

INTRODUCTION

Dayton's natural resources are among the defining features of the City. Balancing preservation of these features with future growth is a cornerstone of this plan, and was articulated as a priority by residents during both the comprehensive planning process and during the parks and open space planning process.

Elm Creek Park Reserve, the Mississippi River, and French and Diamond Lakes are among the dominant natural features of the City. Elm Creek Park Reserve, managed by Three Rivers Park District, occupies the southeast corner of the City, and extends south into Maple Grove as well as east into Champlin. The numerous hiking and biking trails, skiing, and other outdoor recreation opportunities in the Park Reserve draw visitors from throughout the region, while the diverse and often high quality habitats combine with the large size of the park to provide outstanding wildlife habitat and viewing opportunities.

The Mississippi River is not only a defining feature of the City; it is also a national landmark...

French and Diamond Lakes define the west-central portion of the City. Diamond Lake is the largest, at over 400 acres, and provides a popular shallow-lake fishery. The Mississippi River is not only a defining feature of the City; it is also a national landmark and important transportation and ecological corridor of national and international significance. While the river becomes much more industrial as it flows south, within Dayton it retains much of its wild character. The River Corridor is a critical migratory route for numerous species of birds, many of whom are threatened by significant habitat loss throughout their range; within Dayton it provides opportunity for boating, wildlife viewing, hiking, and a multitude of other uses.



GOALS AND POLICIES

Goal 1: Preserve natural areas for multiple uses including wildlife habitat, lake and wetland restoration, fishing, parks, and other recreational uses.

Goal 2: Maintain Dayton as a "dark-sky" community, minimizing unnecessary outdoor lighting through educational efforts and effective exterior lighting ordinances.

Goal 3: Identify and preserve as many of Dayton's beautiful viewsheds as possible.

Goal 4: Protect, conserve, and enhance environmental and natural resource systems from the impacts of future growth and development activities.

Policy 1: Preserve, as undeveloped open space, the following environmentally sensitive areas, to the extent consistent with the reasonable utilization of land, and in accordance and cooperation with applicable federal, state, and local regulations:

- a. Unique and/or fragile areas, including wetlands as defined in Section 404 of the Clean Water Act, as amended, and as delineated on National Wetland Inventory maps prepared by the U. S. Fish and Wildlife Service, field verified by on-site inspection.
- b. Groundwater and aquifer recharge areas.

- c. Lands in the floodplain.
- d. Drainage ditches and their adjacent lands.
- e. State and federal threatened and endangered animals and plants, as well as their habitats, as identified on federal and/or state lists.
- f. Significant trees or stands of trees, defined as the largest known individual trees of each species in the state, large trees approaching the diameter of the known largest tree, or species or clumps of trees that are rare to the area or of particular horticultural or landscape value.
- g. High quality natural areas, defined as sites mapped as A, B, or C quality in the 2003 Natural Resources Inventory.
- h. Historically significant sites, including significant archaeological sites, as listed on federal, state, and/or local lists.
- i. High quality soil areas.

Policy 2: Require all development to be designed so as to preserve and be compatible with the important natural features of its site and minimize or avoid impact to high quality resources.

Policy 3: Create incentives for developers to preserve or dedicate prime natural resources areas within developments for parks, trails, and open space.

Policy 4: Establish state-of-the-art conservation requirements for new development, including enforced buffer requirements for areas near water, low-impact development, rain gardens, and swale stormwater run-off programs.

Policy 5: Promote the use of plant species native to Hennepin County and/or central Minnesota in landscape plans to help enhance habitat value. This is especially

relevant for properties within greenway corridors or adjacent to high quality natural areas.

Policy 6: Strongly promote avoidance of planting and landscape use of plants known to be invasive in Minnesota, as defined by the MnDNR. This includes species such as Amur Maple, Glossy and European Buckthorns, Dame's Rocket, White Poplar, and other species known to be ecologically aggressive, but which may not yet be included on the Department of Agriculture list of invasive and/or exotic plants.

Policy 7: Promote the use of plant variety in the landscape to minimize the spread of horticultural diseases.

Policy 8: Inform citizens of development plans and keep them informed throughout the process.

Goal 5: Preserve greenways that link unique or ecologically significant natural areas.

Policy 1: Continue to follow the Greenway Corridor Plan that identifies key links and establish greenways as property is developed.

Policy 2: As development occurs, ensure that Elm Creek Park Reserve remains connected to Crow Hassan Park by a greenway that supports the regional trail system and links Dayton to surrounding communities by a scenic corridor between French and Diamond Lakes.

Policy 3: Develop a north-south corridor from Elm Creek Park to the Mississippi River through quality forested areas and migration corridor.

Policy 4: Develop an east-west corridor from the Crow to the Mississippi Rivers

through quality forested areas and migration corridor.

Policy 5: Focus on the quality and connectivity of open spaces rather than quantity.

Goal 6: Utilize waterfront areas to make the best use of the land with the least impact to the natural state of the lakeshore, river and stream banks, and critical areas to keep the land beautiful and natural for generations to come.

Policy 1: Conserve existing public open spaces along the Mississippi and Crow Rivers and enhance them by adding amenities for public use and by implementing natural community restoration and management activities to maintain and improve habitat.

Policy 2: Acquire any available lands (if financially practical) in the Mississippi corridor for preservation. Investigate the availability of grant funds to help with acquisition.

Policy 3: Protect the Rush Creek shoreline for the purpose of creating a greenway corridor and trail from Maple Grove to Dayton and preserving the creek's natural beauty.

Policy 4: Require more than adequate buffers around surface waters to preserve the shores and maintain the natural beauty.

Goal 7: Improve water quality to the highest level practical.

Policy 1: Manage the City's wetlands, streams, and lakes for improved water quality and ecosystem health.

Policy 2: Create policies necessary to control excessive volumes and rates of runoff to surface waters.

Policy 3: Implement a plan to reduce phosphorus levels to acceptable levels in French and Diamond Lakes and provide education to the public on what they can do to help.

Policy 4: Acknowledge the important role wetlands and lakes play in the City's environmental quality.

Policy 5: Enforce wetland alteration and mitigation requirements consistent with the Wetland Conservation Act (WCA), as amended. If avoidance is not possible, then consider all possible alternatives to disturbing a wetland by following the "minimize and replace" sequence described in the WCA and encourage mitigation within City limits.

SUSTAINABILITY

Sustainability refers to the concept of using practices and strategies on the land that can be maintained over time without damaging the environment. The intent is to balance near-term interests with the protection of the interests of future generations and to maintain and potentially improve environmental quality. Sustainability can be achieved through a variety of strategies, each which uses natural resources preservation as the guiding principle, while still allowing use of the land.

REVIEW OF EXISTING NATURAL RESOURCES

NATURAL AREAS

According to the original land survey notes (compiled in Minnesota between 1853 and 1856), at the time of European settlement the vegetation of what is now northeastern Hennepin County was comprised primarily of maple-basswood forest and mesic oak forest (referred to as "Big Woods"), with small inclusions of wet prairie and lakes, and occasional tamarack bogs. Based on these notes, it is apparent that the City of Dayton was dominated mostly by Big Woods, with drier oak-aspen land and oak openings in the northeastern corner of the City.



Today, examples of this historic vegetation are preserved in locations scattered throughout the City (as identified by the MnDNR County Biological Survey and by the 2003 Natural Resources Inventory completed for the City.) Some of the best examples are within Elm Creek Park Reserve which supports a number of high quality Big Woods forest remnants including some examples of very large red oak. Other notable native forest remnants can be found along the Mississippi River and near French Lake and Diamond Lake as well as in a broken band connecting Elm Creek Park Reserve to the French Lake/Diamond Lake area.

Other notable natural areas within the City include some high quality wetland areas within and adjacent to the Elm Creek Park Reserve and around French and Diamond Lakes. Two wetland areas are of special interest. One is a very high quality tamarack swamp in the Elm Creek Park Reserve; tamarack swamps approach the southern limit of their range here and are uncommon in Hennepin County. The second is a high quality wetland that is partially within Elm Creek Park Reserve and partially privately owned.

Specific sites identified by the Minnesota DNR survey are as follows:

- Three Black Ash Swamps (Sections 20 to 21, Sections 26, 27, and 34)
- One Cattail Marsh (Section 26)
- One Mixed Emergent Marsh (Section 34)
- One Floodplain Forest (Section 10)
- One Hardwood Swamp (Section 26)
- Three Lowland Hardwood Forests (Sections 20, 21, 34, and 35)
- Seven Maple-Basswood Forests (Sections 16, 17, 20, 21, 27, and 34)
- One Tamarack Swamp (Section 34)
- Two Wet Meadows (Sections 16 and 17)

In addition, there are two additional natural communities which were of good enough quality for Minnesota County Biological Survey (MCBS) to map, but are not of high enough quality to rank as an MCBS site.

The MCBS survey of Dayton lists five rare animal occurrences, all within or adjacent to Elm Creek Park Reserve: Blandings Turtle, Bald Eagle, Trumpeter Swan, Acadian Flycatcher, and American bittern.

These features are among the defining features for Dayton's natural resources and combined with the semi-natural areas and water features described below form the backbone of the City and DNR greenway corridors.

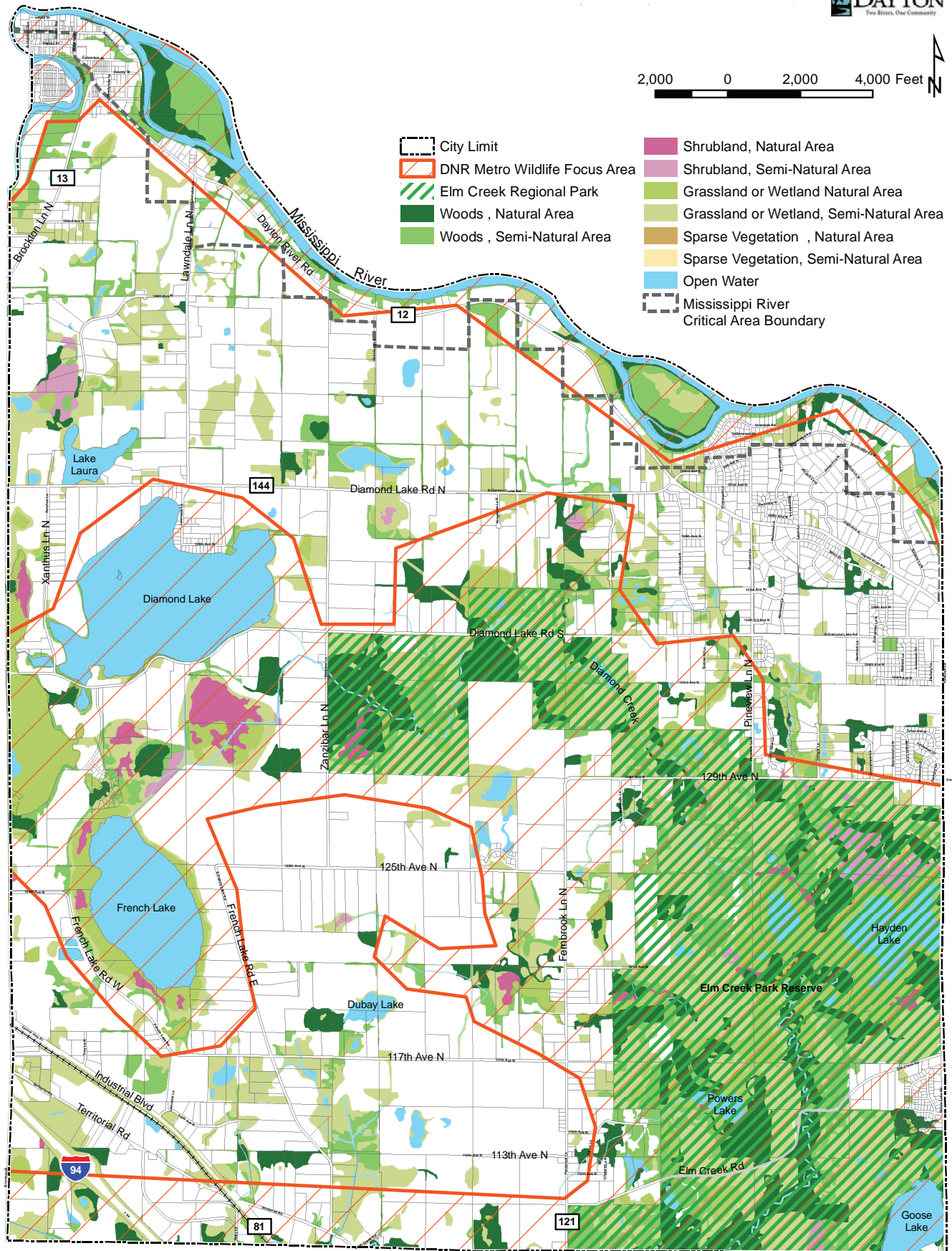
These areas still can offer significant benefit for wildlife and for water quality protection,...

SEMI-NATURAL AREAS

Semi-natural areas are areas of land not subject to active use, and which are not dominated by vegetation native to Minnesota. Examples include fallow pasture or crop land which has been retired, degraded wetlands dominated by reed canary grass or other invasive species, and secondary growth or disturbed woodlands typically dominated by boxelder, green ash, and/or basswood. These areas still can offer significant benefit for wildlife and for water quality protection, and often form important buffers around and connections between remnants of native habitat. As seen on Figure 2.1 – Natural and Semi-Natural Areas and Figure 2.2- Significant Vegetative Stands, these form a significant percentage of the open space and undeveloped lands within the City. Sites within the greenway corridors should be considered high priority for restoration.

Figure 2.1

Natural and Semi-Natural Areas



February 5, 2008

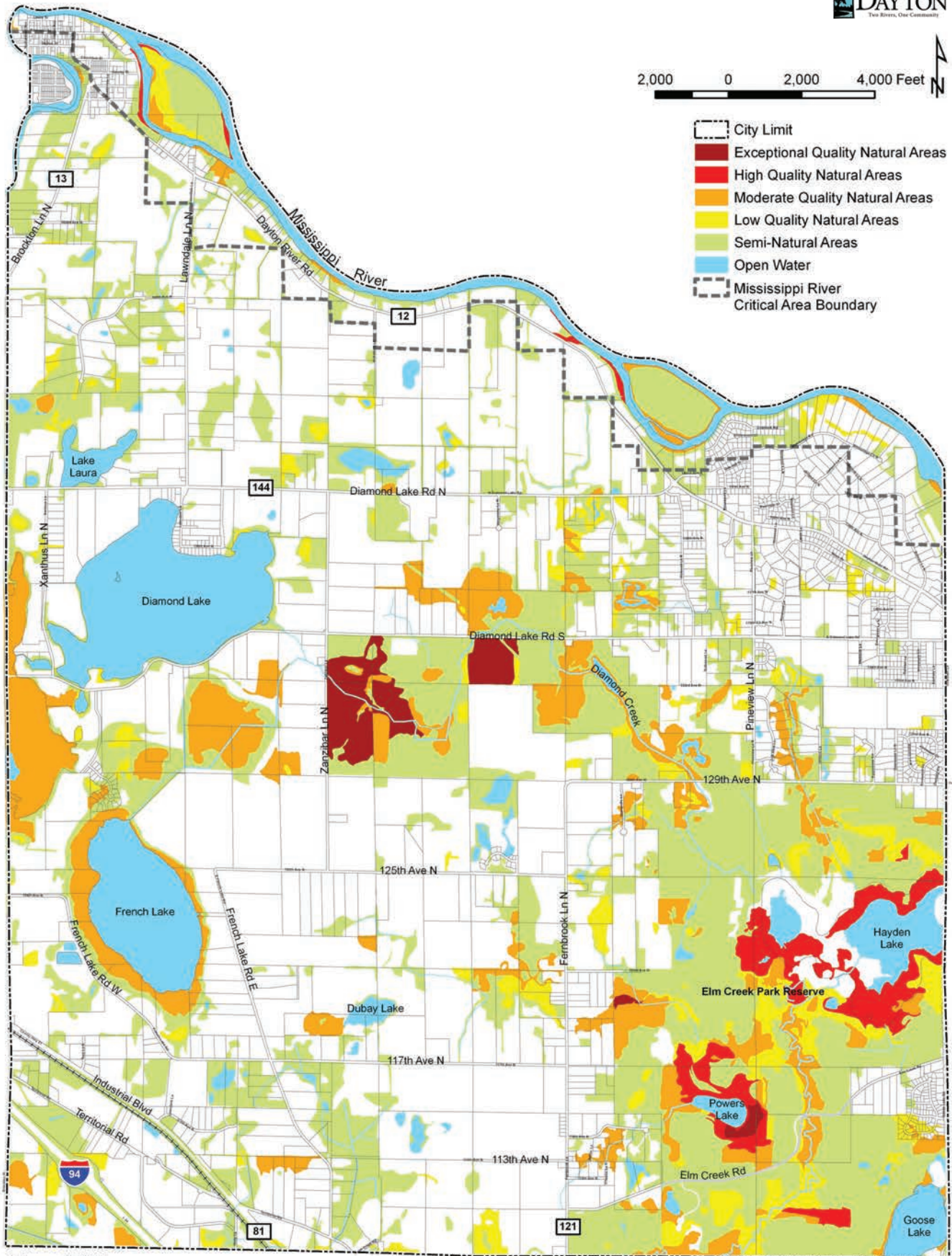
Figure 2.2

Significant Vegetative Stands



2,000 0 2,000 4,000 Feet

- City Limit
- Exceptional Quality Natural Areas
- High Quality Natural Areas
- Moderate Quality Natural Areas
- Low Quality Natural Areas
- Semi-Natural Areas
- Open Water
- Mississippi River Critical Area Boundary



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City of Dayton 2030 Comprehensive Plan

STEEP SLOPES

Within the City, the steepest slopes are concentrated along the bluffs above the Mississippi River with additional areas of steep slopes within 1 to 1.5 miles of the river and within Elm Creek Park Reserve. These areas were formed by prehistoric glacial activity; both as retreating glaciers carved the landscape and melted back, depositing piles of sand, gravel, and other glacial debris, and as torrents of glacial meltwater scoured through piles of this debris.

These areas may be more vulnerable to erosion and are generally poor candidates for building. However, they often provide for scenic vistas of the surrounding landscape. Steep slopes are shown in Figure 2.3 – Steep Slopes.

SOILS

Hennepin County Soil Survey

The soils of northwestern Hennepin County are predominantly fine textured silt loams and clay loams which tend to support mesic native plant communities in the uplands (such as mesic oak forest, maple basswood forest, and mesic prairie).

These soils are also well suited for agricultural crops such as corn and soybeans, as well as pasture lands. In some portions of the City, specifically in the northern portion, the soils are well drained to excessively drained and in some cases require irrigation to grow crops. In addition, poorly drained landscape depressions occur frequently in this portion of northeastern Hennepin County, and tend to support hydrophytic vegetation (i.e., wetland plants such as sedges, grasses, rushes, and wetland herbs) and organic soil accumulation.

According to the soil survey, the predominant soil types within the City of Dayton include, Glencoe, Cordova, Nessel, Lester, Hamel overwash, and Angus loams as shown on Figure 2.4- Soils Map. Many of these soils have moderate erodibility, and are also poorly suited to use in septic systems. (See Figure 2.5 – Soil Limitations for On-Site Septic Systems and Figure 2.6 – Soil Erodibility.) A summary of soil types and their acreages within the City is shown in Table 2.1- Soil Type.

SURFACE WATER

The City has a number of surface water resources defining features include the Mississippi River along the northern border of the City (additional information discussed in Appendix A - Mississippi River Critical Area) and Diamond Lake and French Lake, popular recreation and fishing lakes in the western half of the City. In addition, there are a number of smaller lakes within the Elm Creek Park Reserve. Important streams include Diamond Creek which drains into Diamond Lake and Elm Creek.

PUBLIC WATERS

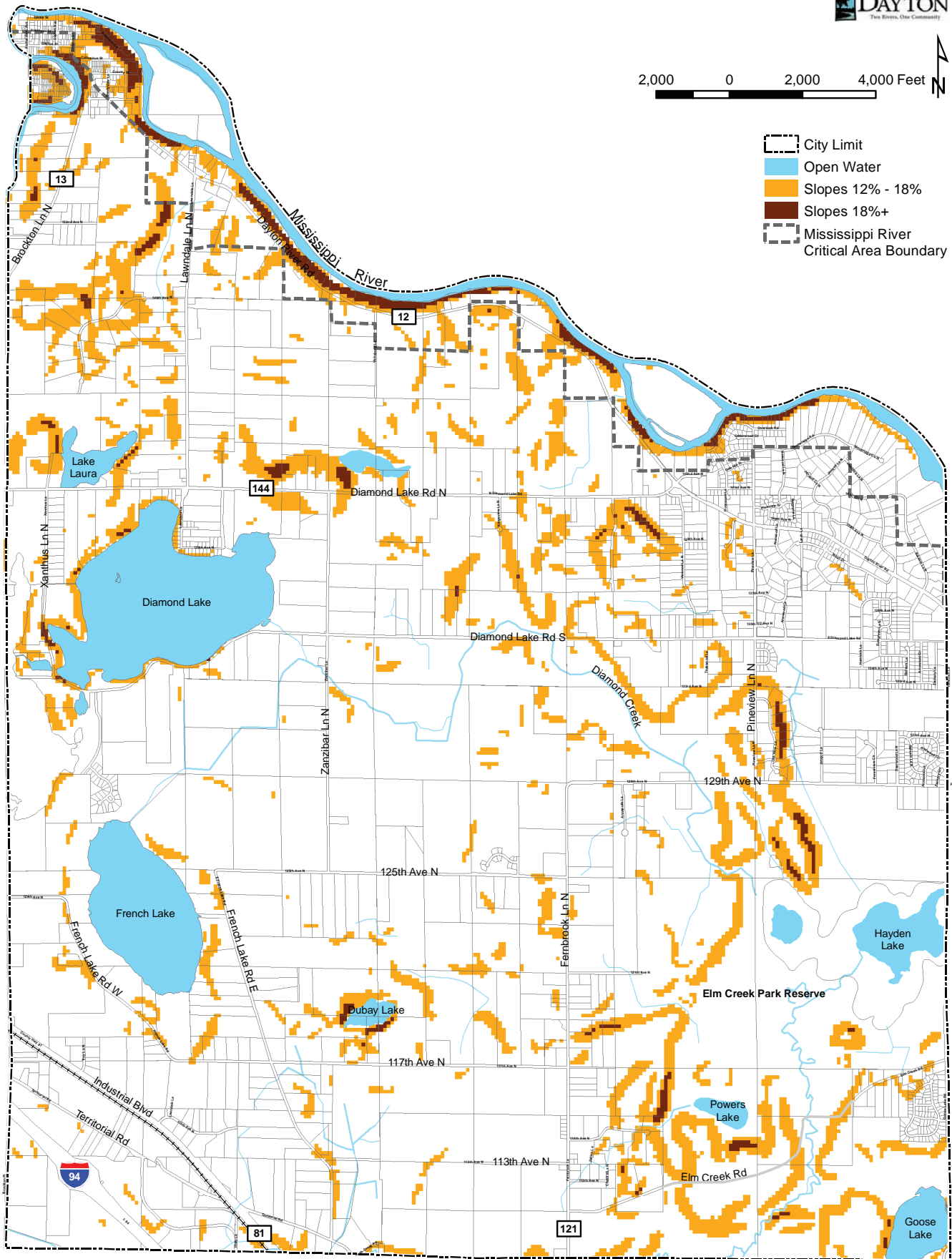
The public waters designation includes lakes, rivers, trout streams, and other bodies of water that meet the standards described in Minnesota Statutes, Section 103G.005, as well as wetlands classified as public water wetlands. Public waters wetlands include all Type 3, Type 4, and Type 5 wetlands that are 10 acres or more in size, in unincorporated areas, or 2½ acres or more in size in incorporated areas. These sites provide public value for recreation, water quality or water supply, wildlife habitat, or are publicly owned. The DNR has regulatory authority over these areas and specific rules are in place regarding the need for a permit or license to cross or otherwise impact these areas.



Figure 2.3
Steep Slopes



- City Limit
- Open Water
- Slopes 12% - 18%
- Slopes 18%+
- Mississippi River Critical Area Boundary



February 5, 2008

City of Dayton 2030 Comprehensive Plan

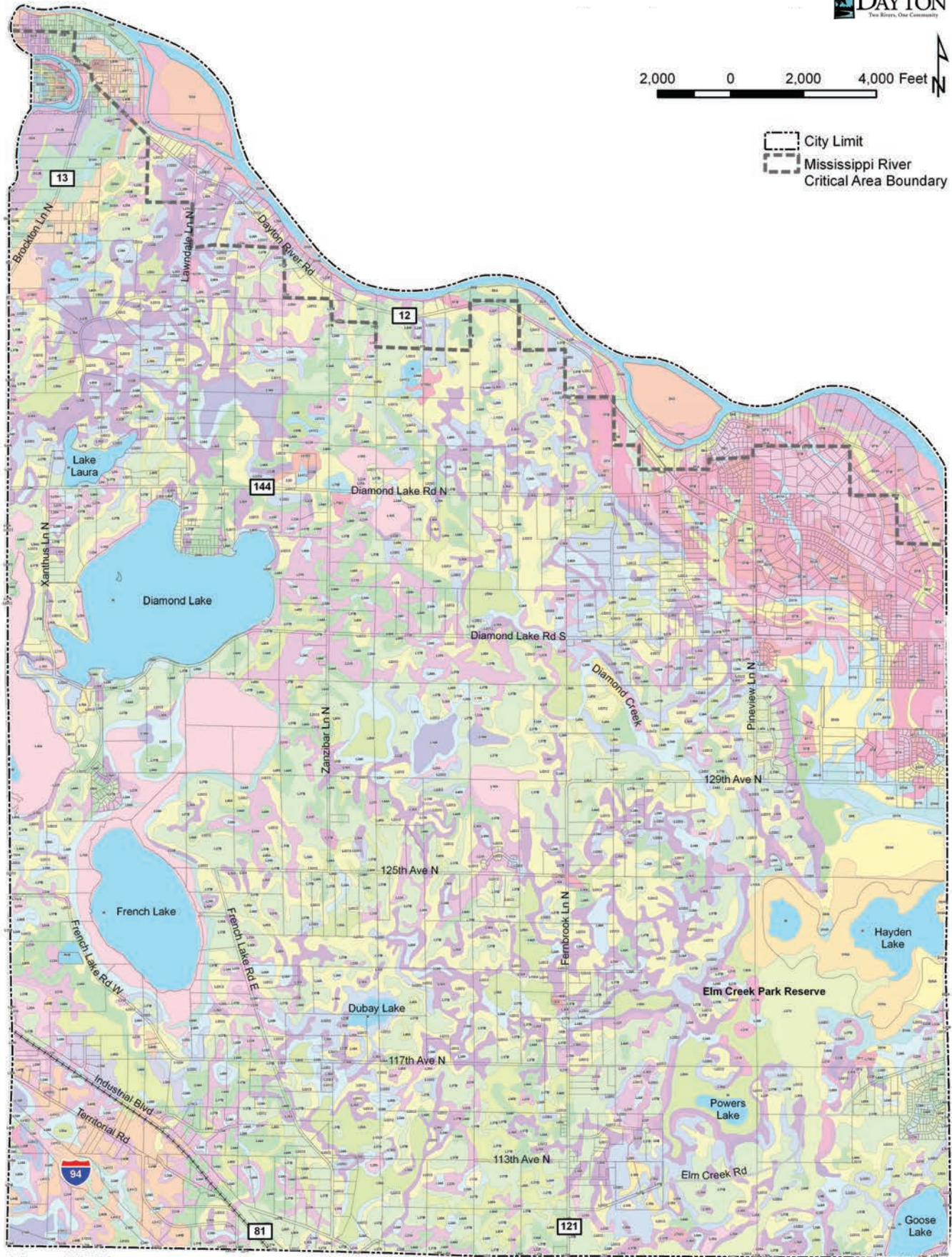
Figure 2.4
Soils Map



2,000 0 2,000 4,000 Feet



City Limit
Mississippi River
Critical Area Boundary



February 11, 2008

Table 2.1- Soil Type

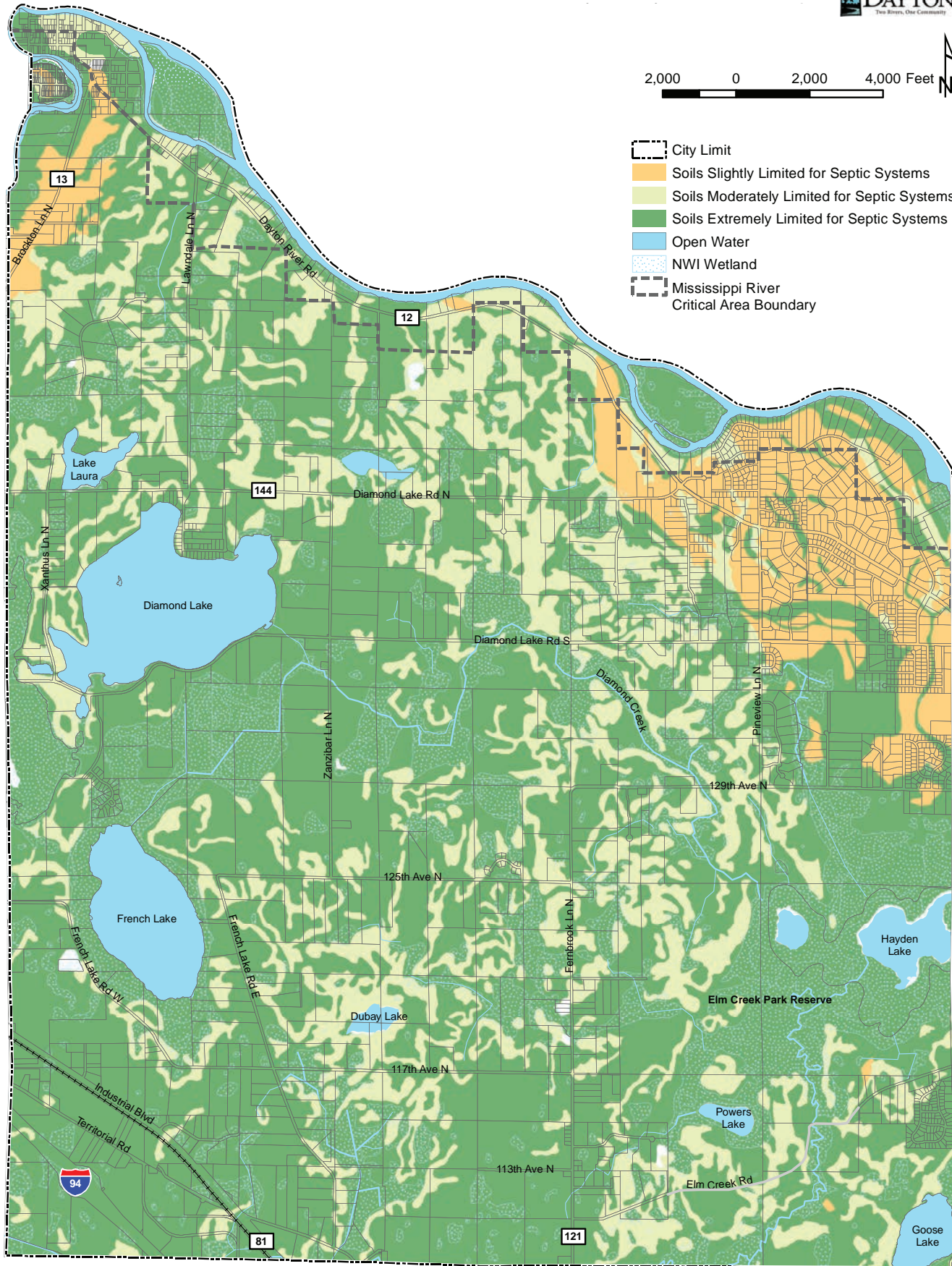
Soil Type	Acres	Map Symbol
Sandberg loamy coarse sand, 2 to 6 percent slopes	1.5	D8B
Crowfork loamy sand, 1 to 6 percent slopes	1.6	L4B
Urban land-Udorthents (cut and fill land) complex, 0 to 6 percent slopes	1.6	U6B
Malardi-Hawick complex, 12 to 18 percent slopes	2.9	L2D
Bygland silt loam, map >25, 6 to 12 percent slopes, eroded	3.2	D12C2
Langola loamy fine sand, terrace, 2 to 6 percent slopes	3.6	D13B
Foldahl loamy sand, map >25, 0 to 3 percent slopes	3.8	D26A
Udorthents, wet substratum, 0 to 2 percent slopes	4.6	U2A
Udorthents (cut and fill land), 0 to 6 percent slopes	5.2	U3B
Sandberg loamy coarse sand, 12 to 18 percent slopes	6.8	D8D
Water, miscellaneous	6.9	M-W
Shorewood silty clay loam, 3 to 6 percent slopes	7.1	L26B
Lester-Malardi complex, 18 to 35 percent slopes	7.3	L70E
Southhaven loam, 0 to 2 percent slopes	7.5	D23A
Dorset sandy loam, 2 to 6 percent slopes	7.7	D4B
Shorewood silty clay loam, 6 to 12 percent slopes, eroded	8.0	L26C2
Lindaas silt loam, 0 to 2 percent slopes	9.6	D11A
Lester-Malardi complex, 6 to 12 percent slopes, eroded	9.9	L70C2
Metea loamy fine sand, 6 to 12 percent slopes	9.9	L71C
Angus-Malardi complex, 2 to 6 percent slopes	11.2	L17B
Lester-Kilkenny complex, 25 to 35 percent slopes	11.3	L41F
Lester-Kilkenny complex, 12 to 18 percent slopes, eroded	12.0	L41D2
Lester-Metea complex, 12 to 18 percent slopes, eroded	15.8	L61D2
Sandberg loamy coarse sand, 6 to 12 percent slopes	15.9	D8C
Moon loamy fine sand, 2 to 5 percent slopes	19.6	L19B
Klossner muck, depressionnal, 0 to 1 percent slopes	19.6	L13A
Bygland silt loam, map >25, 2 to 6 percent slopes	20.4	D12B
Angus-Moon complex, 2 to 5 percent slopes	23.9	L60B
Shields silty clay loam, 0 to 3 percent slopes	24.1	L18A
Verndale sandy loam, acid substratum, 2 to 6 percent slopes	24.4	D6B
Dorset-Two Inlets complex, 2 to 6 percent slopes	27.2	D5B
Lester-Malardi complex, 12 to 18 percent slopes, eroded	32.0	L70D2
Dorset sandy loam, 0 to 2 percent slopes	32.4	D4A
Lester-Metea complex, 6 to 12 percent slopes, eroded	33.1	L61C2
Isan sandy loam, depressionnal, 0 to 1 percent slopes	33.4	D21A
Klossner, Okoboji, and Glencoe soils, ponded, 0 to 1 percent slopes	34.3	L15A
Soderville loamy fine sand, terrace, 0 to 3 percent slopes	35.7	D25A
Minnetonka silty clay loam, 0 to 2 percent slopes	36.2	L9A
Lester-Kilkenny complex, 6 to 12 percent slopes, eroded	40.0	L41C2
Lerdal loam, 1 to 3 percent slopes	46.1	L35A
Canisteo loam, 0 to 2 percent slopes	46.8	L21A
Sandberg loamy coarse sand, 18 to 35 percent slopes	47.4	D8E
Tadkee-Tadkee, depressionnal, complex, 0 to 2 percent slopes	58.9	L64A
Seelyeville and Markey soils, depressionnal, 0 to 1 percent slopes	61.3	D30A
Hamel-Glencoe, depressionnal, complex, 0 to 3 percent slopes	71.5	L132A
Verndale sandy loam, acid substratum, 0 to 2 percent slopes	72.4	D6A
Anoka and Zimmerman soils, terrace, 6 to 12 percent slopes	77.0	D1C
Forada sandy loam, 0 to 2 percent slopes	80.5	D10A
Anoka and Zimmerman soils, terrace, 2 to 6 percent slopes	80.9	D1B
Elkriver fine sandy loam, 0 to 2 percent slopes, rarely flooded	101.4	D2A
Houghton muck, depressionnal, 0 to 1 percent slopes	105.8	L14A

Soil Type	Acres	Map Symbol
Duelm loamy sand, 0 to 2 percent slopes	113.9	D17A
Fordum-Winterfield complex, 0 to 2 percent slopes, frequently flooded	120.4	D19A
Elkriver fine sandy loam, 0 to 2 percent slopes, occasionally flooded	131.0	D3A
Klossner soils, depressional, 0 to 1 percent slopes	143.7	L49A
Lester loam, morainic, 18 to 25 percent slopes	152.9	L22E
Hubbard loamy sand, 6 to 12 percent slopes	154.6	D7C
Lester loam, morainic, 25 to 35 percent slopes	162.9	L22F
Angus-Kilkenny complex, 2 to 6 percent slopes	197.1	L40B
Le Sueur loam, 1 to 3 percent slopes	226.0	L25A
Suckercreek loam, 0 to 2 percent slopes, frequently flooded	229.5	L27A
Seelyeville and Markey soils, ponded, 0 to 1 percent slopes	234.2	D16A
Hubbard loamy sand, 0 to 2 percent slopes	295.3	D7A
Isan sandy loam, 0 to 2 percent slopes	323.1	D20A
Hubbard loamy sand, 2 to 6 percent slopes	449.2	D7B
Houghton and Muskego soils, depressional, 0 to 1 percent slopes	488.1	L50A
Dundas-Cordova complex, 0 to 3 percent slopes	503.6	L45A
Muskego, Blue Earth, and Houghton soils, ponded, 0 to 1 percent slopes	564.4	L16A
Glencoe loam, depressional, 0 to 1 percent slopes	707.2	L24A
Nessel loam, 1 to 3 percent slopes	872.4	L44A
Lester loam, morainic, 12 to 18 percent slopes, eroded	917.6	L22D2
Cordova loam, 0 to 2 percent slopes	956.5	L23A
Water	1,049.7	W
Hamel, overwash-Hamel complex, 1 to 4 percent slopes	1,163.3	L36A
Lester loam, morainic, 6 to 12 percent slopes, eroded	2,206.5	L22C2
Angus loam, morainic, 2 to 5 percent slopes	2,280.9	L37B

Figure 2.5
Soil Limitations for On-Site Septic Systems



- City Limit
- Soils Slightly Limited for Septic Systems
- Soils Moderately Limited for Septic Systems
- Soils Extremely Limited for Septic Systems
- Open Water
- NWI Wetland
- Mississippi River Critical Area Boundary



February 11, 2008

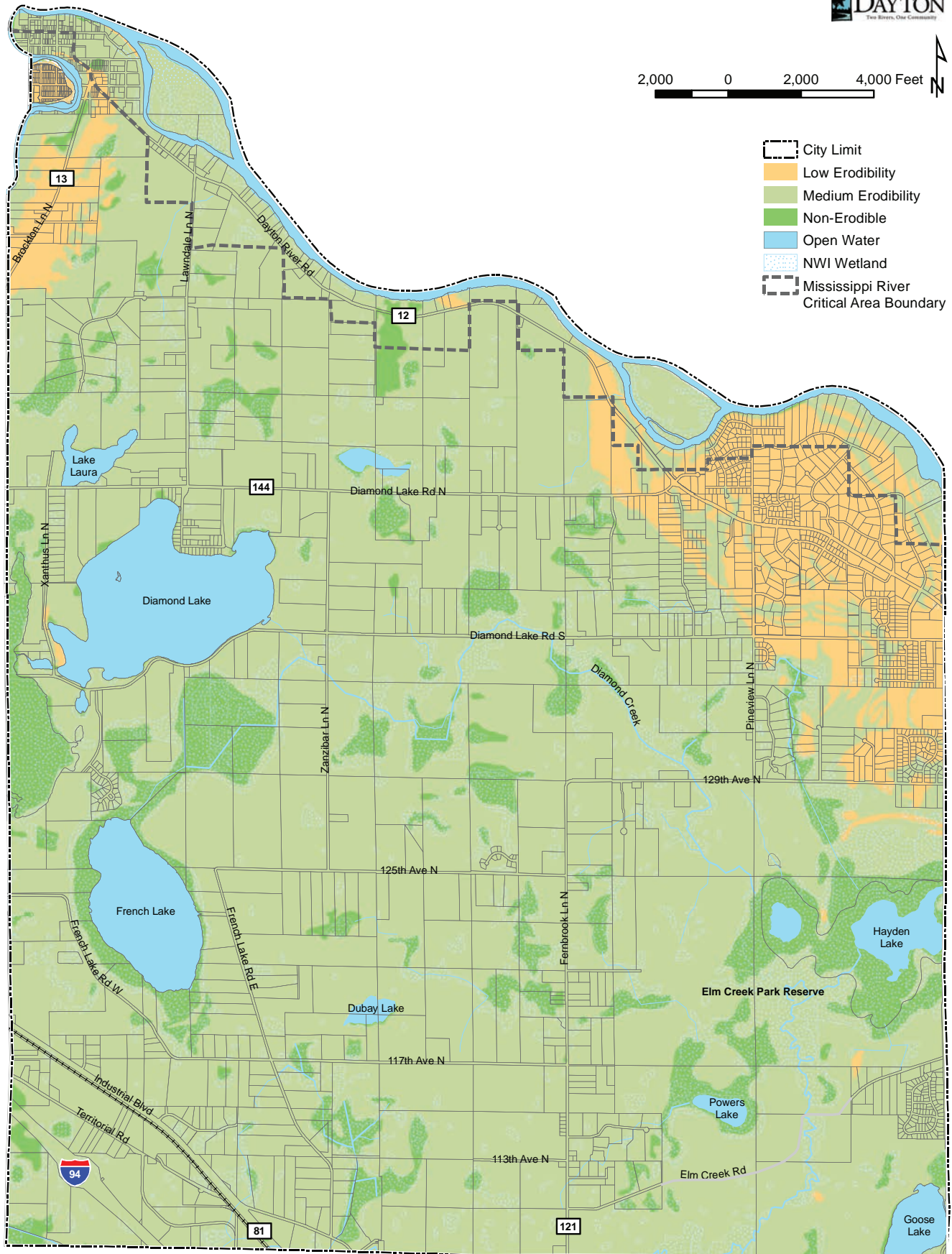
Figure 2.6
Soil Erodibility



2,000 0 2,000 4,000 Feet



- City Limit
- Low Erodibility
- Medium Erodibility
- Non-Erodible
- Open Water
- NWI Wetland
- Mississippi River Critical Area Boundary



February 11, 2008

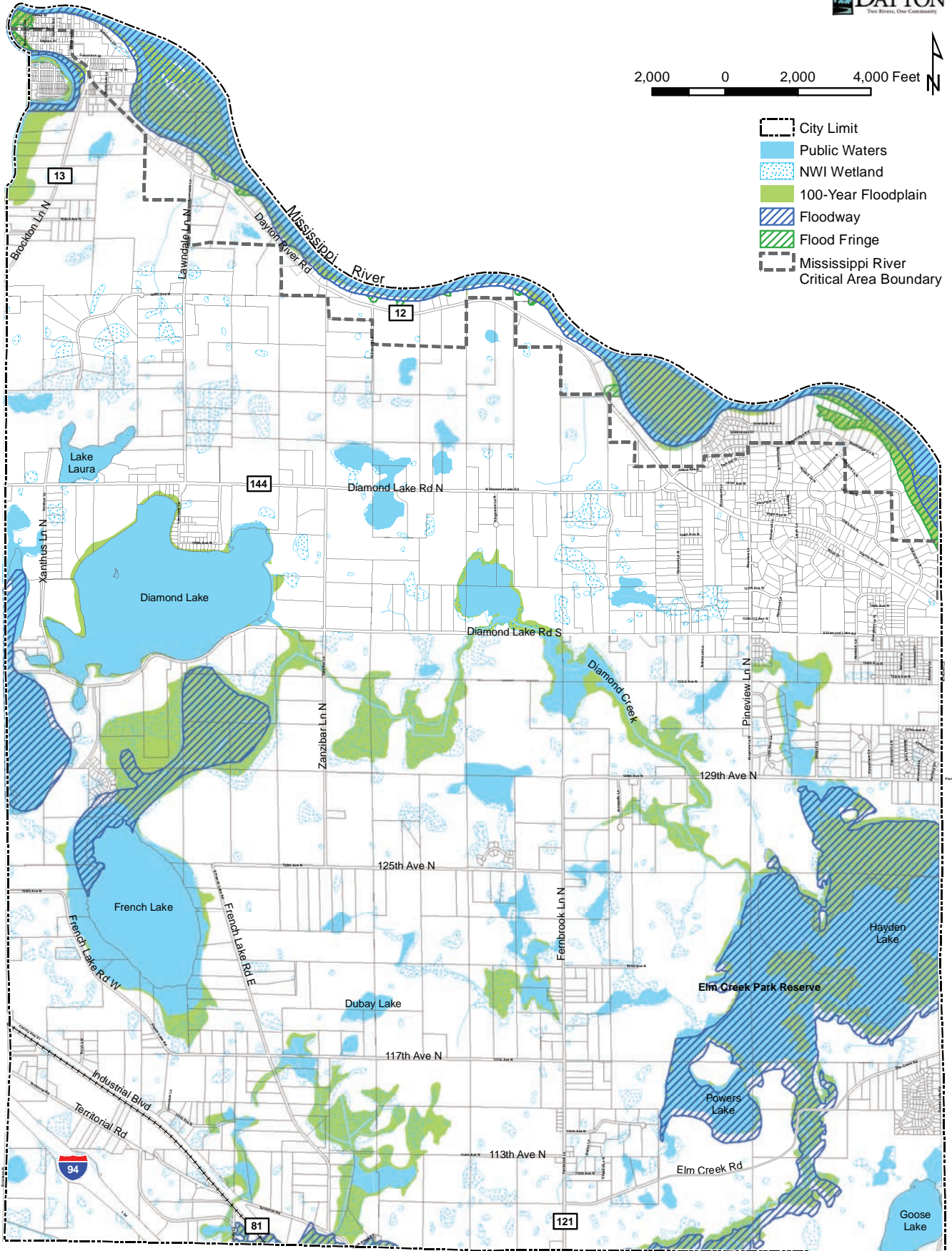
Figure 2.7
Hydrology Inventory



2,000 0 2,000 4,000 Feet



- City Limit
- Public Waters
- NWI Wetland
- 100-Year Floodplain
- Floodway
- Flood Fringe
- Mississippi River Critical Area Boundary



January 23, 2008

City of Dayton 2030 Comprehensive Plan

WETLANDS

Wetlands provide a number of valuable services to the community including natural flood control, filtering, cleaning, and supplying water for both downstream water bodies and groundwater sources, and creating valuable habitat for fish, amphibians, waterfowl, birds, and other wildlife. They are an economic amenity in many developments and can provide visual and spatial buffers between homes. The State of Minnesota and the Federal Government recognize the values that wetlands provide and have created a series of rules that protect wetlands. In the State of Minnesota, nearly all wetlands are protected by the Wetland Conservation Act.

Wetlands are common throughout the City with higher concentrations in Elm Creek Park Reserve, near French Lake, and along the creek corridors. There are several sources of information that can help in a preliminary determination of whether wetlands are present on a site, as described below. In all cases a review by an experienced wetland professional is recommended and in some cases required to make a final determination regarding the presence or absence of a wetland and to determine the legal boundaries of any wetlands. Appropriate permits are required prior to any activities which fill, drain, or otherwise impact a wetland.

National Wetlands Inventory

The National Wetlands Inventory (NWI) is a national assessment of wetland resources, conducted by the United States Fish and Wildlife Service between 1988 and 1992 within the state of Minnesota. The NWI survey was based strictly on aerial photography reconnaissance and interpretation, and may be less accurate than some of the other sources. However, the NWI coverage is useful in giving an estimate of the extent (i.e., approximate geographic location) and type (i.e., system, hydrologic regime, and predominant vegetation types) of wetlands within the City.

Hennepin Conservation District (HCD) Wetland Inventory

The HCD completed a remote assessment of wetland and potential wetland areas within Hennepin County based on a review of the then-current aerial photographs, topography, and hydric soils information.

This survey includes potential wetland areas not included in the NWI and also omits wetlands which have been filled since the completion of the NWI.

MINNESOTA LAND COVER CLASSIFICATION SYSTEM (MLCCS) MAPPING AND NATURAL RESOURCE INVENTORY

The 2003 MLCCS Mapping and Natural Resource Inventory is the main source of field-verified wetland information on a City-wide scale. Limitations of the data include that wetlands below approximately 1 acre in size are not captured in this system, nor are many temporary wetlands in agricultural fields, pastures, or forests.



GROUNDWATER

Three aquifer units are found in the Dayton area. The uppermost aquifer is the glacial drift (sand and gravel) aquifer in which the water table is generally found. Buried (confined) portions of the aquifer may also exist in areas where sand and gravel deposits are covered by layers of low permeability sediments (such as clay). Yield from drift aquifers can be highly variable depending on locations and thicknesses of sand and gravel deposits. In general, yields in the Dayton area are typically too low to supply municipal wells, but are often sufficient to service small capacity domestic or irrigation wells. The second aquifer unit underlying the drift aquifer is the Franconia-Ironton-Galesville (FIG) bedrock aquifer. The FIG aquifer represents the uppermost bedrock aquifer in the Dayton area. Yields from the FIG aquifer can range between 500 gpm to 1,200 gpm per well in the Dayton area depending on local variations in the bedrock deposition. The third aquifer unit, which underlies the FIG aquifer, is the Mt. Simon bedrock aquifer. The Mt. Simon aquifer can yield water supply in the range of 700 gpm to 1,000 gpm per well. At present, the Minnesota DNR is restricting the development of new wells in the Mt. Simon aquifer in order to prevent this aquifer from being over-utilized in the Twin Cities area.

The City of Dayton currently operates on municipal water supply well (Well No. 1), located in the Historic Village Area. This well went online in 2001 and is completely in the FIG aquifer. The well has capacity of 300 gpm which is designed to only service portions of the Historic Village area. The City projects that they will need 19.3 million gallons per day (MGD) in form capacity in order to meet demand conditions at build-out. It is anticipated that 5.0 MGD will be supplied by Maple Grove leaving a net of 14.3 MGD to be supplied by wells in Dayton. In order to meet this anticipated demand, the City is currently planning on the development of two well fields (a north well field and a south well field) with a total of 13 new FIG aquifer wells divided among the well fields. More detail can be found in the City of Dayton's Water Supply and Distribution Plan (Bonestroo, February 2007). In late 2007, the City began the construction of Well No. 2 in the north well field area. Test drilling of this well indicated a capacity of 700 to 800 gpm. Well No. 2 is expected to go online by summer 2008. As new wells are added to the water supply system, overall aquifer yield and sustainable capacity will be reviewed to ensure that planned well field development is both feasible and sustainable.

Management of groundwater in the Dayton area should be focused on prevention of human-caused contamination from spoiling future water supplies. The drift and FIG aquifers will be relied upon to supply both private and municipal water supply wells. As such, these aquifers should be the focus of efforts to prevent impacts from contamination. The lower Mt. Simon aquifer is considered to be relatively low in vulnerability and has less likelihood of becoming contaminated. At present, the City of Dayton has an approved Wellhead Protection Plan in place for Well No. 1. As future wells are added to the City's water supply system, the Wellhead Protection Plan will be expanded to encompass the areas that supply these wells. A side benefit of Wellhead Protection Planning is that it raises awareness in the community of the importance of groundwater protection in general. Overall efforts to protect the City's water supply wells should also result in greater protection to the aquifer(s) that supply the area's private wells.

NATURAL AREAS PROTECTION RESOURCES AND TECHNIQUES —

As mentioned, the City of Dayton is home to many valuable natural resources. As Dayton grows, protection of these resources is critical. There are a variety of tools and strategies available to the City to manage and protect its natural resources which are discussed below.

LOW IMPACT DEVELOPMENT (LID)

LID is a sustainable stormwater management strategy that focuses on managing stormwater locally, using features such as swales, green roofs, constructed wetlands, pervious pavement, and rainwater gardens to infiltrate runoff, rather than relying solely on a system of pipes and stormponds. It has significant water quality benefits and can effectively manage small to moderate rainfall events depending on the LID design. The City approved a LID ordinance that outlines the most important aspects of LID stormwater management quite well including the following:

1. Requiring the subdivision site to perform the same as the pre-development site for the 2-year, 24 hour storm event with respect to runoff volume, peak runoff rate, and time of concentration. When areas become more impervious, it is the effects of the storm events smaller than the 2-year, 24 hour event that causes the greatest damage to natural and water resources through increase loadings of pollutants and volume.
2. Listing Best Management Practices (BMPs) that could be utilized in site design and allowing that list to be revised over time as new technologies/ techniques emerge.
3. Requiring pre-treatment for all infiltration features.
4. Requiring a long-term maintenance plan for all BMPs.
5. Requiring calculations to account for runoff volumes from impervious and pervious separately and not allowing the use of composite Curve Number (CN) values, except where impervious areas runoff onto the same sized area of pervious.

Additional considerations for the City as they move towards finalizing the ordinance are as follows:

- 1. Define Pre-development** [Section 2., Subd.7. (2)] – Pre-development can be defined as the existing land use before the subdivision has been built or the land use prior to European settlement, each having different effects on the level of treatment required for the subdivision development.
- 2. Define Acceptable CN values and Infiltration Rates** [Section 2., Subd.7. (4)] – By defining the CN values of possible pre-development land uses and subdivision sources of runoff (roof, yard, street, etc.) and the infiltration rates or retention capacities of the various LID stormwater BMPs, the application review and approval process may be easier for both the City and the developer. The calculations performed will be more consistent from subdivision to subdivision's applications. The City will more easily know what type of treatment to expect of any given subdivision. The values can be defined based on Hydrologic Soil Group and there are many suggestions for these values in the Minnesota Stormwater Manual.
- 3. Avoid Discouraging Stormwater Ponds with Side Slope Infiltration** [Section 2., Subd.7. (4) d.] – This statement precludes the use of stormwater ponds with side-slope infiltration which have been calculated and monitored to infiltrate approximately 75% of the annual runoff volume generated from low-density residential developments.
- 4. Account for Greater Treatment of Green Roofs** [Section 2., Subd.7. (5)] – Research shows that green roofs with only three inches of growing medium can capture 60% of annual precipitation (Berghage, 2007). Requiring vegetated green roofs to have similar runoff characteristics as HSG "C" soils may be too restrictive of the treatment capacity of green roofs as researched.

PARCEL EVALUATION

Parcel evaluation is a useful strategy for identifying areas where low-impact development design methods such as cluster development or Conservation Design subdivision may be appropriate as a way of protecting priority natural resources. One potential approach is to identify parcels with development or redevelopment potential above a specified size threshold (for example, 10 acres) and determine which of these parcels intersect with priority natural resource features. An additional level of planning would be to consider these factors and overlay them with the DNR and City defined greenway corridors. This may facilitate planning by allowing the City to focus conservation strategies within a defined area (the greenway corridors).

...Conservation Design can foster a sense of neighborhood and community that is sometimes lost in large lot developments...

CONSERVATION DESIGN SUBDIVISIONS

Conservation Design Subdivisions is the practice of designing subdivisions to minimize their impact to the environment by using LID strategies and thoughtful siting of homes and infrastructure to maintain the ecological integrity and function of the landscape. Once a parcel evaluation has been completed to identify areas suitable for low-impact development, subdivisions are designed to allow for more compact development or clustering of homes in smaller areas and retain larger areas of common, open space. If thoughtfully implemented, Conservation Design can foster a sense of neighborhood and community that is sometimes lost in large lot developments and it is an effective choice for maintaining natural resource quality while allowing development. For example, in Conservation Design quality forest areas would be left largely intact and construction activities would occur in semi-natural areas or former agricultural lands. This strategy is appropriate in areas with remnant natural areas, and is especially important for developing and maintaining connections in the greenway corridors.

PARK DEDICATION ORDINANCE

A Park Dedication Ordinance can be an effective strategy for developing and maintaining a park system within the City. The Ordinance acknowledges the value that parks and open space provide for area residents and requires that any new development include a specified area of parks and/or open space within it. In lieu of land, a specified fee may be required instead, either based on the total area of land or on the number of proposed units. Fees would then be assigned to a dedicated parks fund and used for the permanent acquisition and development of parks. This can be a very effective tool for developing resources for parks and allows the City flexibility in determining how and where parks are created. For example, if a proposed development is not impacting any significant natural areas and is not within the greenway corridor, the park dedication fee may allow the City to acquire areas that help achieve the goal of developing the greenway corridor. Similarly, for developments proposed within the greenway, natural areas or restorable areas within the corridor could be required as set-aside for parks and open space. The City has updated their Park Dedication Ordinance based on the Park, Trails, and Open Space Plan needs and recommendations.

...greenways can, and often do incorporate active or passive recreational trails, active recreational spaces...

GREENWAY CORRIDOR

A greenway is defined as “privately or publicly owned corridors of open space which often follow natural land or water features and which are primarily managed to protect and enhance natural resources.” However, greenways can, and often do incorporate active or passive recreational trails, active recreational spaces (such as athletic fields or golf courses), and other public open spaces that may provide rudimentary ecological functions and values.

There are two main greenway corridors identified within the City of Dayton – the City and county Greenway identified during the 2003 Natural Resources Inventory and the regional greenway corridor mapped by the DNR for the Metro Wildlife Corridors project. These corridors are specifically

designed to incorporate high quality natural areas, existing protected and/or public open space areas such as the Elm Creek Park Reserve, the Mississippi River Corridor, and other natural corridors such as stream courses, and connect areas between these features.



If gaps and missing connections within the greenway can be filled, the greenway corridor will provide a critical foundation to help the ecological systems of Dayton and the region adapt to changing land uses and, long-term, to the pressures brought by global climate change.

The City’s Greenway Corridor and the DNR Metro Wildlife Corridor form the backbone for natural resources conservation within the City and have implications for natural resources conservation across the region. Developing strategies to maintain and develop connectivity between natural and semi-natural areas within this system is fundamental to preserving natural resources within the City and to providing an ecological system that is resilient to change over the long term in the face of changing demands, development, and climate change.

As much as possible, development within the greenway should use conservation design strategies, park dedication, and the strategic siting of open space and natural areas parks to develop and improve habitat quality and connectivity within the greenways. Strategies to avoid parcelization and fragmentation of existing natural areas into smaller sections are especially important for maintaining ecological function of the natural areas. This protection will be further supported with the creation of the Greenway Overlay (indicated as an overlay on the Future Land Use Plan) and subsequent zoning ordinance as discussed in the Chapter 4 – Land Use.

SHORELAND ZONING ORDINANCE

The City has a current Shoreland Zoning Ordinance to protect the quality of its lakes, streams, and the Mississippi River. The ordinance regulates the use of shoreland areas; the size, shape, and arrangement of lots; the size, type, and location of structures on lots; the installation and maintenance of water supply and waste treatment systems; the grading and filling of any shoreland area; and the cutting of shoreland vegetation to protect valuable water resources in the City.

MISSISSIPPI RIVER CRITICAL AREA CORRIDOR

Properties along the Mississippi River Corridor in Dayton have been designated as part of the Mississippi River Critical Area Corridor. This area is subject to additional federal and state guidelines to protect the Mississippi River. As part of the Comprehensive Plan process, the City of Dayton updated its Critical Area plan for consistency with its Future Land Use Plan and the requirements of the Mississippi River and Recreational Area (MNRRA) Plan. (See Appendix A - Mississippi River Critical Area Plan.)

A woodland ordinance would emphasize the protection of quality forested areas rather than that of individual trees...

TREE/WOODLAND PRESERVATION ORDINANCE

Many communities use tree preservation ordinances to protect large trees or to require the replacement of trees removed in the course of development or other specific activities. These ordinances can result in the planting of young boulevard trees as replacement when a mature forest or woodland is removed during development. To preserve the ecological function of the Dayton landscape, a woodland preservation ordinance may be a more effective approach, either as a substitute for or in addition to a tree ordinance. A woodland ordinance would emphasize the protection of quality forested areas rather than that of individual trees and acknowledge that trees are part of a more complex, inter-related system. Disturbance to or removal of

a woodland could be compensated for via creating and implementing a management plan for other natural areas, for example, or by concerted efforts to recreate the lost ecological system via restoration efforts rather than planting individual trees. The City of Dayton is exploring this option.

WELLHEAD PROTECTION PLAN

The City of Dayton's Wellhead Protection Plan was approved by the Minnesota Department of Health on February 5, 2008. The Wellhead Protection Plan covers the one existing well (Well No. 1) currently online and serving the Historic Village area. Well No. 1 obtains its water from the Franconia-Ironton-Galesville (FIG) aquifer. The FIG aquifer that underlies the identified Drinking Water Supply Management Area (DWSMA) for Well No. 1 was ranked as being "low" in vulnerability to contamination. That means there is thought to be sufficient geologic protection between the land surface and the FIG aquifer to impede vertical infiltration of contaminants from impacting that aquifer. Management efforts outlined in the Wellhead Protection Plan are aimed at managing other groundwater wells within the DWSMA, since other wells may penetrate the geologic layers that protect the FIG aquifer. Leakage of contaminants into improperly constructed or improperly sealed wells has the highest potential to introduce contaminants into the FIG aquifer.

As the City of Dayton's water supply system expands to include more wells, the Wellhead Protection Plan will need to be updated in order to delineate DWSMAs for those new wells, assess aquifer vulnerability for those new DWSMAs, and develop management strategies to protect the aquifer(s) feeding the City's wells.

WETLAND PROTECTION

The City's 2007 Surface Water Management Plan (SWMP) provides guidelines for wetland management and protection from stormwater runoff including standards for Phosphorus loads and water level fluctuation or "bounce." The City recently approved a wetland ordinance that establishes buffer requirements for wetlands according to wetland quality and/or type.



RECOMMENDATIONS FOR CITY CODE REVISIONS FOR NATURAL RESOURCE PROTECTION

Based on the discussion of Dayton's natural resources and strategies for resource protection included in this Chapter, several potential revisions for Dayton's city code are recommended. These revisions are listed below.

EDUCATION AND OUTREACH

The City of Dayton should pursue education and outreach opportunities for its residents to increase awareness of Dayton's natural resources and the importance of resource protection.

INTERGOVERNMENTAL COORDINATION

Intergovernmental coordination is critical for optimal ecological function as natural resource areas typically cross jurisdictional boundaries and because the actions of one community often impact a much larger ecosystem encompassing many surrounding communities. Coordination with other jurisdictions including neighboring communities and appropriate watershed districts provides opportunity for shared financial resources, as collaborative, cross-jurisdictional efforts often have better grant eligibility for conservation and planning projects.

...developing new approaches for protecting and enhancing its natural resources.

NATURAL RESOURCE INVENTORY-OVERVIEW

The Natural Resources Inventory (NRI) provides the City with extensive data related to the location and quality of natural resources in the City. The City can use this information as a basis for updating its current environmental ordinances or for developing new approaches for protecting and enhancing its natural resources.

Future growth, changes in land use, and development of infrastructure can impact the health and function of natural communities and natural systems. The City can use its zoning and subdivision controls to avoid or minimize these impacts and provide incentives for developers and landowners to protect or restore natural resources.

INCLUDE NATURAL RESOURCE DATA IN PRELIMINARY PLAT

The City could require project proposers to identify all natural resource data from the NRI as part of the data submission for a project. This data could then be used to identify any necessary setbacks or alignments of potential greenway corridors.

INCLUDE DEDICATION OF NATURAL RESOURCES AREAS AS PARKLAND

The City could require developers to dedicate the natural resource areas identified on the NRI maps as open space or parks if they are located within the proposed development area. Dedication of these areas may offset at least a portion of the parkland dedication requirement. Conservation easements are another tool that can be used to protect these resources.

If the size of the natural resources areas contained on the site are greater than the parkland dedication requirement, the City could allow additional density on other portions of the site that do not contain natural resources areas equivalent to the density lost from the additional dedication.

The City may also consider adding language to the park dedication ordinance that specifically states park dedication funds may be used for the purposes of ecological restoration (restoring native plant communities) on lands available to the public. Such activities could be considered a form of park "development." This would allow for necessary active management of purchased or existing natural areas.

CONSIDER GROSS DENSITY CALCULATION FOR DEVELOPMENTS WITH NATURAL RESOURCE AREAS

Protection of valuable natural areas may require preventing development on certain pieces of land. In order to ensure efficient urban development and preserve the rights of landowners while protecting natural resources, density transfers, or “gross density” calculations should be preferred when reviewing subdivision development plans.

The City could adopt regulations that require that all high-value natural areas, wetlands, steep slopes, their related buffers and setbacks, and other sensitive resources be put under easement or deed restriction while allowing the same amount of density overall for the development.

ENVIRONMENTAL PROTECTION OVERLAY ZONE

Overlay districts are commonly used in zoning ordinances to identify special areas and requirements applied to these areas. The Dayton ordinances include a Shoreland overlay district, a Critical Area overlay district, and a Floodplain overlay district which are included in many City codes.

...can provide protection for a full range of natural community types – woodlands, prairies, wetlands, and shorelands

The Minnesota Environmental Quality Board has suggested an option of using a broader overlay district called a Sensitive Natural Environment Areas overlay district for protecting and conserving significant natural resources in the community. This overlay district can provide protection for a full range of natural community types – woodlands, prairies, wetlands, and shorelands. It could reduce the need for separate park dedication, or buffer protection elements discussed. The areas may also include natural resource corridors or greenways identified in the community. This type of overlay is discussed in Chapter 4 – Land Use and in the introduction of the Greenway Corridor Overlay and subsequent ordinance.

The adoption of an environmental protection zone overlay ordinance requires that the community’s resources have been inventoried. Dayton’s NRI meets this need. In some cases, two zones are established – Environmental Protection Zones with the highest level of protection for high quality resources and Environmental Conservation Zones for resources of somewhat lower quality that require a lower standard of protection. The protection zone or zones would be mapped on official City zoning maps just as the Shoreland and Floodplain overlay zones are mapped.

The environmental protection zone ordinance then provides requirements or standards for development within these zones. Such requirements may include the following:

- Setbacks or buffers from the edge of the sensitive area
- Construction management practices to limit disturbance or damage
- Limits to vegetation removal
- Prohibition or limitation of development within the zones by regulating disturbance, lot sizes, densities, etc.
- Limit to impervious surface coverage

Given the number and diversity of high quality natural areas identified in the City’s Natural Resource Inventory, an overlay ordinance of this type offers a way to provide protection to this range of resources rather than using multiple ordinances to address woodlands, wetlands, and other types of natural resources.



OTHER TOOLS FOR PROTECTION AND MANAGEMENT OF NATURAL AREAS

Ordinances are mainly a regulatory (“stick”) approach for protecting and managing natural resources. They can also provide incentives (“carrots”) to natural resources protection. Many communities use a combination of carrots and sticks in protecting and managing natural resources. The regulatory approach assures that some priority resources will be protected, but is limited by laws that prohibit the “taking” of private property without adequate compensation. The “carrot” approach may be more politically acceptable in some cases than the “stick” approach and may be more viable when potential “taking” is an issue.

In addition to changes in existing ordinances or adoption of new ordinances, the City can consider a variety of “carrot” approaches to encourage City residents to protect the natural resources on their properties including the following:

- Provide information and education to homeowners about the special features on their properties. Many landowners will take great pride in knowing that they have something special on their land and will be eager to learn about how best to manage it.
- Inform property owners about options to donate their land as parks and open space, or protect it with a conservation easement. For some property owners, donation of land or easements provide financial and tax benefits.
- Identify grants or other public programs that provide financial or educational benefits to owners of natural areas
- Work with developers or property owners to encourage design strategies that protect and improve the quality of resources.
- The DNR Website (<http://files.dnr.state.mn.us/assistance/landprot.pdf>) contains the resource Land Protection Options, a Handbook for Minnesota Landowners. This

is an outstanding tool to help individual landowners better understand their options and, also, for City Staff as a resource to help positively engage interested property owners.

- Another important resource for private landowners is the publication Beyond the Suburbs: A Landowner’s Guide to Conservation Management. This resource can also be found on the MnDNR website at: http://files.dnr.state.mn.us/forestry/beyond_suburbs.pdf
- The City can also continue to set a good example for other landowners by protecting or restoring natural areas on City-owned properties and by developing interpretive and educational opportunities.
- In addition, there are a variety of funding options available to assist with implementation of these and/or other activities. These include the existing park dedication fee, bond referendums, and grant opportunities. It should also be noted that completion of this NRI and the identification of a greenways corridor is an important step that will improve the City’s competitiveness when seeking natural resource implementation grants from the Minnesota DNR.
- The City could also pursue land banking of properties with valuable natural resource areas. Land banking involves public acquisition of land before it is ready for development. When the land is ready for development, the City can sell the land with restrictions on it to preserve open space areas or limit development.