

Vermillion River Corridor Plan

Improving Water Quality, Habitat, and Recreation



October 19, 2010

Vermillion River Corridor Plan

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Foreword

Why, you might ask, is another plan involving the Vermillion River necessary? After all, the Vermillion River has improved over time. Studies have been completed and more plans and regulations are in place to protect water quality. Many landowners have changed land management practices to reduce erosion and many government agencies are involved in one way or another with the River. Millions of dollars have been invested. There are trout, so the River must be doing fine.



Vermillion River, Empire Township

In spite of past efforts, issues remain. The water quality does not meet public health and environmental standards largely due to multiple, diffuse pollution sources. More in-stream conflicts are emerging between people who want to fish and those who want to canoe; at the same time, there are few public places where people can access the River. Private landowners are concerned about trespassers, potential for paved trails, a seemingly uncoordinated maze of rules and regulations, and a perceived overreach by government. What to do about this?

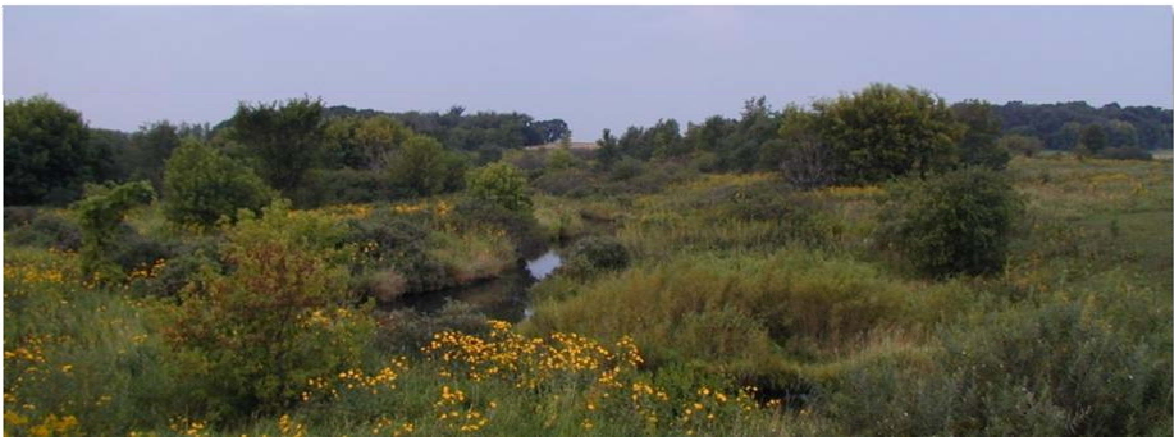
In 2008, Dakota County submitted a proposal to the Legislative-Citizen Commission on Minnesota Resources to use the Vermillion River as the focal point of a plan addressing these types of issues, which are not only occurring here, but throughout the state. The Minnesota Legislature approved the project for funding in 2008. With additional funding from the Vermillion River Watershed Joint Powers Organization and Active Living Dakota County, the plan has been developed over the past two years with many opportunities for public input.

The resulting Vermillion River Corridor Plan looks at the River as a complex natural system, a shared resource, and a place where varied interests and other systems converge. The plan recognizes that the River has very different physical characteristics from the headwaters to the falls. Correspondingly, adjacent land use also varies widely from large swaths of rural, row crop agriculture to nearby historic downtowns and new

suburban development. Rather, than simply focusing on how to improve water quality, the plan integrates wildlife habitat and outdoor recreation in a way to demonstrate how each of these goals can be compatible, strengthen the other and create a framework for more sustainable economic development.

The plan also recognizes that much of this multi-purpose corridor will remain in private ownership among many landowners and that change will occur over time. Each landowner will have an evolving role in what does and does not happen to the river and the surrounding landscape. This plan developed information tools to assist landowners in becoming more involved in individual or collective projects and best practices. New ways for better coordination and communication among all entities involved with the River are described, including possible models for governance among these same entities.

This plan, which is also designed to serve as a guiding document among all of the political jurisdiction and agencies, seeks to create a new foundation for cooperation and strategic financial investments that can provide multiple benefits. Fortunately, the legislature also provided over \$500,000 for implementing projects that exemplify the goals of the plan. In addition, millions of Outdoor Heritage Funds have now been allocated to the County for related corridor protection and improvements throughout the Vermillion River and Cannon River systems.



Vermillion Headwaters Area

Chapter 1: Plan Introduction, Purpose, and Scope

Introduction

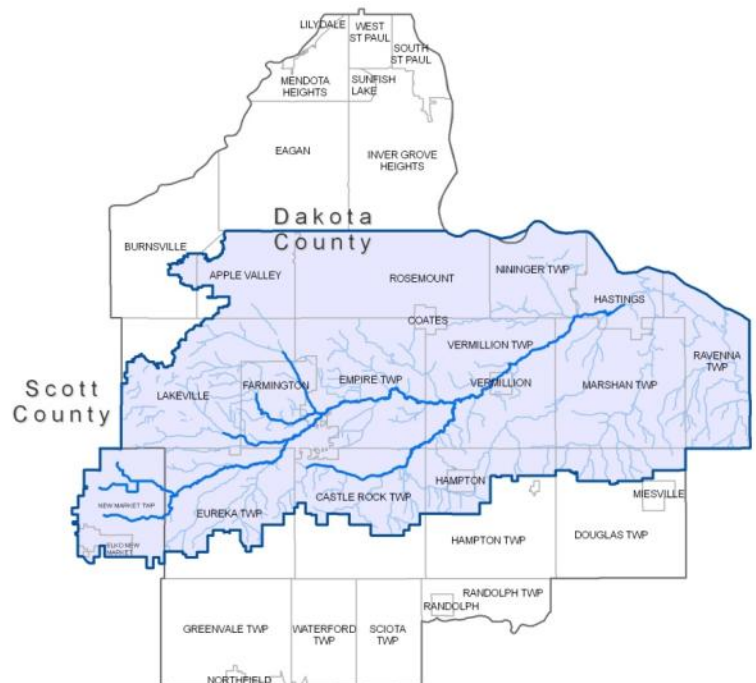
The Vermillion River is a “prairie river” that slowly winds through rural and urban areas in the southern Twin Cities area of Minnesota, draining 335 square miles in central Dakota and southeastern Scott counties. The Vermillion River watershed contains all or part of twenty municipalities, making it the largest watershed in the Twin Cities metro.

Originating in southeastern Scott County and fed by a network of tributaries, the River flows across central Dakota County to Hastings where it drops 90 feet over a dramatic falls. The River splits below the falls with one branch flowing north to the Mississippi River; the other flowing south along the Mississippi for 20 miles before joining it near the City of Red Wing in Goodhue County. Forty-nine miles of the Vermillion River main stem and tributaries are designated trout streams, making it, the only world-class trout stream in the United States within a major metropolitan area, according to Trout Unlimited.

While the Vermillion River is a natural resource worth protecting, its future is uncertain. Many of its stretches consistently have been classified as impaired by the Minnesota Pollution Control Agency. Water quality is intrinsically tied to land use, management, and disturbance patterns over the long-term. Portions of the Vermillion watershed include some of the nation’s fastest-growing communities that have undergone dramatic changes in the past two decades, with growth often accompanying conversion of agricultural land to suburban development. Dakota County’s overall population grew by 12 percent between 2000 and 2009, adding nearly 45,000



*Vermillion River Watershed Location
Twin Cities Metropolitan Area, Minnesota*



*Vermillion River Corridor Planning Scope,
Watershed in Dakota and Scott Counties, Minnesota*



Vermillion River Brown Trout



Vermillion Falls in Hastings

people. Scott County's population grew by 46 percent during the same period, with more than 41,000 new residents.

In this context of new urbanization and growth pressures amid ongoing agriculture, much of the River has been silted, channelized, or otherwise degraded through the cumulative effects of many land management decisions. Within this setting, scientific knowledge is expanding our understanding of how the River and its ecosystems respond to land use changes. These and other factors make a coordinated focus on the Vermillion River a timely initiative.

Actions taken to strategically direct change in the Vermillion River Corridor must be informed by prior and related plans, demographic projections, jurisdictional issues, sensitive natural resources, economics, public involvement, trends, and other existing conditions. Planning for change ensures that actions fit known circumstances, places, and people. Planning also ensures that actions coordinate with, rather than conflict with, plans and actions taken by others, and achieve the greatest benefit for the least time and cost.

Plan Purpose, Scope, and Organization

Plan Purpose: A Shared Vision and Effective Implementation

In a complex world of differing visions, this plan worked with many River stakeholders to build a shared vision and to encourage cooperative and coordinated efforts among the many people who care about the River's future. The purpose of developing the **Vermillion River Corridor Plan** was to identify and focus effort on functions of the Vermillion River Corridor that maximize these public benefits:

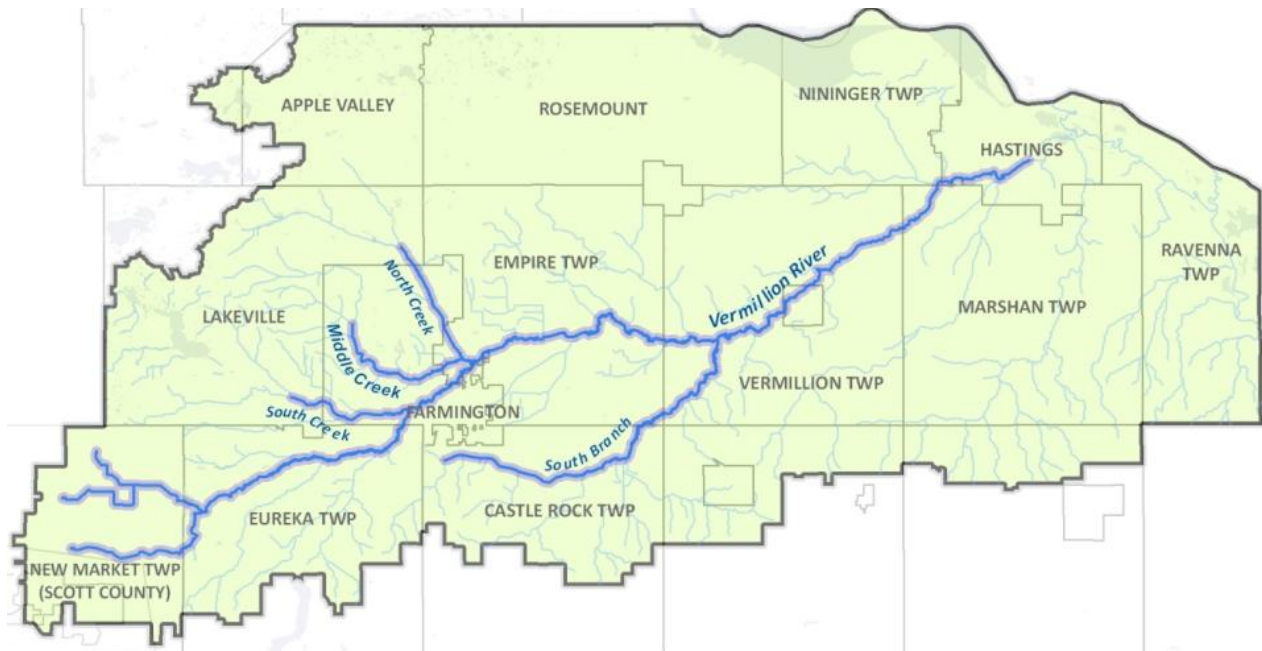
- Improved water quality
- Improved, interconnected in-stream, riparian, and upland natural habitat
- Compatible recreation
- A resilient natural framework in which to live and work, that serves as a foundation for future growth or development

This shared vision addresses *what* the corridor can become in the future. The other aspect of this plan is demonstrating *how* that vision can become reality, by providing an implementation framework based on collaboration, realistic approaches, and carefully weighed priorities. This plan provides a springboard for continued dialogue among its many stakeholders about the River and new ways of managing and investing in shared resource corridors.

Plan Scope

The **Vermillion River Corridor Plan** focuses on the Vermillion River main stem from its headwaters to the Vermillion Falls in Hastings and its primary tributaries of South Creek, Middle Creek, North Creek, and South Branch.

Scope of the Vermillion River Corridor Plan



Although this plan focuses on the mainstem and major tributaries of the River, it is clear that major water quality improvements depend on improved “whole-watershed” approaches. This plan is a subset of the Vermillion River Watershed Plan in geographic scope, with a targeted focus on the riverway and adjoining lands. In addressing corridor habitat and recreation, this plan also represents an expanded scope beyond the traditional water quality and flood control focus of the watershed plan.

Plan Organization

The plan is organized to:

1. Create greater understanding of the Vermillion Corridor and its landscape
2. Demonstrate a desired future for the River and how change in the surrounding landscape can help attain this future
3. Suggest a structure or framework by which the vision can be implemented
4. Identify shared community and public values that form the basis of the plan

Building on Past Efforts

Natural resource and natural area protection in Dakota County and the Twin Cities began with parkland preservation, initially by the region’s cities and followed by park systems at the state, regional, and county levels. State designation of wildlife management areas in the county began in the 1950’s to preserve wildlife habitat and create hunting areas. These efforts have protected some of the best quality natural areas in the region.

Natural resource and natural area protection efforts have gone beyond early parks and hunting areas in recent decades, to protection of watersheds, prime farmland, natural areas, and corridors, and to developing buffers along critical waterways. Broadened protection efforts relate to a shift from thinking about protecting *natural places* to thinking more holistically about protecting *natural systems* and the critical support functions they provide. Often referred to as ecological services, these benefits include:

- Cleaning air and water
- Protecting river channels and banks from erosion
- Mitigating drought and floods
- Protecting biodiversity with refuge and nursery habitat and movement corridors
- Dispersing seeds and storing native seed banks
- Cycling, moving, and storing nutrients
- Detoxifying and decomposing wastes
- Building soils and renewing their fertility
- Pollinating crops and natural vegetation, controlling agricultural pests
- Contributing to climate stability
- Moderating weather extremes
- Recharging and cleaning groundwater for human use and surface water supply

Natural area protection also provides economic and social benefits by:

- Providing for public appreciation, knowledge, education, and recreation
- Increasing and stabilizing community attractiveness, appeal, and livability
- Enhancing individual property values

This evolution in thinking about resource protection is represented among many studies and local plans that provided a foundation for the Vermillion River Corridor Plan.

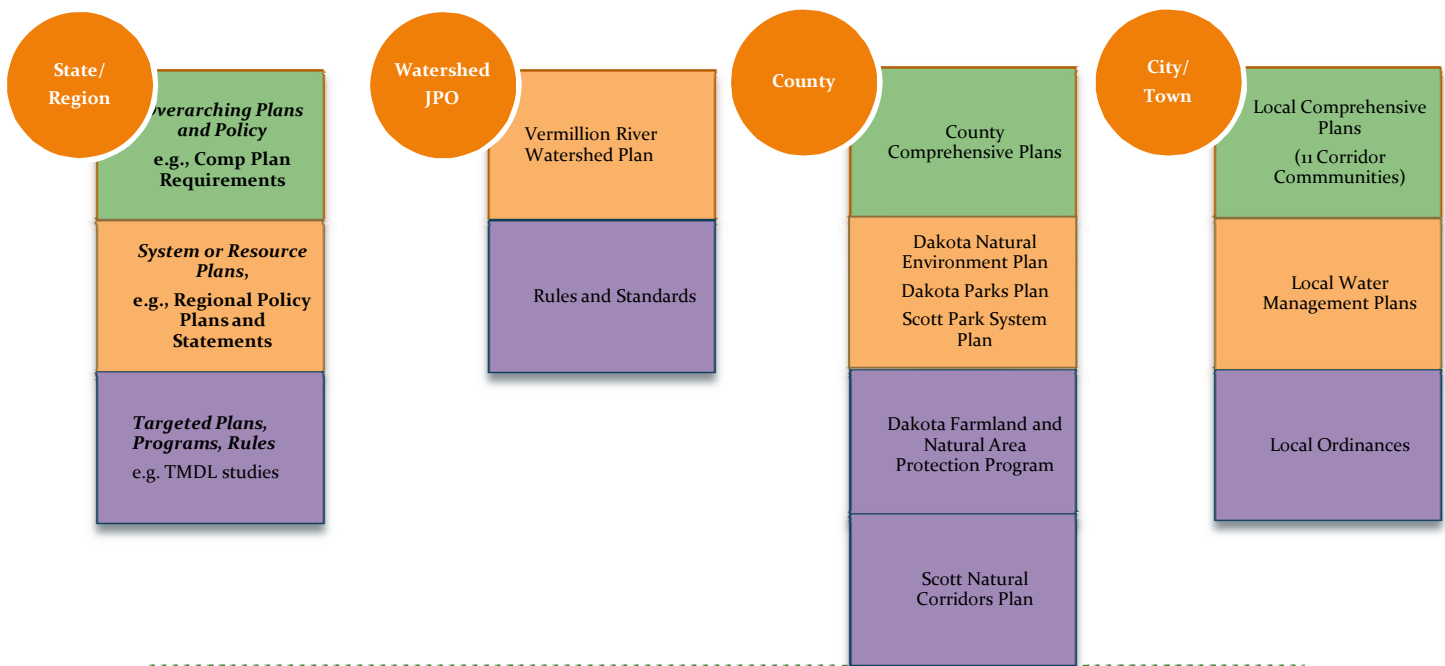
Plan and Study Documents	Year
Vermillion River Watershed Joint Powers Organization Biomonitoring Plan: Ongoing assessment of habitat, fish communities, and macroinvertebrate health	2009
Vermillion River Thermal Trading Study (EPA Targeted Watersheds Grant): Study on stabilizing temperature and volume in the Vermillion River Trout Streams	2009
Scott County Comprehensive Plan: Natural Area Corridors vision	2009
Dakota County Comprehensive Plan, DC2030, and Park System Plan: Greenways - Conservation corridors as part of a green infrastructure framework	2008, 1999
Local City and Township Comprehensive Plans, Dakota County Rural Collaborative Comprehensive Plan: Contemporary resource and recreation plans	2008, 1999
City and Township Local Water Management Plans: Land use authority in Dakota County resides with cities and townships, which are required to adopt local water plans and ordinances to comply with the Vermillion River Watershed Plan	2009
Lon-Range Plan for Fisheries Management, MN DNR: placed high priority on maintaining/improving trout populations in southeast Minnesota trout streams and Vermillion River trout stream reaches. An Aquatic Habitat Action Plan is likely to be developed and published in 2011.	2005
Metropolitan Conservation Corridors: Regional natural corridor planning	2005
Vermillion River Watershed Plan: Goals, objectives, and work plan for improvements in the watershed. Eight predominant issues identified in the plan: <ol style="list-style-type: none"> 1. River flow volumes have increased 2. Surface water quality is threatened or impaired 3. River channel/corridor is impacted and sensitive to change 4. Sensitive resources are present and/or threatened or impaired 5. Groundwater quality is threatened or impaired 6. Additional development is expected 7. Data for making informed decisions is limited 8. Public awareness and appropriate water stewardship is limited 	2005
Mississippi National River and Recreation Area Water Resources Information and Issues Overview Report: Planning document for river water quality	2004
Dakota County Farmland and Natural Area Protection Plan: Resource protection in partnership with private landowners	2002
Vermillion River Volume Study: Increasing flow volumes are concern for channel instability. Good infiltration capacity exists in watershed's developing areas.	2002
Dakota County and Scott County Biological Surveys: Inventory and map of state and federal listed species habitat (threatened, endangered, and special concern)	1992-1994

The Vermillion River Watershed Joint Powers Organization (VRWJPO) is relatively new. The JPO was created in 2002 to replace the original watershed management organization (WMO) that was established in 1984 through a joint powers agreement among 21 cities and townships wholly or partially within the watershed. The WMO dissolved in 2000. Dakota and Scott counties entered into a joint powers agreement to form the VRWJPO in 2002. Their first watershed plan was completed in 2005.

The VRWJPO has markedly increased scientific knowledge about the Vermillion River since the 2005 watershed plan, and they continue efforts to assess specific reaches and prioritize potential improvements. More is now known about what is effective in improving water quality, stabilizing volume and temperature, protecting groundwater base flow, and shaping stormwater management strategies at developed or developing sites. By prioritizing protection and restoration activities, fully characterizing the sites and circumstances, and using best management practices proven through experience and testing, the Vermillion River Corridor can be improved.

Relationship to Other Plans

The Corridor Planning process benefited from recent updates by all of the corridor community to their comprehensive plans (2008-2009); whereby each local community engaged its residents; defined a shared values and goals; and set a coordinated course for growth, development, transportation and resources over the next twenty years. As contemporary statements of each community’s projected future, these local plans were timely informants to the Corridor Plan project. Each corridor community’s vision for its specific systems – e.g., natural resource corridors, recreational trails, and water management – was factored into the Vermillion River Corridor Plan. The Corridor Plan also benefited from targeted plans, programs, studies, and rules, and integrates their findings and recommendations wherever feasible.



Vermillion River Corridor Plan

Navigating a Complex Framework

Water Management and Regulation

In this plan's public engagement process, a theme emerged related to the complex programs, agencies, and regulations that address the River. Landowners seeking permits cited multiple check-ins and processes with several agencies, each of which is responsible for a different aspect of water management and oversight. Participants identified issues with understanding the regulations, knowing which agency is responsible for specific issues, and at times, the need for separate mitigation practices to satisfy the all regulatory. Their concerns are not unique to the Vermillion River.

A 2009 study prepared by the Citizens League of Minnesota evaluated how well current governance systems and public policy are protecting Minnesota's surface waters. The report, *To the Source: Moving Minnesota's Water Governance Upstream* notes:

"In Minnesota's current water governance system, government entities bear the lion's share of the responsibility to assure the public has access to clean water. This system is not effectively protecting and improving the state's waters. Addressing today's diffuse water policy challenges will require more than changes to government. It will require a much more central role for the millions of actors who are responsible for water problems and are capable of creating solutions—businesses, homeowners, civic groups, cities, watershed organizations, and all citizens. To effectively address today's challenges, the people and organizations that contribute to water problems must play a central role in the actions and decision making to address these problems. Minnesota needs a model of water governance that takes advantage of the imagination and capacity of the public to confront these challenges.

Minnesota's system of water governance is fragmented, incoherent, and poorly coordinated to the extent that it is failing Minnesota on all five principles by which the Citizens League evaluated the system:







1. **Transparency:** The lines of responsibility and accountability are difficult to understand, even for professionals and the legislators responsible for funding and overseeing water governance.
2. **Effectiveness:** There is a lack of evidence of overall effectiveness or cost efficiency.
3. **Equity:** Responsibility, resources, and authority for addressing water issues are not equitably distributed, either by geography or by impact on pollution.
4. **Accountability:** is often unclear and frequently not enforced.
5. **Appropriate scale:** The system is driven by individual program and agency goals. Particular tasks have been delegated from the federal government to the state and from state agencies to special districts, cities and counties without comprehensive goals or a coherent picture of the whole system."

In keeping with some themes identified in the Citizen League's report, the Corridor Plan seeks greater public-private collaboration in implementing solutions for the Plan.

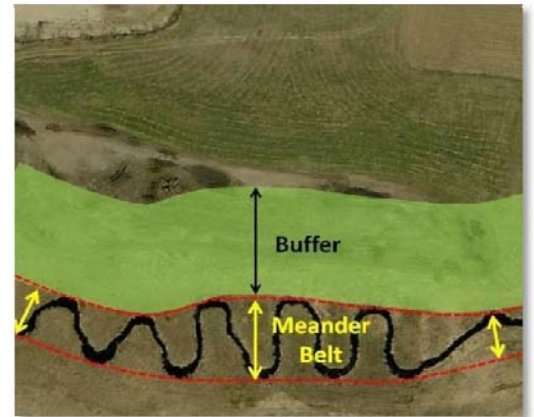
Current Key Regulations for the Vermillion River

Among water quality regulations, buffers became an important discussion topic during the Corridor Plan public engagement process. At the time, local communities were reviewing and adopting of local water management plans, which incorporated the VRWJPO Buffer Standards for the first time. An overview of buffer regulations follows:

Vermillion River Watershed Buffer Standards specify buffer distances from the edge of the River’s meander belt for the mainstem, major tributaries, and minor tributaries, shown on the following map. Buffer requirements are triggered by parcel subdivisions under specific circumstances. The following table lists the major buffer categories based on stream classes, which are color-coded to the map. Also included are required buffer widths, with estimated total lengths and estimated total areas for each stream class.

BUFFER STANDARDS Stream Class		Buffer Width (Feet)	Est. Length (Miles)	Est. Area (Acres)
Conservation Corridors				
	Lower Reach	150	41	1,240
	Upper Reach	150	64	2,205
Aquatic Corridors				
	Principal Connectors	100	74	1,797
	Trout Streams	100		
	Tributary Connectors	50	84	1,019
Water Quality Corridors				
	Smaller Tributaries	30*	182	1,327

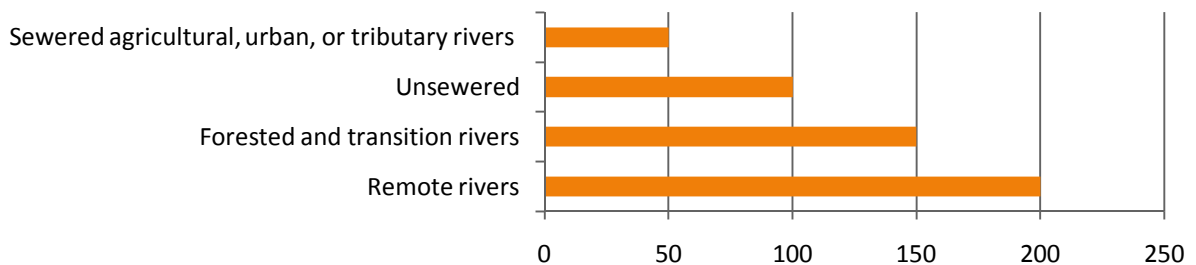
*Measured from center of channel



Meander Belt and Buffer

DNR Shoreland Rules specify structural setback standards on rivers, shown below, and also establish a shore impact zone for agriculture at 50 feet parallel to the Ordinary High Water Line. Agricultural production should not extend into this 50-foot zone.

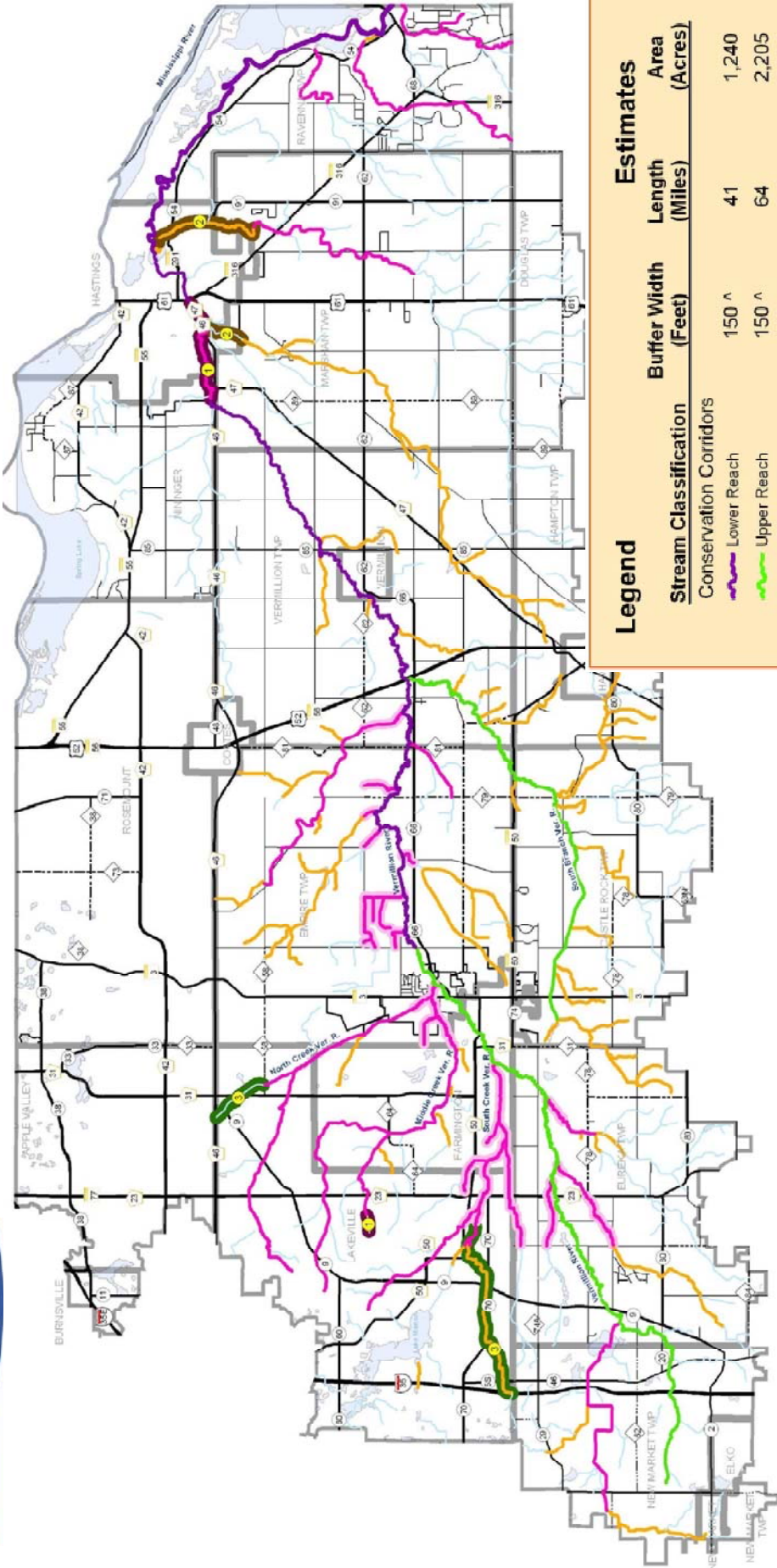
MN DNR River Structural Setback Standards (feet)





Vermillion River Watershed

Adopted Stream Classification and Buffer Standards



Legend		Estimates	
Stream Classification	Buffer Width (Feet)	Length (Miles)	Area (Acres)
Conservation Corridors			
Lower Reach	150 ^	41	1,240
Upper Reach	150 ^	64	2,205
Aquatic Corridors			
Principal Connectors	100 ^	74	1,797
Tributary Connectors	50 ^ +	84	1,019
Water Quality Connectors	30 -	182	1,327
		Total:	445
			7,588

Footnotes:

- 1 Reclassified due to existing development or active lots of record.
- 2 Reclassified due to active platting process at time of rule adoption.
- 3 Reclassified due to existing infrastructure or previously approved stream management plan.

^ Measured from edge of meander belt.
 - Measured from center of channel.
 + Slope factor may apply.



Vermillion River Aquatic Management Area, Empire Township

Landscape Diversity and Complexity

The Vermillion Corridor captures diversity in land uses, economic activity, and land management practices. The Vermillion Corridor includes one of Minnesota's oldest cities, with historic commercial and residential districts and a newly developing edge with new townhome neighborhoods, subdivisions, and commercial development.

Just beyond this developing edge are rural communities with long traditions in agriculture and a future vision for continued agriculture.



Newly developing urban edge, Hastings

Further along the corridor are examples of more working farms, a 4,000-acre wildlife management area, industrial parks and commercial districts, another historic downtown, new suburban development, and rural residential development.

The Vermillion River Corridor is a complex fabric in which diverse activities and a broad spectrum of interests are interwoven.

Chapter 2: Corridor Conditions Today, Key Issues

Characterizing the Vermillion River

Location and Size

The Vermillion River watershed—the largest watershed in the Twin Cities Metro area—is part of the Lower Mississippi River Basin. The 335-square-mile watershed lies within the Western Corn Belt Plains ecoregion, characterized by cultivated land, pasture, and open space. The Vermillion River and its tributaries are *small urban streams*, with mean flows ranging from 15-40 cubic feet per second (cfs) in Farmington to 80-127 cfs in the City of Vermillion, depending on rainfall. For comparison, the Minnehaha Creek drains 176 square miles and has a flow rate of approximately 160-340 cfs.

Channel Qualities

A Meandering River: The River's channel size and depth varies, reflecting near natural to highly engineered conditions. In physical terms, the Vermillion is described as *meandering*. Its natural channel pattern tends to be sinuous rather than straight, due to the natural spiral pattern of water flow within rivers, also referred to as *thalweg*. Without channel straightening or bank armoring, river courses naturally will move over time, carving out curves in its channel and re-depositing riverbed material along its course. The water's own movement creates variation in width and depth.

Channel Straightening: allows faster water movement, and is often accompanied wetland drainage, installation of pattern tile in farm fields, and urban development. Portions of the Vermillion have been straightened over the past 100 years in concert with these land-use changes. A recent study of the South Creek in Lakeville found many straightened ditches with minimal channel or habitat complexity and minimal riparian vegetation.

Channel straightening has contributed to many of the Vermillion River system's present-day challenges. Because straightened channels speed stormwater flow, the River's overall flow has increased, along with pollutant loads – sediments, nutrients, pesticides, bacteria, and even increased heat. Meanders that were turned into ditches usually were excavated to a consistent depth, destroying the variation in habitat that is necessary to attract diverse fish, macroinvertebrates, and wildlife. It has



Bank erosion

also contributed to bank erosion, as the straightened bank is unable to resist the River's natural tendency to meander. Examples of a straightened channel and the restoration of a meandered channel are in the following image.



Tale of Two Streams:

MN DNR restored and stabilized loops and turns in a small portion of the Vermillion River in 2009. This reach, part of the Vermillion River AMA, is a designated cold-water fishery. A straightened tributary intersects the Vermillion River at the point indicated by the arrow. This formerly meandering reach was straightened into a drainage ditch by the U.S. Army Corps of Engineers in the 1940s to drain runoff from the former Gopher Ordnance Works to the northwest.

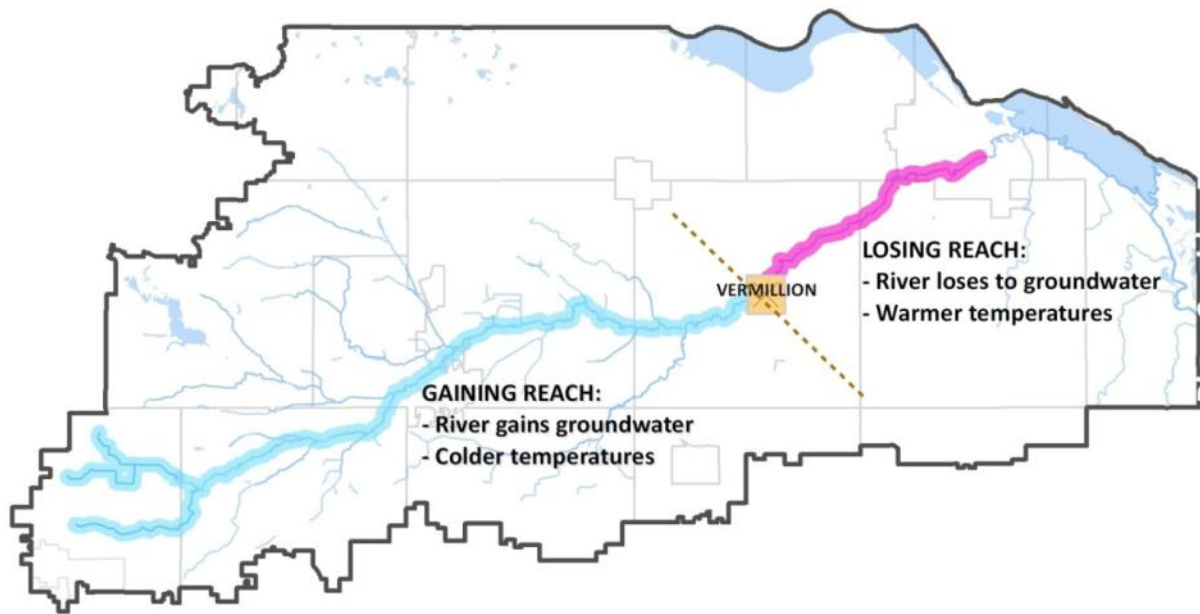
A recent analysis of channel changes was encouraging. Studies of previous data, aerial photographs and direct comparison by staff that conducted the 1999 survey indicate that previously studies sites showed no significant change in channel condition from the 1999 survey. The results of this assessment effort suggest that the study subreaches were not subject to considerable change in channel stability over the past 10 years.

Channel Ownership: The Vermillion River is also classed as a *meandered stream*, meaning that land along the River was platted for individual ownership in the 1800s and property ownership extended to the centerline of the riverbed. The corridor today is predominantly in private ownership, and many landowners derive a living from farming along the River. Public landholdings are few, but include a few city parks as well as a vast open space complex at the midpoint of the Vermillion's course through Dakota County – 4,000 acres comprised of the Vermillion Highlands Wildlife Management Area (WMA), the Vermillion River WMA and Aquatic Management Area, Dakota County's new regional park, the Empire Wastewater Treatment Plant, and Empire Township public lands.

A River of Contrasts

The Vermillion River has been described as a “perfect laboratory” for studying ecology, hydrology, and geology. The River is a study in contrasts on many counts. Beginning as a narrow stream strongly fed by springs and cold groundwater in its western headwaters (the gaining reach), the River widens and loses volume to groundwater and underlying bedrock as it flows east to Hastings (the losing reach). Contrasts continue in the varied land use contexts within the gaining and losing reaches. From highly urbanized to newly developing, from protected open space to rural agriculture, from residential to industrial, the River travels through a rich diversity of settings.

Gaining and Losing Reaches



Water Quality

Historic Land Use Patterns and Water Quality Conditions

The Vermillion River and its tributaries drain a watershed consisting of 335 square miles in central Dakota County and extreme southeast Scott County. Surface water quality in this large area is tied directly to how land is used and managed, and a key intermediary in this dynamic is rainwater.

Agricultural Impacts: Historically, Dakota County's fertile soils made raising livestock and crops easy and profitable. By the early 20th century, more than 80 percent of the land in the County was actively farmed. Farming resulted in the removal of native vegetation, draining of wetlands, and modification of river and stream channels within the Vermillion River watershed. Small agricultural centers such as Farmington, Hastings, Lakeville, and Rosemount developed during the days of early settlement. Agriculture remained the most significant land use in the Watershed until World War II.

Portions of the Vermillion River flow through rural communities with strong agricultural roots and a continued commitment to future agriculture. Rural agriculture also affects the Vermillion River – rainwater and snowmelt carry fertilizer, eroded soil particles, pesticides, nutrients, and bacteria from treated fields and animal feedlots; drain tiles and ditches rapidly convey water and field runoff to the River. Groundwater withdrawal for irrigation can also stress the River, since it relies on groundwater for base flows.



Turbidity: Stormwater Conveyed to Surface Water

Development Impacts: In the 1950s, federal highway and home mortgage credit programs led to the earliest subdivisions along major transportation corridors. Single-family homes became the dominant development pattern through the 1960s, transitioning through the 1980s to include infill development with increased high density residential, commercial, and industrial land use. This increasing urbanization throughout the northwestern part of the watershed has led to decreased water quality, increased groundwater consumption, and further modification of natural hydrology.

The northwestern portion of the watershed includes some of the most rapidly developing communities in the

Twin Cities region, and has undergone dramatic change over a short period. Urban development has brought homes and businesses to the watershed, and also has brought physical changes that affect the fate of rainwater and surface water quality. Construction removes plant cover and native top soils, compacts soils, and expands impervious surfaces that promote runoff and block infiltration. Natural hydrology is further altered by stormwater sewer systems, roads, parking lots and other infrastructure.

As traditional urbanization occurs, more stormwater and substances it carries are quickly transported through conveyance systems to surface waters. Less rain infiltrates in the area where it fell, posing multiple problems: flooding, depletion of groundwater, rapid transmission of pollutants, increased water temperature, and more.

Point Source and Non-Point Source Pollution

Point source (PS) pollution includes pollutants discharged to waterways from the end of a pipe, such as an industrial outfall. PS pollution has been reduced through state and federal regulations: stricter permitting, gradual reduction of legally allowable levels of pollutants in discharges, technological advances, more sensitive and comprehensive monitoring, targeted enforcement, increased public awareness, and penalties.

Non-point source (NPS) pollution hasn't been reduced as effectively as point-source pollution, partly because it is tied to widespread land uses and management practices. Unlike PS pollution, NPS pollution comes from many diffuse sources and is readily carried by rainfall or snowmelt to lakes, rivers, wetlands, coastal waters and ground waters. Across a range of management practices, NPS pollution adds soil, sediment, phosphorous, nitrogen, agricultural chemicals, and pathogenic bacteria into waterways like the Vermillion River. Rain and snowmelt carry pollutants directly off farm fields into rivers and streams and conveys pollutants through ditches and drain tiles. According to the US Environmental Protection Agency, NPS pollution is the leading cause of water pollution in the United States today, with agricultural runoff considered to be a significant source. Eroded soils and sediment contribute to turbidity (cloudiness) of the water, one of the major impairments of the Vermillion River today.

Urban and suburban runoff is also a NPS pollutant. Collected over large areas and conveyed into city stormwater systems, this runoff is often discharged to waterbodies through an outfall. Among the



Drainage Tile Outfall along the Vermillion River

pollutants carried by runoff through urban and suburban landscapes are soil, road de-icing salt, pesticides, pet wastes, seepage from septic systems, heat, petroleum hydrocarbons, driveway sealants, and more. Runoff associated with conventional urban development that lacks adequate stormwater treatment remains a challenge in the Vermillion Corridor.

Pollution and Impairment Status

It is important to understand the Vermillion River’s current pollution status in the context of established standards. The federal Clean Water Act requires that waters be assessed to see if they are “fishable and swimmable” or are clean enough to be used for designated uses. For the Vermillion River, uses that define water quality standards include consuming fish caught in the River, activities that involve contact with the water, and supporting wildlife.

Water quality in the Vermillion River is monitored continuously throughout the year at eight fixed stations that record water levels and temperature. Continuous temperature monitoring takes place from May through October when hot weather can increase stream temperature. Flow rates are recorded continuously and field-verified five to seven times per season. Spot sampling for chemicals, nutrients, bacteria, and other physical qualities such as turbidity (cloudiness) is done bi-weekly and during large rainfall events at the eight fixed sites. On a biennial basis, the Minnesota Pollution Control Agency (MPCA) compares data from the Vermillion with state and regional standards for similar types of streams to determine if any Vermillion River reaches or tributaries are impaired or unsuitable for designated uses due to:

- **High fecal bacteria counts:** from septic and wastewater plant systems, livestock, wildlife, and other sources. Body contact and ingestion are discouraged.
- **Increased levels of turbidity:** excessive sediment, harmful to aquatic organisms.
- **Low dissolved oxygen levels:** insufficient oxygen levels to sustain fish populations. Often related to channel degradation.
- **Polychlorinated biphenyls (PCBs):** industrial toxins that accumulate in fish tissue. Fish consumption should be in limited amounts, if at all.
- **Increased temperatures:** adversely affects cold-water species such as trout.

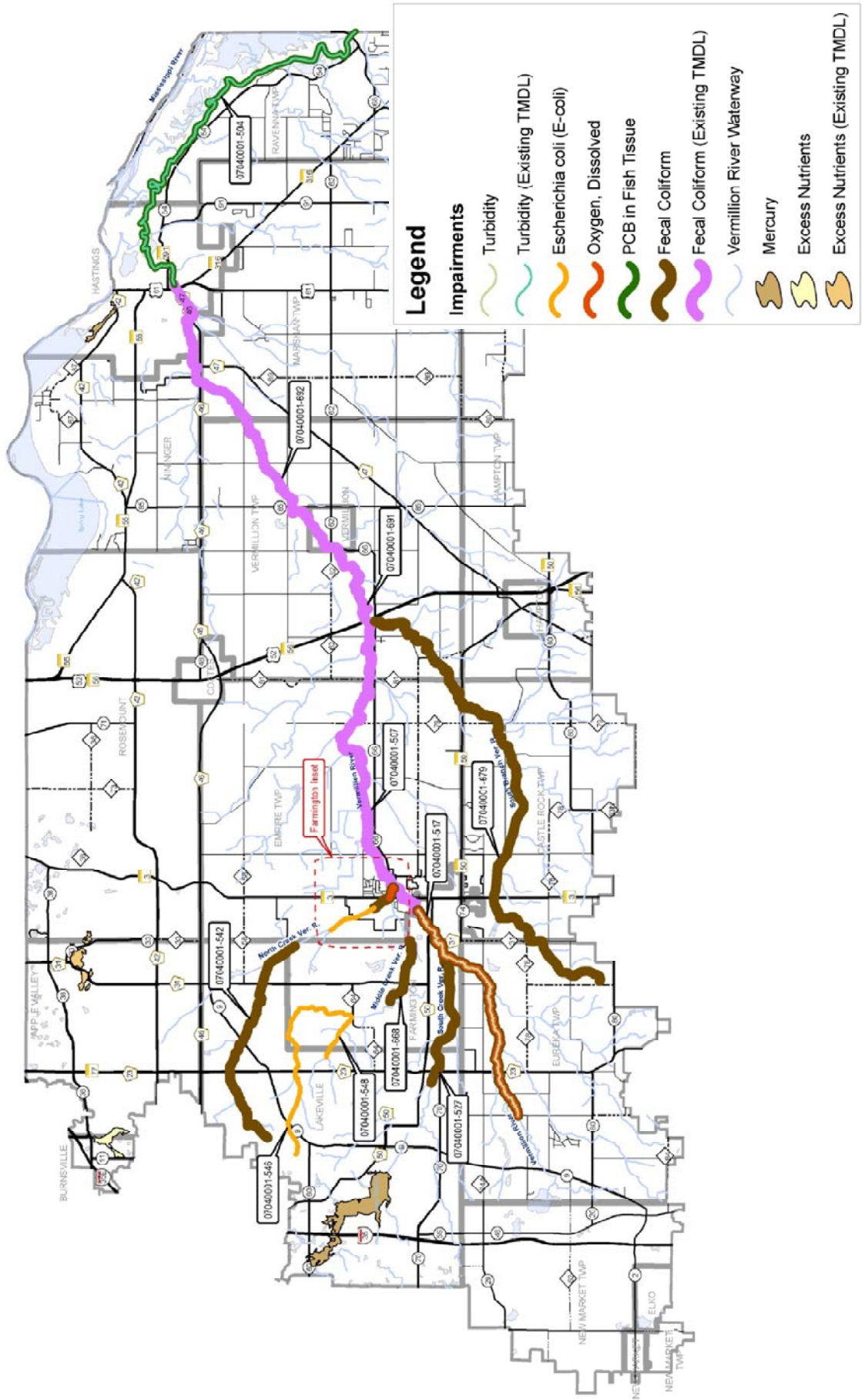
MPCA’s 2008 and 2010 impairment classifications for the Vermillion include bacteria, low dissolved oxygen levels, PCBs, and turbidity.

2008 and 2010 Impairments	Vermillion River Reach
Fecal Coliform Bacteria	Most of the River, mainstem and major tributaries
Low Dissolved Oxygen	North Creek, from Middle Creek to Mainstem
PCBs	Mainstem, below the Falls
Turbidity	Mainstem, from Highview Ave. to 210 th Street and below the Falls



Vermillion River Watershed

2008 and 2010 Stream Impairments



The Vermillion River currently is not impaired for temperature, although monitoring shows that the trout stream segments are nearing levels at which impairment might be proposed. The River also is not listed as impaired for nitrate; however, the MPCA recently adopted a surface water standard for elevated nitrate. The South Branch of the Vermillion frequently contains concentrations of nitrate above the surface water standard and may be listed for nitrate in the future. Because the EPA requires states to propose sites for listing every other year, the River may be listed for additional impairments as soon as 2012.

Impairment Consequences: Impairment triggers a study process known as a Total Maximum Daily Load (TMDL), whereby the MPCA or designated local government identifies and quantifies impairment sources. Upper limits are then set on pollutant amounts that can enter a target waterbody on a daily basis. In 2009, the MPCA initiated TMDL study for bacteria in the reach shown in pink on the preceding impairment map. A TMDL study for turbidity was completed in 2009 as part of the Lower Mississippi River Basin TMDL, which identified sources and strategies for improving turbidity. The VRWJPO has been requested to conduct watershed-wide TMDL study on all impairments (2012).

Groundwater Relationships: Groundwater and surface water interact continually throughout the Vermillion Corridor. Groundwater maintains base flow and stream temperatures in the River, but is also affected by land use and management decisions. Due to unique geologic conditions, the River loses volume and transported contaminants to underlying groundwater near Hastings. The Hastings Area Nitrate Study (HANS) identified high nitrate levels in drinking water wells and pesticides at some sampling locations. The HANS program, now in its third grant cycle, is currently working with area farmers to lower nitrate and pesticide levels in drinking water. The Minnesota Department of Health, in developing a wellhead protection plan for the City of Hastings water supply, identified parts of the lower watershed as having impacts on drinking water quality.

Decision-Making on Individual Properties and Water Quality



Bank slumping and erosion

The preceding sections describe water quality in cumulative terms. How land use practices at the level of a single property contribute to nonpoint source pollution in the Vermillion River may be less apparent. External factors influence individual land management decisions and may relate to public agency roles and standards, changing subsidy or conservation programs, market dynamics and crop prices, changing land use, land

management options, changing scientific knowledge, and the responses of natural systems. A complex set of issues can coalesce on a single property in ways that reduce or compound the pollution problem.

For example, Dakota County Soil and Water Conservation District staff conducting field work in the 2008 season noted changes in agricultural set-aside areas that had been in perennial cover for years. In some areas, planted trees were cut down and marginal croplands brought back into cultivation—in some cases, less than 50 feet from the River. High corn prices coincided with changes to the Green Acres conservation program, whereby woodlands, wetlands, and other areas not used for agricultural production became ineligible for reduced property tax valuation and deferrals. Site level management choices don't always



Farming to the Vermillion's edge compared to buffering

anticipate natural system responses. For example, invasive non-native plant species, like reed canary grass, are common along the Vermillion. Reed canary grass was introduced and planted extensively in the Upper Midwest for forage and, ironically, for erosion control. Reed canary grass forms a thick root mat near the surface and lacks the deeper stabilizing root structure of native grasses. Over time, reed canary grass allows bank slumping and erosion to occur, contributing sediment loads to the River.

Summary of Water Quality

Is the Vermillion River's water quality better or worse than in the past? The answer is some of both, improved by some measures and worse by others. Brown trout reproduce naturally in the River today as they did in the past, but had been all but eliminated by the 1950's and 1960's. Clean-up efforts and re-introduction of trout have produced a river that today supports trout without additional stocking. More recently, progress in issues identified in the 2005 watershed management plan can be partially attributed to removal of effluent from the Empire Wastewater Treatment Plant through a large-scale public investment project. Additional improvement is anticipated with similar improvements to the Elko-New Market wastewater plant, although this will not address all of the remaining water quality issues.

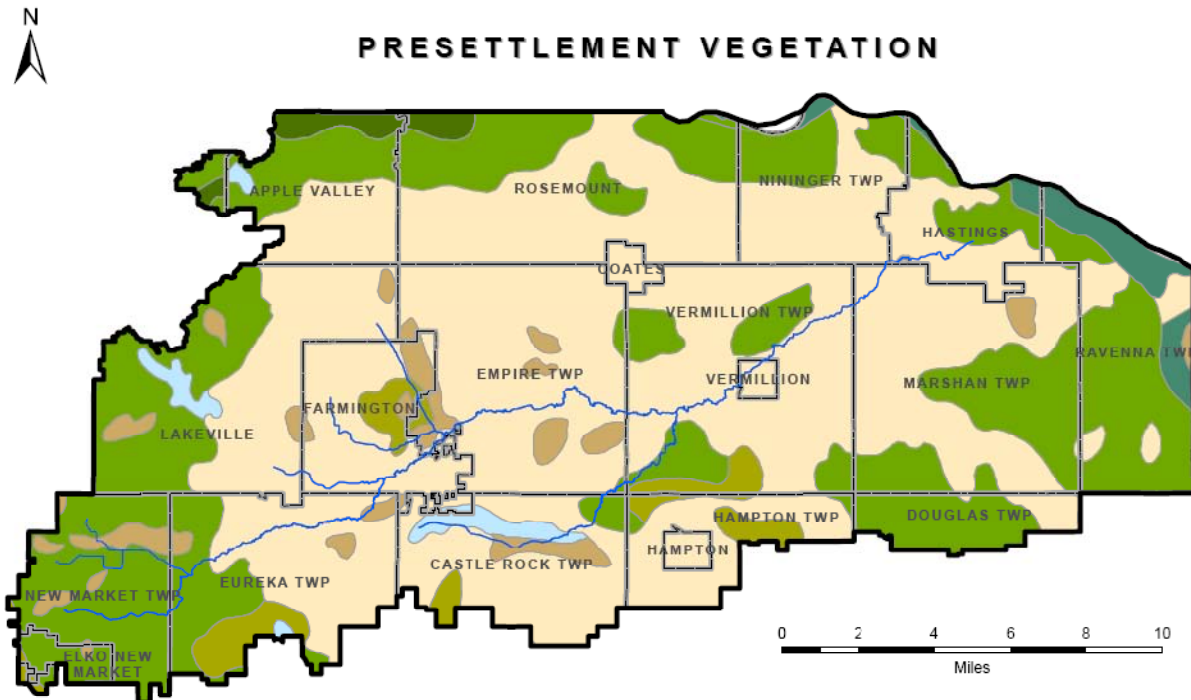
Substantial efforts to improve water quality have been underway for many years by public, private, and nonprofit organizations and individual landowners. Improving water quality in the River is a complicated long-term effort, and requires large-scale efforts by the public sector and developers (design, landscape restoration, stormwater system retrofits to increase infiltration). For individual landowners, greater adoption of best management practices is needed, such as installing buffers and promoting stormwater

infiltration. The quality of the Vermillion River today is largely dependent on the land and resource management decisions of thousands of landowners and managers within the watershed, and especially dependant on the decisions of those who live and work along its banks. As land use changes and growth occur in the future, this basic fact will remain. However, the number of individual decision-makers and land managers will likely increase, posing greater challenges to the river system.












Natural Areas and Habitat

Corridor Habitat Conditions

The Vermillion River system is located in the Western Cornbelt Plains ecoregion, which is heavily dominated by row crop agriculture. In contrast, pre-settlement habitat in Scott and Dakota counties was remarkably diverse, based on its location at the crossroads of several distinct ecological subsections. Significant rivers border or cross each county. Native plant communities in the past included prairie; wet prairie; brush prairie; aspen oak forest; “Big Woods” of oak, maple, basswood, and hickory; river bottom forest; and open water, which provided habitat to a broad range of wildlife.



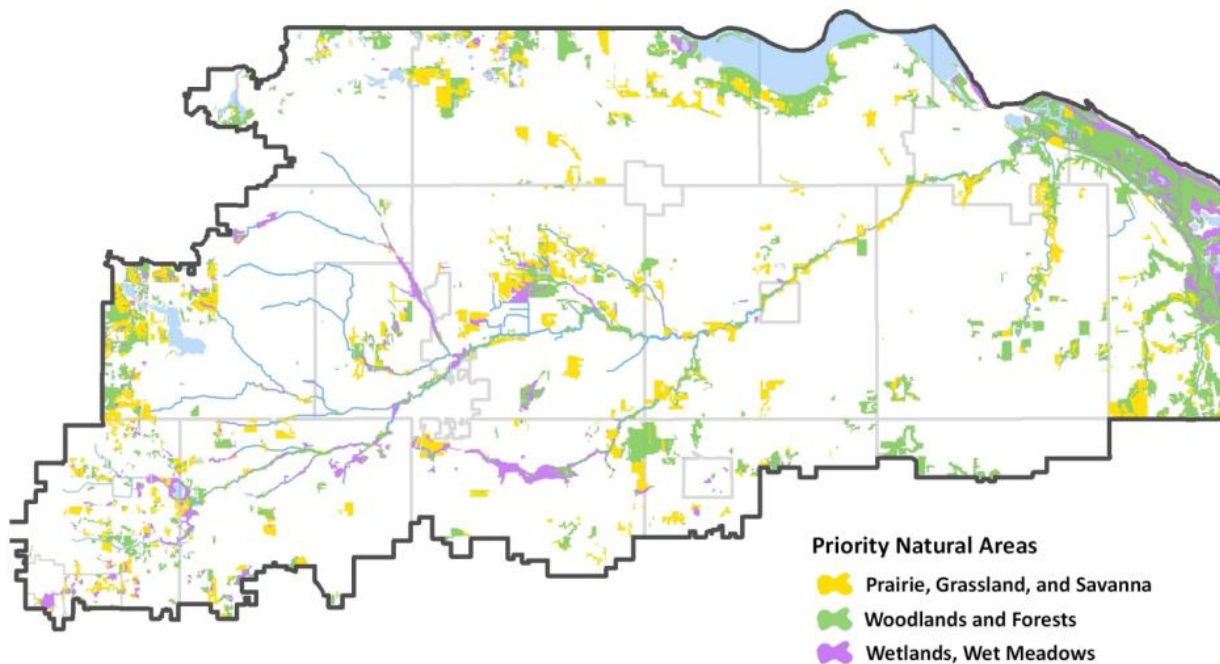
Legend

-  Prairie
-  Oak Openings and Barrens
-  Vermillion JPO Boundary
-  Wet Prairie
-  Dig Woods (Oak, Maple, Basswood, Hickory)
-  Vermillion River
-  Brush Prairie
-  River Bottom Forest
-  Municipal Boundary
-  Aspen-Oak
-  Water

This rich natural legacy has been lost and altered over the past century through agriculture and development. Today only three percent of Dakota County’s native communities remain¹ and 86 percent of its native wetlands have been drained.² The watershed is still primarily agricultural, but urban development continues to replace prairie grasslands, wetlands, forests, and farmland. Ecological diversity has been further reduced by invasive species, such as reed canary grass and buckthorn. Although most of the pre-settlement native landscape in the Vermillion River Watershed has been lost, degraded, or fragmented, many less pristine, but high quality natural areas remain. These natural areas include prairie, woodland, and wetland ecosystem types, as shown on the following map of high priority natural areas in the Vermillion River watershed.

Some of the more prominent features include Vermillion River Bottoms (a 3,000-acre floodplain forest along the Mississippi River near Dakota County’s eastern border), scattered natural prairie communities, oak forests, and unaltered wetlands. The watershed also includes several State Scientific and Natural Areas with upland hardwood forest, floodplain forest, sand coulee, prairie, and the rare species that reside there.

Priority Natural Areas in the Watershed



¹ Dakota County Biological Survey, 1997: Minnesota Department of Natural Resources

² Minnesota Wetlands Conservation Plan, 1997: Minnesota Department of Natural Resources

Adjoining Upland Habitat

In addition to the floodplain and riparian zone habitats that supports fish, macroinvertebrates, insects, birds, and mammals, there are high-quality and restorable upland habitat areas adjacent to the Vermillion Corridor. Some of these high quality ecosystems and the species they support include:

Grassland Communities: Various native grassland communities exist within the Corridor and adjoining lands under different moisture conditions. This variation influences the mix of native plants typically found within the community, including:

- Dry Prairie, including sand-gravel subtype and barrens subtype
- Mesic Prairie (intermediate moisture regime)
- Dry Oak Savanna (mostly grassland with scattered oaks, typically bur oaks), including sand-gravel subtypes
- Mesic oak savanna



Oak Savanna

Wooded Communities: Several types of forest, woodland, and shrubland are adapted to differing moisture regimes within the Corridor and adjoining lands, including:

- Oak Forest, including Mesic and Dry Oak Forest communities
- Maple Basswood Forest
- Aspen Forest
- Floodplain Forest
- Lowland Hardwood Mixed Forest
- Mixed Hardwood Swamp
- Red Cedar Woodland
- Willow Swamp



Floodplain Forest

Wetland Communities: Dependent on hydrology, soils, and topography, a variety of wetlands are found within the Corridor, including:

- Seepage Meadow
- Cattail Marsh
- Mixed Emergent Marsh
- Wet Meadow
- Wet Shrub Meadow



Willow Swamp

In addition to a broad variety of native plant and animal species, several species with State-listing status have been documented in the Corridor area, including:

Blanding's Turtle (*Emydoidea blandingii*)

State-listed as Threatened



Blanding's Turtle

Loggerhead Shrike (*Lanius ludovicianus*)

State-listed as Endangered



Loggerhead Shrike
Photo: Tom Munson

Valerian (*Valeriana edulis ciliata*)

State-listed as Threatened

Hill's Thistle (*Cirsium hillii*)

State-listed as Special Concern



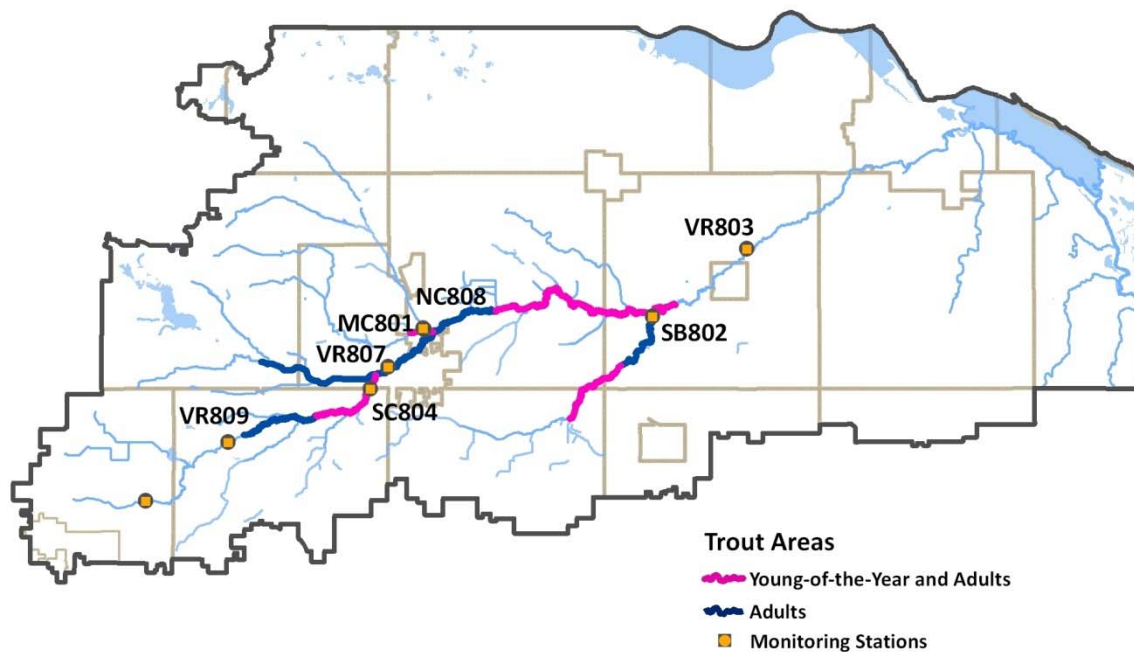
Hill's Thistle,
Photo: William Glass



Valerian
Photo: Charles Pierce

Aquatic Habitat and Cold Water Ecosystems

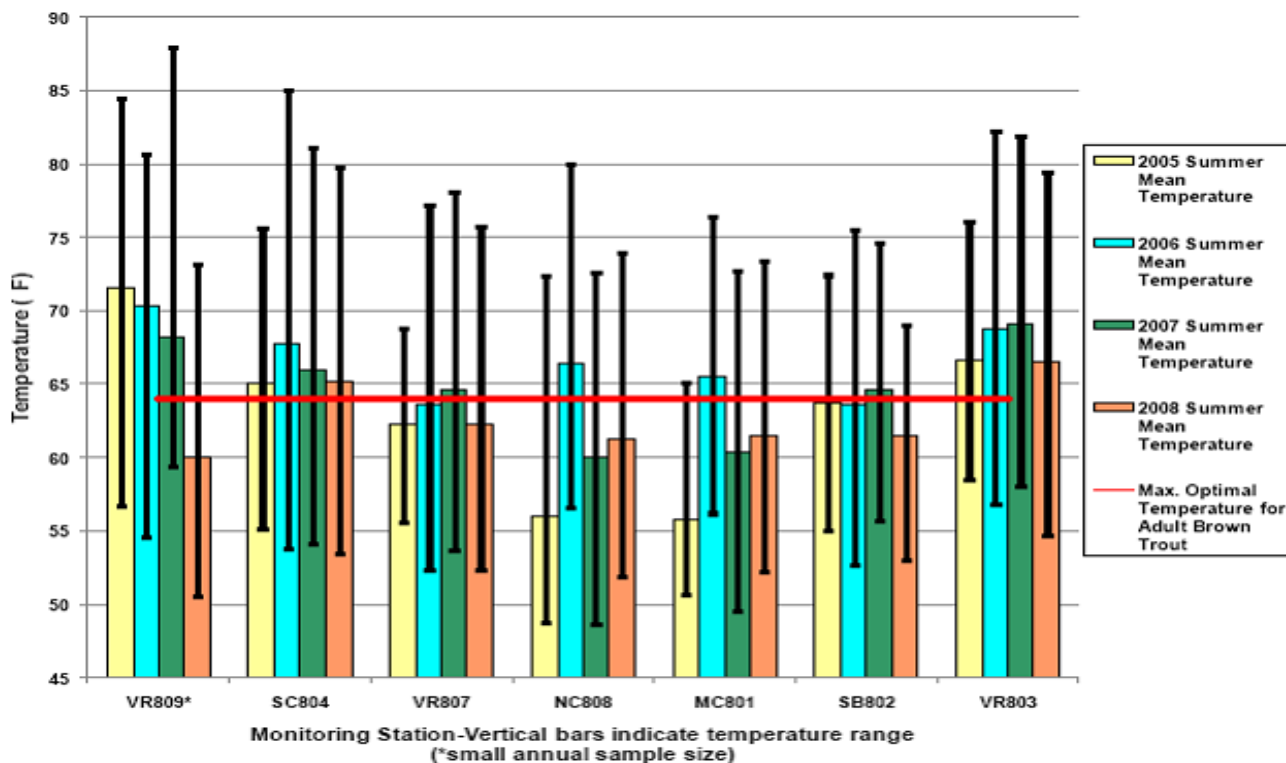
The Vermillion River is unique among rapidly developing urban areas nationwide due to its 49 miles of designated trout stream in its upper reaches. Brown trout naturally reproduce in some reaches, supported in part by inflow of cool groundwater. The Vermillion has been described as one of the best urban trout fisheries in the nation, due to the length of the system and the trophy-sized fish it produces. Brook Trout once reproduced in the River, although this native species was extirpated by high pollution levels in the 1950's. Non-native Brown Trout and Rainbow Trout were introduced in the 1970's. Trout can be considered as an "indicator" for the other essential species that thrive in this cold-water ecosystem, many of which are less readily recognized and aren't specifically valued as part of a recreation tradition or culture.



Favorable Water Temperatures for Juvenile and Adult Trout

Adult trout favor water temperatures below 64 degrees Fahrenheit. Temperatures above 68 degrees stress adult trout, and above 73 degrees can be lethal for adults and for juveniles. Young-of-the-year trout are most sensitive to warming waters. The above map shows areas usually cool enough to support juveniles (pink). Dark blue segments are less supportive habitat for juvenile trout.

2005-2008 Mean Summer Temperatures along the Vermillion River

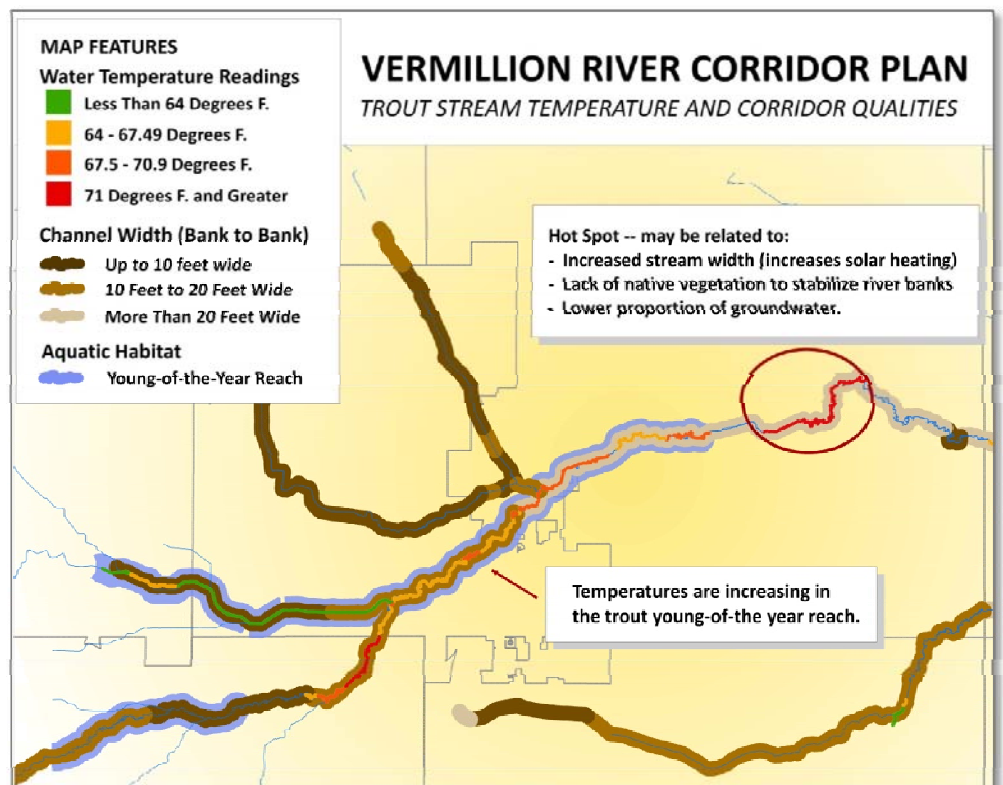


The preceding graph shows the results of temperature monitoring at seven stations on the Vermillion River over a four-year period (2005-2008). The red horizontal line marks the temperature where adult trout begin to experience heat stress; i.e., 64 degrees Fahrenheit. Colored bars indicate *average* temperatures over the summer at each monitored location for each year of the study. All locations showed average temperatures above the stress level for at least one year in the study, although generally below the lethal level (73 degrees). The black lines over each bar show the range of recorded water temperatures for each location and demonstrate that temperatures intermittently exceeded both the stress and lethal levels. The warmest water temperature recorded in the study was 87 degrees.

Cold water streams receive substantial water volume from cool groundwater. Factors that maintain cool stream temperatures include bank, channel, and streambed characteristics; stormwater management and infiltration; streambank shading; agricultural drainage or management systems; and temperature control of industrial discharges or wastewater effluent. The following map shows bank widths in relation to warmer water temperatures measured in 2009.

River Hot Spots

The JPO tested river summer temperatures in trout reaches of the river and found warming waters in areas that support juvenile trout (blue), which are more heat-sensitive than adults. Stress level (orange) and lethal level (red) temperatures are shown. Brown shows bank width (dark = narrow, light = wide). As banks widen, water temperatures increase.



The VRW JPO and the St. Anthony Falls Laboratory at the University of Minnesota conducted an extensive thermal modeling study in evaluating a potential thermal credit trading program. Although the VRWJPO chose not to actively pursue the trading program, they learned much about how heat loads into the Vermillion River and have a

clearer picture of the portions of the River that generally stay cool and which portions, on average, appear to be warming.

One of the more surprising study findings of the study was the amount of heat loading from un-vegetated stormwater detention ponds, which can overflow during moderate rainfall on a hot summer day to piping that drains to the River. Commercial and industrial rooftops are another major contributor during these types of rain events as they can quickly shed a large volume of warm water from a highly heated surface. The JPO is conducting additional studies on options to reduce heat loading into the designated trout stream portion of the River.

What can be done to preserve the Vermillion’s cold-water ecosystems? Designated trout streams are protected by special fishing regulations set by the MN DNR and are eligible for MN DNR Trout Stamp funds for habitat improvements. The MPCA sets stricter water quality standards for designated trout streams, requiring no material increase in temperature and lower levels for turbidity and for ammonia. The MN DNR also recently acquired three Aquatic Management Areas along the River to protect and restore trout reaches and provide public access. Restoration efforts include re-meandering straightened reaches, improving trout habitat, and planting native species. Some efforts, such as re-meandering, are landscape-level restorations that require adjoining shoreland. Other effective practices can be accomplished within a small area.



Tale of Two Streams:

The City of Lakeville re-meandered a straightened stream reach west of Cedar Avenue in Lakeville, adding habitat features to provide shade for trout.

East of Cedar Avenue is another re-meandered stream segment, completed by Dakota County and the City of Lakeville as part of an upgrade to Cedar Avenue and associated mitigation.

Biological Quality of General Fish Populations

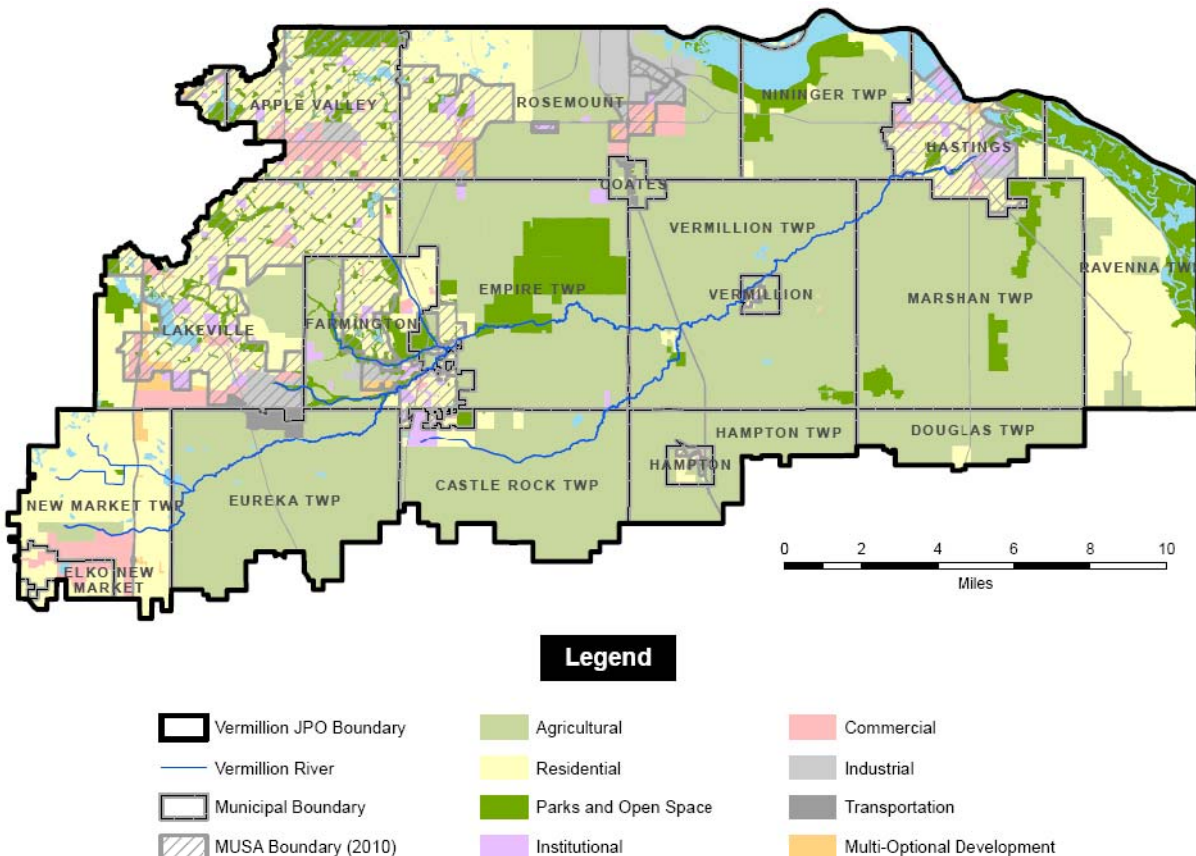
The VRWJPO prepared a Biomonitoring Plan to assess changes in all fish populations, including warm water species, and evaluate channel stability on a regular, rotating basis. The 2009 fish evaluation for a range of sampling sites along the River all scored *fair to poor* on an Index of Biological Integrity. This indicator of low quality fish populations was attributed to stressors on streams throughout the watershed, lack of diversity in species, and variable stream quality in different reaches of the Vermillion River.

Land Use, Economic Conditions, and Urban Development

Current and Planned Land Use

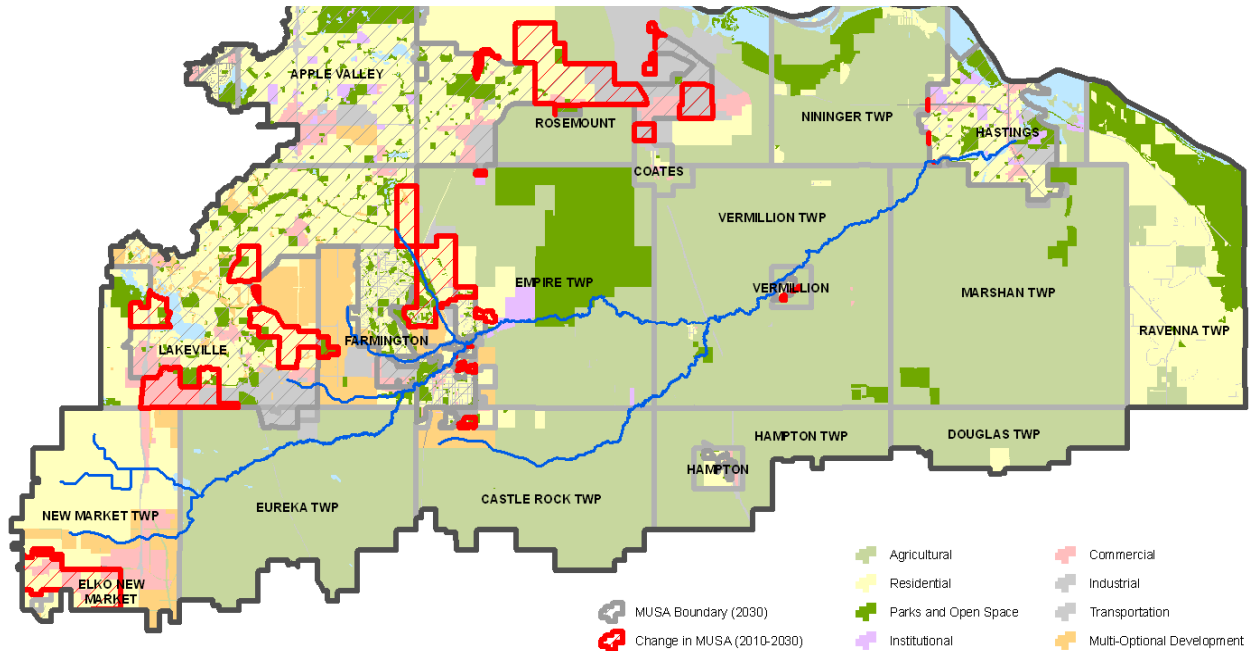
The Vermillion River watershed today includes diverse land use patterns, including suburban residential, commercial districts, historic downtowns, large lot rural residential, agriculture, industry, mixed use development, and institutional lands. Settled in the mid 1800's, Hastings and Farmington include the corridor's oldest urban development. The leading edge of new development is in central Rosemount, Lakeville, Farmington, and Elko-New Market.

Current Land Use



In the watershed's rural townships and along the Vermillion River corridor, the predominant land use today is agriculture – corn, soybeans, alfalfa, small grains, vegetables, livestock, and other products. Much of the Vermillion watershed has prime agricultural soils, among the most productive in the state.

Where Growth Will Occur: The following map was compiled using each community's projected land use for the year 2030, the planning horizon required by the Metropolitan Council for the 2008-2009 round of Comprehensive Plan updates. The Metropolitan Council requires that all local communities update their comprehensive plans every ten years, to address future regional needs for housing, transportation, and other services.



By 2030, transition from rural to fully serviced urban uses along the Corridor will be concentrated in parts of the cities of Lakeville, Farmington, and Elko New Market, with more modest changes in Hastings. Areas proposed to enter into the Metropolitan Urban Service Area (MUSA) and receive public sewer and water service are outlined in red. Local plans are summarized according to predominant land use patterns below:

Rural Agriculture (light green): Townships zoned 1 dwelling unit per 40 acres and in agriculture plan to remain so. Rural townships (Eureka, Castle Rock, Empire, Vermillion and Marshan townships) seek to preserve agriculture into the foreseeable future. New residential development is proposed for western Empire Township.

Rural Residential (light yellow): Ravenna and New Market townships are rural residential and plan to remain so over the next 20 years. These townships frame the easternmost and westernmost ends of the River.

Existing Urban Development (gray, yellow, pink, orange): commercial, residential, industrial and institutional land within the MUSA, representing a full spectrum of development and potential redevelopment opportunities.

New Development with Expansion in Urban Services (red outline): Areas to receive MUSA services include a mix of land uses. Modest expansion of MUSA is proposed for western Hastings and the City of Vermillion. Lakeville and Farmington will add residential development near North Creek, currently outside of the MUSA, but proposed to receive services by 2030. Lakeville will add residential development with urban services in the eastern part of the city currently used for agriculture, and will expand its industrial corridor along the South Creek. Elko-New Market also is proposed to receive a MUSA expansion, shown in red on the map.

Quantifying Projected Growth: This Corridor plan was completed in 2010, during an economic slowdown that has brought new development in the watershed to a near standstill. Assuming growth resumes its past pattern, more than 82,000 new housing units are projected to be added in Dakota County (county-wide) between 2000 and 2030, and population will increase by 77,359 households. Between 2000 and 2030, the Metropolitan Council forecasts 43,027 new households in Scott County overall. Scott County cities are projected to at least double their housing stock by 2030.

In its 2030 Regional Development Framework forecasts as updated in 2009, the Metropolitan Council projected that 31,120 new households will be added to the Vermillion Corridor communities between 2010 and 2030.



Vermillion Tributary in Lakeville

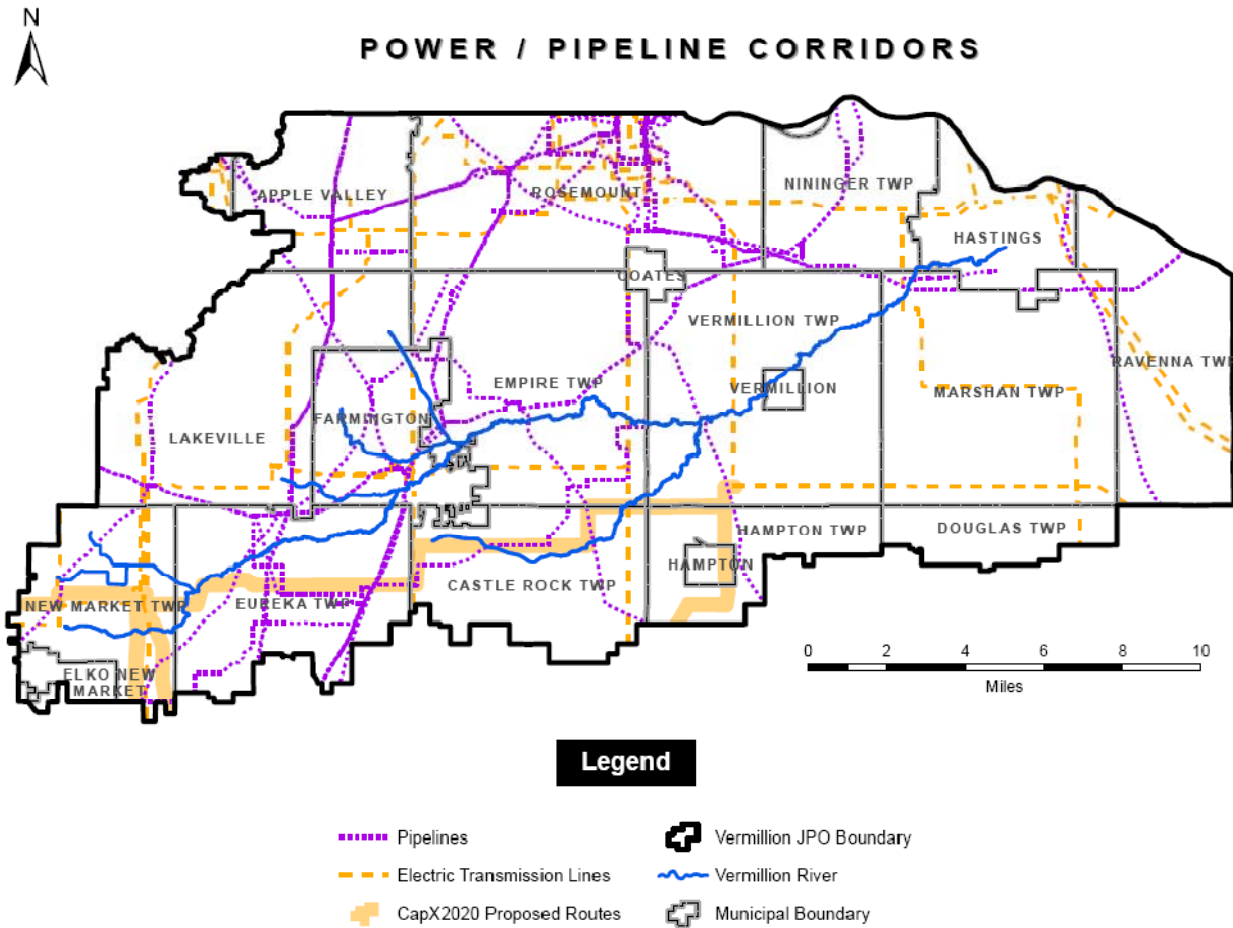
Community, County	Added Households, 2010 to 2030
Castle Rock Township, Dakota	100
Elko New Market, Scott	5,880
Empire Township, Dakota	2,150
Eureka Township, Dakota	150
Farmington, Dakota	5,000
Hastings, Dakota	3,700
Lakeville, Dakota	13,300
Marshan Township, Dakota	70
New Market Township, Scott	650
Vermillion City and Township, Dakota	120
Total Households Added	31,120

The Vermillion River Corridor is a microcosm of land-use challenges in rapidly developing metropolitan areas. The River threads through communities committed to vigorous economic development as well as communities where a long agricultural heritage translates to a commitment to maintaining the land’s rural character and function.

Factors that future development should consider include:

- Groundwater’s role in hydrologic systems, its sensitivity to land change and pollutants
- Soil types that vary, from slowly infiltrating clays to rapidly infiltrating sands
- Drinking water availability, especially where municipal supplies have not been established and private or production wells use groundwater resources
- Availability of suitable soils and sufficient land for septic systems in areas where wastewater facility treatment is not available
- Regional needs for sand and gravel, in plentiful supply in the upper watershed
- Local land-use authority in Dakota County cities and townships, and county land-use authority in Scott County
- Brownfields properties where hazardous substances and contaminants are suspected, but not confirmed
- More stringent regulatory requirements
- Location of major infrastructure (current and planned) such as roads, rail lines, power lines, pipelines, sewer lines, and other features

Expansion of utility infrastructure to meet local, regional, and state needs will be part of the Corridor’s future. The following map shows existing pipelines and transmission lines and the proposed alignment of the CAPX2020 interstate electric transmission line.



Dakota County promoted two overarching goals related to development and protecting natural capital in its 2009 Comprehensive Plan:

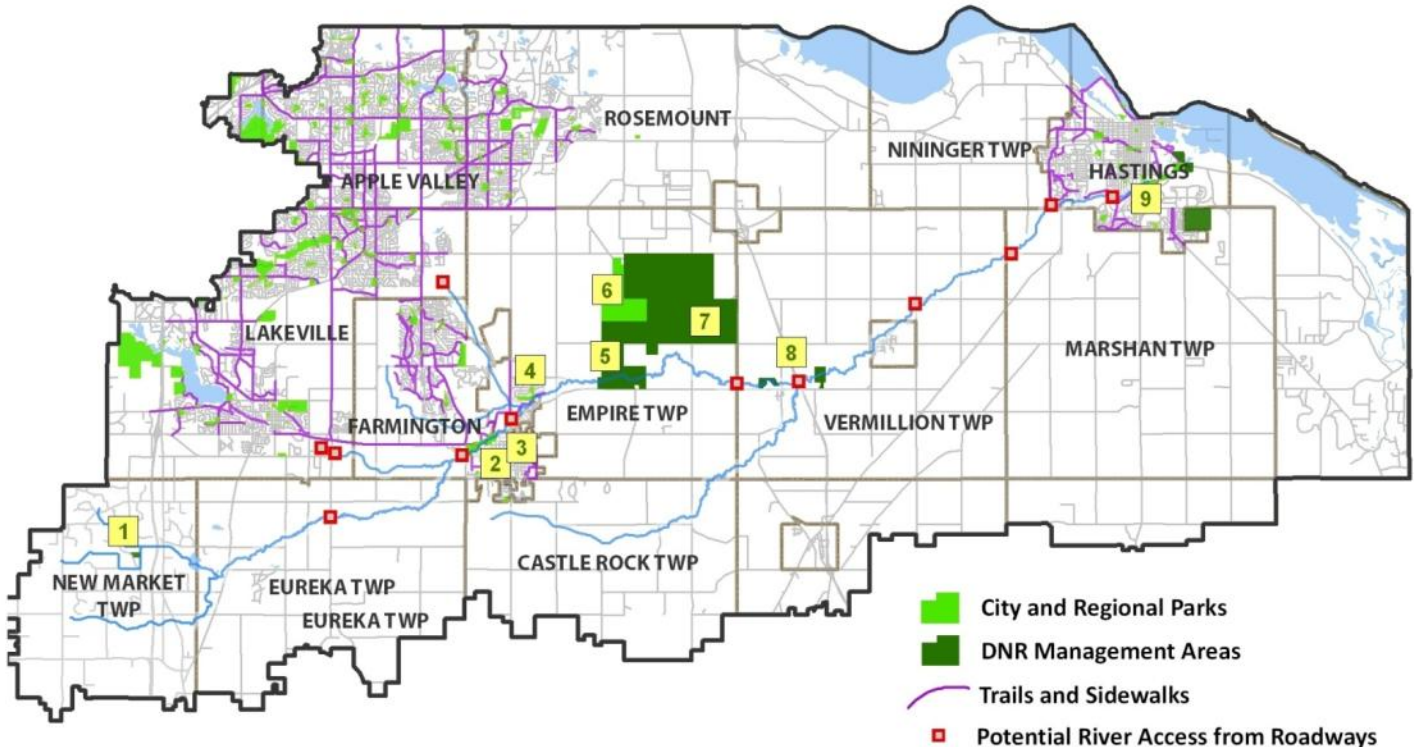
- 1) Protect the integrity of the county's natural resource base, reinforce natural systems, and restore their functioning – green infrastructure
- 2) Let green infrastructure shape land use instead of fragmenting natural systems. Orderly development around natural systems will preserve their function, provide cleaner air and water and healthier natural resources, reduce long-term costs, and create high quality amenities that enhance the value of development.

Planning efforts such as the Vermillion River Corridor Project focus on river corridors as a natural amenity that provides an organizing structure for new development while protecting the our natural resource base and ensuring economic growth and stability.

Recreational Opportunities

Parks and Trails in the Corridor

Public access and recreation opportunities within the Vermillion Corridor currently are limited to parks and trails within Lakeville, Farmington, Hastings, and Empire Township and DNR management lands in Empire, Vermillion, and New Market townships.



Public Lands

From west to east, the existing public recreation areas within the corridor are:

1. Spartina Wildlife Management Area (WMA): 17 acres in New Market Township on the Vermillion River, managed by MN DNR for wetland and brushland species, and primarily used for wildlife viewing and hunting
2. Rambling River Park: 76 acres, managed by the City of Farmington for community recreation, sports facilities, habitat, and River access
3. Prairie Waterway: managed by the City of Farmington as a linear community green space with River access
4. Empire Soccer Fields: 3 acres, managed by Empire Township for athletic activities and River access
5. Vermillion River Aquatic Management Area and Wildlife Management Area (AMA)/WMA: 837 acres in Empire Township, managed by MN DNR. Much of the land was previously farmed, but recently has been seeded to native grasslands. Provides opportunities for birding, hiking, nature study, and hunting.

Game species include deer, small game, pheasant, doves, and turkeys. The AMA provides aquatic habitat improvements and fishing access.

6. New Regional Park: 462 acres in Empire Township, managed by Dakota County and undergoing master planning in 2010 to determine future recreation uses
7. Vermillion Highlands Modified WMA: 2,838 acres in Empire Township, co-managed by MN DNR for wildlife and hunting and by the U of MN for research and Dakota County for limited trail-based recreation. Hunting options include deer, pheasant, and turkeys.
8. Otting and Kummer AMAs: Two new AMAs (former Otting and Kummer properties) totaling 104 acres in Vermillion Township, managed by the MN DNR for aquatic species habitat and River access
9. Hastings Vermillion River Falls and Old Mill Parks: 12 acres in Hastings, managed by the City of Hastings for general leisure recreation and River viewing.

In-Stream Recreation: Angling, Canoeing, and Kayaking

The Vermillion River is seasonally suitable for canoeing and kayaking, particularly east of Farmington to Hastings, where the River widens and water depths increase. Conversely, portions in the extreme western reaches seasonally lack adequate volume for canoeing and kayaking. At present, little or no formal provision has been made for canoeing and kayaking, such as designated put-in and take-out access with parking.

The western reaches of the River, generally west of Highway 52, include the designated trout stream reaches. Maintaining habitat conditions that favor trout may involve leaving deadfall trees in place in the River to provide shade and spawning habitat – a practice inconsistent with the needs of kayakers and canoeists. Because the banks and floodplain along much of the River are privately owned, trespassing can be an issue once a kayaker or canoeist leaves the water, even if the intention is getting around a fallen tree.

Under Minnesota law it generally is legal to kayak or canoe in the river and walk in the channel if access was gained through an allowable access, such as public lands or public road rights-of-way. Informal water access for angling and canoeing is limited and currently exists on most public recreation and management lands and at bridge crossings. Most of these informal sites have not been improved, such as providing parking and better shoreline access for public recreational use. The preceding map includes results of a preliminary screening of potential River access on public rights of way, based on accessible slopes, bank heights, adequate right-of-way width, and potential for limited parking. Several of these sites are currently used by anglers and others. With some improvement, many sites east of Highway 52 present good potential for kayak and canoe access, and would improve the overall spacing of access points along the Corridor.

Community Trail and Greenway Plans

Trails are among the most popular public recreation amenities, particularly those that follow natural features and connect well to neighborhoods. Trail connections to the Vermillion River are in purple on the preceding map. Hastings, Lakeville, Farmington, and Empire Township have developing trail networks and Elko-New Market is planning a trail system. Each Corridor community engaged its residents during Comprehensive Plan updates to address growth-related needs, and each community has a contemporary vision for trails between now and 2030. These plans were reviewed as they relate to a Corridor vision and summarized below:

City/Town	Reach	Trail and Corridor Language from Plans
Farmington	Vermillion Mainstem	Not specific about side of River. Widen 8' trails in Rambling River to 10'-12' width with vegetative buffers. Locate out of floodplain, as possible.
	North Creek	10'-12' trail on both sides of River. Out of floodplain, vegetative buffers. Meandering throughout greenway.
	Middle Creek	Start on south, work with north side landowners for future 10'-12' trail width, vegetative buffering
	South Creek	10'-12' trail, both sides of River. Trail setback from River of 100', vegetative buffering.
	Prairie Waterway	Trails exist in half of the greenway from Hwy 50 to the Vermillion River. Should connect to new regional park (through Empire Twp).
Elko-New Market	Vermillion River (S. Headwaters)	Conservation Area/Greenway for future study, establish 100' buffer. Future consideration for trail connections to Dakota County.
Empire Township	Vermillion Mainstem	Regional trail on north side of River throughout township. [May also evaluate south side as needed.]
Eureka	Vermillion Mainstem	Natural Resource corridor now and near-term. Residents may have future interest in parks/trails, but no demand now.
	Chub Creek	Natural Resources corridor now and near-term. Residents may have future interest in parks/trails, but no demand now. Will work with County on planning future Chub Lake Greenway.
Vermillion Twp	Vermillion Mainstem	Preference for connected natural resource corridors. Discuss greenways with Dakota County. Important to know when to establish trails.
	South Branch	Preference for connected natural resource corridors. Discuss greenways with Dakota County. Important to know when to establish trails.
Vermillion City	Vermillion Mainstem	City has one park. Coordinate regional trail development with Dakota County.
Scott County	Vermillion Headwaters	Natural Area Corridors proposed with no specific trail plans on River. Coordination with Dakota County on road trail connection.
Hastings	Mainstem	Vermillion River Linear Park with trail, continuing southwest along River into adjacent township. Core destination trail, 10' width, ADA accessible
Lakeville	South Creek	Greenway with trails, land acquired along much of S Creek
	North Creek	Outside of Vermillion River Corridor Plan scope, but continuation of greenway and trail on west fork of N. Creek
Castle Rock Township	S Branch	No type of trail or greenway included in the plan.
Marshan Township	Mainstem	Natural resource corridor/river greenway. Planning in coordination with Dakota County.

Dakota County's **2030 Park System Plan: Great Places, Connected Places, Protected Places**, developed in 2008 with extensive public participation, calls for the development of a countywide connected network of greenways and rural conservation corridors. *Conservation corridors* emphasize protection of habitat and water quality along rural stream corridors. *Greenways* function as linear parks that connect communities and incorporate benefits for habitat, water quality, recreation, and transportation. Greenways connect popular destinations at local and community levels; provide nested loops that offer short or longer experiences; and offer trails around lakes. Many will rely mostly on public lands, such as parks, schools, and community centers.

The Dakota County Park System Plan included the Vermillion River in both categories, prioritizing near-term greenways in Hastings, Lakeville, Farmington, and parts of Empire Township. Conservation corridors are the near-term priority for the other rural townships, and Dakota County seeks to work with townships on pre-planning greenways as public interest increases and/or development and land use change approach. Timing is critical to planning greenway networks as land use evolves. It is imperative to preserve the corridor and build a local greenway vision before development proceeds.

Scott County engaged residents in its Comprehensive Plan update and the subsequent Detailed Area Plan (DAP) for rural residential services in the southeastern part of the county. This 73-square mile area is the largest pocket in the seven-county metro region that the Metropolitan Council recognizes as an area unlikely to be served by public sewer and water services; i.e., the final build-out form is rural residential with 2.5-acre lots. The DAP includes a portion of the Vermillion River headwaters and does not call for a trail along the Vermillion in the near-term. The overall Scott County vision calls for Natural Area Corridors to protect key resource systems, including both branches of the Vermillion headwaters.

Benefits of Recreation

Stable communities generally offer the services and amenities that families and business value, including recreational resources and access to open space. Recreation and open space are important components of community identity that can enhance resident sense of belonging to that community. In addition to physical health benefits provided by outdoor recreation, public access to natural environments is essential for building public understanding and appreciation of natural resources and systems, which in turn is critical for ongoing public engagement in protecting the natural resources.

Greenways with recreational use, such as hiking, canoeing, and biking, function as linear parks that can also provide economic and social benefits and contribute to healthy lifestyles. Because greenways are being planned to connect the kind of destinations that are already on the daily or weekly schedules of many residents, greenways promote healthier transportation choices that involve some physical activity (biking or walking).

Dakota County Parks, Lakes, Trails and Greenways Vision, 2030

What's New?

GREAT PLACES: Destination Parks

- * New Regional Park in Vermillion Highlands
- * More things to do in parks
 - Winter activity area
 - Gathering and celebration areas
 - Swimming and water play areas
- * More popular "park basics"
 - Enhanced picnicking
 - Biking and accessible trail loops

CONNECTED PLACES: Greenway Trails

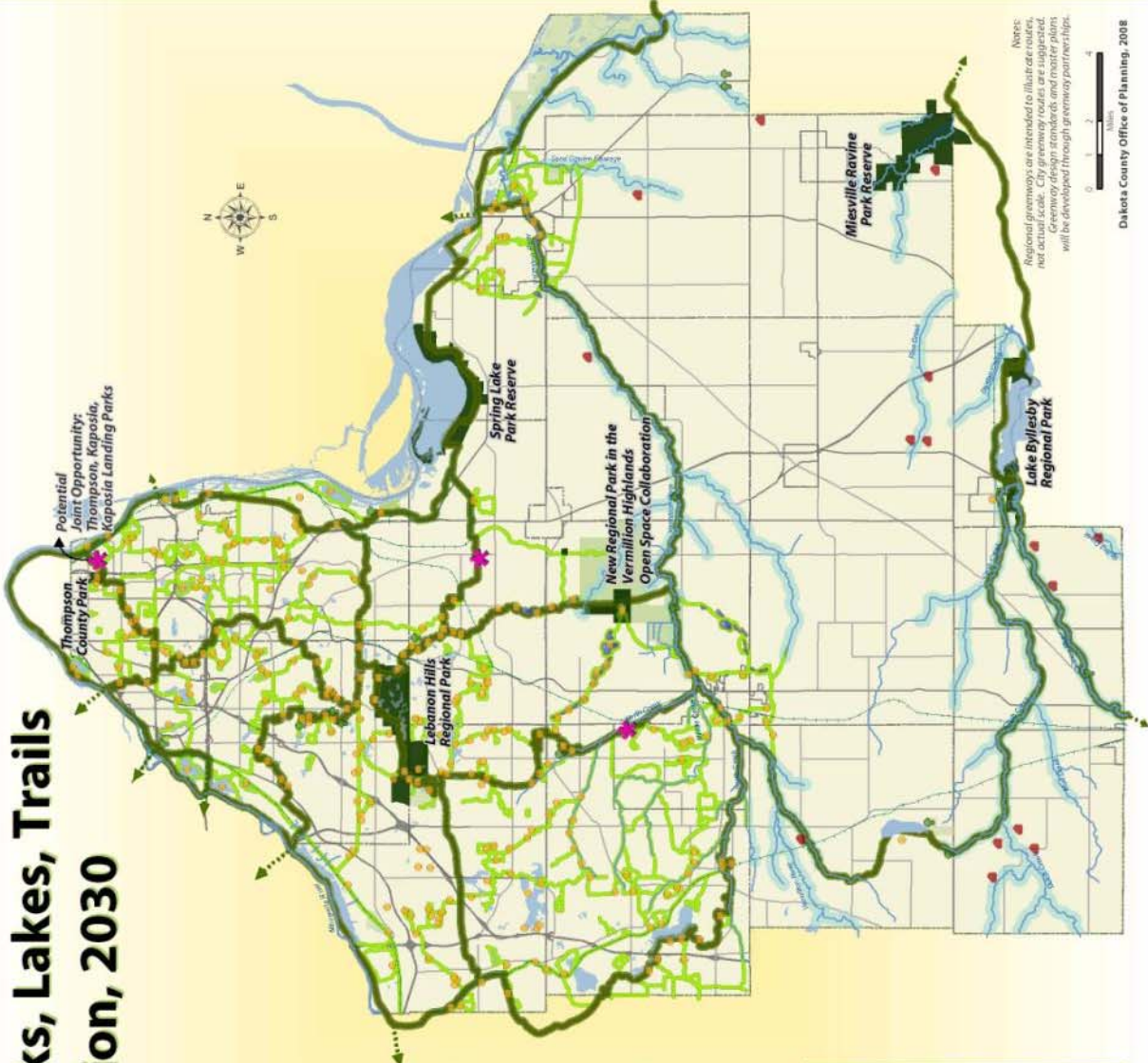
- * "Bring parks to people" -- Linear parks connect parks, schools, lake trails, playgrounds, libraries, and the Minnesota and Mississippi Rivers.
- * Walking, biking, and in-line skating
- * Public agencies work together to create 200 miles of greenways using mostly publicly-owned land.

PROTECTED PLACES: Green Infrastructure

- * Enhance and protect park resources
- * Protect stream corridors in public/private partnerships
- * Protect natural areas and open space in public/private partnerships

DAKOTA COUNTY PARK SYSTEM and COLLABORATIVE OPEN SPACE PROTECTION

- Dakota County Parks
- Federal, State, and Other Regional Open Space
- Existing and Planned Regional Greenways
- Regional Status Discussion with Metropolitan Council
- Example City Greenways (route concepts)
- Stream Conservation Corridors and Greenways
- Destinations: City Parks, Schools, Lakes, Libraries
- Privately-Owned Protected Farmland (FNAP)
- Private/Public Protected Natural Areas (FNAP)
- Potential Rail to Trail Opportunities



Concepts for Greenways



Greenways Connect Places Where People Want to Go

Coordination and Management in the Corridor

Public Agencies and Roles

Within the Corridor, many agencies and organizations are currently involved with improving water quality and habitat and providing compatible recreation. For specific situations involving surface water and groundwater, several of the following agencies may have a jurisdictional role:

Cities: Cities are responsible for plans and ordinances addressing erosion and sediment control, floodplain protection and easements, stormwater rate and water quality control, pond development, maintenance, and easements, shoreland protection, wetland management plans. Cities may implement WCA.

Townships: Dakota County's townships are unique in Minnesota in that they retain land use control. Townships delegate many activities listed for cities to the County. Preparation and implementation of wetland management plans is encouraged. Townships must prepare, adopt and implement local water management plans.

County: Dakota County administers shoreland-floodplain regulations in unincorporated areas; Scott and Dakota counties jointly manage the Vermillion River Watershed; counties may implement the Wetland Conservation Act (WCA). Dakota County is lead agency for regional greenways and the buffer easement initiative in the county.

Soil and Water Conservation District: SWCDs implement urban and agricultural erosion control services, WCA assistance; County Agricultural Inspector services; State cost share

assistance; stormwater management services; feedlot program services for surface water improvements; administers agricultural best management practices implementation loan program.

Vermillion River Watershed Joint Powers Organization: Responsible for water management; watershed plans; uniform policies and official controls for surface water; may implement WCA.

Metropolitan Council: collects and treats wastewater; provides regional surface water planning; provides non-point source pollution management, prevention and abatement grants; industrial wastewater management; water quality monitoring and reporting; reviews watershed plans and local water plans; approves funding for regional parks and regional trails.

MN Pollution Control Agency: Administers federal National Pollution Discharge Elimination Systems/State Disposal Systems stormwater permit program, Section 401, septic system regulations, feedlot permitting and enforcement; composes State list of impaired waters; conducts Total Maximum Daily Load studies; administers State water resource monitoring database. Permits: sanitary

sewer extensions, wastewater land application, stabilization ponds; potable water treatment plants, industrial process wastewater, stormwater management or runoff, noncontact cooling water, Water Quality Cooperative Area-wide State Disposal System; reviews wetland permits; determines wastewater effluent limitations.

MN Department of Health: Responsible for fish consumption advisories, drinking water protection, groundwater protection planning, and well safety and installation.

MN Department of Agriculture: Administers pesticide and fertilizer regulation; guidelines for soil amendments and nutrient management; surface water and groundwater monitoring for agricultural chemicals, and invasive species.

Board of Water and Soil Resources: implements Metropolitan Area Surface Water Management Act; reviews and approves watershed plans; administers WCA Statewide; oversees watershed organizations and SWCDs; assists local governments in managing and conserving water resources – provides guidelines, training and technical assistance for local water plans; provides State funding for water and soil management programs and

projects; administers National Pollution Discharge Elimination Systems permits.

MN Department of Natural

Resources: permits water diversion and appropriation, public waters work, dam safety, fishery-related, floodplains, shoreland and aquatic plant management control. Reviews local water plans; enforces Wetland Conservation Act; manages State's fisheries, including trout stream designations; Mississippi River Critical Area, Flood Damage Reduction Grant, Lake Management, Mississippi

National River and Recreation Area, Project WET, River Resource Mgmt., Shoreland Mgmt., Wild and Scenic Rivers, Floodplain Mgmt., National Flood Insurance, Environmental Review, and Public Waters Inventory, Lake Hydrology, Stream Hydrology, Surface Water Technical Analysis.

Natural Resources Conservation

Services: Implements Wetlands Reserve Program and the Farm and Ranch Lands Protection Program, Water Quality and Environmental Cost-Share Program, Conservation Plans for Highly Erodible Land.

US Army Corps of Engineers:

Provides engineering services, including planning, designing, building, operating and maintaining water resources and civil works projects; administers Section 10 of the Rivers and Harbors Act permit program (regulates placement of structures and/or work in or affecting navigable U.S. waters); administers Section 404 permit program of the Clean Water Act (regulating excavation of wetlands and discharge of dredged or fill material into U.S. waters).

Several non-profit environmental organizations are active within the Corridor, including, among others:

Friends of the Mississippi River (FMR): Protects and enhances the Mississippi River and its watershed in the Twin Cities, through land conservation efforts that protect, restore and manage important natural areas; watershed protection efforts that draw attention to the health of local rivers, lakes and wetlands; and river corridor stewardship activities, including coordination of the Vermillion River Stewards program.

Trout Unlimited (TU): a national organization dedicated to conserving, protecting, and restoring North America's coldwater fisheries and their watersheds through a variety of education programs, habitat restoration projects, partnerships, funding, and advocacy.

Trust for Public Land (TPL): a national, nonprofit, land conservation organization that conserves land for people to enjoy as parks, community gardens, historic sites, rural lands, and other natural places, ensuring livable communities for future generations.

While many agencies and organizations have specific roles in habitat and native species protection and management, recreation, and economic development, the overall coordination of roles among these agencies is neither automatic nor guaranteed to occur. Structures for sharing information exist among a number of the key local and state agencies within the Vermillion River Watershed governance structure and these structures generally work well. What currently is lacking are:

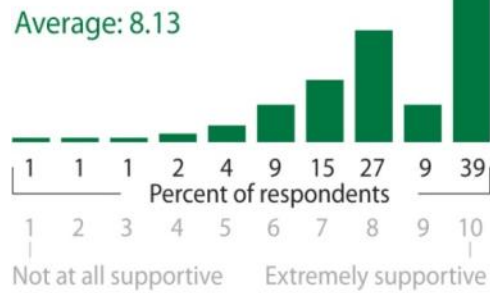
- Full coordination among all water quality related agencies
- An integrated water management approach that incorporates related habitat and recreation benefits
- A dedicated central point of information access for landowners
- Coordinated and strategic public investment
- Enhanced public/private partnerships

Public interests and Trends

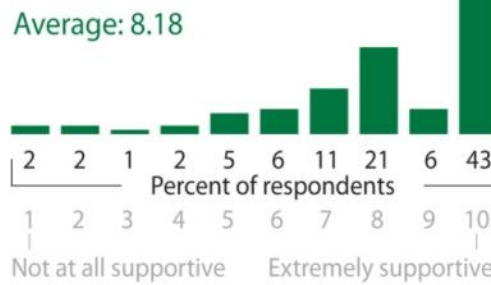
Recent Survey Findings

Dakota County residents consistently have expressed support for natural resource protection. The following snapshots from a 2008 scientifically-sampled survey demonstrate resident support for an active County role in the areas related to this plan.

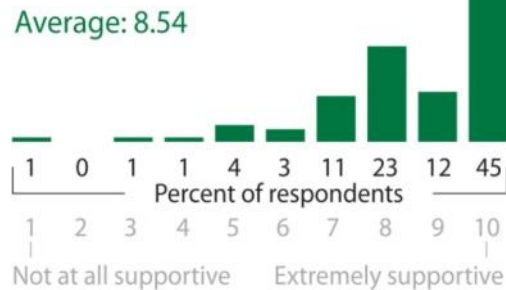
Dakota County should pursue an active role in protecting farmland from development.



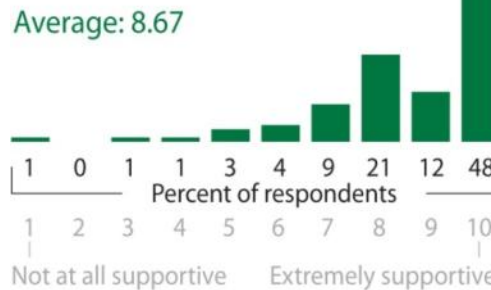
The County should work with cities to connect city and county parks and popular destinations with greenways that include recreational trails.



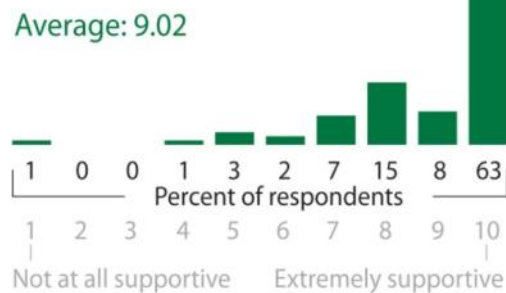
The County should pursue an active role in protecting remaining natural areas.



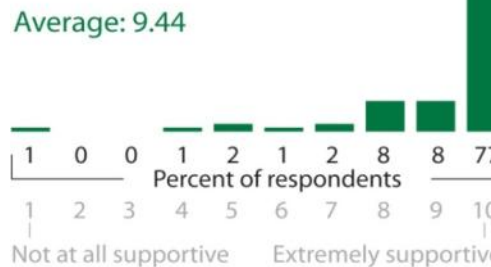
How supportive are you of Dakota County taking a leadership role in protecting open space, historic places, and water quality?



Dakota County should pursue an active role in protecting lakes, streams and wetlands.



The County should ensure sufficient, sustainable, high-quality drinking water is available in the future.



Trends

As a plan drafted in 2010, the Vermillion River Corridor Plan mirrors many of the predominant issues, concerns, and trends of its day. These trends help shape some of the plan outcomes by providing a clearer picture of the complex world in which the plan was written. A study of trends also can help identify potential areas that the plan can tap into to help advance common goals. A few examples follow.

Getting Older, but Staying Active: the age 65-and-older population is expected to grow by 147 percent from 2000-2050. Baby boomers reaching retirement remain more active than previous generations and seek more choices in outdoor and active recreation.

Communities Designed for Active Living: Americans are experiencing an increase in obesity rates and associated health risks often associated with sedentary lifestyles. Community design can help residents incorporate healthy activity into their everyday schedules by providing safe venues for walking to local destinations instead of driving.

Locally Grown Foods: many people are re-thinking the quality and sources of food they eat and serve to their families. Sustainable agriculture promotes foods that are seasonal, genetically diverse, locally grown and distributed, and produced without environmentally harmful chemicals or practices. The Twin Cities is home to organic farms, food cooperatives, farmers markets, and restaurants that take advantage of these trends. The south metro counties and Vermillion Corridor have an opportunity to be premier local food producers for the greater metropolitan region.

Changes in Agriculture: on a nationwide basis, farmers are farming longer than in the past, with many continuing to work into their 70's. Studies have shown that succession planning for transfer of the farm to a next generation of farmers is often delayed. On average, fewer children of farmers go into the family business. As rental of cropland increases, implementation of stewardship practices tends to decline.

Chapter 3: Corridor Principles, Vision, and Goals

The Vermillion River Corridor Plan is based on three components that speak to why the plan was prepared, how planning should occur, and what the plan should deliver:

- **Plan Principles** that summarize collective values in planning for the River
- **Goals** that identify specific desired outcomes for the Corridor Plan
- **Vision** for the River corridor's future, expressed in words and illustrations

Corridor Plan Guiding Principles

The guiding principles summarize important values of the stakeholders who participated in designing an overall approach to protecting the Vermillion Corridor. The principles were reviewed, edited, and refined by focus groups, standing advisory committee members, and participants at seven public workshops.

1. The Vermillion River is a valuable natural resource system and protecting it is everyone's responsibility today and for tomorrow's generations.
2. The Corridor Plan will protect and strengthen ecological stability and water quality.
3. The Corridor planning process will be inclusive of all stakeholders, build a shared vision, provide methods to strategically invest in River protection, and help resolve potential conflicts.
4. The Corridor Plan will draw on previous Vermillion River efforts, incorporate sound science and best practices from other projects, and serve as a model for protecting other river corridors.
5. The Corridor Plan will promote collaboration and communication among landowners, public agencies, businesses, institutions, and others while addressing private property rights and broader public benefits.
6. The Corridor Plan will provide a framework to support a more sustainable network of agricultural, residential, business, public and institutional land uses.
7. Cold-water habitat in the Vermillion River is its most unique and significant natural resource feature and should be a priority in any land use decision-making.
8. The Corridor Plan will improve access to the River in appropriate locations for public enjoyment, education, community involvement, and nature-based recreation (such as hiking, bird-watching, canoeing, kayaking, or fishing).

Corridor Goals and Objectives

The following goals and objectives summarize outcomes sought by the Corridor Plan.

- 1. Improve stream water quality and quantity in all corridor settings: agricultural, residential, urban commercial districts, and natural open space**
 - Reduce/eliminate erosion
 - Reduce/eliminate other non-point source contamination
 - Reduce/eliminate point-source contamination
 - Maximize infiltration to contribute to base flows and reduce runoff

- 2. Improve stream channel and floodplain structure and function**
 - Improve stream bank stability
 - Re-naturalize stream channels where feasible
 - Address structures that interfere with channel stability and quality
 - Protect floodplains and restore natural flood storage

- 3. Improve, stabilize, and connect corridor habitat**
 - Reduce heated storm flow from impervious surfaces, un-vegetated rate control ponds and other contributors
 - Provide stream bank shading
 - Protect natural groundwater inputs (springs, base flows)
 - Protect and restore agricultural wetlands
 - Improve in-stream structure (e.g., pools, riffles, meanders, overhangs)
 - Protect, restore native communities in the corridor
 - Build connectivity through natural corridors

- 4. Build and protect a healthy natural framework for the future**
 - Identify and prioritize areas that are critical for water quality/quantity and habitat functions (e.g., floodplain, critical habitat, buffer zones)
 - Identify and protect sensitive cultural resources
 - Permanently protect high priority critical areas through a variety of public and private approaches, and optimize public protection of urban reaches within the corridor

- 5. Improve quality of life for corridor residents, businesses, and visitors**
 - Provide healthy recreation opportunities in compatible in-stream and upland areas
 - Improve community walkability and connectivity
 - Provide access to experience natural settings within the corridor
 - Promote sustainable economic development opportunities and sustainable alternatives for existing economic enterprises
 - Protect landscape visual quality

- 6. Promote sustainable development patterns within a protected natural framework**
 - Encourage communities to adopt sustainable standards for new development
 - Design community infrastructure to reduce stormwater runoff and maximize on-site infiltration
 - Design communities to cluster urbanization and maximize natural open space
 - Design communities to promote walkability and healthy physical activity

- 7. Optimize efficient placement of new infrastructure into the corridor**
 - Consolidate future River/corridor crossings by bridges and utilities
 - Promote on-site energy production

- 8. Promote continued research of the watershed and corridor**
 - Continue and update biological inventories
 - Develop additional models for watershed level phenomena, such as sediment loading, nutrient loading
 - Continue to expand understanding of the Vermillion's cold water ecosystems
 - Continue to study relationships between groundwater and surface water in the watershed

- 9. Educate and inform the public about the corridor and its goals**

- 10. Build partnerships among Corridor interests to implement the plan and maintain projects**
 - Explore coordination options that:
 - + Identify and address administrative and service-based gaps
 - + Implement the plan over time
 - + Streamline provision of information and permitting for the public
 - + Improve coordination and efficiency among agencies
 - + Monitor progress in plan implementation and benchmark existing plans

- 11. Identify and leverage new funding for corridor projects and maintenance**

Vermillion River Corridor Plan Concepts

The vision for the Vermillion River Corridor seeks a balance between broad public good and individual pursuits, between restoring what once existed and improving the current reality, and between cost and benefit. Within this context of balance, the vision seeks a more sustainable and healthier physical environment that is achievable.

Individual concepts have been developed for water quality, habitat, recreation, and economy that taken together help communicate and illustrate the overall vision for the Vermillion River.

Water Quality Improvement Concept



The Vermillion River is believed to be among the best trophy-class trout streams within a major metropolitan area of the United States. This impressive standing is a foundational factor in water quality objectives for the Vermillion River. Without active steps to improve “business-as-usual,” it is likely that routine practices will cause a decline in the overall water quality and the ability of the River to sustain a trout fishery.

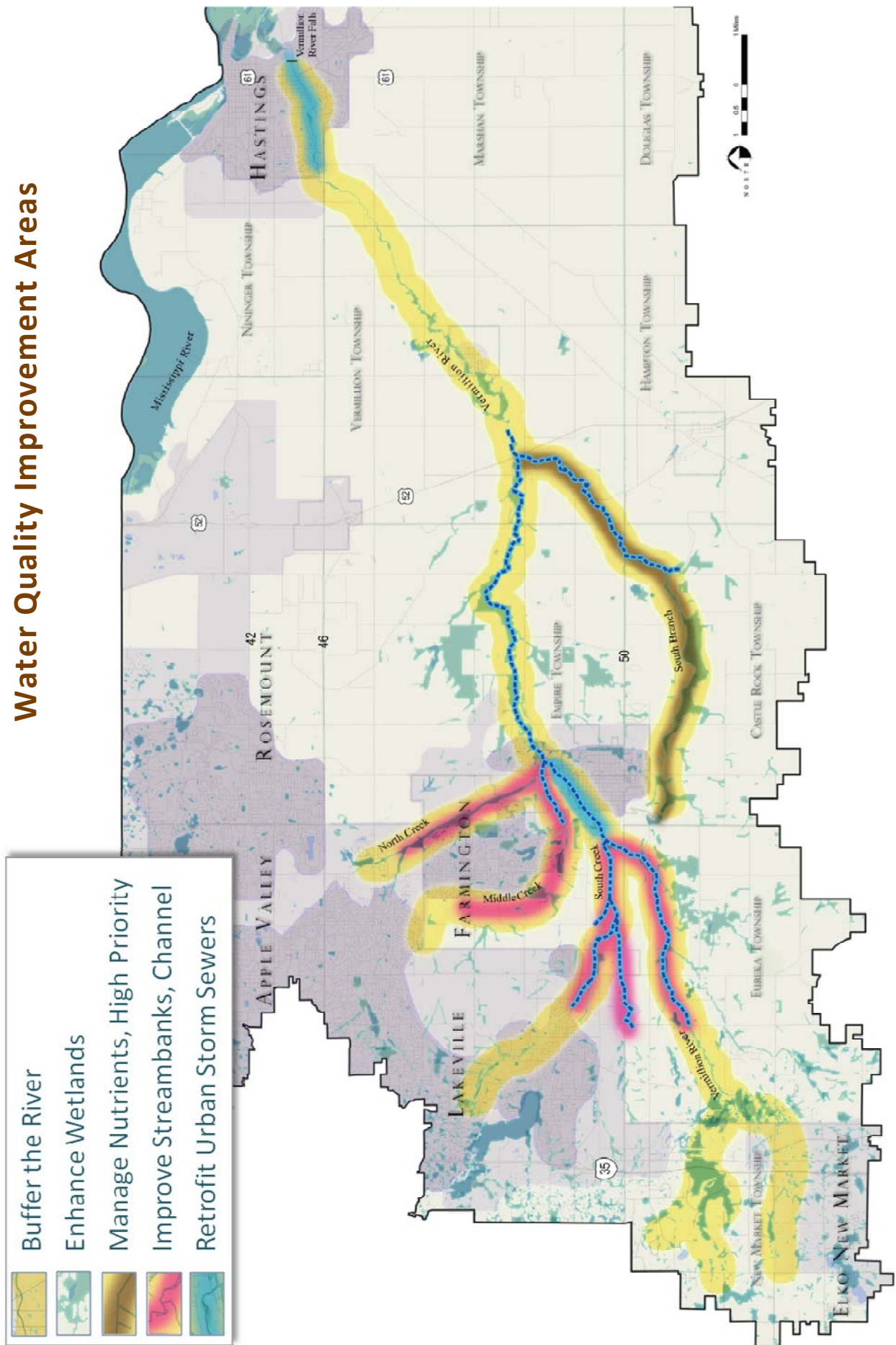
Water Quality Objective: A Stable and Healthy Hydrologic Regime

The water quality objective for the Vermillion River is to create a stable and healthy hydrologic regime – the pattern and quality of rainwater infiltration and stormwater flow reaching the Vermillion River. If the hydrologic regime of the Vermillion watershed can be stabilized and enhanced, even with continued development, better water quality and a resilient cold-water fishery will be major benefits. Healthy trout populations west of Highway 52 is an important indicator of a stable hydrologic regime in the Vermillion River watershed. Critical factors in trout health are water temperature, water clarity, the absence of toxins, the presence of critical native plant and animal communities, and stable river flows.

The *Priority Water Quality* diagram on the next page illustrates resource focus areas for five critical long-term activities that will improve Vermillion River water quality.

Riparian Buffers: A continuous corridor of perennial, native vegetation along the River will significantly reduce runoff sediments and pollutants entering the River. The vision is to establish a continuous riparian buffer of adequate width along full length of the Vermillion River and its tributaries.

Vermillion River Corridor Priority Water Quality Improvement Areas



Wetland Management, Restoration or Enhancement: Most of the natural wetlands in the Vermillion River watershed have been drained or degraded. Improved wetlands play a significant role in stabilizing and enhancing the hydrologic regime. Examples include re-creating drained wetlands, removing sediments from existing wetlands, establishing vegetative buffers around wetlands and restoring native vegetation near and within wetlands.

Nutrient Management: Nutrient-laden runoff from excess fertilizer, plant clippings, and animal waste has a devastating effect on River water quality. Aquifer formations in the eastern watershed are fractured and vulnerable to surface water contaminants, including those in the Vermillion River and its tributaries. Nutrient management, especially for nitrates, is a key initiative in parts of the watershed. Strategies like monitoring nutrient levels in soils and adjusting fertilizer rates, introducing and maintaining perennial vegetation, and no-till farming can reduce nutrient loading to the River.

Streambank and Channel Improvement: In most segments of the River, banks have been significantly altered from their natural state. In some areas, long-standing livestock access has flattened the banks and widened the channel, causing water to be shallow and susceptible to warming – too warm to support trout. In other areas, banks have been engineered in ways that don't support native plants and aquatic species. Targeted streambank restoration, including re-grading slopes, re-meandering the stream, stabilizing erosion, and planting native vegetation will improve water quality.

Urban Storm Sewer Retrofits: Many older developed areas still pipe untreated stormwater directly into the Vermillion River. In some cases, current treatment methods address only some of the critical aspects of stormwater treatment, which include volume control, sediments, pollution and water temperature. Effective stormwater treatment methods to infiltrate rainwater where it falls and cleanse and chill runoff before it can reach the Vermillion River will be critical to River water quality.

The following table lists specific management practices illustrated in the water quality concept diagram that can address the water quality needs identified for specific reaches of the Vermillion River.

Water Quality Management Practices and Benefits						
	Water Clarity	Flow Stability	Essential Aquatic Plants and Animals	Absence of Toxins	Water Temp.	Essential Bacteria
Riparian Buffers	X	X	X	X	X	X
Wetland Improvements	X	X	X	X	X	X
Nitrate Management	X		X	X		X
Bank, Channel Improvements	X	X	X		X	X
Urban Storm Sewer Retrofits	X	X	X	X	X	

Natural Area Stewardship and Protection Concept



The Vermillion River is a unifying feature in the broader landscape. Prior to western settlement, its watershed functioned naturally and maintained equilibrium through natural forces. Plant and animal communities evolved to create an ecological balance that sustained and buffered the Vermillion River. It is well outside of anyone's abilities and outside of anyone's intentions to fully restore the Vermillion Corridor to pristine pre-settlement conditions. However, it is still feasible to create more sustainable and balanced conditions within the Corridor.

Stewardship and Protection Objective: A Healthy Ecological Balance

The natural resource objective for the Vermillion River landscape is to strike a new and healthier ecological balance that is different from pre-settlement conditions, but still creates a healthy context within which the Vermillion River can be sustained. This vision suggests the combination of improved land management and strategic habitat protection and restoration can create protective and resilient natural landscapes that sustain and buffer the Vermillion River.

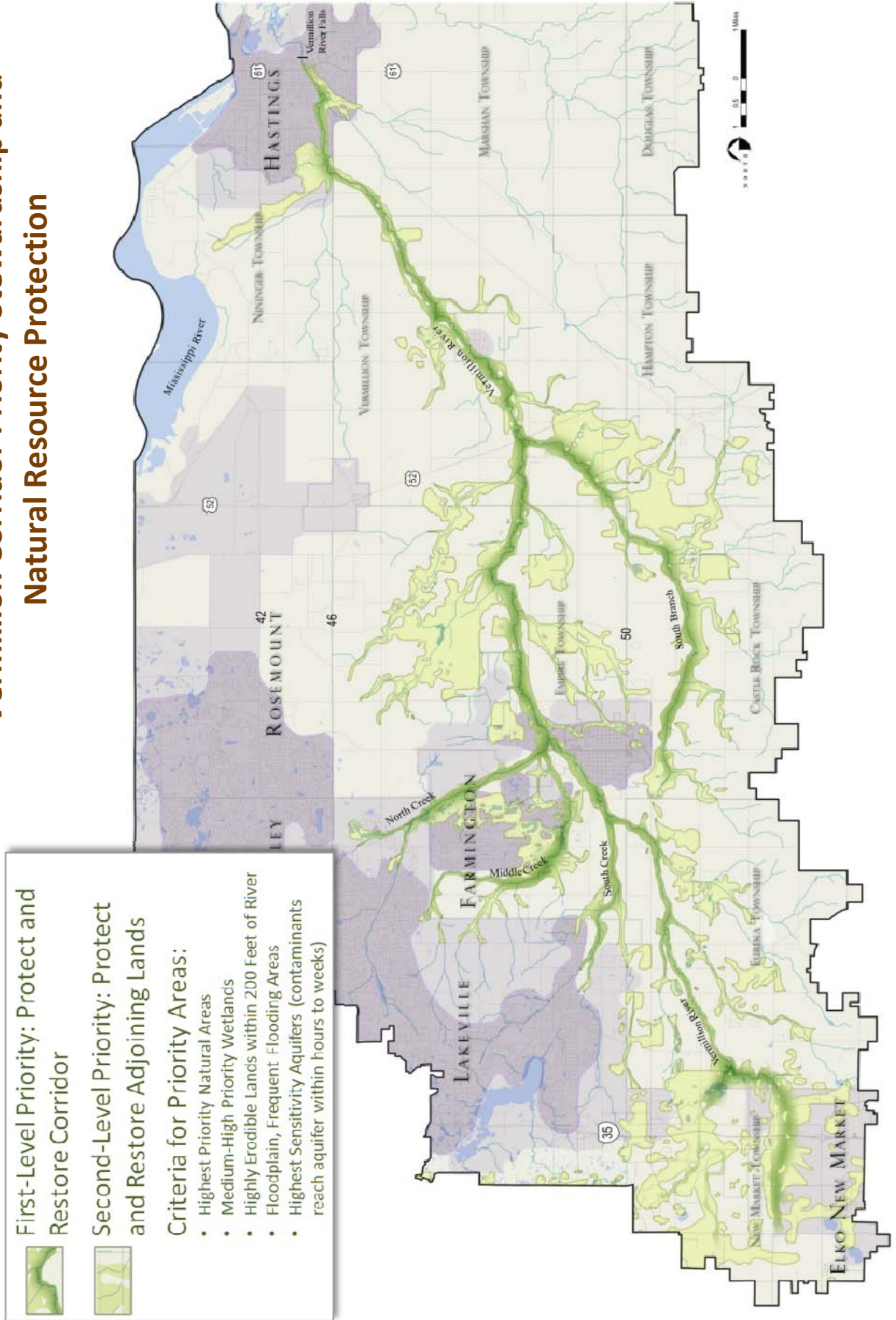
The Priority Stewardship and Natural Resource Protection diagram on the following page highlights the most sensitive landscapes that affect and are affected by the Vermillion River and its tributaries. The diagram identifies two levels of priority.

The Corridor: The first order of priority is restoring habitat of the River corridor itself with continuous native habitat on both sides of the River. This continuous ribbon of varying widths will function as a wildlife corridor and buffer the River from damaging effects like runoff, pollution and invasive species.

Adjoining Sensitive Lands: The next priority is habitat restoration and protection of the most sensitive lands, including uplands that link the River to the broader landscape. These landscapes perform vital functions of preserving habitat, species diversity, and stormwater infiltration and cleansing. Prioritization of these landscapes will be based on several factors including erodibility, aquifer recharge, wetlands, native plant communities, wildlife species of special concern, size, and quality, in addition to landowner interest. Designated wildlife and aquatic management areas and parks are also shown since they provide important refuge for wildlife and native plants, and can support larger-scale restoration projects.

A Healthy Natural Framework: Stewardship of first and second-order landscapes will reestablish a stronger habitat network within which the Vermillion River can exist and thrive in the future. This overall habitat and open space network will have greater resilience and will provide a strong framework for future growth.

Vermillion River Corridor Priority Stewardship and Natural Resource Protection



Recreation Concept



While the first two layers of the Vermillion River vision – water quality and natural resources – represent improvement to the ecological baseline, the next two – recreation and economy – represent positive ways for us to interact with a more resilient River.

Like nearly all river corridors, interest is growing in the Vermillion River as a recreation venue for fishing, canoeing, birding, picnicking, walking, and cycling. River corridors with water access and a healthy natural resource base are strong candidates for investing in public recreation opportunities. As attraction to the River as a recreation amenity increases, the potential for conflicts among private property and recreation interests may increase. Establishing a framework for balanced interests and mutual respect is the key to balancing these varied interests.

Recreation Objective: Connected, Compatible, Supportive Recreation

The recreation objective for the Vermillion River is to facilitate a network of supportive recreation opportunities that enhances actively lifestyles, can co-exist with healthy river ecology and respects private property interests. Although recreation is an integral aspect of the River’s future, not all types of recreation are appropriate for the Vermillion River nor are they appropriate in all stretches of the River.

The following Outdoor Recreation diagram identifies several categories of recreation and the stretches of the River or adjacent landscape where they are intended.

Existing and Future Parks: Local communities within the Vermillion watershed have identified existing or planned parks through their individual comprehensive plans. Local visions for recreation have been integrated into the Outdoor Recreation diagram to understand and build strategic connections for enhanced opportunities to experience the Vermillion River corridor.

Wildlife-Oriented Recreation: Several DNR Wildlife or Aquatic Management Areas are critical components of the Vermillion River corridor vision. These public lands are designated as permanently undeveloped hunting, fishing and wildlife viewing areas. They will be managed for native habitat and wildlife.

Trout Fishing: The portion of the Vermillion River designated by the DNR as a trout stream will be managed for trout fishing as its primary recreational use. This implies that fish habitat values (such as leaving downed trees in the stream) will supersede other recreational interests (such as removing trees for canoe navigation). It also implies that designated public access to the River will be designed to emphasize fishing and supportive uses such as birding and picnicking, opposed to other recreational uses such as canoe or tubing access.

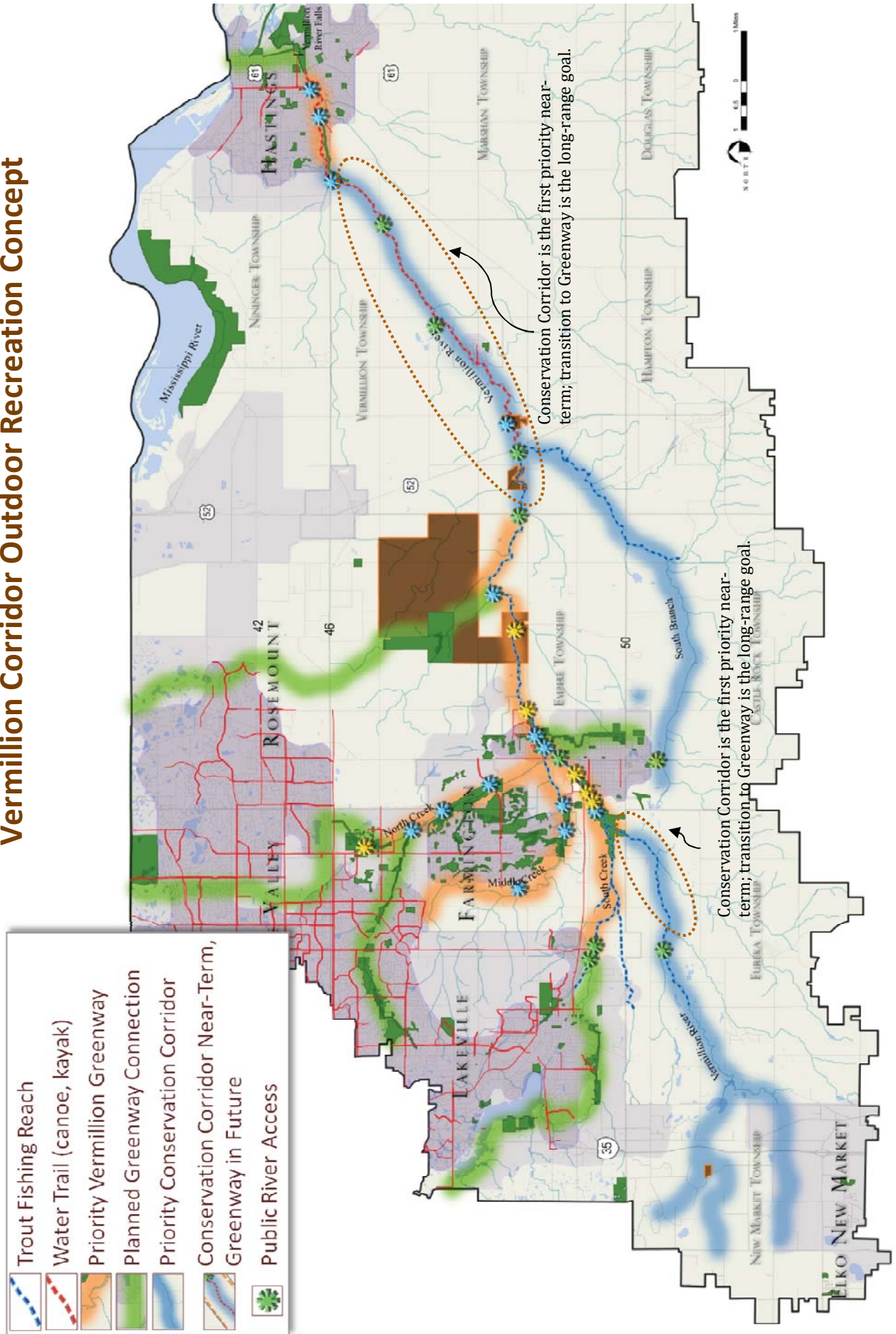
Vermillion River Water Trail: The Vermillion River from near Highway 52 to above the falls in Hastings will be managed as a water trail for canoeing and kayaking. Unlike the designated trout stream, this reach will be minimally-maintained for navigation. To the extent necessary to allow canoe passage, downed trees would be removed from the River channel. Access to the River via public lands will be designed to accommodate canoe and kayak landing, fishing access, as well as associated uses such as birding and picnicking.

Vermillion River Greenways and Key Greenway Connections: The Outdoor Recreation diagram depicts urban reaches of the Vermillion River and connecting corridors beyond the River as “greenways” or multi-functional trail, water quality, and habitat corridors. Greenways promote water and habitat quality, compatible recreation, and non-motorized transportation, and are planned throughout the developed and developing portions of Dakota County. The diagram illustrates planned greenways along the Vermillion River and its tributaries and key connections to the River. As development expands beyond currently-planned boundaries, it is anticipated that conservation corridors (described in the next paragraph) will be re-designated as greenways.

Vermillion River Conservation Corridors: Conservation corridors are public and private lands within rural areas along the Vermillion River and its tributaries that focus primarily on land and water protection and habitat stewardship. For the immediate near-term, conservation corridors are not intended to include recreational trails. Conservation corridors are designated throughout rural portions of Dakota and Scott counties although only those along the Vermillion River and its tributaries are shown in the diagram. For Dakota County, as land adjoining conservation corridors develops, the County will work with townships to transition conservation corridors to greenways with recreational trails. In Scott County, most of the land in New Market Township is planned for rural density residential as an end land use.

Vermillion River Access Sites: Several types of River access have been identified on the diagram. Only opportunities for River access on current public lands are shown. River accesses would be designed differently depending on specific situations, but each would provide parking, access to the River for fishing and/or canoeing/kayaking, and possibly facilities for picnicking or other nature-based recreation.

Vermillion River Corridor Outdoor Recreation Concept



Recreation Features

MAP BACKGROUND:

-  RURAL AREAS
-  URBAN AREAS
-  DEVELOPING AREAS (2030 COMP PLANS)
-  EXISTING CITY SIDEWALKS AND PATHS

NEAR-TERM RECREATION FEATURES:

-  EXISTING AND FUTURE PARKS (2030 COMP PLANS)
-  WILDLIFE ORIENTED RECREATION (HUNTING, FISHING, VIEWING)

 TROUT FISHING

 WATER TRAIL - CANOEING AND KAYAKING

 VERMILLION RIVER GREENWAYS - NEAR TERM: GREENWAYS (PUBLIC HABITAT/TRAIL CORRIDORS) ALONG THE VERMILLION RIVER AND ITS TRIBUTARIES THAT EXIST OR ARE DESIGNATED IN LOCAL COMPREHENSIVE PLANS.

 PLANNED AND EXISTING GREENWAY CONNECTIONS: KEY REGIONAL GREENWAYS (PUBLIC HABITAT/TRAIL CORRIDORS) EXTENDING FROM THE VERMILLION RIVER AND ITS TRIBUTARIES THAT EXIST OR ARE DESIGNATED IN LOCAL COMPREHENSIVE PLANS.

 VERMILLION RIVER CONSERVATION CORRIDORS - NEAR TERM: PUBLIC AND PRIVATE LANDS ALONG THE VERMILLION RIVER AND ITS TRIBUTARIES EARMARKED FOR ENHANCED STEWARDSHIP.

SELECTED CONSERVATION CORRIDORS:

Conservation Corridor is the first priority near-term; transition to Greenway is the long-range goal.

RIVER ACCESS

-  PUBLIC RIGHT OF WAY OR UTILITY (ROADSIDES, PUBLIC WORKS)
-  PUBLIC LAND (PARK, AQUATIC, OR WILDLIFE MANAGEMENT AREA)
-  POTENTIAL/FUTURE ACCESS ON PARKS AND PUBLIC LANDS

A Vibrant Economy



While the Vermillion River landscape has few economic activities built around the presence of the River today, with time and investment, those who see an economic, market and lifestyle niche could be drawn to the Vermillion River landscape. The Vermillion River may be an unrealized natural amenity that, with investments in water quality, habitat and recreation, could become the foundation for an emerging, sustainability-focused micro-economy.

Provide a strong natural framework: the first economic objective for the Vermillion River is to first strengthen its quality as a natural and recreational amenity that can support a diverse range of private economic investments and pursuits that sustain value over time.

Grow a river-centric sustainable micro-economy: the fact that the Vermillion River landscape is largely rural, within a metro-area and possesses a compelling riverine ecosystem could offer a market advantage in areas like sustainable agriculture and industry, farm-to-market foods, recreation services and potentially farm-stay tourism. Demand currently exists for all of these economic pursuits. This economic vision ultimately relies on creating a corridor with high water quality, habitat, and open space within a restored corridor ecosystem.

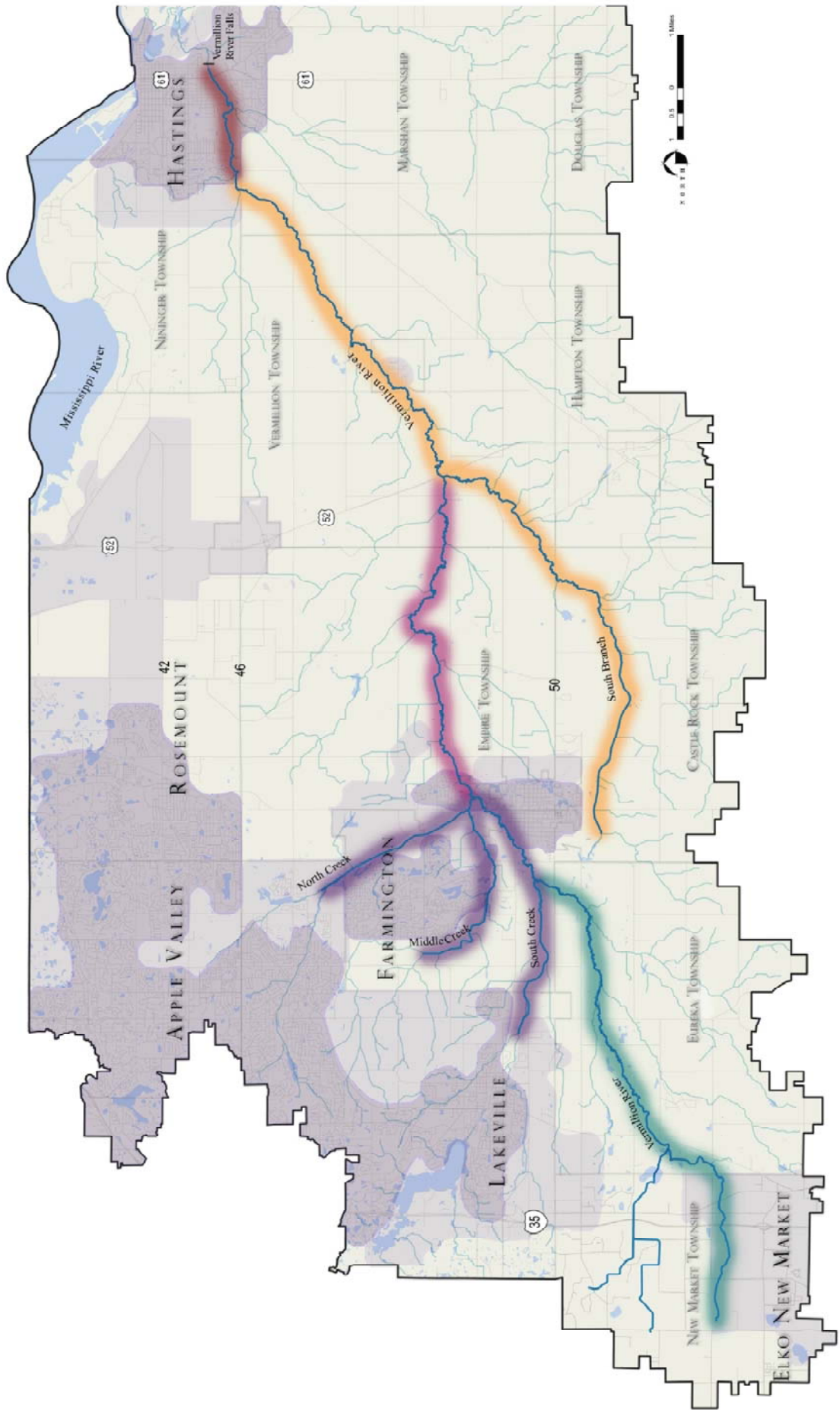
The vision of a **high quality and resilient Vermillion River Corridor** is built upon water quality, natural resource protection, recreation and economy, and this vision is greater than the sum of its parts.

Stable hydrologic regime +
Healthy ecological balance +
Supportive recreation +
River-centric sustainable economic growth =
High quality, resilient Vermillion River Corridor

Priorities for Distinct Geographic Areas of the Corridor

This layered vision includes priorities that apply differently to different reaches of the Vermillion River corridor. The following map illustrates the application of key priorities to the five distinct geographic areas of the River, from west to east: **Headwaters** (Eureka and New Market townships, rural residential and agriculture), **Lakeville and Farmington** (urban), **Empire Township** (rural, with large public open space areas), **Castle Rock, Vermillion, and Marshan townships** (rural agriculture), and **Hastings** (urban).

Vermillion River Corridor Priorities by Geographic Planning Area



Summary of Corridor Priorities by Geographic Planning Area

Along the Vermillion Corridor, priorities vary with land use; local interests and needs; and conditions related to river characteristics, water quality, habitat, and public recreational use. The following table summarizes priorities by geographic planning area:

Vermillion Corridor Geographic Planning Area Priorities		Headwaters	Lakeville-Farmington	Empire	Castle Rock, Vermillion, Marshan	Hastings
(through the combined efforts of local, regional, state agencies and private landowners)						
General Strategy	In cities and next to Vermillion Highlands near-term, seek public ownership of corridor land via land dedication and purchase from willing sellers.		X	X		X
	In rural areas, enhance protection of corridor via cooperative landowner easements and best practices near-term.	X		X	X	
	Partner with landowners on water quality and habitat improvements	X	X	X	X	X
	Work with government entities to: <ul style="list-style-type: none"> • Lessen negative impacts and expand river-related benefits of infrastructure • Utilize public land for better River access • Improve natural resource management on corridor public lands 	X	X	X	X	X
Water Quality	Expand, enhance River wetland buffers using native plant communities	X	X	X	X	X
	Restore wetlands, stream banks, and channel to more natural states	X	X	X	X	X
	Increase stormwater infiltration	X	X	X	X	X
	Minimize negative impacts of drain tile outlets and ditches	X		X	X	
	Retrofit urban stormwater infrastructure to enhance River quality		X			X
	Plan and create larger scale streambank and channel improvements		X	X		X
	Seek greater reduction in nitrate levels				X	
Habitat	Protect and restore wetlands	X	X	X	X	X
	Enhance thermal protection of designated trout stream	X	X	X	X	
	Strengthen native plant communities in corridor	X	X	X	X	X
	Combine opportunities for corridor habitat improvement with economic benefits	X	X	X	X	X
	Protect, connect, and manage upland natural areas	X	X	X	X	X
	Plan and conduct large-scale habitat and wetland protection, restoration, enhancements on public lands			X		
Public Recreation	Provide River access points on public lands and roadway rights of way	X	X	X	X	X
	Develop regional greenways with trails in urban and developing areas, near-term		X	X		X
	Connect local trails to corridor regional greenways		X	X		X
	Manage adjacent public lands to enhance the corridor		X	X		X

Chapter 4: Putting the Plan into Action

In contrast to implementing a capital improvement plan or road improvement in a planned sequence, the Vermillion River Corridor Plan vision will rely on strategic and opportunistic approaches. Strategic approaches will focus on identified and demonstrated water quality and habitat needs and will be implemented through targeted outreach and project development efforts with the public and private sector. Opportunistic approaches will work with willing private landowners and public partners on a project solicitation and evaluation basis. Coordinated public agency projects and management efforts will continue over the long-term.

Implementation Principles

The following key principles speak to how new and ongoing efforts will implement the Corridor Plan vision over time:

- **Development of an Effective Coordination Framework:** Chapter 5 identifies key coordination roles
- **Collaboration** among public agencies, private landowners, and non-profit organizations to 1) integrate efforts related to water quality, habitat protection, recreation, and building a resilient development framework; and 2) implement and sustain corridor projects
- **Public Education** to increase awareness and understanding about the River, project and assistance opportunities, and existing regulations
- **Leveraging Investment Resources** from existing and new sources, public and private
- **Identification, Prioritization, and Development of Projects** by building opportunities for corridor enhancement into existing efforts, defining project funding criteria, and allocating resources for project development
- **Ongoing Maintenance and Monitoring** of projects over time to protect initial project investments and gain insight on potential improvements in methods
- **Effective Enforcement of Regulations:** Regulations are intended to preserve key public values, and therefore must be well-crafted, understandable by the public and those that enforce them, and enforced in a consistent and equitable manner.
- **Development Review:** Review development proposals and identify opportunities to achieve goals through incentives and other approaches.

Potential Project Approaches

Potential implementation approaches are outlined below for private landowners and the public sector to develop Corridor enhancement projects and adopt best practices:

Individual Projects and Best Practice Implementation

Individual land management decisions, taken in the cumulative across many properties, can significantly improve the River corridor. Private landowner efforts to protect water quality and habitat are vital to the vision of a healthier Vermillion River Corridor. Landowners in the Corridor are encouraged to undertake stewardship projects (such as buffer strip installation or streambank stabilization) and adopt best management practices (such as reduced tillage or soil nutrient management practices). This can best be accomplished through incentives, such as cost-sharing and technical assistance from public agencies and nonprofits.

Small Area Projects with Multiple Landowners

Similar to individual projects, a small-area approach could strategically engage groups of landowners to work together with a coordinating entity to improve a stretch of the River and address high priority issues. This approach would work well on:



Streambank Stabilization Project

1. High priority issues that are common throughout an extended reach with known water quality problems related to inadequate buffering, unstable or eroding banks, or lack of stream shading.
2. Problems that would involve several properties to achieve a stable and sustainable solution, such as a channel restorations to improve low dissolved oxygen levels.

Demonstration Projects

Seeing how a best practice or enhancement project looks and understanding how it works can be very helpful for landowners and agencies considering similar practices or projects. Landowners and agencies that are willing to share information with others can effectively communicate the benefits, costs, and lessons learned from a specific project or practice. Projects can range from individual landowner improvements to urban development or redevelopment projects, major restorations, and infrastructure improvements that incorporate corridor enhancement elements. Partner organizations can also assist with information sharing and evaluation of the effectiveness of a practice or project over the long-term.

Integrated Development and Re-Development Solutions

Developers have a unique position among private landowners, as their work can permanently affect adjacent and on-site natural resources at a large scale. Incorporating development design techniques that address sensitive natural resources and systems, on-site and off-site, can be incorporated to a greater degree in project planning. Addressing these considerations in the development process often yields higher quality development that sustains value over time, by creating places that the public recognizes as quality place to live or work, and reducing mitigation costs related to countering rather than working with natural systems.

Examples include Conservation Design, which maximizes open space in a development project, and Low-Impact Development (LID), which integrates stormwater infiltration in design and relies less on engineered solutions to move stormwater off the project. Developer collaboration with local municipal zoning authorities is essential to the success of environmentally sensitive designs. Cities are encouraged to incorporate environmentally-sensitive design standards into city planning and zoning ordinances. Scott County now provides incentives for Planned Unit Development (PUD) in its unincorporated areas to encourage conservation design and LID, as an example of how this can be accomplished.

Public Sector Corridor Preservation Approaches

Several cities in the Corridor have actively protected portions of the riverway and its major tributaries as an amenity and framework for high-quality development. The Corridor vision calls for continuing public efforts to protect urban reaches for public benefit and access, using a variety of tools, such as park dedication, development guidelines, ordinances, fee acquisition, conservation easements, Transfer of Development Rights, deed restrictions, covenants, developer agreements, and potentially, Official Mapping.

As rural parts of the Corridor urbanize, this Plan seeks timely protection of the riverway, i.e., transition from private conservation corridor to public greenway before subdivision to large lot rural residential parcels occurs or land prices rise. Rural subdivision ordinances with specific provisions for protecting river corridors and other tools such as park dedication can help townships address subdivision of riverfront properties.

Joint Planning Initiatives

Collaborative planning is a cornerstone approach to implementing the Corridor Plan. Consideration of Corridor enhancement opportunities for multiple benefits should be a consistent element of project planning and review. Dakota County and partnering cities prepared the ***Greenway Guidebook*** to develop an approach and joint roles for cities and the County in collaborative planning, design, construction, funding, and operations of regional greenways. The guidebook is based on principles that could apply to other joint planning projects.

Major Restoration Projects:

Restoration projects can include re-meandering straightened reaches, installing trout-friendly habitat, and restoration of native or natural landscapes. Some efforts are landscape-level projects that require sufficient shoreland and are may be easiest to accomplish on publicly-owned lands. Other effective restoration practices can be accomplished within a small area. All practices require appropriate technical skills.

Implementation Resources

Online Resource for Best Management Practices

This Plan seeks greater adoption of “best practices” that improve water quality and wildlife habitat, and provide appropriate recreation in the Corridor. Practices are intended to be implemented by willing landowners and local governments, in priority locations that will improve the Corridor in multiple ways.

An online resource was developed to provide a searchable database of practices with descriptions, information, and cost-sharing and technical assistance resources. Landowners can also upload imagery and information about their own project and practice implementation to the website, as demonstrations for others to view. This resource is online at: <http://www.improvethevermillionriver.org>.

Home Best Practices Funding Technical Assistance Search

Vermillion River Corridor Handbook

Improving the corridor together

About the Handbook sticky

This website is one outcome of the [Vermillion River Corridor Plan](#) and draws from the [Vermillion River Watershed Handbook](#). It is designed to be a resource for landowners as well as local government officials to learn about the watershed, and ways in which they can protect and enhance it. This is also a resource to match landowners and other project proposers with [technical assistance](#) and potential [funding sources](#).

Get Started:

RIVER-FRIENDLY PRACTICES TECHNICAL ASSISTANCE FUNDING

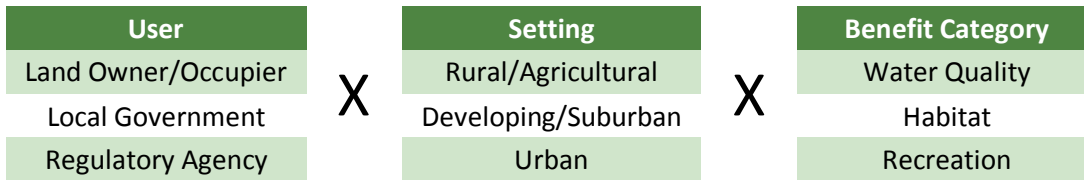
ON THE MAP:
See existing projects

LEARN MORE ABOUT:

- The Watershed
- Backyard conservation
- Agricultural Resources
- Fishing the Vermillion
- Volunteering

The practices were adapted from the [Vermillion River Watershed Handbook](#) developed by Dakota County SWCD and the MN DNR. Practices were also identified during the planning process, through review of corridor plans nationwide and review of state and local practices. Practices were refined through the Corridor Plan public workshops. Participants were asked to review practices for applicability to their property, suggest new practices or provide input on how practices could be improved.

Best practices were identified for urban, suburban and rural/agricultural settings and further classified by identified benefits (habitat, water quality and recreation). Practices can be searched by user type, land use, and benefit category. Practices can fall under more than one category (e.g., rural and suburban).



Workshop participants expressed strong interest in additional funding and technical assistance to implement best practices on their property. The website has added contact information and links to organizations that can supply technical assistance. For each best practice, relevant funding sources are identified with information about eligibility and the application process. Funding sources were identified from Dakota County, the watershed district and state and federal programs.

Pilot Projects

Many beneficial projects, large and small, have occurred over the years along the Vermillion River and its tributaries. In many cases, projects have been small and single-purpose with limited value to the overall corridor. More recently, large-scale, collaborative projects have provided multiple benefits. A specific goal of this planning process was to identify and implement on-the-ground projects that:

- Demonstrate more effective integration of water quality, wildlife habitat, and recreation benefits into single projects; and
- Demonstrate more effective project implementation mechanisms, including budgeting and funding, among traditional and non-traditional partnerships.

With over \$500,000 of pilot project funding available and several high quality pilot projects identified prior to plan development, it could have been advantageous to spend the funds early in the project to ensure that project deadlines were met. Long-term success of new project implementation methods will depend on partnerships that function well after the corridor plan is developed. As a result, the project team was committed to completing the plan before selecting projects to ensure that these projects would truly illustrate the

outcomes of the plan. During the planning process, project suggestions were solicited from participants. All Corridor landowners will be re-contacted to evaluate their project interest.

The goal of the pilot projects will be to strategically protect 125 acres of high quality resource land within the Corridor through fee title or easement and restore 40 acres of protected resource land to a more sustainable and resilient condition.

Partners for Collaboration

Many agencies and organizations have been actively involved with efforts to improve the Vermillion River, its watershed, and the corridor, and will continue to work to protect the River in the future. Future collaboration partners could include:

- Vermillion River Watershed Joint Powers Organization
- Scott County Natural Resources Department and Parks Department
- Dakota County Farmland and Natural Areas Program, Parks and Open Space Department, and Water Resources Department
- Dakota County SWCD and Scott County SWCD
- Local Corridor Communities: cities and townships
- MN DNR
- Non-Profit Environmental Organizations: Friends of the Mississippi River, Great River Greening, Audubon Society, Sierra Club
- Civic organizations: Chambers of Commerce, Rotary Clubs
- Scouts and other youth organizations
- Faith-based groups
- Sportsmen: Trout Unlimited, Pheasants Forever, and Dakota Habitat Alliance
- Volunteer Organizations: Vermillion River Stewards
- Academic Institutions: University of Minnesota, Dakota County Technical College, School of Environmental Studies (Apple Valley), and local high schools



Vermillion River Bend

Prioritizing Corridor Projects

The goals of the Vermillion River Corridor Plan are to protect and improve water quality and wildlife habitat, integrate recreational opportunities, and promote economic health within the Vermillion River watershed. To help ensure that projects selected are aligned with these goals, they will be evaluated using the following criteria.

Category	Criteria (Note: Point values to be set for each criterion)
Potential to Protect and Improve Water Quality	Reduces sediments, nutrients, chemicals, and bacteria related to documented impairments and corridor location
	Improves stream channel stability and functions consistent with current geomorphic assessments
	Improves wetland and/or floodplain functions
	Reduces water temperature in designated trout stream and upstream
	Mitigates drain tile impacts
	Achieves buffer objectives
Potential to Protect and Improve Wildlife Habitat	Natural area significance: Regional, County, Corridor, Local
	Length of shoreline <u>and</u> acreage amount (urban and rural)
	Proximity to protected lands
	Landowner's current/previous commitment to stewardship
	Improves in-stream habitat quality
	Improves shoreline and riparian habitat quality
Enhances Natural Resource-based Recreation	Improves upland habitat quality
	Improves upon previous public recreational investments
	Improves public River access
	Improves fishing opportunities
	Improves canoeing/kayaking opportunities
	Provides new trail opportunities
Financial	Improves interpretative/educational opportunities
	Leverages other resources or cost share
	Total project cost
	Landowner commitment to future stewardship
	Part of a more sustainable economic/residential/agricultural development project
	Potential to reduce long-term public costs
Other	Level of private partnerships in addition to landowner involvement
	Level of documented public support
	Level of threat/urgency
	Project readiness and/or difficulty
	Applicability as a model for other projects/areas
	Aesthetic/scenic qualities as viewed by the public

Vignettes for Urban, Developing, and Rural Settings

To illustrate how the Vermillion River landscape could transform over time through the implementation of best practice techniques, a series of before and after vignette sketches were created. The vignettes illustrate hypothetical landscapes in three typical settings found in the Vermillion River landscape – urban, developing and rural. Each depicts the application of various best practices ranging from tried-and-true to innovative.

Perhaps the most important message that the vignettes communicate is the potential to achieve multiple benefits. To varying degrees, each design technique carries multiple benefits for water quality, habitat, recreation and economy. The vignettes illustrate how a critical mass of techniques appropriately applied will not only address core values, but also have the power to aesthetically transform the landscape in positive ways.

Each “after” vignette illustrates a set of best practice techniques. Not all techniques are appropriate in all situations, so it is important to cluster techniques to have the greatest impact on the Corridor Plan targeted benefits: water quality, habitat, compatible recreation, and a resilient natural framework for growth and economic development.

Rural Environment

The design approach to the rural environment is focused on minimizing the impact of agricultural operations to significantly enhance water quality and habitat value. It also demonstrates diversification of the farm operation through alternative crops and agrotourism.

Urban Environment

Because it is already developed, the design approach to the urban environment must be a targeted one. Design techniques focus on property and infrastructure-based rehabilitation to address issues of stormwater quality, heat-island reduction, and micro-habitat.

Developing Environment

The design approach to the developing environment suggests how greenways can be protected and woven into the development pattern. This could be done through a combination of protection at the time of new development and strategic alterations in existing neighborhoods. The keys are habitat connectivity along stream corridors and upland stormwater infiltration/treatment.

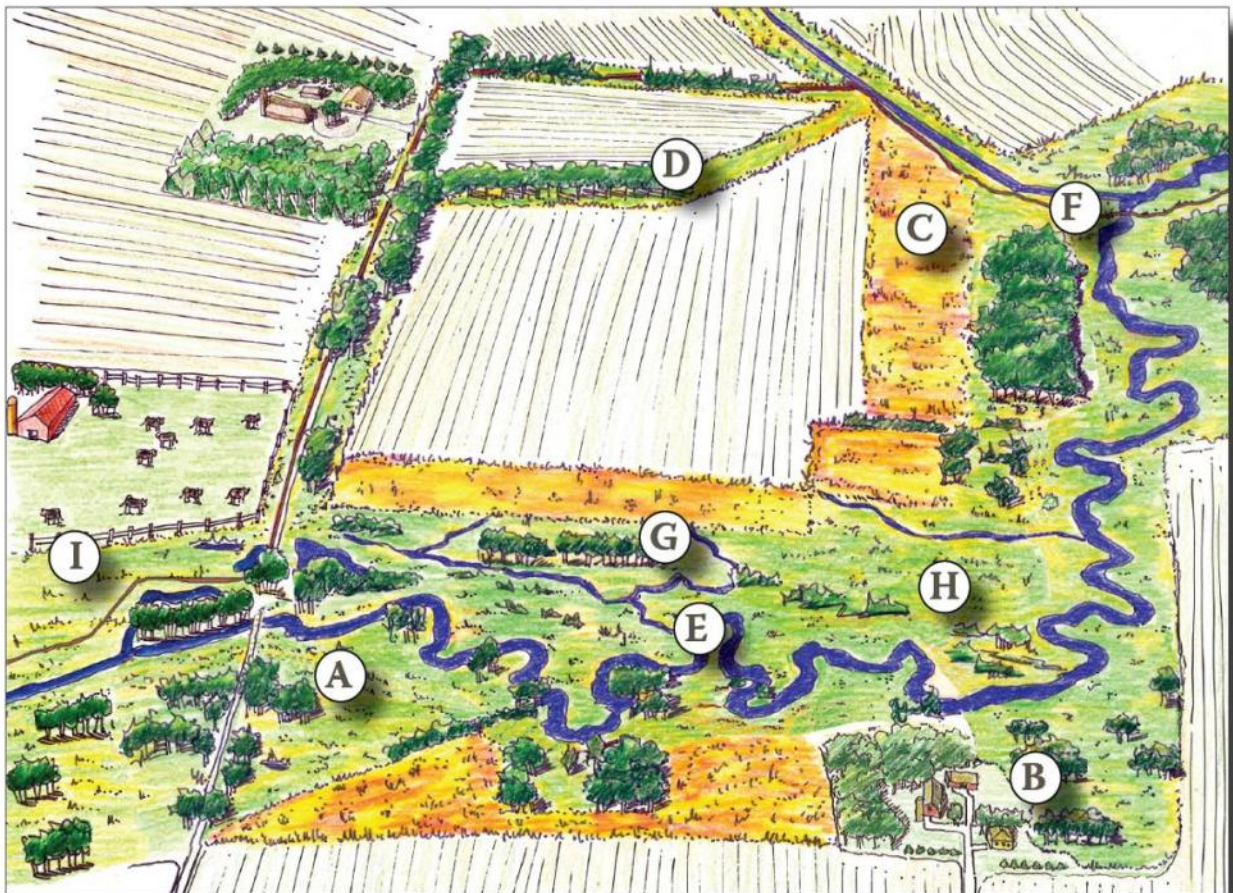
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RURAL ENVIRONMENT

DESIGN APPROACH

These hypothetical illustrations depict how multiple design techniques can be applied to a landscape to achieve a full range of community values.

TODAY



FUTURE

TECHNIQUES

These images from other places depict how the highlighted techniques may look in the landscape.

A ENHANCED STREAM BUFFER
width and plant type



F CONSERVATION CORRIDOR
habitat, tourism, recreation,
could include trail



B SENSITIVE LANDSCAPE PRACTICES
native landscaping, smaller lawns,
minimal chemicals



G WATER DIVERSION
overland flow vs. tiling



C ALTERNATE CROPS
permanent cover - no tilling



H HABITAT RESTORATION
prairie, wetlands, woods



D EROSION CONTROL
vegetated buffers, grass swales



I LIVESTOCK MANAGEMENT
manure management, separate from
streams/wetlands



E STREAMBANK STABILIZATION/
SHADING



URBAN ENVIRONMENT

DESIGN APPROACH

These hypothetical illustrations depict how multiple design techniques can be applied to a landscape to achieve a full range of community values.

TODAY



FUTURE

TECHNIQUES

These images from other places depict how the highlighted techniques may look in the landscape.

- A** SENSITIVE LANDSCAPE PRACTICES
native landscaping, smaller lawns,
minimal chemicals



- F** GREENWAY/TRAIL CORRIDOR
alternative transportation, recreation



- B** RAINWATER REUSE
cistern-fed or passive irrigation
systems



- G** HABITAT RESTORATION
prairie, wetlands, woods



- C** PERVIOUS PAVEMENTS



- H** GREEN ROOFS



- D** BOULEVARD LANDSCAPING & TREES



- I** STREAM ACCESS



- E** STORMWATER MANAGEMENT
within streetscape



- J** RAINWATER GARDENS/
BIO-SWALES

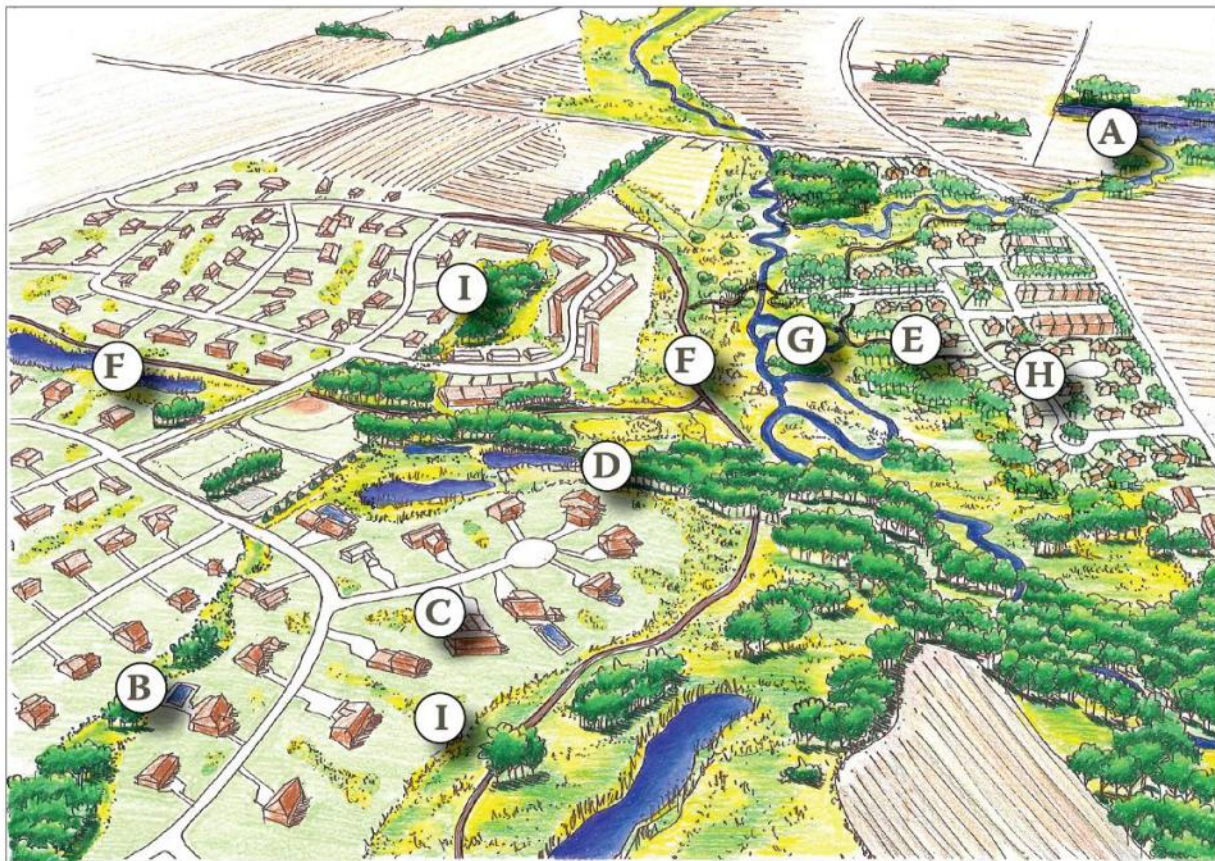


DEVELOPING ENVIRONMENT

DESIGN APPROACH

These hypothetical illustrations depict how multiple design techniques can be applied to a landscape to achieve a full range of community values.

TODAY



FUTURE

TECHNIQUES

These images from other places depict how the highlighted techniques may look in the landscape.

A HABITAT RESTORATION
prairie, wetlands, woods



F GREENWAY/TRAIL CORRIDOR
alternative transportation, recreation



B STORMWATER STORAGE & INFILTRATION
backyards & communal open spaces



G STREAM ACCESS



C SENSITIVE LANDSCAPE PRACTICES
native landscaping, smaller lawns,
minimal chemicals



H PERVIOUS PAVEMENT



D STREAMBANK STABILIZATION/
SHADING



I RAINWATER GARDENS/
BIO-SWALES



E OPEN SPACE NEIGHBORHOOD
DESIGN



Case Examples

The following pages include case examples that demonstrate water quality, habitat, and recreation enhancement planning and projects conducted in partnership approaches.

Case Example #1 – Joint Planning:

Case Example #2 – Restoration:

Case Example #3 – Infrastructure:

Case Example #4 – Development Studies:

Greenway Guidebook

North Creek Channel Rehabilitation

Hastings Ravine Improvement

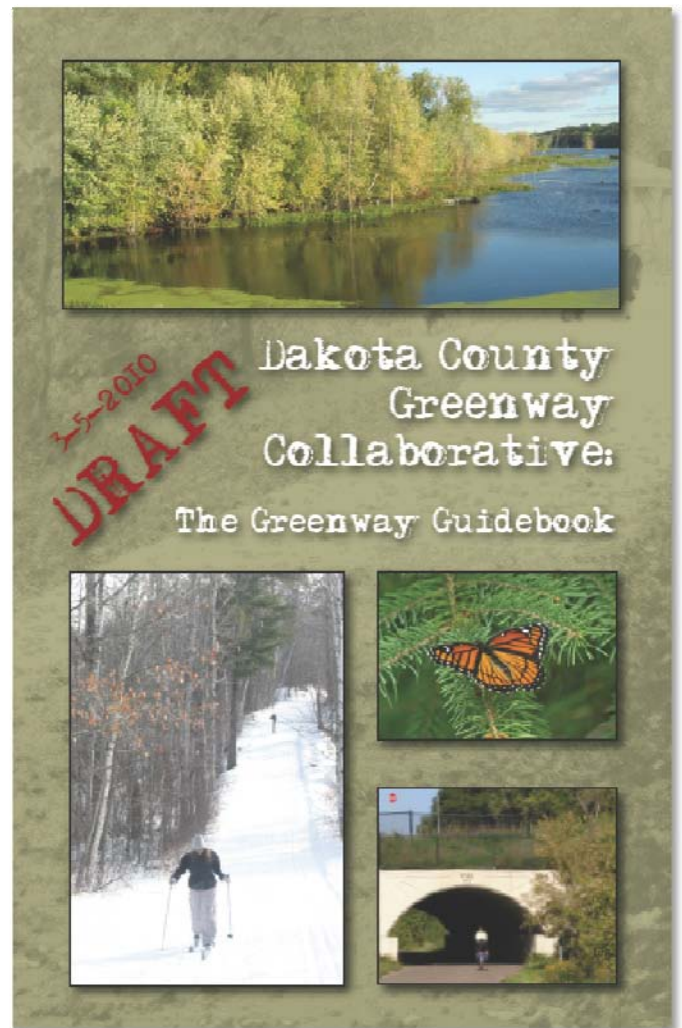
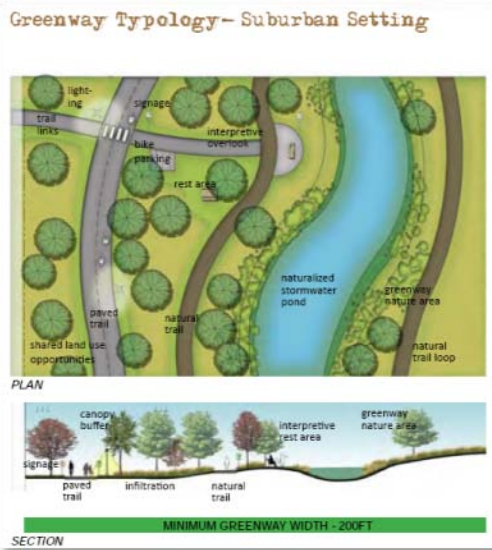
Graduate Student Project

Case Example #1: Joint Planning

The **Greenway Guidebook** is the product of a collaborative planning effort that included staff from Dakota County and the cities of Apple Valley, Burnsville, Eagan, Farmington, Hastings, Inver Grove Heights, Lakeville, Rosemount, South St. Paul, and West St. Paul.

The Guidebook outlines a collaborative framework for planning and operating regional greenways, and is organized around key activities for developing successful greenways:

- Funding and Governance
- Land Protection and Stewardship
- Greenway Design
- Construction and Operations



[View the Greenway Guidebook online.](#)

Case Example #2: Restoration



Capital Improvement Project



Farmington: North Creek Channel Rehabilitation

This restored stream meander was planted with native vegetation stabilizing the stream banks, preventing erosion, and providing habitat for wildlife.

A project completed cooperatively between

- City of Farmington
- Dakota County Soil & Water Conservation District
- Vermillion River Watershed Joint Powers Organization

Put the bends back into North Creek to reduce erosion

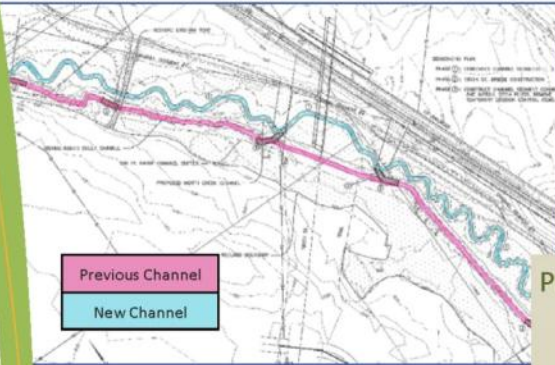
Decades ago, North Creek, a tributary of the Vermillion River flowing through Farmington, was straightened. However, a creek's natural curves or meanders reduce the water's energy, slow the stream flow, and reduce erosion.

The City of Farmington approached the Vermillion River Watershed Joint Powers Organization (VRWJPO) in 2007 to discuss recreating a winding course (remeandering) and restoring 3,200 feet of the straightened North Creek channel. Cost-share funding from the VRWJPO enabled the City of Farmington to complete this project in the fall of 2009 at the same time as the City's 195th Street improvement and extension project.



The project involved channel restoration, stream bank stabilization, and seeding and planting with native vegetation—all of which will improve stormwater conveyance, improve water quality and habitat, and prevent erosion.





Problem:

- Straightened stream reach allows bank and channel erosion and provides poor wildlife habitat

Actions:

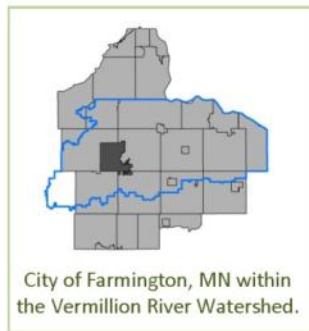
- Remeander and restore 3,200 feet of straightened North Creek channel
- Incorporate this project's work with the 195th Street Extension Project
- Use native plants and willow live-staking to stabilize stream banks

Benefits:

- Reduces erosion
- Improves in-stream and riparian (streambank) habitat
- Dissipates stream's energy and excess sediment transport
- Improves aesthetics
- Protects water quality
- Helps maintain stream temperature
- Provides flood control
- Allows for education, outreach, and stewardship

Costs and contributions:

- City of Farmington: \$392,493 – project cost
- Vermillion River Watershed Joint Powers Organization: \$100,000 – cost share
- Dakota County Soil and Water Conservation District: design and construction technical assistance



City of Farmington, MN within the Vermillion River Watershed.



Vermillion River Watershed
 Joint Powers Organization
 14955 Galaxie Avenue
 Apple Valley, MN 55124
www.dakotacounty.us
 952-891-7000

The Vermillion River is a vital natural resource that is important to public health and recreation, as well as to preserving unique wildlife habitats. It flows from New Market Township in Scott County, through residential and agricultural areas in central Dakota County, and cascades into a 100-foot ravine before it enters the Mississippi River near the Cities of Hastings and Red Wing, Minnesota. Throughout its journey, the river reflects urban and rural life within its 335-square mile watershed.



Project completed October 2009

Case Example #3 – Infrastructure:



Capital Improvement Project



Hastings: Hastings Industrial Park Ravine Stabilization and Restoration

Reducing Sediment from Entering the Vermillion River

The Industrial Park Ravine in the City of Hastings was re-graded and stabilized using a turf reinforcement mat. A pond was constructed at the top of the ravine to control the flow rate in the ravine and provide settling of runoff sediment.

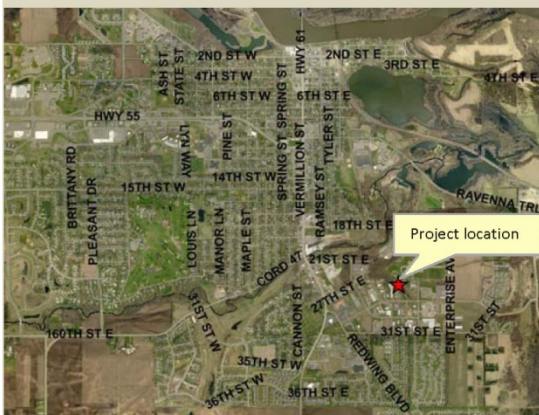
Stormwater flow caused significant erosion, ten to 12 feet deep in places, in the 2,200-foot long ravine adjacent to Spiral Boulevard in Hastings. Sediment- and nutrient-laden waters drained into the Vermillion River. That reach of the Vermillion River is currently impaired for turbidity (cloudiness).

The project was completed cooperatively by the:

- City of Hastings
- Dakota County Soil and Water Conservation District
- Vermillion River Watershed Joint Powers Organization

Cost-share funding from the Vermillion River Watershed Joint Powers Organization enabled the City of Hastings to re-grade and stabilize the ravine, prevent further erosion, build a treatment pond, and reduce sediment from entering the Vermillion River. The ravine was stabilized with a turf reinforcement mat to prevent erosion and promote the growth of grass and other vegetation in the ravine.

The project will reduce the amount of sediment entering the Vermillion River and will help address the turbidity impairment.





**Vermillion River Watershed
Joint Powers Organization**
14955 Galaxie Avenue
Apple Valley, MN 55124
www.dakotacounty.us
952-891-7000

The Vermillion River is a vital natural resource that is important to public health and recreation, as well as preserving unique wildlife habitats. It flows from New Market Township in Scott County, through residential and agricultural areas in central Dakota County, and cascades into a 100-foot ravine before it enters the Mississippi River near the Cities of Hastings and Red Wing, Minnesota. Throughout its journey, the river reflects urban and rural life within its 335-square mile watershed.

Problem:

- Stormwater flow caused erosion in the ravine adjacent to Spiral Boulevard
- Large amounts of sediment have been delivered by the eroding ravine to the Vermillion River
- Approximately 230 acres of a mostly developed watershed has drained to the ravine with minimal water quality treatment
- The ravine drains to a reach of the Vermillion River where a turbidity impairment exists

Actions:

- Re-grade and stabilize approximately 2,200 feet of highly eroded ravine draining to the Vermillion River
- Install turf reinforcement mat to prevent further erosion and promote vegetation growth
- Install pond at the top of the ravine to control flow rate and allow settling of runoff sediment

Benefits:

- Addresses turbidity impairment in Vermillion River
- New bike trail parallels ravine and allows for public viewing and enjoyment
- Allows for education, outreach, and stewardship

Costs and contributions:

- City of Hastings: \$284,065 – engineering and labor
- Vermillion River Watershed Joint Powers Organization: \$125,000 – cost share
- Dakota County Soil and Water Conservation District: design and construction technical assistance



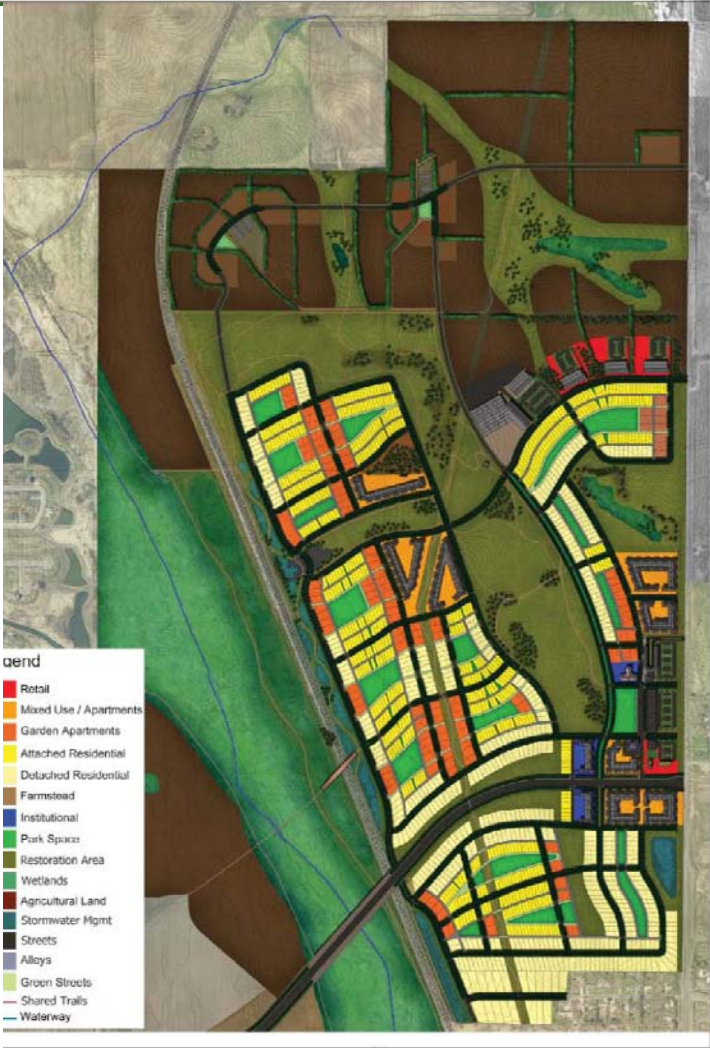
Case Example #4: Development Studies

Sam Geer, a graduate student at the University of Minnesota, undertook a capstone project to maximize innovative subdivision design that enhances water quality, habitat, recreation, and sustainable economic development benefits.

Sam met with staff from Dakota County and Farmington, and selected a theoretical project site in Farmington’s developing North Creek area– in transition from rural to suburban use. His design, Farmington Meadows, includes:

- On-site stormwater infiltration
- Cluster development
- Shared open space
- Energy efficient design
- Transit-oriented town center
- Complete streets
- Adaptive agriculture – an innovative concept for small-scale, organic production of high-demand locally grown food, shown below. These small farms also provide transition between residential areas and traditional agriculture.

Sam modeled runoff and other factors and demonstrated benefits not found with traditional development patterns.



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Chapter 5: Corridor Framework

The future of the Vermillion River as well as the success of this Corridor Plan ultimately rests on the ability to coordinate many diverse efforts among public and private entities. Throughout the course of this planning project, landowners participating in focus groups and workshops identified the complexity of the current regulatory environment as an obstacle to using and managing their property. This same complexity makes it difficult to manage a shared resource in a comprehensive manner that addresses all facets.

Governance

Chapter 1 described the complex framework of water governance in Minnesota. Over time, water and land management regulation has become divided among more entities, and no single entity addresses all statutory and administrative issues that can affect a single property. For most public waters in the metropolitan region, the following jurisdictions and agencies are responsible for one or more of the water puzzle pieces:

- Townships, Cities and Counties
- Watershed Organizations/Districts
- Soil and Water Conservation Districts
- Metropolitan Council
- Minnesota Board of Water and Soil Resources
- Minnesota Departments of Agriculture, Health and Natural Resources
- Minnesota Pollution Control Agency
- US Department of Agriculture
- US Army Corps of Engineers
- US Environmental Protection Agency

Collectively, these entities constitute components of a governance structure. What is governance? In the broadest sense, governance is administrating, managing and coordinating the development of policies, regulations, and budgets to address specific responsibilities. A short answer is that *governance is what government does*, although government is not the only entity that performs these key administrative and coordination functions.

Within this loose structure, each of the above agencies has its own “job description” for what they can and cannot do related to land and water management. While many of these activities may work well, it is not clear that the “sum of the parts” across all agencies addresses everything that should be addressed, and it is also unclear that the work and roles of these agencies are free of contradiction. Add to that the other key elements of the corridor concept – wildlife habitat, recreation and economic development in its many forms – and the level of complexity, confusion and inefficiency increases even more.

For example, the VRWJPO focuses on water quality, water quantity, and aquatic habitat within the watershed. Its purpose is to look comprehensively at this natural resource across jurisdictional boundaries. Upland habitat improvement, recreation, and economic development are not primary responsibilities. Similarly, Soil and Water Conservation Districts address water quality and habitat issues throughout the watershed, but were not created to provide recreational opportunities. City and township typically begin and end their efforts at their jurisdictional boundaries.

While a great deal of informal effort strives to coordinate these initiatives at a staff level, no formal structure exists to coordinate use of various funding streams to plan and implement key capital projects. It is also possible that each of the municipal budgets in the corridor could be oriented and planned to better address these priorities, but currently no mechanism exists to coordinate efforts among several municipalities. The direct participation and representation of townships and cities within the governance of the Corridor is unclear and not formalized. There does not appear to be a single governmental authority that has governance responsibility to manage funding and policy for all of the programs affecting the future of the Vermillion River Corridor.

Effective public engagement in restoring and protecting the Vermillion River Corridor is critical given the extent to which these activities will depend on the decisions of individual private landowners. Key civic leaders and organizations will likely have a role in shaping community expectations about the stewardship of the River and its watershed. To date, it is unclear how that role will be fulfilled.

Broadly-related issues and shortcomings with the current state of management include:

- Separate public investments targeted solely at water quality improvements, land acquisition, in-stream or upland restoration and management, recreation, or infrastructure such as bridges and utilities are not aligned, sequenced and coordinated in terms of comprehensive goals and outcomes.
- Funding sources are often narrowly defined and directed toward specific benefits. Program eligibility, funding requirements, and time frames do not lend themselves to incorporating multiple benefits beyond the specified program target. Addressing additional benefits can render a project ineligible or impractical for funding.

How can we more effectively address these challenges?

The Vermillion River Corridor Plan attempts to take a step back and ask if we were to think in terms of these different systems intersecting and affecting each other within this shared, multi-jurisdictional corridor, what would it take to protect and enhance all of the interests and opportunities that lie within the corridor? In considering options for enhancing governance for the Vermillion River Corridor, a number of interrelated

functions and activities critical for successful implementation of the corridor vision have been identified. These important functions and activities could constitute a “job description” for the ideal governance entity or entities and would include the following:

Model Leadership and Governance Functions and Activities

I. Rules, Regulations and Policies

- A. Develop, Revise and Enforce Standards
- B. Improve Coordination Among Regulatory Agencies, e.g., Soil and Water Conservation Districts, Watershed Organizations, Counties, State Natural Resource Agencies, Natural Resources Conservation Service, Transportation, Corps of Engineers, and Local Governments
- C. Improve Monitoring/Accountability
 - 1. Water quality improvements
 - 2. Program/project implementation
 - 3. Effective use of financial and other resources
 - 4. Effectiveness of restoration/management activities
- D. Conflict Resolution:
 - 1. Develop a forum and procedures for resolving conflicts that will arise

II. Financial Management

- A. Budget Administration
 - 1. Develop budgets, accounting procedures
- B. Increase, Integrate and Coordinate Cost-sharing and Funding from Traditional and Non-traditional Sources
 - 1. Private sector (foundation and corporate/business)
 - 2. Public sector (federal, state, regional, and local)

III. Facilitation

- A. Create and Foster Leadership at various levels throughout the watershed
 - 1. Political (federal to local)
 - 2. Agencies and Organizations
 - 3. Institutions, Schools, Foundations, and Faith Communities
 - 4. Corporate/Business
 - 5. Landowners
 - 6. Residents
- B. Develop an Comprehensive Communication Plan for internal/external audiences with general information; policies, rules, standards, and procedures; partnership opportunities; individual project needs; advocacy, marketing and fundraising; and recognition

- C. Strengthen and Develop Collaborative Structures, Strategies and Processes
 - 1. Develop innovative and effective partnerships and organizational structure(s)
 - 2. Develop new volunteer opportunities

- D. Elevate and Integrate Land and Water Conservation into Other Plans, Programs and Projects
 - 1. Transportation
 - 2. Agriculture
 - 3. Housing
 - 4. Economic Development
 - 5. Recreation
 - 6. Utilities

- E. Collect and Share Information and Data (clearinghouse function): Collect, review, store, monitor, update and share information on previous and current plans, natural resources, land cover, wildlife, model ordinances, etc.

- F. Celebration
 - 1. Recognition and Rewards
 - 2. Community-Building

IV. Natural Resource Management

- A. Improve Conservation Stewardship of Existing Public and Private Lands
 - 1. Continue improving restoration assessments, techniques, and materials
 - 2. Increase restoration/management commitment, funding, and capacity for both private and public lands
 - 3. Increase awareness and adoption of best management practices

V. Land Protection

- A. Increase Permanent Protection of Strategic Lands
 - 1. Ensure the permanent protection of regionally significant natural areas and open spaces already held by the public and semi-public entities
 - 2. Utilize a wide range of land protection tools (fee acquisition, conservation easements, TDR, deed restrictions, covenants, developer agreements, land registry, etc.) to secure unprotected lands

VI. Recreation

- A. Improve Compatible, Outdoor Recreational Opportunities**
 - 1. Inventory potential recreational activities
 - 2. Prioritize type, location and scope of activities
 - 3. Improve appropriate recreation uses, facilities and access
 - 4. Increase/leverage resources to improve recreation opportunities

VII. Research

A. Determine, conduct and interpret research for protection and improvement

1. Accurately and effectively assess, interpret and apply data through a variety of educational materials and programs for land-use planners and decision makers, developers, local governments, agency and organizational staff, landowners, and citizens

Short-term Coordination Structure

Regardless of what governance option might be developed, an enhanced level of collaboration must be fostered to include goals outside of the normal “job description” of one or another agency in order to effectively implement any comprehensive vision for the Vermillion River corridor. At the very minimum, this means providing extensive communication and support across traditional lines of authority and coordinating responses to proposed developments so that confusion is eliminated and opportunities for multiple benefits are encouraged. This includes the coordination of investment opportunities through application of available grant funds, federal and state conservation program dollars, recreational development funds (park dedication and acquisition funds), as well as direct economic development opportunities.

The challenge in this type of approach is managing the additional time required to maintain contacts and communication and work collaboratively on an ongoing basis with all involved agencies. This calls for a coordinating role to be taken on by an entity – the question remains as to which entity would most appropriately take on that role and what capacity and resources are required to accomplish it. Overall, it would be an advantage to use the existing institutional framework and capacities with all involved agencies. Further discussion on this topic among the counties and VRWJPO will continue with implementation of this plan.

Implementation Resources

As a result of many past and present efforts, there are significant financial resources available for implementing the corridor vision.

Minnesota Environment and Natural Resources Trust Fund

As a critical element of the original LCCMR funding proposal, the Legislature provided Dakota County with \$360,000 from the Minnesota Environment and Natural Resources Trust Fund and \$149,965 of state bond funding to protect 125 acres of quality natural resource land through fee acquisition or conservation easements and to restore 40 acres to a more sustainable and resilient condition. Potential projects will be sought and selected later in 2010 to demonstrate how it is possible to integrate water quality, habitat and recreation into the same project. The County is currently recommended to receive an additional \$800,000 for easements and restoration along the Vermillion and Cannon River systems beginning in 2011.

Farmland and Natural Areas Program

With the passage of a \$20 million bond referendum in 2002, Dakota County has been protecting and restoring land throughout the County. Over \$3 million of these funds have been expended protecting over 1,300 acres within the Vermillion River corridor with several additional projects underway. Over \$1 million is still available for use within the corridor. In addition, the County has utilized over \$700,000 of federal farmland protection funds within the corridor, with more opportunities available in the future.

Outdoor Heritage Funding

With the passage of the state constitutional amendment in 2008, significant state funds have become available for wildlife habitat, water quality and recreational projects. The County has been successful in securing over \$3 million over the past two years for lakeshore and buffer easements for the Vermillion and Cannon River systems. Specifically, these funds are available until 2012 for acquiring permanent conservation easements from willing sellers and then developing and implementing natural resource management plans.

Vermillion River Watershed Joint Powers Organization

In efforts to encourage establishment of buffers on the Vermillion River and its tributaries, the VRWJPO has identified funding for support of the establishment of buffers and purchase of conservation easements as part of its annual budgeting process. There will be up to \$200,000 available in 2011, and a similar amount is projected for 2012. These funds are part of the Capital Improvement Projects and may be used to match funds available from other (state or federal) sources.

Soil and Water Conservation District

The Dakota County Soil and Water Conservation District supports cost share opportunities available for various conservation practices from state, federal or local funding sources applicable to the Vermillion River Corridor area. These may be for traditional cost share types of practices supported through USDA by the Federal Farm Bill, state cost share programs through the Board of Water Soil Resources, or may include newer practices such as harvestable buffers for production of biomass based energy.

Chapter 6: Public Engagement

The Vermillion River Corridor planning process was designed to elicit a broad range of perspectives from local residents and stakeholders in all areas of the River through a combination of focus groups and participatory workshops. A summary of the key messages heard from participants follows.

Focus Groups

Information-gathering sessions were held with randomly-selected residential, business, and agricultural landowners located along the corridor and with stewardship and recreation organizations in the spring of 2009. Participants provided insights into how they value the River, changes they have seen in the River over time, regulatory issues, and what they hope the plan would accomplish. The recreation session built perspective on balancing recreation and resource protection in a fragile environment.

Business Landowners: March 12, 2009

Six representatives of banking, food, construction, and development businesses participated. Key messages heard include:

- “Too many hands on the River” - many agencies and regulations. Difficult to know which agency regulates which issue
- Regulations and decision-making should be based on good science
- Consistent policies, enforcement, and procedures are needed throughout the system. Personal contact with knowledgeable agency staff is important
- Required mitigation projects should combine requirements of several programs into a smaller footprint project rather than doing several individual projects to address each agency’s requirements
- Planning shouldn’t hinder ability to develop. Assistance on phasing restoration and reclamation plans would be helpful.
- Protection of the cold-water ecosystem is important, but specific regulations for designated trout streams caught some landowners unaware
- Increase awareness of the trout stream designation and convey information to landowners on all regulations, sensitivity to pollution, and increasing temperatures
- Increase awareness of cost-sharing available for water quality projects
- Improve public access for fishing to minimize trespassing on private lands. Interest in trails along parts of the River is guarded

Agricultural Landowners: March 18, 2009

Nine participants own agricultural land or represent agricultural interests. Key messages heard include:

- Different land and water programs, how they affect landowners is confusing

- Concern over potential “takings” related to buffers and restrictions on how they could use their land. Uncertainty as to how buffer lands can be used
- Information is needed on maintenance responsibilities for buffers and on the River’s impairment status
- Uncertainty about permissible activities in corridor: e.g., driving across tributaries to reach farm fields, withdrawal of irrigation water, and installation of fencing
- The Corridor is valued as a home for wildlife
- Maintaining rural character of the land is very important
- Recreational activities, specifically kayaking, were acceptable as long as private property rights are recognized.

Residential Landowners: March 30, 2009

Six participants who live in the Corridor provided the following key messages:

- Long-term property owners know the River and its issues. Agency staff should talk more with landowners.
- The quality of the River has been damaged. Few or no minnows are seen in parts. Other parts of the River dry up. Protect the springs feeding the River.
- Public works projects have caused damage. Bridges removed deep pools and shade. Drains contribute oil and trash. Road salt is an issue. There seem to be more and more rules and inconsistent enforcement of the existing rules. Dumping occurs. Some houses are too close to the River.
- Eureka Township includes pheasant habitat and eagles nests.
- Too many agencies have a hand in the River.
- People need to be educated on taking care of the River.
- Bike paths won’t work in western part of the corridor – soils are too wet.

Recreation and Resource Agencies and Organization: April 9, 2009

12 participants represented recreation, natural resources, and sportsmen’s interests.

Key messages include:

- Water quality and habitat are priorities. Recreation should include only compatible passive activities. Protection of the corridor now is key, continuous trail from Hastings to Lakeville should be a future consideration. Focus on near-term trails in urban and developing areas.
- Agricultural impacts to the River are considerable. More agricultural easements and funding are needed. Establish water quality buffers as a first priority.
- ATV’s and snowmobiles pose conflicts with habitat protection
- Hunting could be controversial and could pose conflicts with a number of other uses

Public Workshops

Workshop 1: A River Worth Protecting

The first workshop was held in June and July 2009, to introduce the Corridor Plan and identify priorities for water quality, habitat, appropriate recreation, and future growth opportunities. Each session focused on a specific part of the corridor, defined by similar land use patterns.

- Session 1: Empire Focus Area, June 11, 2009
Dakota County Extension Center – Farmington, MN
Attendance: 20
- Session 2: Hastings Focus Area, Monday, June 15, 2009
Hastings City Hall - Hastings, MN
Attendance: 27
- Session 3: Lakeville-Farmington Focus Area, Thursday, June 18, 2009
Dakota County Extension Center – Farmington, MN
Attendance: 25
- Session 4: New Market-Eureka Focus Area, Monday, June 22, 2009
Farmington Public Library – Farmington, MN
Attendance: 31
- Session 5: Castle Rock-Vermillion-Marshan Focus Area, Wednesday, July 1, 2009
Dakota County Extension Center – Farmington, MN
Attendance: 18

Format

Participants at all five sessions were first introduced to the project with a presentation on the Vermillion River Corridor Plan process, current land use, water quality, habitat, and recreation.

Following informational presentations, attendees worked through three small group exercises designed to share their collective vision for the River's future.

Small groups first reviewed a series of images depicting approaches for enhancing water quality, habitat, recreation, and future development as they might look in each of the corridor's predominant land uses (agriculture, residential, open space, and commercial). Participants used a consensus-based approach to select their most and least preferred future approaches for planning consideration. Small groups then worked to identify where, within the workshop focus area, these approaches would be most appropriate for the River corridor. Participants reviewed a set of draft corridor principles and provided edits and comments that reflected their shared priorities.

Attendees participated in an interactive audience feedback that provided additional information on river perceptions, priorities and performance standards. An Audience Participation System (APS) instant survey technique was used to gain input across a range of specific questions.

Key messages from workshop #1 include:

- Most participants recognize the Vermillion River as a resource worth protecting today and for future generations.
- Water quality and habitat enhancement were prioritized over approaches providing for recreation and economic development, more notably so for rural portions of the Corridor.
- Participants in all sessions placed perennial agricultural buffers in their top five approaches. Participants emphasized the need for a variety of approaches to protect and enhance the corridor.
- Priorities varied across the corridor, reflecting local land use patterns and the degree of income generation from the land.
- Individual property rights are an important consideration for stakeholders.



Small Group Exercise, Empire Township Session

Workshop 2: Working Together

The second workshop series offered participants the opportunity to review and refine draft concepts for the full corridor. The agenda gathered input on design approaches and techniques for different river settings, and further refined the corridor principles. APS was used to gather participant opinions on a range of corridor issues.

Workshop 1: Wednesday, December 2nd 2009
Dakota County Extension Center – Farmington, MN
Attendance: 51

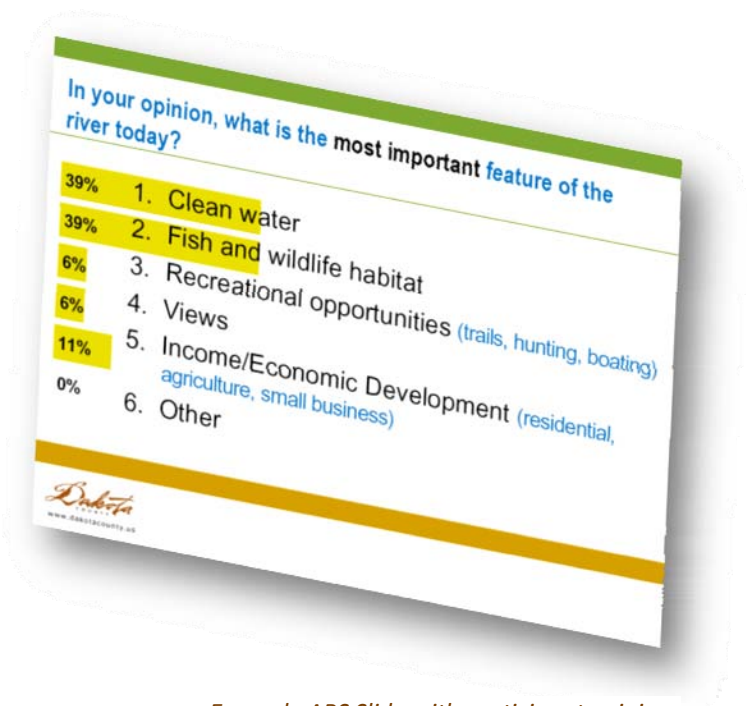
Workshop 2: Monday, December 7th 2009
Dakota County Extension Center – Farmington, MN
Attendance: 50

Format

Participants reviewed project information, project goals, guiding principles, and performance standards. Participants then visited stations featuring one of three corridor settings (rural, developing and urban) to view enhancement approaches consisting of land management techniques and water management strategies.

Attendees participated in interactive sessions that gathered information on audience demographics, river perceptions, preferred landscape strategies, and implementation priorities. Key messages and themes from the second round workshops include:

- Protecting Vermillion River Corridor natural areas, habitat and water quality are priorities for stakeholders.
- Techniques and practices illustrated in the break-out exercises would improve quality in rural, developing and urban settings.
- Technical assistance, cost-share resources and demonstration projects are important to river corridor stakeholders.
- Individual property rights remain an important consideration for many community stakeholders.
- Future recreation interests vary widely throughout the corridor and include active and passive recreation activities.



Example APS Slide with participant opinions

Workshop 3: Putting the Plan into Action

A total of 50 people attended workshop sessions held on April 26 and April 28, 2010. Participants reviewed the refined corridor concepts (water quality, habitat stewardship, and recreation) that comprise the Corridor Plan vision. Input was sought on how the Corridor Plan could be coordinated and implemented. An online best practice information tool and a greenway simulation were demonstrated. Findings include:

- The habitat concept was considered most effective, followed by the water quality and recreation. The concepts should work well together.
- The right issues generally are being addressed, but many don't know which agency is responsible for specific regulations. Enforcement was rated poorly (31 percent) more than positively (20 percent). It is very important to have common, comprehensive goals for the River.
- The most important criteria for selecting enhancement projects were:
 - Reducing pollution/erosion and improving stream channel stability**, improving wetland and floodplain function, increasing groundwater recharge, and reducing stream temperatures
 - Improving upland habitat and protecting high quality or unique habitat**, improving in-stream habitat, proximity to other protected lands, and landowner commitment to stewardship.
 - Connecting existing and planned recreation infrastructure**, interpretive features, trail access, wildlife viewing, fishing access, and canoeing/kayaking.
- People reacted favorably to the online best practice tool and provided useful comments for enhancing its functionality.
- Participants gave generally positive feedback on North Creek Greenway simulation and provided a few suggestions for improving it.
- Comments on urban and developing area greenways related to:
 - Ensuring that natural resources are protected and native plants are used
 - Effective design solutions for safety
 - Phasing and implementation over time, long-range plan
 - Public perception of greenways and trails
 - Needs for efficient maintenance and operations over the long-term
 - Funding needs, budget constraints, and potential funding resources
 - Collaboration among public agencies and the private sector

Other Comments:

Participants liked “instant surveys” with the APS keypads as a part of the workshops.

What Else Should the Plan Address?

Enhance communication among agencies and with landowners. Suggestions: better web sites, more information on River issues, Q / A sessions with landowners.

North Creek Greenway Simulation: Before and After in Lakeville



Final Open House:

The draft Vermillion River Corridor Plan was released for public review from August 25 to September 25, 2010. A total of 24 people attended the final open house held during the public review and comment period on September 23, 2010. The session was unstructured, with project team members available to answer questions and engage participants in discussion about the draft plan. A summary of comment cards received from the open house follows:

Comments about the Water Quality Concept:

- *Looks very reasonable*
- *Water quality concept is very good. Monitoring and identifying problems is key to success.*
- *Concepts cannot be separate from each other – all interconnected as far as trout are concerned.*

Comments about the Habitat Concept:

- *Excellent*
- *Seems like a reasonable priority. Concentrate on establishing buffers in areas that are threatened with development and/or high environmental quality. Better to have some continuous corridor versus scattered protection.*

Comments about the Recreation Concept:

- *Keep the trout stream natural.*
- *Excellent*

What do you like or dislike about the plan?

- *The plan doesn't take my land unless I am willing.*
- *Restoration of the wetlands and the plan for nutrient management are specifically good plans. Developing of greenways and restoring habitat are keys to success.*
- *I appreciate the intelligent separation of the trout vs. canoe by cold vs. warm temperature. "Something for everyone, long-term thinking."*

How can the plan be improved?

- *Secure funding*

Other comments:

- *As it stands, the plan is excellent if most of the concepts can be implemented.*
- *Great balanced approach.*

Appendix 1: Replicable Model

Inventory and Analysis

The project relied on Geographic Information Systems (GIS) mapping and modeling to characterize the Vermillion River Corridor for:

- Water Quality
- Habitat and Natural Resources
- Land Uses and Community Plans
- Recreation Opportunities
- Infrastructure and other intersecting systems

The initial round of maps documented current conditions across the Corridor, and a second round of map modeled the needs related to Corridor Plan goals.

The project benefited from a wealth of GIS information, including very contemporary data being produced with research projects concurrent with the Corridor Plan effort. Some of these data are highly specialized (such as thermal readings) and enhanced the quality of project efforts, but may not be widely available for similar project elsewhere.

Issues Identification

In addition to map analyses, broadly-based efforts to identify major issues included

- Review of similar multi-jurisdictional resource corridor plans
- Discussions among staff from Dakota and Scott counties and the Vermillion River Watershed
- Meeting with peer watershed organizations
- Focus Groups: corridor landowners (business, agricultural, and residential) and recreation and stewardship agencies and organizations
- Public Workshops

Public Workshop Techniques

Public workshops were planned in a variety of locations to bring the effort to residents, rather than inviting the public to one location. Each workshop provided a structured format for collecting information from participants through:

- Pre-designed survey questions
- Open-ended questions, answers, and discussion
- Group exercises with maps, imagery, and editing the Corridor Plan principles
- Demonstration and discussion sessions for specific land uses in the corridor (rural, urban, developing)

The overall format sought to balance and alternate gathering input from participants with information-sharing from the project team on the project, corridor conditions,

interim products, and options for the plan’s major directions. The team sought to provide a dynamic session that met a range of communication styles and needs.

All of the workshops used an Audience Participation System (APS) linked to a Power Point presentation. Audience members received handheld keypads with transmitters that allowed instant polling. Survey questions were presented on the screen, participants selected their answers, and the overall results were displayed on screen within seconds. This technique provided anonymity, allowed the project team to gather input uniformly on a full range of issues from all participants, and allowed participants and the team to “read the temperature” of the room on the selected issues. Use of the APS was generally well-received by participants.

Public Outreach Methods

The Vermillion River Corridor planning process engaged Friends of the Mississippi River (FMR), a local membership-based non-profit conservation organization, to conduct community outreach activities designed to maximize public participation Vermillion River Corridor planning workshops. Workshop outreach activities included, but were not limited to, the following:

- Event bulletins posted on the Vermillion River Corridor Plan website through the Dakota County website:
www.co.dakota.mn.us/CountyGovernment/PublicEntities/VermillionJPO/CorridorPlan
- Full color post cards were delivered to 2994 households in communities throughout the Vermillion River watershed for each of the three rounds of workshops. Post cards were sent to a wide range of addressees including:
 - Property owners along the Vermillion River Corridor.
 - Local residents who have recently participated in Vermillion River stewardship, education and public information events.
 - Members of local recreation, hunting, fishing, habitat, conservation, faith-based organizations and other community groups.
- Follow Up e-mail invitations and reminders were delivered to all invitees for whom viable email addresses were available. Emails were delivered to 518 individuals.
- Phone calls were made to 600 potential attendees for the first round of workshops, inviting them to attend the meeting of their choice. Phone call recipients included:
 - A portion of residents who received the initial post card invitation
 - Members of local recreation, hunting, fishing, habitat, and conservation organizations who did not receive the initial invitation post card.
 - Local elected officials, appointed officials and city staff

- Automated phone calls were included in outreach for the second round of workshops to facilitate additional public participation. The automated phone calls delivered a pair of 30-second pre-recorded messages delivered to 2000 phone numbers with a reminder of the meetings. The automated message was sent only to those who had previously received outreach materials.
- Friends of the Mississippi River posted the event through their monthly Mississippi Messages event bulletin (distributed to 5000 individuals each month) and through the www.fmr.org website.
- Event announcements were also distributed by a number of local organizations, including conservation groups, faith-based organizations, river recreation organizations, local business coalitions and others.
- Dakota County communications staff distributed press releases and other information to a wide range of local media outlets, including print media sources.
- Twitter and Facebook postings were distributed to partner networks including FMR and HKGI, encouraging additional public participation.
- Dakota County staff provided information updates at standing advisory committee meetings and local public meetings encouraging residents to attend and participate.
- FMR provided project updates and invitations to attendees of river corridor stewardship, education and recreation events prior to each round of workshops.

