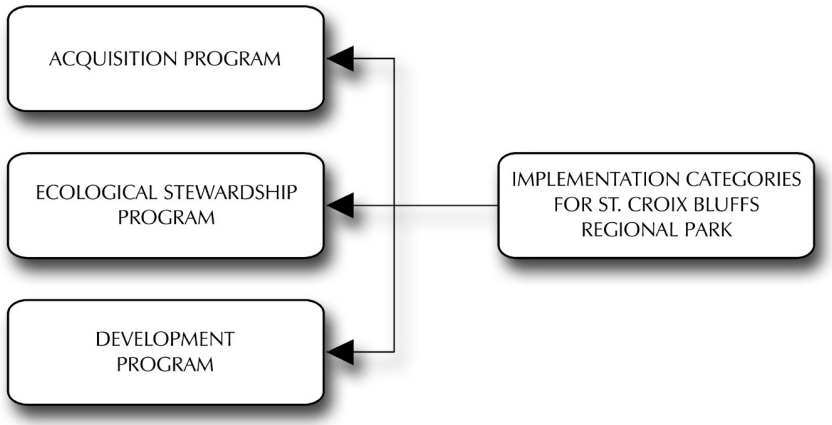
Implementation Strategy and Priorities

Given the magnitude of potential costs, it is expected that implementation of the master plan will be phased in over a period of time to coincide with funding opportunities. The following defines the overall strategy and priorities for master plan implementation.

Implementation Categories

As shown in figure 7.1 on the next page, the implementation plan is broken down into three categories, which reflects the major implementation challenges facing the park

Figure 7.1 – Implementation categories for St. Croix Bluffs Regional Park.



The following considers the overall priorities *between* categories, which is followed by discussion related to the priorities *within* each category.

Implementation Priorities Between Categories

Since land acquisition has not been completed, the acquisition program ranks at the top of the implementation priorities.

With respect to the ecological stewardship and development programs, taking a balanced approach to implementation is proposed to ensure that both cultural *and* ecological goals of the master plan are accomplished as implementation occurs in forthcoming years. Under this approach, ecological and physical development concerns will be of relatively equal priority as decisions are made regarding implementation strategies, funding packages, and maintenance and operations budget allocations. A balanced approach also allows priorities within each category to be pursued simultaneously to take advantage of funding opportunities that may arise from various sources. This approach also provides greater flexibility in developing effective implementation sequences that link physical development and ecological restoration objectives together whenever it is advantageous to do so. The following table provides a strategy statement for each of the categories to establish a starting point for developing specific implementation priorities.

Priority	Category	Overall Strategy Statement
1	**Acquisition Program**	Acquisition of the privately and County-owned lands is the top overall priority since amassing the land is essential to the park's existence.
2 (Equal Priority)	**Ecological Stewardship Program**	Once acquisition is completed, moving forward on the ecological stewardship program becomes a high priority to begin restoring the park's natural areas, especially transitioning agricultural areas to native systems and forestalling any continued decline in quality of existing native plant communities.
	Development Program	On par with implementing the ecological stewardship program, phased implementation of the development plan becomes a priority to expand recreational and cultural opportunities as defined by the master plan.

By focusing on a balanced implementation approach, the cultural and ecological values of the park will grow in relative equilibrium. However, inherent to the implementation strategy is the need for flexibility to react to the real conditions, circumstances, and opportunities that present themselves. In this context, the greatest utility of the implementation plan is that it provides a framework and starting point for Washington County to develop funding packages and grant applications to achieve the vision for the park as defined by the master plan.

Strategy for Land Acquisition

Reimbursement of the County-owned property can occur after preparation of an agreement between Washington County and the Metropolitan Council. Reimbursement would occur when funds are available through the appropriate funding program.

Acquisition of the privately-owned property is much more of an uncertainty since the land owner ultimately decides on a time frame for selling, assuming that they have an interest in doing so. By adopting the master plan, Washington County and Metropolitan Council will be positioned to react to any opportunity that may arise to purchase the property. Given the uncertain time frame, Washington County, in concert with the Metropolitan Council, will have to be prepared to act quickly on any opportunities that may arise to purchase the property. To this end, it is recommended that Washington County meet with the landowner to formally show an interest in purchasing the property and developing strategies that would appeal to the landowner. Strategies could range from right of first refusal and life estate to phased or outright purchase.

Strategy for Implementing the Development Program

The implementation strategy for the development program follows more traditional routes. In general, future capital improvements will be funded through Metropolitan Council regional park grants. The table on the next page lists the line items defined in the previous cost estimate in order of priority relative to each other. Note that these priorities are not linked to specific implementation time frames since actual project phasing will be a function of demand, opportunity, and funding availability. Note also that these priorities are subject to change in future years. In addition, each priority may require more than one phase to complete.

Priority	Development Component (as defined in Cost Projections)	Comment	Costs (In $'s)
1	Nature Trails	Serves a fundamental park need.	150,000
2	Multipurpose Trails	Serves a fundamental park need.	250,000
3	Conference Cottage Expansion	Established need that can occur prior to park expansion.	150,000
4	Group Picnic Areas	Established need that can occur prior to park expansion. May fall to a lower priority if land acquisition occurs in the nearer term.	130,000
5	Campground Area	Established need that can occur prior to park expansion. May fall to a lower priority if land acquisition occurs in the nearer term.	330,000
6	New Park Drive	Necessary infrastructure to serve new development areas.	510,000
7	Beach Area	High priority new facility given public demand.	585,000
8	Group Camp Area	Need to replace old site and expand services.	450,000
9	Group Multi-Use Area	Potential to serve a broad constituency and preserve historic farmstead.	1,200,000
10	Boat Launch Area	General upgrading of this area will be needed in the foreseeable future.	50,000
11	Visitor Contact Station	Limited expansion of parking and walks to better serve the public need.	20,000
12	Family Picnic Areas	Simple site enhancement, but not a critical priority.	50,000
13	Maintenance Building	Aesthetic issue that is not as high of a priority as other developments	10,000
--	Signage Program	Would be phased as part of other development packages	25,000
		Total Project Costs - All Phases	**3,910,000**
		15% Project Fees and Charges	586,500
		Total Project Costs*	**4,496,500**

* Does not include any contingency

With respect to long-term maintenance of buildings within the park, Washington County Parks has an established operation and maintenance fund that is funded through Washington County. Critical to this funding approach is making sure that the funds needed to maintain development initiatives is provided at the time that a new development occurs.

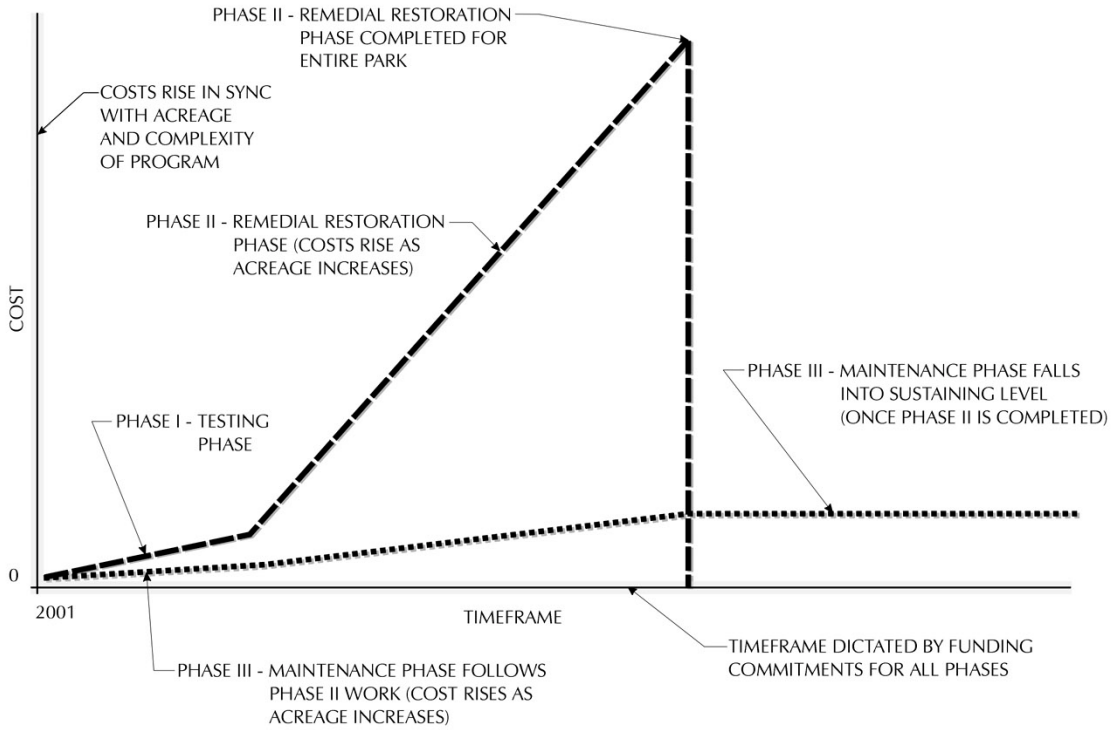
Strategy for Ecological Stewardship Program

Developing and implementing an ecological stewardship program for the park is also a top priority that emerged from the planning process. Although there are numerous acquisition and development initiatives that are high priorities, there is also a sense of urgency to move forward with the stewardship program as well. This is particularly important in that ecological stewardship is a long term issue in which results from near term action will be most appreciated in 10, 20, 50 years hence.

From a funding strategy perspective, the most critical factor is having a perpetual funding source in place for long-term stewardship prior to undertaking the initial restoration activities. Lacking this funding source, gains made during initial restoration can be lost if not followed by prudent management in future years.

With respect to a specific strategy, the funding program for initial restoration needs to be lock-stepped with the other phases of the stewardship program as defined in Section IV. Figure 7.2 provides an overview of how the three phases relate to each other in terms of funding levels needed to support them.

Figure 7.2 – Shifts in funding levels in support of stewardship programs.



The cost for restoring the park's ecological systems far outpaces the costs of taking care of it once that is completed.

As figure 7.2 illustrates, the cost for restoring the park's ecological systems far outpaces the costs of taking care of it once that is completed. Through proper management, the extra costs associated with restoring the park can be largely controlled in the future *as long as the maintenance phase continues indefinitely*. Also, the longer that the park's ecological systems remain in a state of decline before efforts are made to manage it, the more expensive (and scientifically challenging) it will be to restore them. The bottom line is that restoring the park's natural systems to a sustainable level of quality should be done sooner rather than later. The following table provides an overview of the key funding phases associated with the ecological stewardship program.

Implementation Priority	**Implementation Focus Recommended Under this Phase**	**Total Costs (In Dollars)**
Priority 1 – Preparation of Technically-Based Stewardship Program	Focus is on building upon the framework presented in the master plan to prepare a detailed stewardship program defining each phase of implementation. This includes a more detailed land cover inventory, refining prototypes, and developing restoration and management strategies for each condition that is found.	15,000 to 30,000
Priority 2 – Controlled Implementation of Stewardship Program	Focus is on implementing the program in a controlled, predictable manner that is supported by funding and scientific know-how.	Increases year-to-year as more acreage is restored (refer to table on page 7.5 for per acre cost projections and Section V for restoration and management strategy)

From a funding strategy standpoint, a typical capital improvement fund is an appropriate approach for funding the restoration phase of the stewardship program. With respect to the long-term management phase, consideration of other approaches may be necessary to ensure a reasonably consistent stream of funds is available to support the program. Two examples of approaches that can serve this need are defined in the following table.

Funding Option	Overview	Advantages	Disadvantages
Ecological Management Fund	Establishment of a fund similar to a building upkeep or maintenance fund that is used for ongoing maintenance of buildings, trails, and so forth within the park. Funding is typically on a year to year appropriation basis as dictated by the County Board in concert with the Metropolitan Council.	Establishes a stand-alone fund for this purpose.	Only as secure as the commitment to contribute to the fund. Leaner economic times or other political directions can create uncertainty in ability to maintain funding levels from year to year, which makes this approach somewhat vulnerable. (Whereas future development initiatives and even building upkeep can be put off in many cases, stewardship of resources requires a sustained commitment to avoid losing ground.)
Ecological Stewardship Endowment Fund	Establishment of an endowment fund for the perpetual maintenance of ecological systems within the park.	Principle investment that is put into the fund is "locked away" and cannot be used for any other purposes. Program is actually supported by the interest generated by the fund in a secure market as dictated by County policy. The advantage of this approach is that the stream of funding available is more assured and predictable. Also, seed money is a one-time investment that keeps on working for the County.	Current enabling laws governing the Metropolitan Council may preclude the use of grant dollars for creating an endowment fund. Washington County may also have governing policies that could affect the use of this approach. Reconsideration of any current limitations would require state-level legislative action.

As the table indicates, the endowment fund offers significant long-term security in ensuring a consistent level of funding from one year to the next. In addition, the endowment could be structured so that a certain percentage of the interest earned each year would be used to build principal, resulting in a larger pot of money to support expansion of the program. Figure 7.3 illustrates this relationship. Figure 7.3 illustrates how the growth of the stewardship fund is linked to the expansion of the stewardship program.

Figure 7.3 – Growth of endowment fund as a percentage of interest is reinvested.

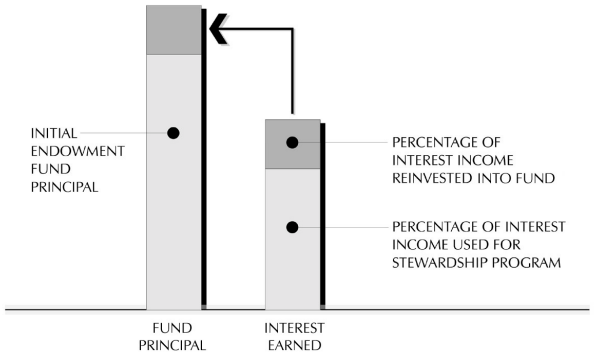
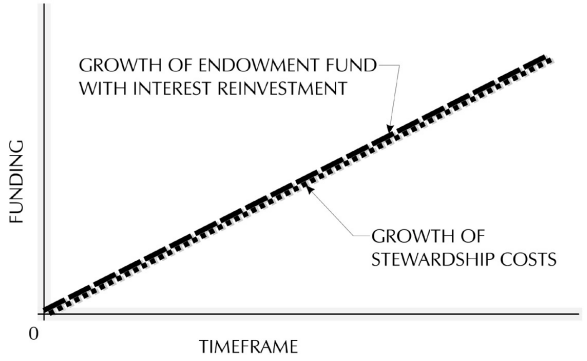


Figure 7.4 – Growth of endowment fund relative to expansion of stewardship program.



Under the framework of the endowment fund as presented, the long-term capital costs for the stewardship program could be *substantially reduced over a pay-as-you-go approach* since the fund generates interest income to support the program, as well as income to reinvestment back into the fund itself. For this reason, the endowment fund option offers a number of distinct advantages that are worthy of consideration in concert with more traditional funding programs.

Public Involvement in Implementing the Master Plan

Washington County is committed to continuing public involvement through the implementation of the master plan.

Washington County is committed to continuing public involvement through the implementation of the master plan. Public involvement and comment will be sought during the design process as specific projects are initiated. In addition, forums for broader public input (e.g., open houses and presentations) would also be used as needed to communicate and exchange ideas with interested citizens.

The objectives associated with involving citizens in the implementation process include:

- Determine who the stakeholders are and their interest in a particular development initiative.
- Understand their needs and unique perspectives.
- Identify and understand concerns and problems.
- Develop alternatives and find appropriate solutions with input from stakeholders.

In addition, Washington County has an appointed Parks & Open Space Commission that advises the County Board on development initiatives within County parks. The public is welcome to attend its regularly scheduled meetings. Also, Washington County is continuing to develop numerous tools to provide a consistent level of communication with interested citizens. (Refer to the Operations Section below for more detail on these tools.)

Operations Plan and Maintenance Plan

The Washington County Parks Division is charged with the operation of the County's park system, including St. Croix Bluffs Regional Park.

The Washington County Parks Division is charged with the operation of the County's park system, including St. Croix Bluffs Regional Park. The Washington County Board of Commissioners establishes policies and goals for the park system and through an annual budgeting process provides capital and operating funds for parks. The Parks & Open Space Commission, appointed by the County Board of Commissioners, serves as an advisory committee advocate for an improved and enhanced park and trail system in the County. The specific responsibilities of the Parks Commission include:

- Review proposals and make recommendations concerning park and trail acquisition and development;
- Review and make recommendations concerning recreation programming, fees for facility use and park use policies;
- Recommend enhancing natural resources in County parks and regional trail corridors;
- Provide input into the County Park Policy Plan and Park Master Plans for park development site planning;
- Perform fact-finding tasks as directed by the County Board.

A copy of the specific wording of the related ordinance is available through Washington County staff.

Ordinances

Public use and enjoyment of the County park system, including St. Croix Bluffs Regional Park, is controlled by Ordinance No. 93, Park Ordinance, (the Ordinance) which was last amended on December 12, 2000. The Ordinance incorporates pertinent Minnesota statutes, and addresses the following issues:

- Regulation of Public Use
- Regulation of General Conduct
- Regulations Pertaining to General Parkland Operation
- Protection of Property, Structures, and Natural Resources
- Regulation of Recreation Activity
- Regulation of Motorized Vehicles, Traffic and Parking

A copy of the ordinance is available through Washington County.

Enforcement

Park visitors are informed of park rules and regulations in a variety of ways. Kiosks and signs are strategically located to address specific information about park hours, trails, permitted and prohibited activities, fees, and directions. The Washington County Sheriff's Department responds to emergencies and criminal complaints.

General Operations

The Parks Division has an annual operations and maintenance budget of approximately $1,750,000 to operate and maintain the County's park system and approximately 12.5 permanent employees. In addition, approximately 62 seasonal employees are hired each year as life guards, maintenance workers and gate attendants.

Washington County's annual report of facts and figures for 2001 reported that 180,000 visits were made to St. Croix Bluffs Regional Park. Planned improvements to the park are expected to increase park use and, therefore, increase revenue. Revenues from the facilities and services at St. Croix Bluffs Regional Park total approximately $78,300, which does not include annual or daily entrance fees.

Maintenance

Maintenance of facilities and lands is essential to protect public investment, enhance natural resource qualities and achieve the County's goals of providing users clean, safe, enjoyable year round park experiences. Washington County Parks Division has a clearly defined maintenance program. Reporting to the Park Director are the Parks Manager and Planner. Reporting to the Parks Manager are the Maintenance Supervisor, Parks Coordinator, and office staff. The Maintenance Supervisor oversees five maintenance workers, 12 seasonal maintenance workers, and six park attendants.

The predominant categories of tasks accomplished by maintenance staff are:

- Grounds maintenance
- Building custodial
- Facility maintenance/repair
- Equipment maintenance/repair
- Natural resource management
- Program support
- Miscellaneous shop duties
- Other miscellaneous/unique duties

As defined by the master plan, St. Croix Bluffs Regional Park has a maintenance facility that functions as an equipment and supply storage area. The facility also provides an indoor work area to perform minor vehicle and equipment maintenance, as well as serving as a place to conduct park maintenance operations.

Accomplishing the maintenance needs of St. Croix Bluffs Regional Park is and will continue to be challenging. As park land and facilities are further developed, new or expanded maintenance services will need to be provided. Washington County recognizes the need to remain committed to the maintenance needs of the park and to meet the new needs/priorities identified by the master plan. It is unlikely that existing staff and budget resources will be sufficient. Although increased funding is critical, perhaps even more important is increasing the number of staff. As an example, trail development and natural resource management have an initial cash intensive need, but ultimate success requires hands-on stewardship for many years to achieve desired results. This takes staff with the knowledge and time to commit to this stewardship.

Traditional and non-traditional funding and staffing sources will have to be pursued to meet the maintenance needs of the park and the master plan objectives.

Outreach and Marketing

Washington County continues to expand its outreach effort, in an effort to improve public awareness of its park facilities, programs, and services. This outreach effort has various components, including the following:

Printed Materials: Washington County has developed and distributes on a regular basis brochures and maps, including park maps and picnic, camping, and other brochures. Park fliers are also distributed to County departments, libraries, community agencies, and other contacts throughout the community.

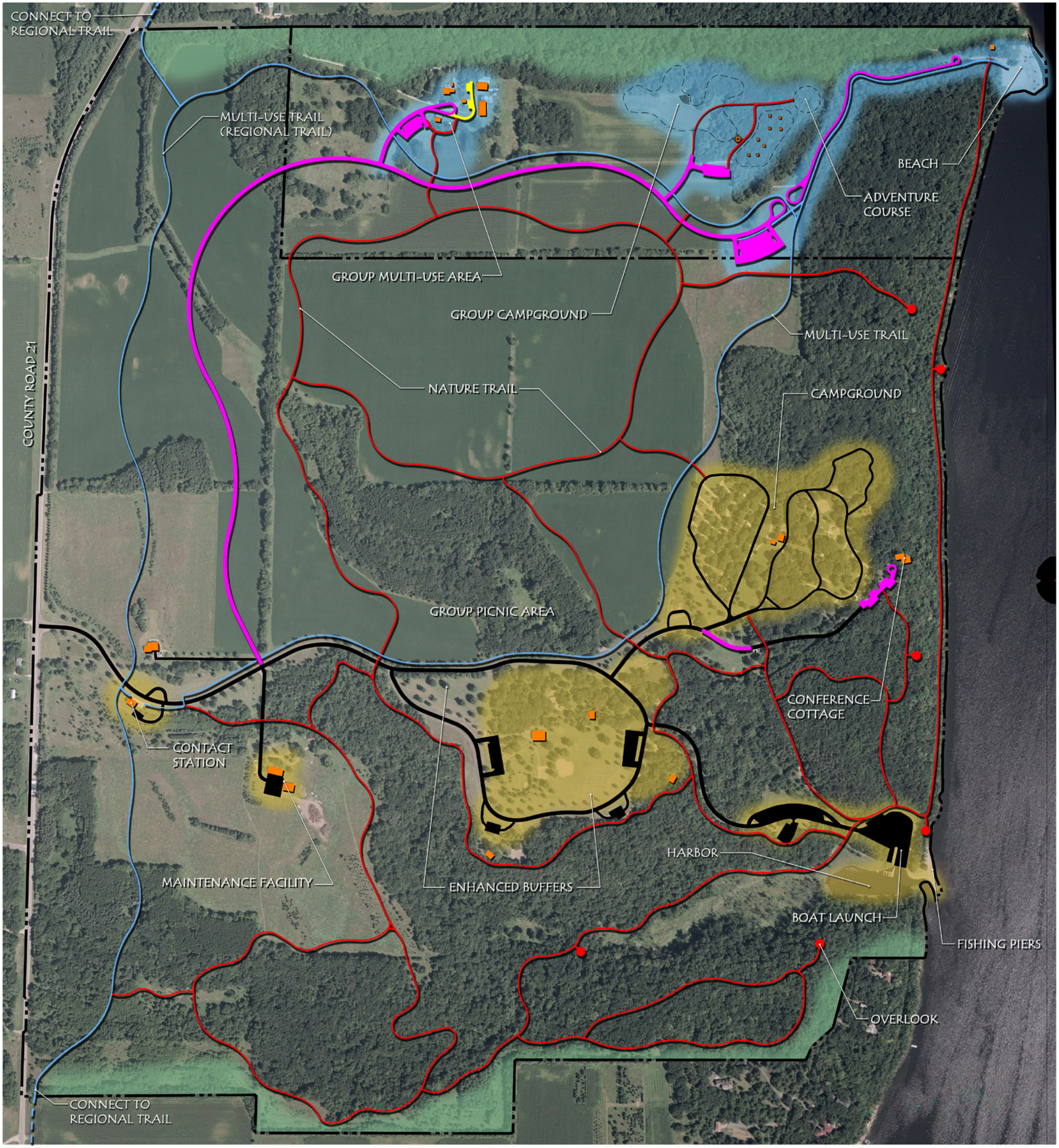
Electronic Communication: Washington County has a web page to inform citizens about the County's functions and services (e.g., Park Commission meetings, the master planning process, park facilities, and programs). In addition, the public can contact the Parks office through the County's e-mail system.

Other Outreach: Other forms of outreach and marketing include displays at the Washington County Fair, articles in the County Commissioners' quarterly newspaper, the production of flyers and brochures and the display of information at County Service Centers and park kiosks. The County also publishes news releases and advertisements in local community and metropolitan area newspapers that highlight upcoming programs and facility openings. The County also promotes park use through feature articles and presentations to other County departments and local agencies.

Marketing Initiatives: Washington County will be developing a comprehensive marketing plan to increase public awareness, understanding, and use of park facilities, services and programs. In addition, the marketing plan will identify the need to expand and diversify marketing and communication efforts to advance park use by minority populations and special needs groups.

St. Croix Bluffs Regional Park Master Plan

Washington County Parks



LEGEND

- EXISTING DEVELOPMENT
- PROPOSED DEVELOPMENT
- EXISTING DRIVE / PARKING AREA
- PROPOSED DRIVE / PARKING
- MULTI-USE TRAIL
- NATURE TRAIL
- BUFFER ZONE
- BUILDING
- OVERLOOK / OBSERVATION POINT

200 0 200 400 600

Scale: 1" = 200'

LAND USE PLANNING AND DESIGN

BRAUER & ASSOCIATES, LTD

Job #: 02-14

December 2002