Watershed Implementation Plan for Lake Vermilion and the North Fork Vermilion River

Vermilion County, Illinois

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EXECUTIVE SUMMARY

The North Fork Vermilion River and Lake Vermilion in Vermilion County, Illinois, have several water quality impairments that take away from the full use of this very important water resource. To address this and other concerns, the Vermilion County Soil and Water Conservation District (SWCD) took the lead role in establishing a watershed planning committee of landowners, city, county, and state officials, agency employees, and private citizens for the purpose of formulating a watershed based planning document that "will strive to protect and enhance the water quality in the North Fork Vermilion River Watershed".

Through a process of public discussions, problem areas were identified and prioritized, goals and objectives were established, implementation strategies and a cost analysis were put in place, all to guide future actions taken by this and/or other watershed management groups. The three problems of highest priority that were identified were: 1.) The water quality impairments which include excess nitrate and phosphorus concentrations in the river and lake; 2.) Wastewater contamination as indicated by fecal coliform in the river segment between Bismarck and Lake Vermilion; and 3.) Excess sediment loads in the river and Lake. The overall goal is to remove or decrease these inputs to achieve full intended use of the water resources.

The most effective methods identified for achieving the goals listed above were: 1.) To implement a variety of Best Management Practices (BMPs) to address the water quality impairments; 2.) Construct a waste water (sewage) treatment system for Bismarck, and provide for a means to conduct on-site septic system inspections, maintenance, and renovation if necessary; and 3.) Address stream bank erosion on the North Fork Vermilion River and its two main tributaries, the Middle and East Branch.

INTRODUCTION

In 2007, the Association of Illinois Soil and Water Conservation Districts (AISWCD) awarded the Vermilion County Soil and Water Conservation District (SWCD) a grant to develop a watershed implementation plan. This plan was developed primarily for Lake Vermilion (RBD) and those segments of the River (BPG 05, BPG 09, BPG 10, and BPGD) that flow into the lake and are currently listed as impaired according to the Illinois Environmental Protection Agency's 2006 Integrated Water Quality Report (IR). As such this document has been prepared based on the guidelines provided to the SWCD by the AISWCD. It is also important to note that this plan is a working document and the recommendations put forth by the Watershed Planning Committee are just that, recommendations and are subject to revision.

PLAN COMPONENTS

I. Mission Statement

The North Fork Vermilion River Watershed Planning Committee will strive to protect and enhance the water quality in the North Fork Vermilion River Watershed through the sustainable use of the natural resources in the watershed while maintaining local control.

II. Watershed Description

The North Fork Vermilion River (NFVR) Watershed is located in east-central Illinois and west-central Indiana (See Figure 1).

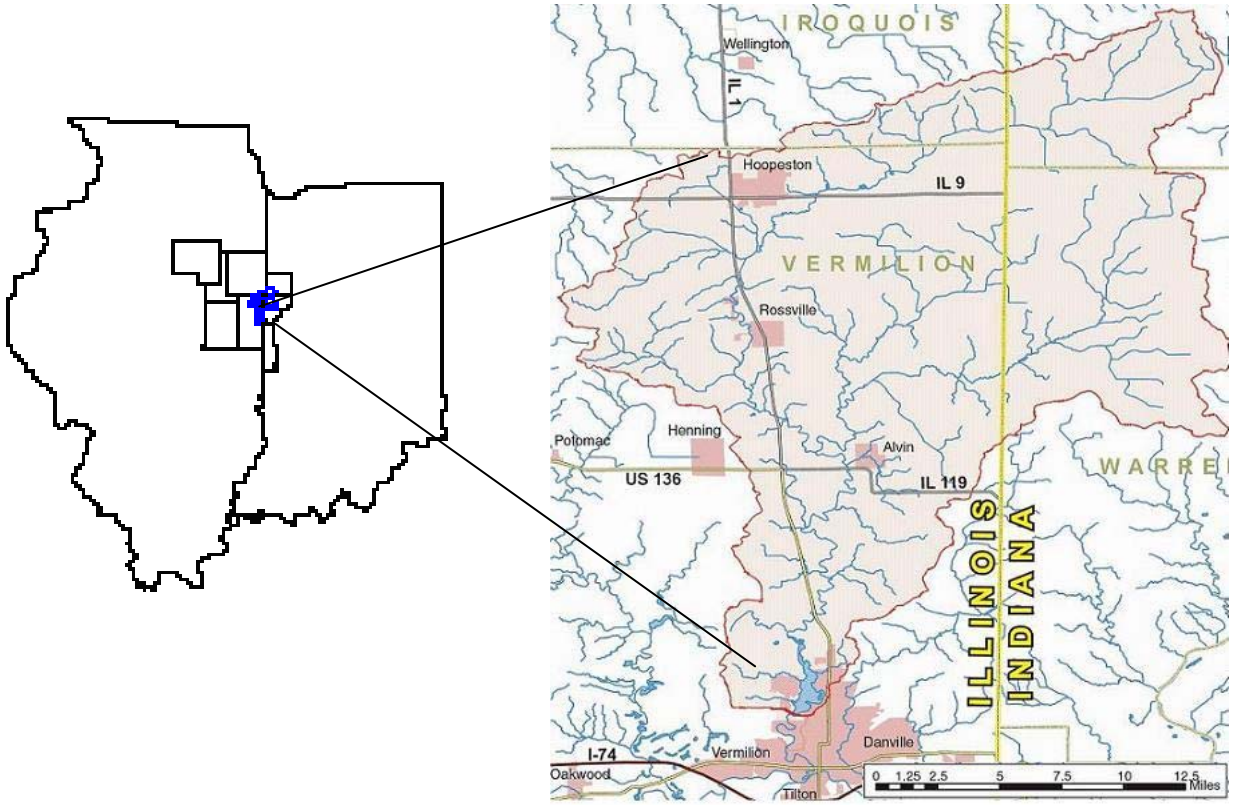


Figure 1. The North Fork Vermilion River Watershed.

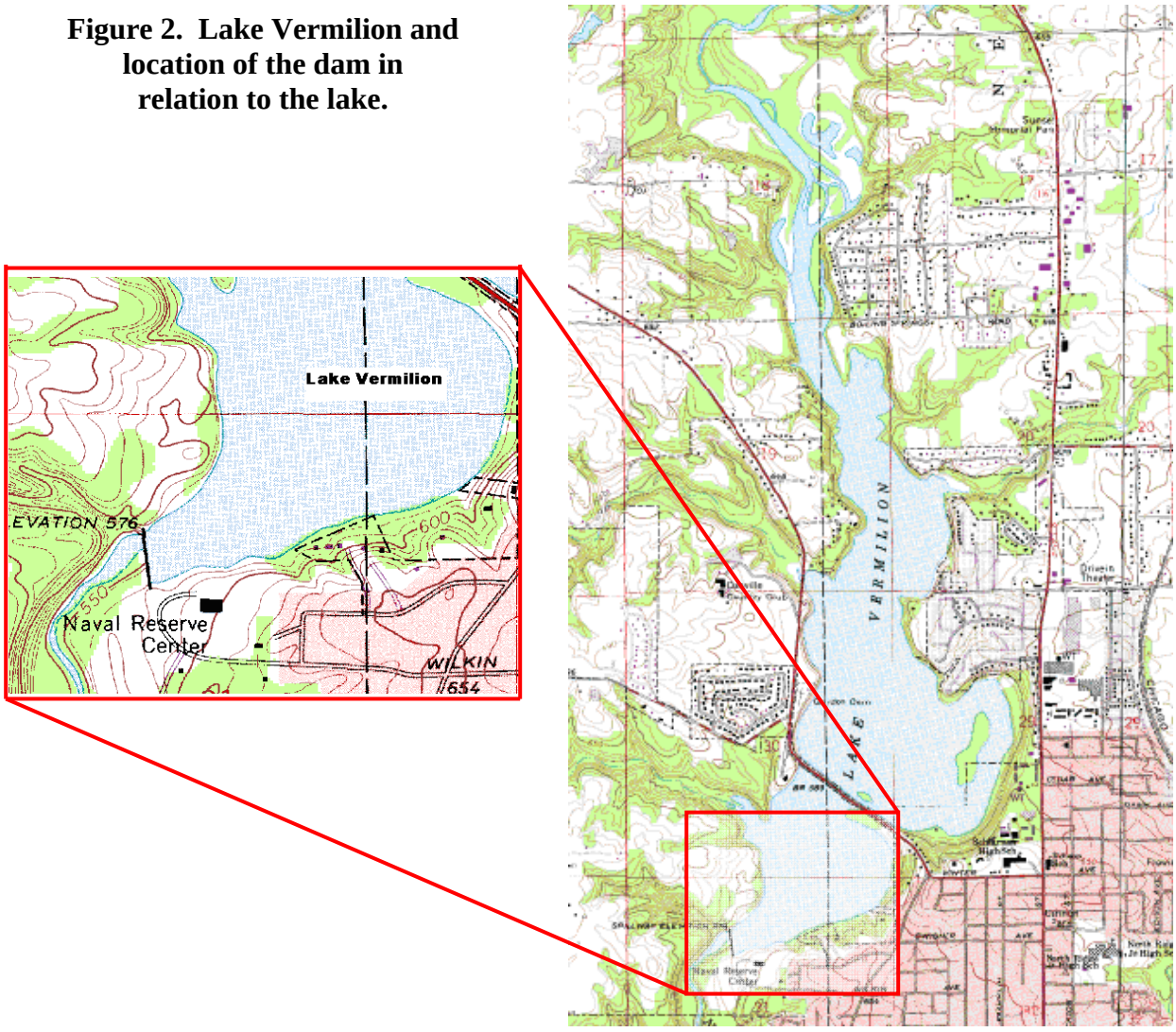
The NFVR watershed encompasses approximately 295 square miles (188,950 acres) of nearly flat to gently rolling (generally < 2% slope) topography that has undergone slight modification by post-glacial streams. The largest portion of the watershed lies within Vermilion County, Illinois. One third of the watershed extends east into Warren and Benton Counties in Indiana and a very small portion extends north into Iroquois County, Illinois. The distribution of watershed area is shown in Table 1 on page 9.

Table 1. Distribution of Watershed Area (taken from Tetra Tech, 2006).

County, State	Area of Watershed in County (Square Miles)	Percent of Watershed in County (Percent)
Vermilion County, Illinois	190	64
Iroquois County, Illinois	10	3
Warren County, Indiana	66	23
Benton County, Indiana	29	10

The North Fork Vermilion River (NFVR) Watershed is located within hydrologic unit 0512010909 and includes all waters upstream of the dam at the south end of Lake Vermilion (See Figure 2 below). There are approximately 5.4 miles of river downstream of the dam before the NFVR converges with the Vermilion River. This segment of the NFVR has not been included in this document because it does not directly impact flows into or the water quality of Lake Vermilion.

Figure 2. Lake Vermilion and location of the dam in relation to the lake.



The primary land use in the NFVR Watershed is agriculture. In fact of the 121,000 acres in Vermilion County 86% or 104,000 acres are considered to be in row crop production (See Land Use in the Resource Inventory Section).

It is estimated that the population residing in the North Fork Vermilion River Watershed is approximately 23,896 individuals with 22,369 of those residing in Vermilion County (Tetra Tech, 2006). Communities located within the watershed include the town of Ambia (pop.197) in Indiana and Alvin (pop.316), Bismarck (pop.542), Hoopeston (pop.5,965), Rossville (pop.1,217), and the northern part of Danville (pop.9,154), all in Illinois (U.S. Census Bureau, 2000).

It is important to note that this plan will utilize the Illinois Environmental Protection Agency's (IEPA) numerical identification system for the lake, river, and watershed (See Figure 3 on page 11 and Table 2 below). Due to differences in state agencies between Illinois and Indiana, this implementation plan will focus primarily on that portion of the watershed which lies in Iroquois and Vermilion Counties in east-central Illinois.

Table 2. Summary of water bodies located in the Vermilion County portion of the NFVR watershed.

Stream or Lake Name	IEPA Waterbody ID	Miles / Acres	Impairment
Lake Vermilion	RBD	880 acres	YES
Hoopeston Branch	BPGD	4.72 miles	YES
Jordan Creek	BPGC-01	7.4 miles	NO
Middle Branch	BPGE-01	15.13 miles	NO
North Fork Vermilion River	BPG05	9.82 miles	YES
North Fork Vermilion River	BPG09	5.91 miles	YES
North Fork Vermilion River	BPG10	24.1 miles	YES
North Fork Vermilion River	BPG11	4.52 miles	NO
Total Miles of River Monitored by IEPA		**71.6 miles**	

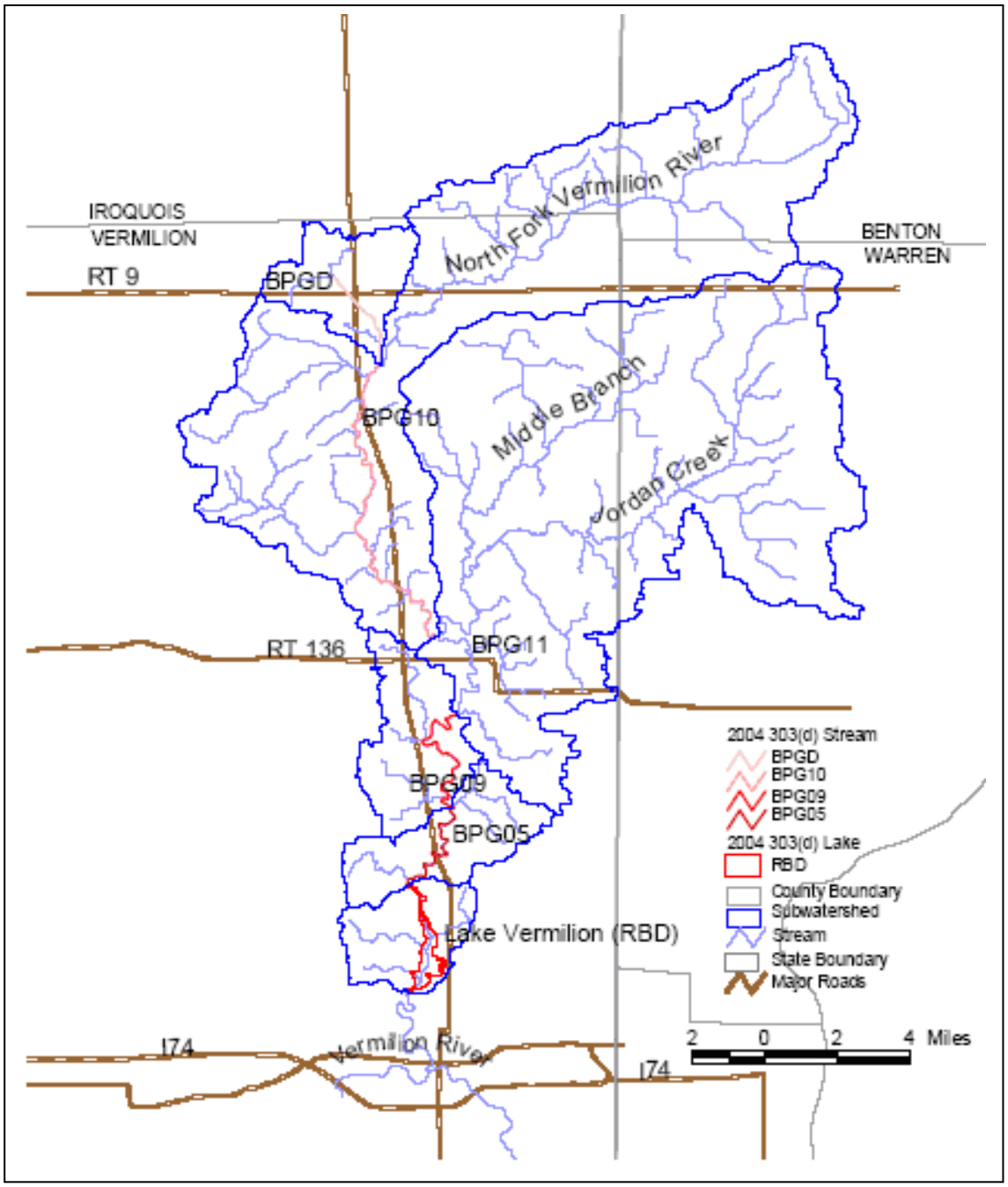


Figure 3. The North Fork Vermilion River Watershed with the lake and streams identified as impaired by the IEPA (taken from Tetra Tech, 2006).

The North Fork Vermilion River (NFVR) is classified as a mature river. A mature river is considered to be low-gradient and have a channel that is stable and not down cutting. The channel in a mature river erodes wider rather than deeper causing it to become a meandering stream. A profile of the NFVR is included in Figure 4 below. The profile shows elevations at key locations and gives the average channel slope. Some of the highest elevations, nearing 855 feet above sea level, are located in the extreme upper end of the watershed approximately two to three miles northwest of Boswell, Indiana. There are approximately 6.7 miles of the NFVR that flows in a west-southwest direction across west-central Indiana. The elevation of the NFVR as it enters Iroquois County, Illinois is approximately 715 feet above sea level. The river flows in a west-southwest direction for 2.6 miles before turning to flow in a more southerly direction crossing over into northern Vermilion County. The remaining 37 miles of river lie in Vermilion County and empties into Lake Vermilion at the south end of the watershed at an elevation of 582.2 feet above sea level.

There are two notable tributaries that flow into the North Fork Vermilion River. These include the Middle Branch and the East Branch (also know as Jordan Creek). The two tributaries merge approximately 1.5 miles northwest of Alvin, IL just east of the CSX Railroad and flow in a southwesterly direction for approximately 4.5 miles before entering the NFVR. Another tributary of interest is Painter Creek, rising east of Bismarck and carrying runoff from the village and surrounding area into the NFVR from the east about 15 river miles above Lake Vermilion.

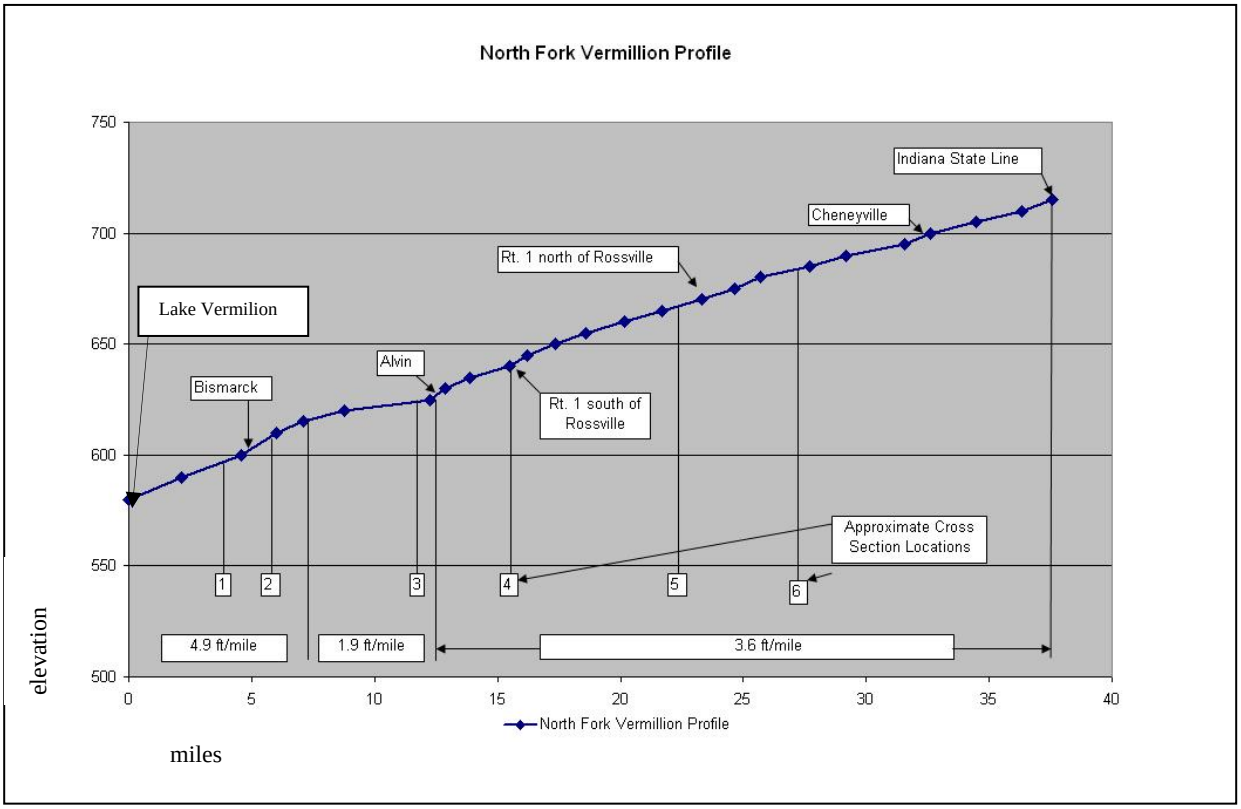


Figure 4. North Fork Vermilion River Profile (taken from Kinney, 2005).

III. Watershed Activities

Drainage

In 1889, state legislation was passed to provide for the organization of drainage districts (Hay and Stall, 1974). These drainage districts were given taxing authority to provide for the construction and maintenance of drainage ditches and subsurface drain tiles. In many areas, ditches were dug where no channel previously existed to provide tile outlets and connect with the natural stream.

The NFVR watershed area is characterized by nearly flat to gently rolling (generally < 2% slope) topography that has undergone slight modification by post-glacial streams. Many of the soils require artificial drainage (tile, surface, and open ditch) to attain maximum productivity. In fact, almost all cultivated land in the watershed has been artificially drained by one means or another. The flatness of the topography in the upstream portion of the watershed is evident by the fact that the two largest drainage districts, Drainage District No. 1 – Town of Grant (7,354 acres), and the Hoopeston Drainage District (6,863 acres) are located north and southeast of Hoopeston, respectively. Table 4 on page 23 includes the listing of all the drainage districts in the watershed and is located in the Watershed Resource Inventory section of the plan. There are a total of 14 drainage districts in the watershed which encompass approximately 36,653 acres, or nearly 30 percent of the NFVR watershed area in Vermilion County.

History of Lake Vermilion

Lake Vermilion is located at the very southern end of the drainage area and is the receiving body for surface and subsurface drainage waters of the watershed via the North Fork Vermilion River (NFVR). It serves as the municipal water supply for nearly 61,500 individuals living in the City of Danville (pop. 33,904), the Villages of Tilton, Catlin, Westville and Belgium, as well as the surrounding unincorporated areas (www.aquaillinois.com). The lake, along with the water supply facility, is privately owned by Aqua Illinois, Inc.

Lake Vermilion was formed by the construction of a concrete dam on the NFVR in 1925. In 1991 the level of the lake was raised by 4.5 feet to its current elevation of 582.2 feet above sea level in order to create a greater holding capacity. Currently Lake Vermilion holds 3 billion gallons of water and has a surface area of approximately 880 acres. The lake has historically been faced with chronic water quality issues including sedimentation and high nitrate levels which can be associated with lawn fertilization, agricultural activities, faulty septic systems, and stream bank erosion.

The lake is lined with large mature trees (See Figure 5 on page 14) and there are many lake-shore residential properties. The lake shoreline itself has been protected from excessive wave erosion by the application of large stone (rip rap) at the waterline in recent years (See Resource Inventory).

Lake Vermilion is not only Danville's source for drinking water, but also a popular spot for recreation. Activities on the lake include boating, canoeing, and fishing. Lake Vermilion is

recognized as one of the state's best fishing lakes where many fishing tournaments are held each year. Annual visitors to the lake are estimated at 150,000 individuals.

Figure 5. Lake Vermilion (courtesy of the Vermilion County Conservation District website).

Keep Vermilion County Beautiful

Keep Vermilion County Beautiful (KVCB) is a certified affiliate of the national Keep America Beautiful program and was organized in 2001. Their mission is to make Vermilion County a cleaner, healthier, safer and more beautiful place to live and work. By forging partnerships with the public and private sectors, Keep Vermilion County Beautiful focuses on litter prevention, education and beautification. Some of their recent events have included river cleanups, adopt-a-spot (sections of roads and streets, parks, etc are 'adopted' and cleaned on a regular basis), educational activities, and other projects to beautify the community. Occasionally old tires are found in the channel (See Figure 6) and along stream banks near bridges. Free-of-charge community tire collections are co-sponsored by Keep Vermilion County Beautiful (KVBC) with funds from IEPA. This type of project is typically funded in a given county only once every 2-3 years. The last tire collection was held in August of 2006.

Figure 6. Tires in the North Fork Vermilion River.

Lake Vermilion CleanUp Day

The first annual Lake Vermilion Clean Up day was held in June 2002 (Figure 7) and has been going strong ever since. The IEPA's Streambank Cleanup and Lakeshore Enhancement (SCALE) grant has been providing funding for this project since 2004. The clean up day is typically held on the first Friday in June and there are usually anywhere from 20 to 30 volunteers that come out to help and support the event. This program has been very successful in that the amount of trash and debris pulled out of the lake has continued to decrease since that first cleanup (Figure 8).

Figure 7. 1st Lake Vermilion Clean Up Day taken June 2002
(taken from Vermilion County Conservation District website)

Figure 8. Some of the debris removed from Lake Vermilion
(courtesy of Vermilion County SWCD)

Lake Vermilion Water Quality Coalition

The Lake Vermilion Water Quality Coalition (LVWQC) was formed in 1992 in response to nitrate concentrations in Lake Vermilion that exceeded the EPA standard for safe drinking water. Current membership is at about 38 individuals and organizations and is open to any concerned citizen with an interest in water quality and nutrient and sediment management in the watershed. Member volunteers include farmers, homeowners, and several county agency staff with responsibilities for water quality and erosion management.

Funding for the LVWQC has come from the state and Aqua Illinois Water Company, Inc., in addition to private contributions. Activities have focused on crop plot demonstrations for nitrate management, watershed tours for landowners/public/students to show conservation practices, and sponsoring workshops and seminars on pond construction and biology, stream bank stabilization, forest land management, and the role of farm tile in drainage and water quality. Most recently, efforts have been focused on outreach information via local media, and classroom presentations to 5th and 7th graders with the Enviroscape model (watershed and erosion) as well as the Rainfall Simulator for tillage and water quality demonstrations. These activities will continue as requested and as resources become available.

Members of the LVWQC have also undertaken limited water quality sampling of the NFVR as well as tile outfalls along the NFVR channel to measure nitrate concentrations at five sites

between the state line and Lake Vermilion. Intermittent sampling began in 1996 and has continued through 2005. This data, available through the Lake Vermilion Water Quality Coalition, has supplemented other official water quality sampling for a variety of pollutants. The results have shown substantial losses of nitrate from crop fields through agricultural tile drains during high flow events. These losses could account for up to several pounds of nitrogen per acre during a one inch rainfall event. This would correspond to 20-30 mg/L of nitrate nitrogen at tile outfalls which exceeds the IEPA drinking water standard of 10 mg/L. See Resource Inventory, page 40, Table 16.

Currently, the LVWQC is serving as the technical advisory committee for the NFVR Watershed Plan. Once this document is complete, the LVWQC will become instrumental in the implementation of the plan's goals and objectives. Other planned activities include a conservation tour in the fall of 2008 as well as a conservation program workshop.

North Fork Special Service Area Committee

In 1987, a "NFVR Watershed Work Plan" was prepared under agreement with the Illinois Department of Transportation, Division of Water Resources. The purpose of this work plan was to "identify the problems, recommend solutions, estimate costs, and evaluate impacts of drainage and channel improvement of the North Fork Vermilion River in Vermilion County".

This plan addressed the following identified watershed problems: inadequate land and water management, erosion, and inadequate drainage (i.e. NFVR channel blockages). Recommended measures included the removal of log jams and trees, silt bars, and stream bank stabilization. Funding was also requested to provide fencing for livestock exclusion, tile outlet renovation or replacement, and a 20 foot wide maintained grass strip planted adjacent to the channel where cropping extends to the channel edge. These practices were completed and paid for by an Illinois General Assembly appropriation of approximately $2,332,300.

The current North Fork Special Service Area Committee and associated activities grew out of the above mentioned plan. After the initial construction phase of the North Fork Project in the early 1990's, the North Fork Special Service Area Committee was tasked with the ongoing care and maintenance of the Vermilion County portions of the NFVR, the Middle Branch (Miller Creek), and the East Branch (Jordan Creek). This committee is governed by a board of nine (9) commissioners, one of which is appointed by the Board of Directors of the Vermilion County SWCD, one is appointed by the Vermilion County Board, and seven (7) of which are appointed from the NFVR watershed.

Pheasants Forever

The Vermilion County Chapter of Pheasants Forever has been active in the NFVR watershed for over 20 years, assisting landowners in wildlife habitat development. Assistance includes providing food plot seed as well as native grasses, forbs (herbaceous flowering plants), and shrubs at no cost to landowners. Technical assistance is also available. The chapter has also supported seminars, workshops, the development of Heron Park at Lake Vermilion, hunting opportunities for youth, environmental ethics and technique training for school teachers, and

the purchase of no-till drills. The chapter's goals include increased wildlife habitat, improved water quality, and decreased soil erosion.

TMDL Development

In 2003, the Illinois Environmental Protection Agency (IEPA) contracted with the environmental management consulting firm, Tetra Tech EM Inc., to begin development of a Total Maximum Daily Load (TMDL) for the North Fork Vermilion River Watershed. The TMDL establishes the greatest amount of a pollutant that the NFVR and / or Lake Vermilion can receive, and still meet water quality standards for their intended uses (i.e. drinking, irrigation, swimming, fishing, etc.). The TMDL process as a whole sets pollution reduction goals which are a necessary step in improving the quality of an impaired water segment as identified by IEPA. Although the process attempts to identify the causes and/or sources of pollutants within the watershed, the recommendations put forth by Tetra Tech will be both independent of, and more general in nature than this planning document. At the time this watershed implementation plan was written, the final TMDL report had not yet been released. The final TMDL report will soon be available online at http://www.epa.state.il.us/water/tmdl/report-status.html.

Vermilion County Soil and Water Conservation District (SWCD)

The Vermilion County SWCD, founded in 1942, has worked with a multitude of different partners over the years to promote a variety of conservation practices and programs. In fact, a considerable amount of work has been completed in the NFVR watershed over the years through a series of IEPA Section 319 Grants dating back to 1997. During Phase I of the project (1997 – 1999), operators in the NFVR watershed were contacted in order to increase their awareness and to help them adopt conservation measures. Best management practices (BMPs) were designed and constructed and included 6,150 feet of terraces and 7.5 acres of waterways to reduce siltation and nutrient/pesticide transport. Phase II (2000 – 2002) of the project included a cover crop demonstration and the installation of additional BMPs. The BMPs that were designed and constructed to reduce siltation and nutrient/pesticide transport included 6.07 acres of grassed waterways, 7 grade stabilization structures, 7,515 feet of terraces, and 1.5 acres of tree plantings. Phase III (2004 – 2007) of the project included two (2) conservation tours as well as the installation of additional BMPs. More information on the BMPs installed through Phase III can be found under the Sediment and Nutrient Reduction Structures section of the Watershed Resource Inventory.

IV. Watershed Resource Inventory

Brownfields

There are several brownfields that have been identified within the NFVR watershed. According to the IEPA website, a brownfield is an abandoned, unused, or underused industrial and/or commercial property, or a portion of a parcel, which has actual or perceived contamination and an active potential for redevelopment

(http://www.epa.state.il.us/land/brownfields/faq.html). There are two sites in Hoopeston, IL that are currently going through the IEPA's site remediation program. One site is located on the northwest corner of Routes 1 and 9; the other is located on the southwest corner of Routes 1 and 9 in Hoopeston, IL (See Figure 9). The Hoopeston Branch passes immediately adjacent to this area, so naturally there is a water quality concern.

Figure 9. Brownfields in Hoopeston, IL.

Channel Obstructions/Flooding

There are two main types of flooding that may occur within the NFVR watershed. The planning committee has identified flooding from "urbanized areas" as one type. Urbanized flooding is normally associated with flash flooding that typically occurs in tributaries immediately downstream of municipalities that contain a high proportion of impervious areas such as paved streets and parking areas. In the NFVR watershed, this could affect river segments below Hoopeston, Rossville, and Bismarck. Water falling on impervious surfaces can not be absorbed by the ground and as a result it runs off into storm sewers which eventually overwhelm stream channel capacity.

The second type of flooding is a more "rural" phenomenon associated with heavy rains from large storm events throughout the watershed. Periodic flooding is a natural occurrence, but often times there may be factors present that can exacerbate these flooding events. One such problem - recently cleaned stream channels or channelized drainage ditches--is apparent upstream in Indiana. The extent of these channelized drainage practices is unknown, but when surface water is forced into engineered drains without the volume buffering capacity offered by natural or manmade floodplains, riparian areas, wetlands, or retention areas, the result is downstream flooding in Vermilion County. Additional problems that compound flooding issues are beaver dams and woody debris that restrict flow in the main channel of the NFVR as well as its tributaries. This has a tendency to decrease drainage timeliness and if allowed to remain may also lead to localized flash flooding.

In addition, accumulation of woody debris at any of the 17 bridges on the main river channel during high water events can cause structural damage from impact (See Figure 10). The previously mentioned North Fork Special Service Area Committee considers these problem situations and remedies flow impedances as needed and as resources arise in cooperation with

township and county officials. Of even greater concern, however, is the increase in the rate of scour erosion around bridge footings and earthen embankments. In one case, the bridge structure in the channel itself has diverted the river from its "natural" path and led to undercutting of stream banks, creating loss of land and adding to the sediment load of the NFVR and the Lake.

Figure 10. An accumulation of woody debris on Jordan Creek.

Conservation Easements

In August 2001, the Illinois Department of Natural Resources (IDNR) awarded the Vermilion County Soil and Water Conservation District (SWCD) two grants to acquire permanent conservation easements. A conservation easement is a voluntary, legally binding agreement that allows the landowner to retain ownership of the property, but limits certain types of uses and prevents development from taking place on the piece of property. These grants, also known as the Habitat Enhancement Project (HEP) allowed the SWCD to acquire a total of 333.18 acres from nine (9) landowners. This acreage is located within the HEP project area (outlined in red) and located in the NFVR watershed and the location of the acreage can be seen in Figure 11. The principal goals of this project were to protect existing habitat, reduce habitat fragmentation, improve & protect water quality, maintain/improve the stability of

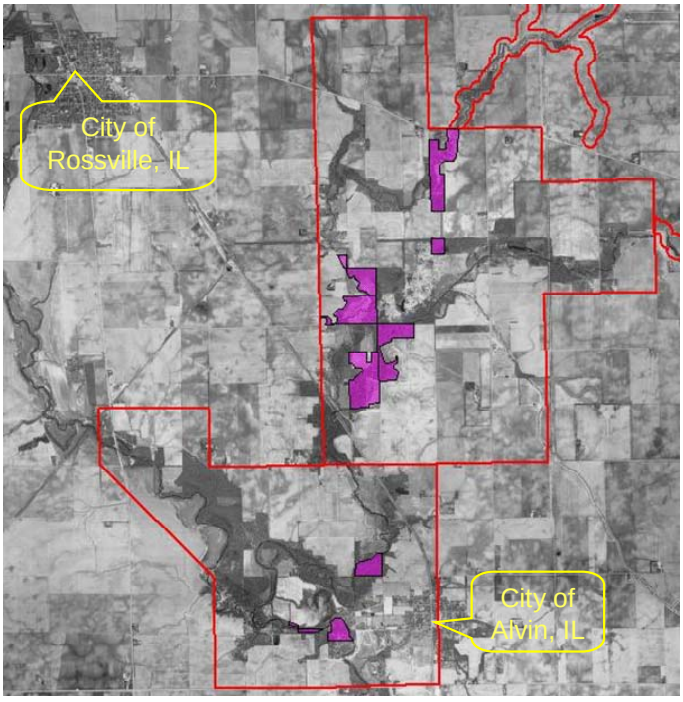


Figure 11. Location of permanent conservation easements purchased through HEP.

streams, create core areas for forest & grassland dependent species, create large blocks of contiguous forest & grasslands, and establish grass or tree cover along both sides of streams.

Conservation Practices

The IEPA considers nutrients and sediment to be the primary nonpoint source pollutants in the NFVR Watershed. Fortunately, there are conservation practices that when installed and maintained properly help reduce the amount of those pollutants from entering water bodies. Some of these practices include filter strips, riparian forest buffers (areas of forested land adjacent to the river), wetlands, nutrient (fertilizer) management, conservation tillage techniques, and grassed waterways. The United States Department of Agriculture (USDA) – FSA and NRCS as well as the Illinois Department of Agriculture (IDoA) offers programs that provide cost share to implement such practices. The rules, details, and funding of these programs change over time, but those that are predominately applied in the North Fork Vermilion River Watershed are listed below and in Table 3 on page 21. Additional programs such as IEPA or IDNR funded programs are sometimes available from various sources. The Vermilion County Soil and Water Conservation District can be contacted for current program availability.

IDoA Funded Portion of Conservation 2000 (C-2000) Program

The C-2000 program provides cost-share assistance for the construction or adoption of projects that conserve soil and protect water quality. The program is funded through the IDoA and is administered by local Soil and Water Conservation Districts (SWCDs). The program has 3 principal components; erosion and sediment control practices, the nutrient management plan practice, and the water well decommissioning practice.

CRP: Conservation Reserve Program

The CRP program is administered by the USDA Farm Service Agency with the Natural Resource Conservation Service (NRCS) providing the technical assistance for the program. The goals of the program are to reduce soil erosion and sedimentation in streams and lakes, as well as improve water quality, establish wildlife habitat, and enhance forest and wetland resources. It also encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as native grasses, wildlife plantings, trees, filterstrips, or riparian buffers (http://www.nrcs.usda.gov/programs/crp/).

Table 3. Summary of Current Conservation Practices and the Watershed Acreages Enrolled Into the Conservation Reserve Program as of 2007.

Program	Practice	Pollutants addressed	Acres enrolled in Iroquois County, IL	Acres enrolled in Vermilion County, IL	Acres enrolled in Benton County, IN	Total Acres Enrolled
CRP (USDA)	Grass filter strips along stream channels	Filters sediment and pollutants bound to sediment such as Phosphorus & some pesticides. Plant roots also uptake dissolved forms of Nitrogen & Phosphorus.	50.55	804.17	83.8	854.72
CRP (USDA)	Riparian Forest Buffers (trees) along stream channels	Filters sediment and pollutants bound to sediment such as Phosphorus & some pesticides. Plant roots also uptake dissolved forms of Nitrogen and Phosphorus. Trees also provide shading which increases dissolved oxygen levels in streams.	0	269.81	0	269.81
CRP (USDA)	Grassed waterways	Prevents transport of sediment by healing or preventing formation of gullies in cropped fields.	11.23	373.48	29.5	384.71
CRP (USDA)	Shallow water areas and wetland buffers	Traps sediment. Aquatic plants take up nutrients.	0	34.92	11.4	34.92
CRP (USDA)	Other grass, tree, and / or shrub planting practices	Such practices include field borders, windbreaks & wildlife food plots. While these are not implemented for the benefit of water quality, land used for these practices are taken out of crop production thus reducing erosion & fertilizer losses.	0	0	13.4	13.4

EQIP: Environmental Quality Incentive Program

The EQIP program began in 1997 and is funded by the USDA and administered by the Natural Resources Conservation Service (NRCS). The program is available to farmers and ranchers who have an interest in protecting the natural resources on their property. The focus of the EQIP program has been to improve water quality, conserve both ground and surface water, reduce soil erosion from cropland and forestland, and improve rangeland. The program has also been used to help improve riparian and aquatic areas, improve air quality, and address wildlife issues. There are eleven (11) active EQIP contracts within the NFVR watershed (Figure 12). Some of the practices that are currently being implemented through this program include grassed waterways, nutrient management planning, and water and sediment control basins.

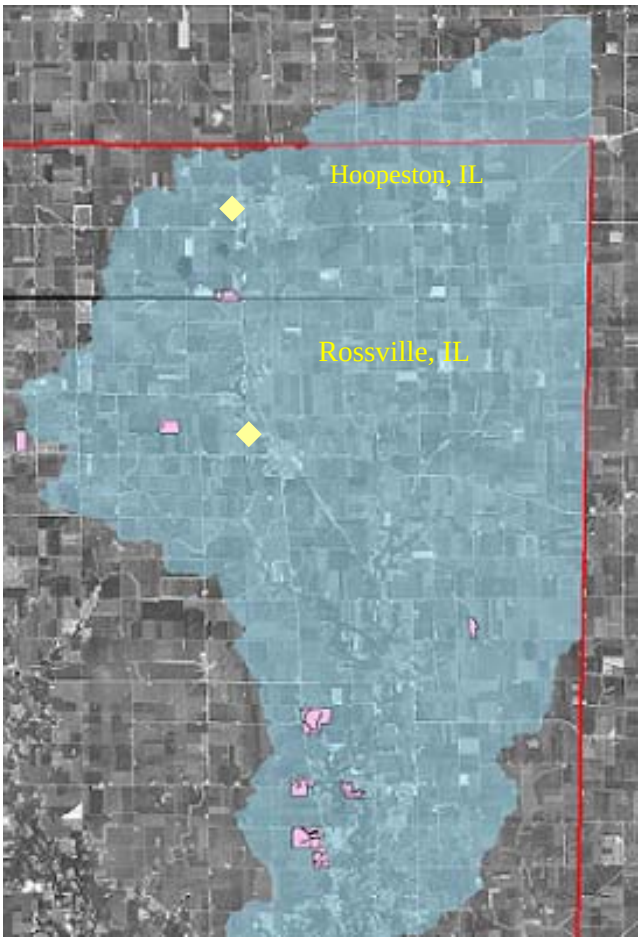


Figure 12. Location of acreage enrolled into the EQIP program.

WHIP: Wildlife Habitat Incentive Program

The WHIP program began in 1998 and is funded by the USDA and administered by the NRCS. The program is available to all private landowners who have an interest or desire in developing a plan to improve the wildlife habitat on their property. The NRCS provides technical assistance to landowners to develop upland, wetland, riparian, and aquatic habitat areas which are critical to the species that need these areas to thrive. There aren't any active WHIP contracts in the NFVR watershed at this time. There hasn't been as much interest and/or participation in this program primarily because the incentives are not as good when compared to other programs such as CRP.

WRP: Wetlands Reserve Program

The WRP program was established in 1990 and is funded by the USDA and administered by NRCS. The program is available to all private landowners who wish to enhance, protect, or restore wetlands on their property. Landowners enrolled in this program are able to establish

long-term conservation and wildlife practices and protection. There aren't any active WRP contracts in the NFVR watershed at this time. Similarly to WHIP, there just isn't the interest and/or participation in this program primarily because the incentives are not as good when compared to other programs such as CRP.

Drainage Districts

Most of the cultivated land in the watershed is tile-drained, requiring outlets often maintained by locally organized and maintained drainage districts. A total of fourteen (14) drainage districts have been formed over the years to serve the NFVR watershed area. However, it appears that only half of these are currently listed as active. One of the reasons districts remain inactive is that the original drainage installations continue to function efficiently, and therefore no action is required. If drainage fails or additional lines or outlets are needed, districts previously formed but presently inactive could be reactivated. The active drainage districts are responsible for maintaining the tile outlets in the open drainage channels that lie within their boundaries. Table 4 has been included below to show the status and area that is served by these drainage districts, while Figure 13 on page 24 shows a majority of the active districts in, and adjacent to, the Vermilion County portion of the watershed.

Table 4. Drainage Districts in the North Fork Vermilion River Watershed
Source: Records of Vermilion County, Illinois and Circuit Clerk of Circuit Court of Vermilion County, IL

District #	District Name	Status	Area (Acres)	Date Organized
1	Alvin	Active	3,903	1908
2	Antioch (a/k/a Heaton D.D.)	Inactive	2,165	1916
4	Beneficial Special	Active	2,580	1917
5	Bismarck	Inactive	2,040	1959
6	Bridgeman	Active	3,577	1916
7	Brougher	Active	1,600	1921
13	Drainage District No. 1 Town of Ross	Inactive	1,420	N/A
14	Drainage District No. 2 Town of Ross	Inactive	2,272	1912
15	Drainage District No. 1 Town of Grant	Active	7,354	1924
21	Henning	Inactive	894	1912
26	Hoopeston	Active	6,863	1910
41	Pleasant Hill	Active	1,985	1918
36	Rossville Union Drainage District No. 1 Towns of Ross & Grant	Inactive	N/A	1923
52	Union #3 of Grant & Ross	Inactive	N/A	N/A

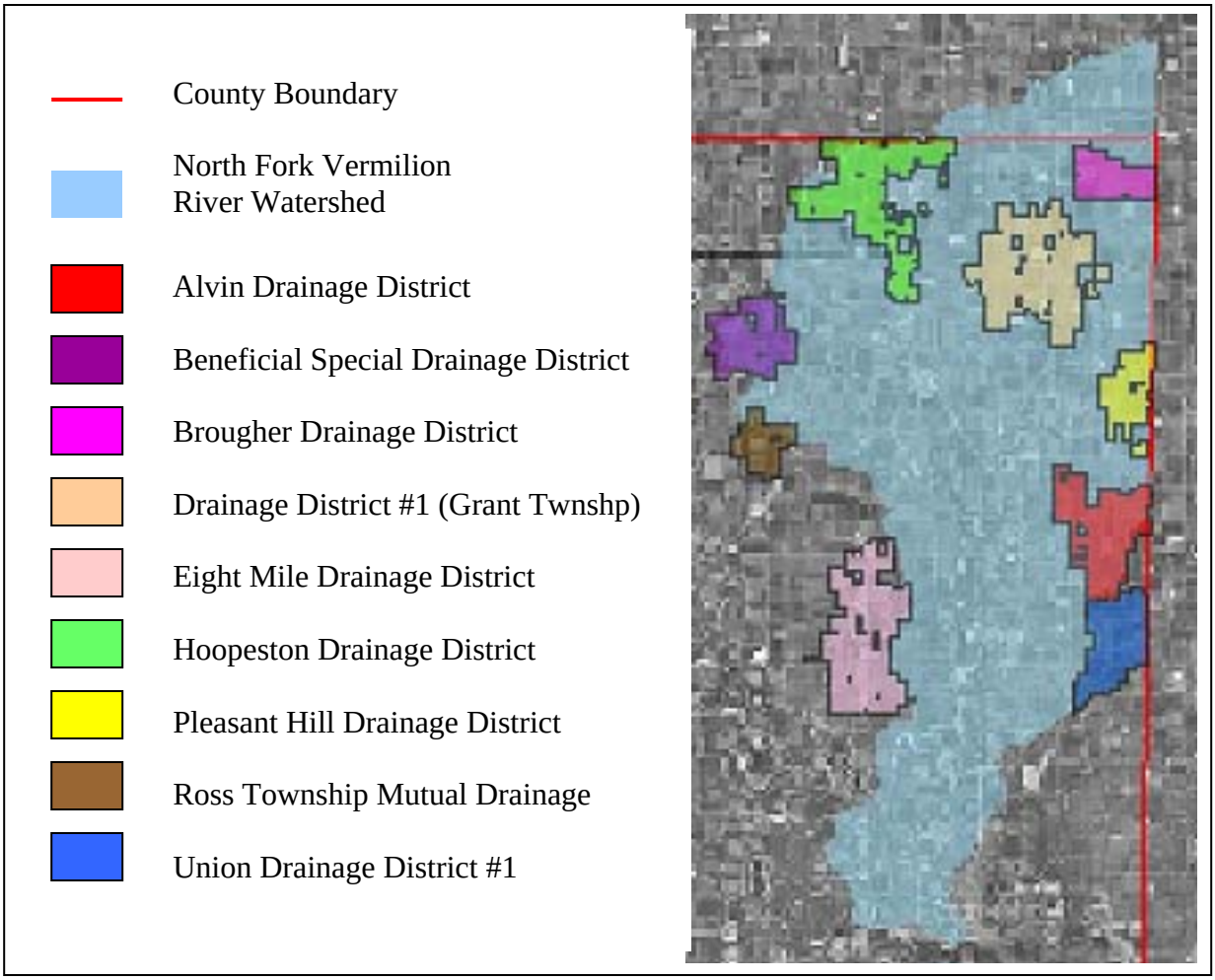


Figure 13. Location of Active Drainage Districts within and immediately adjacent to the Vermilion County portion of the North Fork Vermilion River Watershed. Inactive Drainage Districts have not been included on this map. Source: Vermilion County, Illinois Geographic Information System

Flow Data

There is only one United States Geological Survey (USGS) flow gauging station located in the NFVR watershed (see Figure 14). USGS station 03338780 is located near Latitude 40°15'55", Longitude 87°38'34" (NAD of 1927), in the SE ¼ of the NE ¼ in Section 24, T.21 N., R.12 W., in Vermilion County, Illinois. It is situated on the left bank on the downstream side of County Road 2750 N, 1.8 miles west of Bismarck, Illinois. The gage is 594 feet above sea level and drains 262 square miles at this location.

This station measured flow from June 1970 to September 1974 partially and fully from October 1988 to present. The mean flow is 297.4 cubic feet per second (cfs), and the median flow is 107 cfs. The maximum flow of 14,500 cfs was recorded on April 12, 1994. The minimum flow of

2.5 cfs was recorded in September 1991, which was a very dry month (http://il.water.usgs.gov/annual_report/data/manuipts/03338780.htm).

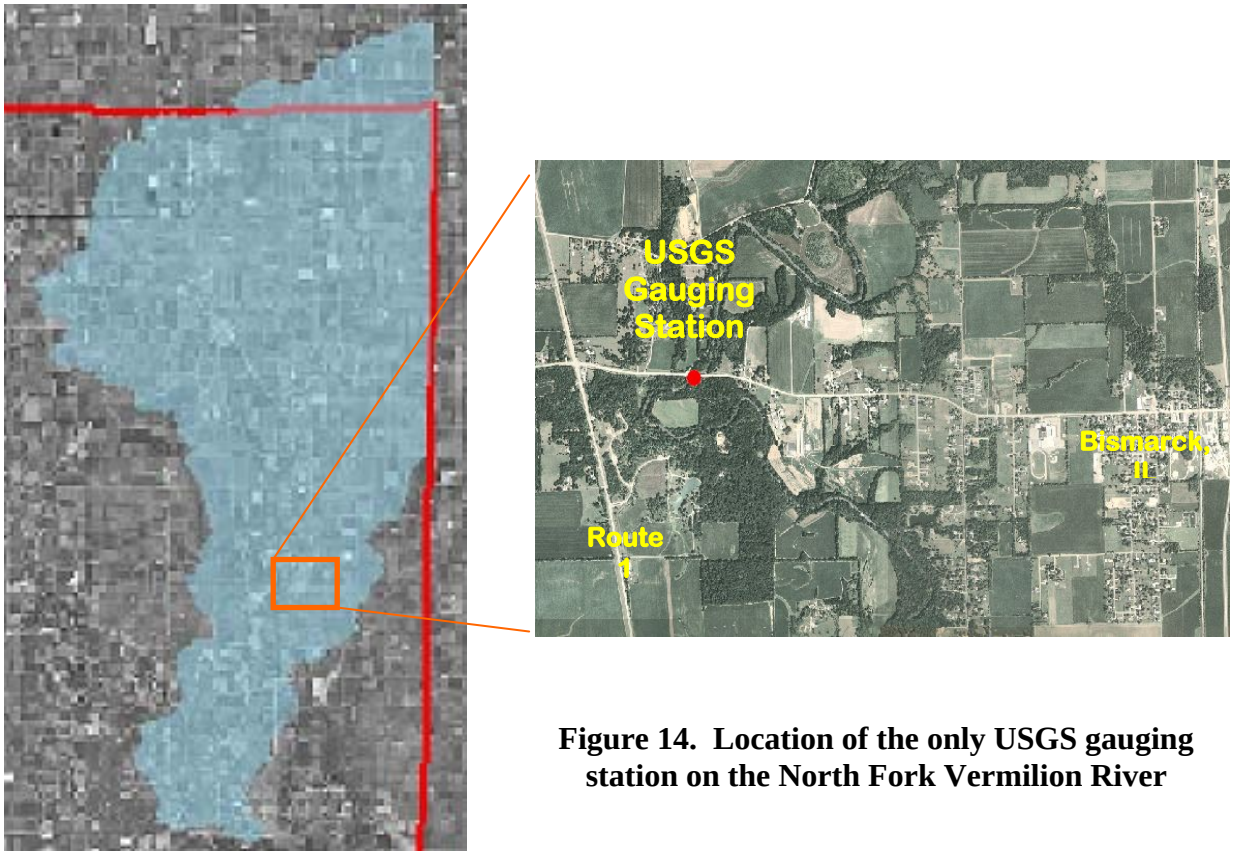


Figure 14. Location of the only USGS gauging station on the North Fork Vermilion River

Golf Courses

There are two golf courses located within the NFVR watershed close to the river channel or to the lake itself, both of which could potentially be adding to the nutrient load. The Hubbard Trail Course (approximately 70 acres) is located just north of Rossville, IL. The Danville Country Club Course (approximately 175 acres) sits just west of Lake Vermilion (see Figure 15).

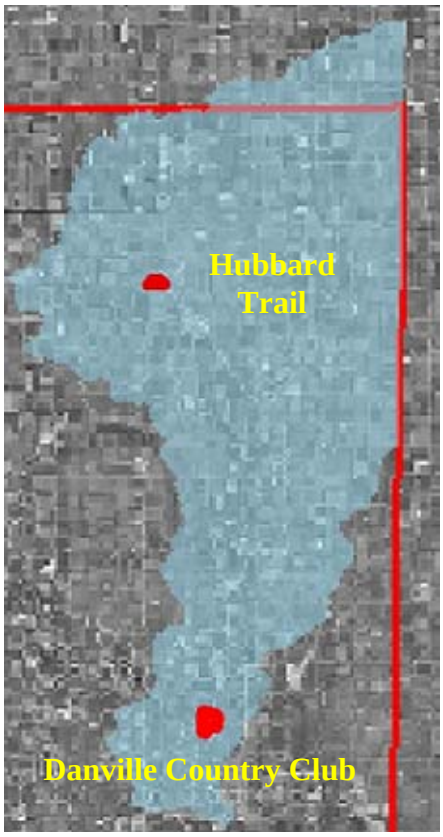


Figure 15. Location of Golf Courses.

Highly Erodible Land

There are approximately 9,750 acres of highly erodible land located within the NFVR watershed. The vast majority of these soils are located adjacent to Lake Vermilion, the main channel of the NFVR, and its two main tributaries, as well as a few areas located throughout the watershed (see Figure 16 on page 27). Table 5 is included to identify those soil types that are considered to be highly erodible.

Table 5. Highly Erodible Soils.

Soil Name	Soil Map Symbol	Average Slope	Tolerable Soil Loss
Blount	23B2 & 2023B	4 %	3
Chatsworth	241C	8%	3
Clarence	147B2	4%	3
Jasper	440C2	8%	5
Martinsville	570C2 & 570F	9% - 26%	5
Morley	194D3, 194F, 194G	14% - 50%	4
Onarga	150C2	7%	4
Ozaukee	194C2	8%	4
Parr	221C3	9%	4
Varna	223C2	7%	5

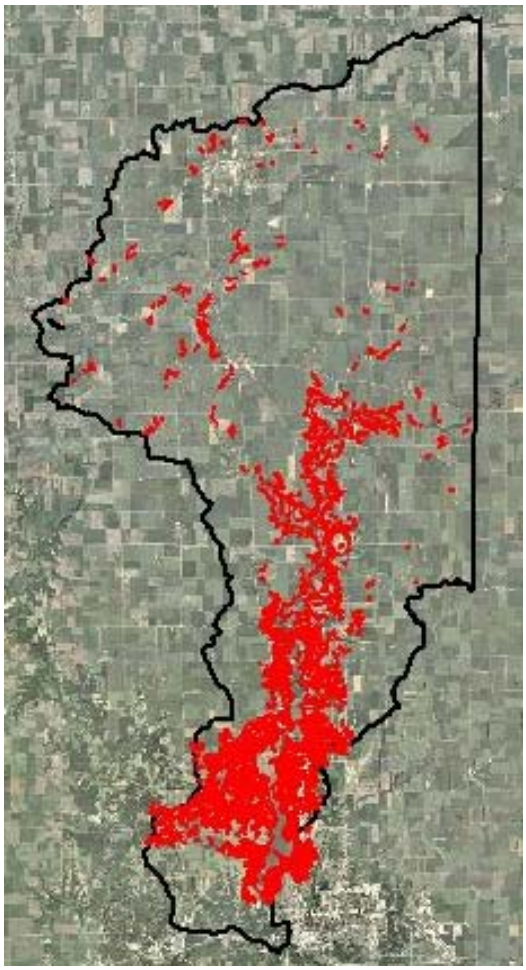


Figure 16. Highly Erodible Soils within the North Fork Vermilion River Watershed

Illinois Integrated Water Quality Report and Section 303d List

The current impairments along with their potential causes and sources are summarized in Table 6 on page 28 (IEPA, 2006). It is important to note that the current TMDL Report that is being developed by Tetra Tech EM Inc. is based on the IEPA 2006 303(d) list. Total Phosphorus for Lake Vermilion (RBD) was not listed in the 2004 or the 2006 listings. Upon reviewing the monitoring data it was determined that total phosphorus was mistakenly not listed as a cause of impairment, therefore a TMDL is still being developed for this important pollutant (not included in Table 6 below). The current TMDL being developed for Lake Vermilion and the NFVR should be completed in 2008. The impaired lake and river segments were shown in Figure 3 on page 11.

Table 6. Potential causes and sources of pollutants for water bodies in the NFVR Watershed as listed in IEPA's 2006 Integrated Water Quality Report. (TMDLs are being developed for pollutants in bold)

Water Body (IEPA Identifier)	Impaired Designated Use	Potential Causes	Potential Sources
Hoopeston Branch (BPGD)	Aquatic Life	Total Nitrogen Total Phosphorus	Industrial Point Source Discharge Municipal Point Source Discharges
Lake Vermilion (RBD)	Aesthetic Quality Public Water Supplies	**Nitrate Nitrogen** Total Suspended Solids (TSS)	Runoff from Forest/Grassland/Parkland, Crop Production, Other Recreational Pollution Sources, Littoral/shore Area Modifications, Impacts from Hydro structure Flow Regulation/modification (the dam)
BPG-05	Public Water Supplies	**Nitrate Nitrogen**	Unknown Source
BPG-09	Primary Contact Recreation	**Fecal Coliform**	Unknown Source
BPG-10	Aquatic Life	Total Nitrogen	Crop Production Municipal Point Source Discharges

Lake Vermilion Shoreline

Lake Vermilion has approximately 14 miles of shoreline, which equates to 73,920 linear feet. In 2002 a shoreline survey was conducted on Lake Vermilion. The investigation found that 25,429 linear feet of shoreline was considered to have severe erosion (Figure 17 on page 29). Funding through an IEPA Section 319 Grant as well as an Illinois Clean Lakes Program Grant was utilized to stabilize all of the severely eroding shoreline. Riprap, geo-textile fabric, and vegetation were the primary means of stabilizing these banks. There are still areas of shoreline with slight and moderate erosion that are contributing to the sediment load in Lake Vermilion. These areas may be targeted for stabilization in the future as they still need to be addressed.

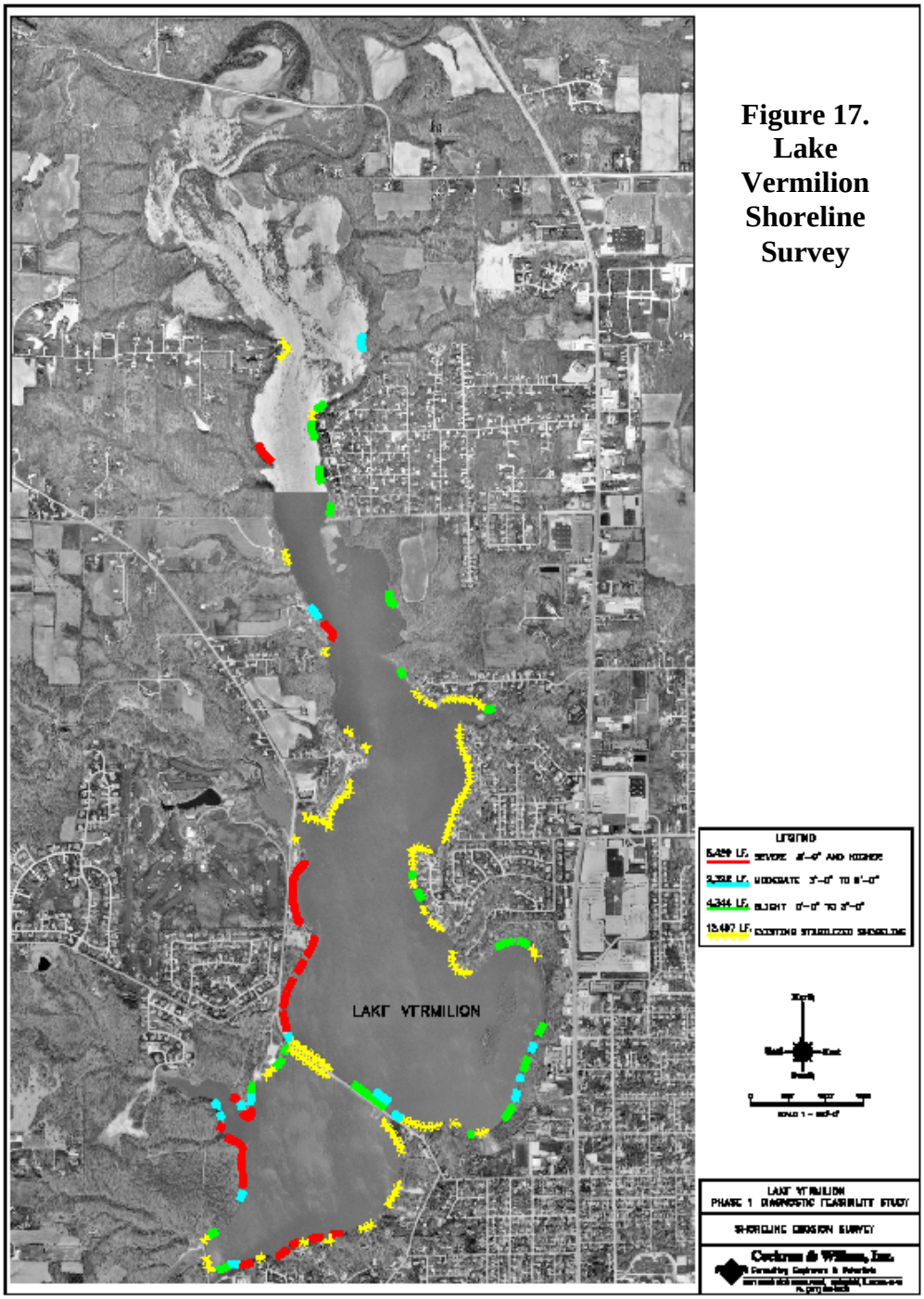


Figure 17. Lake Vermilion Shoreline Survey

Land Development

Residential and commercial development has increased between Danville (pop. 33,904) and Bismarck (pop. 542) within the last ten years. In particular, the construction and operation of three "big box" retail outlets, all within one mile of the lake should be noted. The potential impact on erosion and pollutant inputs to the NFVR has increased from impervious surface runoff and individual and commercial septic or wastewater treatment system outflows near the

lake. In addition, lack of mandated erosion control measures at residential and commercial construction sites needs to be addressed due to the potential for large amounts of sediment leaving these sites.

It is unclear as to the amount of development, like that mentioned above, that could take place in the watershed in the future. This fact could be somewhat linked to the lack of zoning in the county as a whole. The city of Danville has zoning which extends north from the city 1½ miles into the NFVR watershed.

Land Use

The principal economic land use activity in the NFVR Watershed is agriculture and the associated businesses and services. There are approximately 121,000 acres of the NFVR Watershed that lies in Vermilion County of which 86% are considered to be cropland (Table 7). In fact, in 2005, Vermilion County ranked ninth in total corn production, and sixth in soybeans for Illinois (http://www.nass.usda.gov/QuickStats/).

Table 7. Summary of land uses in the NFVR watershed (taken from Tetra Tech, 2006).

Land Use	Area (acres)	% of Watershed
Cropland	162,868.9	86.2
Pasture	14,102.5	7.46
Forest	5,981.2	3.17
Urban	2,604.2	1.38
Wetland	1,344.7	0.71
Grass Land	1,307.4	0.69
Water	708.8	0.38
Upland Shrub Land	27.5	0.01
Barren or Mining	3.0	0.002
Transitional	1.6	0.001
TOTAL	**188,949.9**	**100**

Landowner Assistance

There are many organizations located in Vermilion County and the surrounding areas that are available for education as well as financial and technical assistance. Contact information for these organizations has been included in Table 8 on page 31.

Table 8. Summary of Agencies and Organizations Providing Conservation Assistance to Residents of the North Fork Vermilion River Watershed.

Organization	Contact Number	Assistance
Illinois Department of Natural Resources	(217) 784-4730	A, E, F, T
Illinois Environmental Protection Agency	(217) 782-3362	E, F, T
Illinois Natural History Survey	(217) 333-6880	A, E, T
Illinois State Geological Survey	(217) 333-4747	A, E, T
Illinois State Water Survey	(217) 333-2210	E, T
Iroquois County SWCD	(815) 432-3946 ext. 3	E, F, T
Keep Vermilion County Beautiful	(217) 431-2662	E, F, T
Lake Vermilion Water Quality Coalition	(217) 442-8511 ext. 3	E
Lincoln Heritage RC&D	(217) 253-5466	E, F, T
Pheasants Forever	(217) 778-4030	E, F
Prairie Rivers Network	(217) 474-9285	E, T
National Wild Turkey Federation	(217) 536-6978	E
Vermilion County Conservation District	(217) 442-1691	E
Vermilion County Farm Bureau	(217) 442-8713	E
Vermilion County Health Department	(217) 431-2662	E, T
Vermilion County Recycling	(217) 431-2662	E, T
Vermilion County SWCD	(217) 442-8511 ext. 3	E, F, T
Vermilion River Ecosystem Partnership	(217) 442-8511 ext. 3	F, E
University of Illinois Extension (county offices)	(217) 442-8615	E, T
USDA - FSA (Iroquois County Office)	(815) 432-3946, ext. 2	F
USDA - FSA (Vermilion County Office)	(217) 442-8511, ext. 2	F
USDA - NRCS (Danville Field Office)	(217) 442-8511, ext. 3	F, T
USDA - NRCS (Watseka Field Office)	(815) 432-3946, ext. 3	F, T
USGS - Illinois Water Science Center	(217) 344-0037	E, T

A = Applied Field Assistance **E** = Educational Opportunities
F = Financial Assistance **T** = Technical Assistance

Nutrient Management

Nutrient runoff from the approximately 104,000 tilled acres in the watershed has historically been a problem. In 2001, the IEPA approved a Section 319 Grant (Agreement No. 3190010) for the AISWCD to help local producers reduce the amount of nitrogen being applied to cropped fields in the watershed. This grant offered incentive payments to producers to implement nutrient management plans on their corn acreage in 2001 and 2002. A total of twelve (12) producers participated in the program. Table 9, on page 32 shows the total acreage participation rates within the watershed. Table 10, on page 32 shows a comparison of the

amount of nitrogen that had typically been applied prior to using a nutrient management plan and the amount of nitrogen that was applied by implementing the nutrient management plan. Figure 18 shows the location of where the nutrient management plans were implemented over that two year period. It is also important to note that this particular program was only available to landowners located in one small sub-watershed of the NFVR watershed consisting of approximately 19,000 acres. Although this information is somewhat dated we will assume that the current rate of individuals following a nutrient management plan is similar to what it was a few years ago.

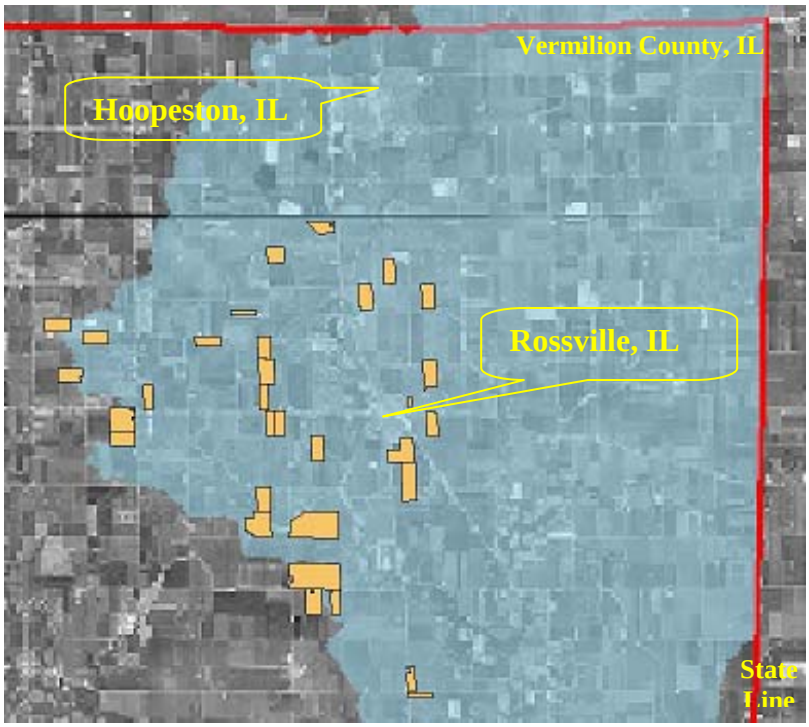


Figure 18. Location of nutrient management plans that were implemented in 2001 & 2002 through an IEPA 319 Nutrient Management Project - Agreement No. 3190010

Table 9. Nutrient Management Participation Rates in Project in 2001 & 2002
(taken from 319 Nutrient Management Project Agreement No. 3190010 Final Results – Crop Years 2001-2003)

Number of Acres Implementing Nutrient Management Plans		Percentage of Acres Implementing Nutrient Management Plans	
2001	2002	2001	2002
1,377	2,728	15 %	29.7 %

Table 10. Comparison of Nitrogen Normally Applied and Amount Applied in Project
(taken from 319 Nutrient Management Project Agreement No. 3190010 Final Results – Crop Years 2001-2003)

Nitrogen Normally Applied			Nitrogen Applied in Project			Load Reduction for Project	
2001 lb/acre	2002 lb/acre	Average for Project (lb/acre)	2001 lb/acre	2002 lb/acre	Average for Project (lb/acre)	Average N Reduction (lb/acre)	Load Reduction for Project (total lbs)
166.2	146.0	156.1	141.7	134.8	138.3	17.8	64,290

Point Sources

There are six (6) point sources located within the NFVR watershed that could potentially be contributing to the pollutant load (See Figure 19). They include:

1.) Hoopeston Foods Inc.
2.) Hoopeston Sewage Treatment Plant (STP)
3.) Rossville STP
4.) Alvin Water Treatment Plant (WTP)
5.) Bismarck Community Unit School
6.) Bismarck Community Water District

Wasteload Allocations are the pollutant loads assigned to point sources; and were given to relevant point sources for pollutants which had TMDLs developed (total phosphorus and fecal coliform).

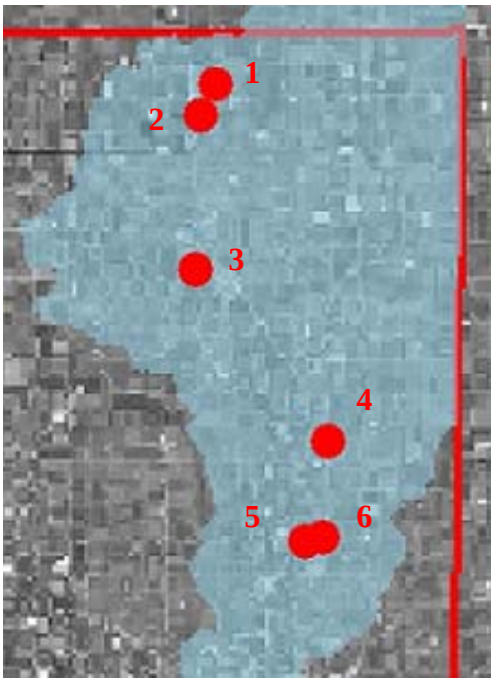


Figure 19. Location of Point Sources.

Sediment and Nutrient Reduction Structures

A total of ten (10) sediment and nutrient reduction structures were recently installed throughout the North Fork Vermilion River watershed. These structures were funded through an IEPA Section 319 Grant which began on May 19, 2004 and ended on December 31, 2007. Eight (8) of the structures were ponds, one (1) was a water and sediment control basin (WASCB), and one (1) was a large terrace system. The location of the 10 projects can be seen in Figure 20. Through the completion of this project the total sediment load in the North Fork Vermilion River watershed was reduced by approximately 1,014 tons per year. In addition the phosphorus load was reduced by 451 lbs/year and the nitrogen load by 900 lbs/year.

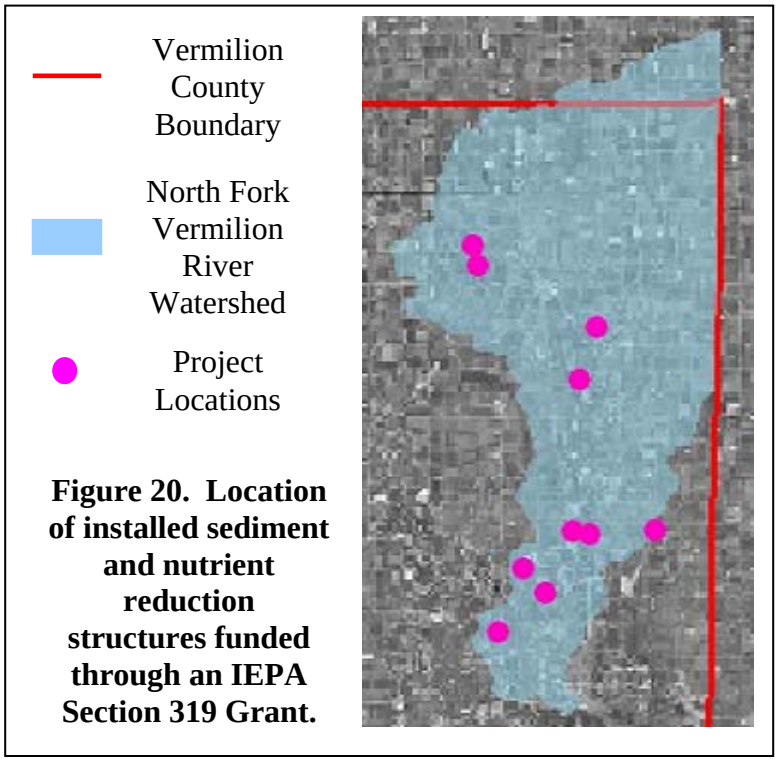


Figure 20. Location of installed sediment and nutrient reduction structures funded through an IEPA Section 319 Grant.

Septic Systems

Nearly 2,600 individual residential septic system treatment permits have been issued for the watershed area in Vermilion County since 1971 (See Table 11). Using non-sewered watershed population numbers and 2.3 people per household, it does appear that a large majority of present septic systems have been permitted. It is not known how many of these systems are still operating properly, nor how many additional systems were never permitted and have never been inspected.

Proper operation and maintenance is necessary for all septic systems to protect water quality. This applies not only to active systems like aeration and sand filters, but also passive tank absorption field systems. The closer the home site is to a lake or stream, the more important it is to be sure the system is operating properly. At this time the number of failing septic systems in the NFVR watershed is unknown.

Table 11. Number of Septic Systems Permitted Since 1971 in the NFVR Watershed.

Township	Total Number of Permits	Discharging Systems (aeration or sand filter)
Blount	735	194
Grant	143	34
Newell	1,439	380
Ross	87	11
South Ross	194	37
TOTAL	**2,598**	**656**

Solid Waste Landfill

Illinois Landfill, Inc. operates the Hoopeston Landfill (170 acres) which is currently active and has been in operation since December of 1991. The landfill is located just southeast of the town of Hoopeston at 16310 East, County Road 4000 North (see Figure 21 on page 35). It is the only operational landfill in the watershed and operates under IEPA permit number 98110023. It consists of lined cells and they implement a daily soil cover. All leachate is collected, contained, and hauled to the Hoopeston Sewage Treatment Plant (STP) for treatment and release. Life expectancy of this landfill is currently to 2082.

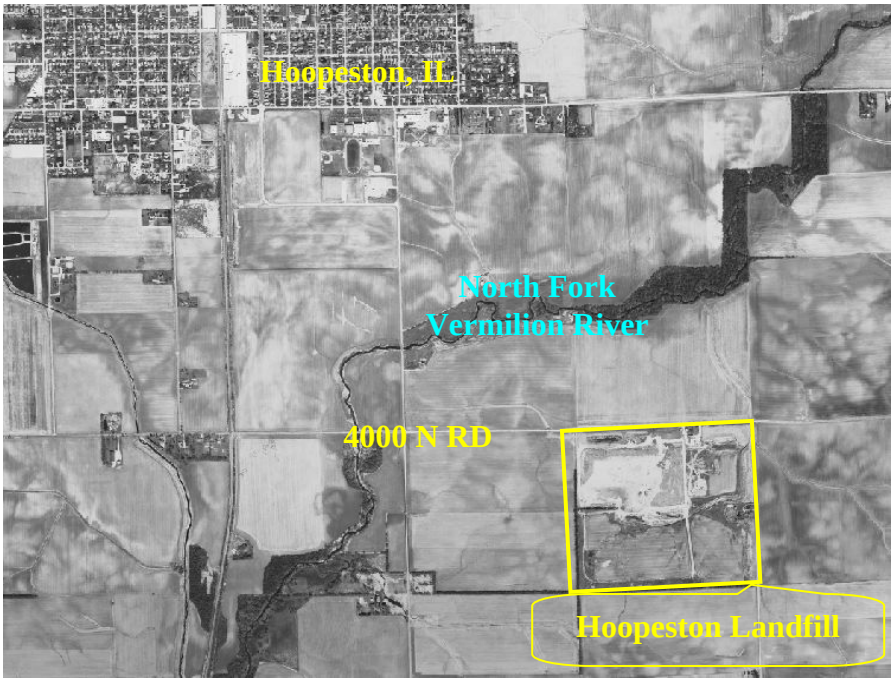


Figure 21. Location of active Hoopeston Landfill.

Streams

There are approximately 71.6 miles of streams in Illinois portion of the NFVR watershed which includes the NFVR, Middle Branch, Jordan Creek, and the Hoopeston Branch. This total does not include other notable tributaries such as Painter Creek, other lesser tributaries, drainage ditches, or intermittent streams. In March of 2004 low level geo-referenced video was taken of the NFVR. Approximately 30 miles of river were recorded beginning at the upper end of Lake Vermilion and proceeding upstream to IL Route 9 just east of Hoopeston, Illinois. This video was then analyzed by Wayne Kinney of Midwest Streams, Inc for the IDoA. Areas with existing log jams and areas of bank erosion were identified. Figure 22 shows some examples of bank erosion in the NFVR watershed. A copy of the Aerial Assessment Report for the NFVR can be accessed online at http://www.epa.state.il.us/water/tmdl/aerial-assessments/north-fork-vermilion/north-fork-vermilion-aerial.pdf.

Figure 22. Examples of Stream bank erosion on the North Fork Vermilion River (Left, eroded bank 20 - 30 feet high; Right, eroded bank 6 feet high).

In 2006 another Streambank Erosion Study was conducted and confirmed Kinney's findings. This project was a Vermilion River Ecosystem Partnership grant which was funded in part by the Illinois Department of Natural Resources (IDNR) with in-kind services being provided by the Geographic Information Sciences Lab at Eastern Illinois University. This survey began by canoe at the bridge just west of Rossville, IL and proceeded downstream to the bridge on West Newell Road just north of where the NFVR enters Lake Vermilion. The results of the survey are summarized below in Table 12.

Table 12. Summary of 2006 Streambank Erosion.
Source: Gutowski et. al, Streambank Erosion Study – North Fork Vermilion River, 2006.

Erosion Index	Count	Length (ft)	Percent (%)
No Erosion	9	4,151.52	1.76
Slight	128	119,083.75	50.40
Moderate	100	84,212.81	35.64
Severe	50	28,841.90	12.21
TOTAL	**287**	**236,289.98**	**100.00**

Transect Survey

The Transect Survey is a biennial survey conducted by Soil and Water Conservation Districts on behalf of the Illinois Department of Agriculture (IDoA). The surveys are designed to measure the progress the county has made in reducing soil erosion to tolerable soil loss levels (T). The results of the survey provide data on the presence of conservation practices in the county, as well as an estimate of conservation work that still needs to be done. Information is gathered on tillage systems, crop residue amounts, as well as the presence of sheet and rill and/or ephemeral soil erosion. The last transect survey was conducted in 2006 with the next survey scheduled to be completed in the spring of 2009 at the earliest. There are a total of 475

transect survey points which lie in Vermilion County. Of the 475 points, 134 of them lie within the Vermilion County portion of the NFVR watershed.

Tillage Systems

The tillage systems used in planting corn and soybeans in 2006 within the NFVR watershed can be seen in Table 13. Mulch-till and no-till are considered to be conservation tillage systems because they both leave at least 30% residue on the soil surface after planting. Only 1/3 of the points surveyed in the watershed were currently utilizing some type of conservation tillage. Although reduced tillage systems provide some level of soil conservation, crop residues are not present in the amounts necessary to be categorized as conservation tillage (IDoA, 2006).

Table 13. Tillage Systems in the NFVR Watershed.

Tillage System	Number of Points	Percent (%)
Conventional	73	54.48
Reduced Till	16	11.94
Mulch Till	7	5.22
No Till	38	28.36
TOTAL	**134**	**100.00**

Soil Loss

Soil losses through sheet and rill erosion are estimated by using the Revised Universal Soil Loss Equation (RUSLE). This formula adopted by NRCS calculates the tolerable soil loss rates (T). Tolerable soil loss levels were exceeded at 19 of the 134 survey points (See Figure 23).

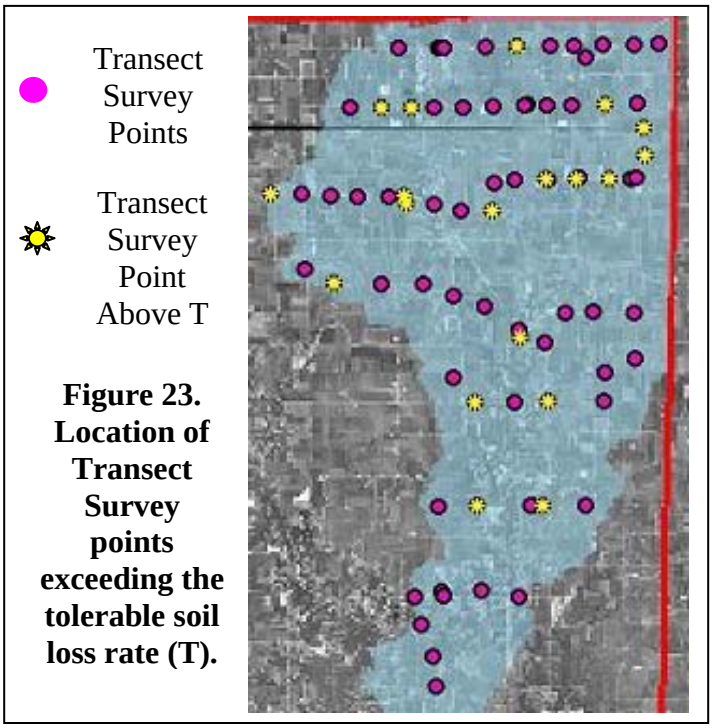


Figure 23. Location of Transect Survey points exceeding the tolerable soil loss rate (T).

Soil Erosion

Soil erosion was noted at 38 of the 134 survey points (See Figure 24) which means that 28% of the fields surveyed had some degree of erosion. According to transect survey guidelines a field with soil erosion is one "in which ephemeral erosion has occurred or is likely to occur in areas of concentrated surface water flow. This type of erosion requires structural conservation practices, such as grassed waterways, in addition to tillage or other cultural erosion control practices" (IDoA, 2006).

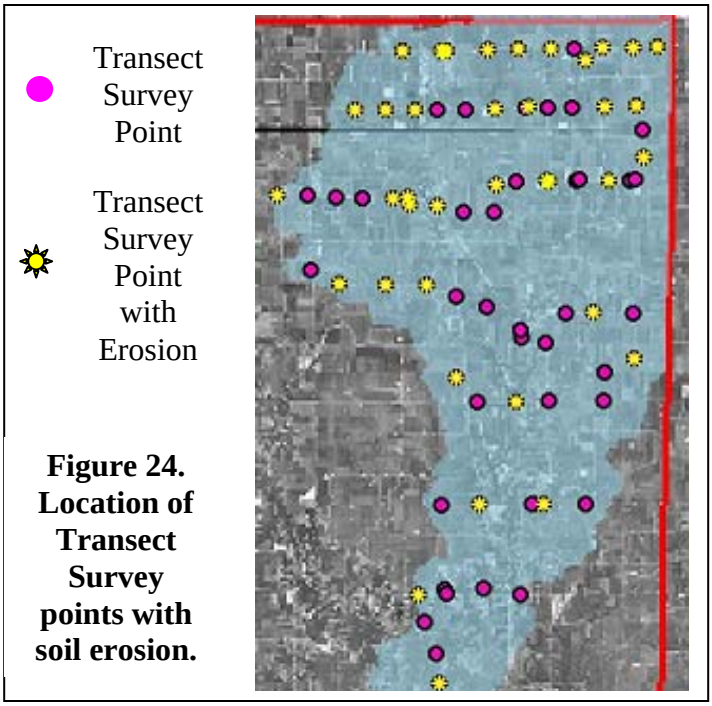


Figure 24. Location of Transect Survey points with soil erosion.

Vermilion County Conservation District Foundation (VCCDF)

The VCCDF owns the 550 acre Jordan Creek Wildlife Preserve east of Rossville, IL. The preserve contains a dedicated Illinois Nature Preserve along Jordan Creek which contains several state endangered mussels. The preserve features several habitat types including streams and their associated riparian areas, wetlands, mature oak forest, savanna, secondary successional forest, grasslands, a seep, a small pond, and an old orchard. Wildlife is plentiful and includes deer, fox, coyote, rabbit, raccoon, opossum, squirrel, pheasant, a variety of songbirds, neo-tropical birds, and one of the county's three known great blue heron rookeries.

Water Quality Data

The USGS collected monthly water quality samples in the NFVR at their gauging station near Bismarck, IL (see Figure 14 on page 25) from 1977 to 1998. Water quality constituents that have been collected in the past include: total phosphorus (TP), dissolved phosphorus (DP), ammonia nitrogen, dissolved oxygen (DO), total suspended solids (TSS), nitrite and nitrate nitrogen, and fecal coliform (Tetra Tech, 2006). Data from these samples can be retrieved from the NWIS database (USGS 2007) and USEPA STORET (USEPA 2007) database. Jordan Creek and the Middle Branch were monitored during the 2001 IEPA Intensive Basin Survey and both tributaries were listed as fully supporting aquatic life (Tetra Tech, 2006).

Five sites in Lake Vermilion have been monitored by the Illinois Environmental Protection Agency (IEPA) for water quality on a regular basis since 1978 (See Figure 25 on page 36). Water quality parameters that were being monitored from the five sites include TP, ammonia

nitrogen, nitrate and nitrites, total nitrogen, DO, and Chlorophyll-a. This data can be accessed from the USEPA STORET database as well as the IEPA for data after 1998.

Herbicides and pesticides are applied for weed and pest control in row-crop production within the NFVR watershed. The herbicide Atrazine has been the only chemical that Aqua Illinois frequently detects through their analysis of water quality samples taken for their voluntary monitoring program. Concentrations exceeding the drinking water standard of 0.003 mg/L (3 µg/L or 3 ppb) at the water treatment plant intake are observed primarily during periods of high flow which are typically in May and June. Maximum observed concentrations of Atrazine have been obtained from Aqua Illinois and are included in Table 14. The data included in Table 14 is just a partial listing and only includes the dates of the maximum concentrations observed each year. As you can see there are instances in which the Atrazine concentration exceeds the safe drinking water standard of 0.003 mg/L (3ppb).

Table 14. Atrazine Concentrations (ppb)
Source: Aqua Illinois's Voluntary Monitoring Program Data on Atrazine

Date	Atrazine Concentration (ppb) of raw water
5/13/96, 6/3/96, 6/17/96	10.56
5/12/97, 6/16/97	5.30
5/4/98	18.00
6/7/99	9.20
6/12/00	9.50
5/29/01	4.40
5/19/03	12.48
6/8/04	8.38
6/13/05	9.11
4/30/07	5.50

Aqua Illinois began monitoring for E. coli in April 2007. Table 15 shows the results of that monitoring.

Table 15. E. Coli Monitoring Data

Date	E. Coli Concentrations (cfu/100mL)	Date	E. Coli Concentrations (cfu/100mL)
4/3/07	34.0	9/18/07	5.2
4/18/07	7.5	10/2/07	44.0
5/1/07, 5/15/07	6.3	10/16/07	38.0
6/12/07	5.2	11/14/07	54.0
6/26/07	4.1	11/28/07	28.0
8/7/07	17.5	12/16/07, 12/26/07	5.2
8/22/07	45.7	1/8/08	16.1
9/4/07	7.5		

Table 16 shows partial results of periodic sampling in the NFVR watershed for nitrate N conducted by the Lake Vermilion Water Quality Coalition (samples analyzed by Aqua Illinois). The results in the table have been listed from upstream (top of table) to downstream sites. Figure 26 on page 40, has been provided to show the water quality sampling locations. Any sample that exceeds the water quality standard of 10 mg/L is of concern.

Table 16. Nitrate Concentrations in mg/L in the NFVR watershed collected by the Lake Vermilion Water Quality Coalition from 2004 – 2006.

Site	7-8-04	11-30-04	1-5-05	4-28-05	5-15-06
#1 Tile outfall upstream of site #2, south side of the river	**15.6**	**--**	**--**	**14.5**	**35.4**
#2 County Road 1950 East Road Bridge just north of Cheneyville, IL	**6.8**	**9.92**	**12.4**	**7.9**	**24.5**
#3 Small Tributary at intersection of County Road 3870 North and Rt. 1	**3.8**	**8.5**	**10.4**	**11.7**	**24.3**
#4 Tile outfall on Henning Road south of 3400 North	**4.9**	**14.8**	**17.6**	**19.9**	**19.8**
#5 Tile outfall upstream of site #6 west side of the river	**--**	**13.9**	**16.3**	**17.6**	**25.6**
#6 Bridge on County Road 3400 N	**3.9**	**10.2**	**16.7**	**8.7**	**23.5**
#7 West Newell Road bridge	**3.5**	**9.5**	**10.0**	**10.4**	**23.9**

There are three things that can be inferred by the data in Table 16. First is that in general, nitrate concentration in the main channel decreases with distance downstream, compared to Site #2 near Cheneyville, IL (upstream). Second, concentrations in tile outfalls exceed concentrations in the receiving water. And finally, concentrations in early summer (before maximum corn growth) can be very high, exceeding the 10 mg/L drinking water standard by two or three times, triggering additional water treatment procedures for water taken from the lake by Aqua Illinois.

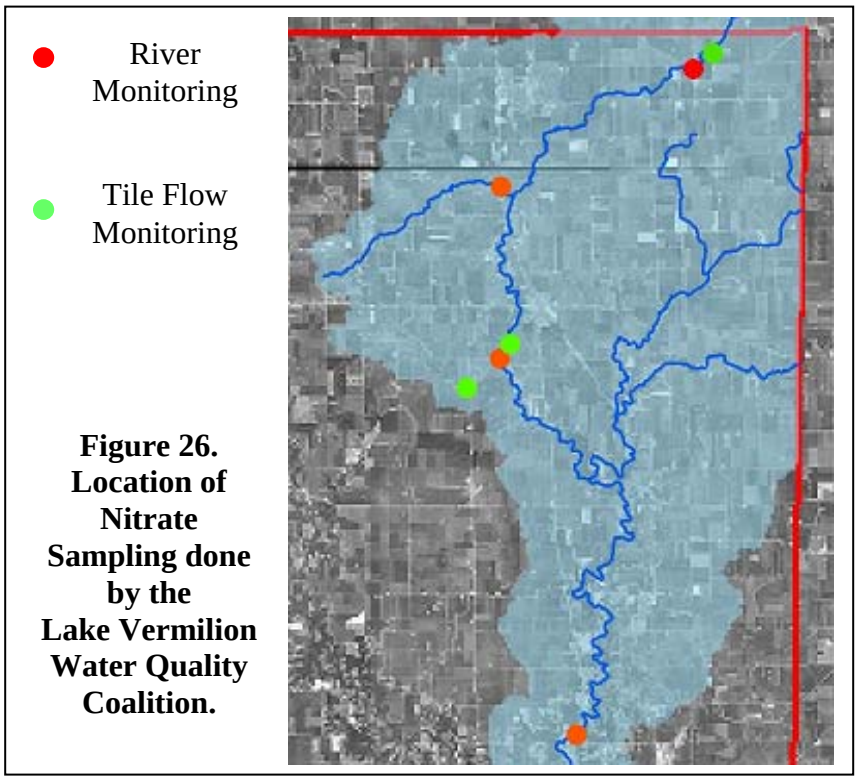


Figure 26. Location of Nitrate Sampling done by the Lake Vermilion Water Quality Coalition.

V. Problem Statements

Problems within the watershed were identified by the NFVR Planning Committee, research reports, and other interested individuals, agencies and volunteer groups. The following problem statements and descriptions are listed below in descending order of importance. The priority listing was established by the watershed Planning Committee through discussions focusing on the overall water quality and sustained natural resource use in the watershed.

IEPA-Identified Water Quality Impairments

Nitrate nitrogen has been identified as a major nutrient pollutant in the NFVR, as well as phosphorus (P) and sediment. Nitrate inputs come primarily from tile flow, whereas P is associated more with overland flow such as sheet and rill or gully erosion, and wastewater inputs. The IEPA has identified Lake Vermilion and four segments of the NFVR as having nutrient, sediment, and/or pathogen impairments, and as such they are included in this section.

Lake Vermilion (RBD)

Lake Vermilion is impaired for aquatic algae (attributed to total phosphorus), nitrate nitrogen, and total suspended solids (TSS). There are no current water quality standards for TSS and therefore a TMDL is not currently being developed for this impairment. However, it is

important to note that it has been estimated that the lake's storage capacity decreases by approximately 1% each year (Bogner and Hessler 1999). Such inputs can be attributed primarily to TSS from the watershed via sheet and rill erosion, highly erodible soils, streambank erosion (Table 12, page 36), and shoreline erosion from Lake Vermilion.

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Nitrate Nitrogen

The Illinois water quality standard for nitrate nitrogen is 10 mg/L for all public and food processing water supplies, including Lake Vermilion. This standard is regularly exceeded in the Lake, especially during storm events with high flows. Potential sources of nutrients may include municipal point sources, residential lawns and septic systems near the lake, and tile flow supporting row crop production. The Danville Country Club Golf Course is located just west of Lake Vermilion and may also contribute to the Lake's nutrient load.

Phosphorus (P)

Excess algae growth, indicated by secchi disk depths of less than two feet, in Lake Vermilion is especially common in the summer, interfering with recreational uses and potentially damaging the fishery. The Illinois water quality standard for total phosphorus is 0.05 mg/L. This standard applies to any reservoir or lake greater than 20 surface acres in size and in streams at the point of entry into these lakes or reservoirs, including Lake Vermilion and the NFVR immediately above the Lake where this total P standard is regularly exceeded. Since algae growth is generally limited by P in Illinois lakes, excess phosphorus typically associated with sediment from high runoff events, known point sources such as untreated wastewaters, and failing residential septic systems can cause algal blooms.

River Segment BPG05 (p.11)

This section of the river is located immediately upstream of Lake Vermilion, and extends 9.82 miles north to about 2550 North Road. This reach of the river is impaired for nitrate nitrogen, originating in tile drainage water inputs to the segment supporting the intensive corn and no-till soybean rotation. Practices to reduce inputs/transport anywhere along the nitrate movement route from applicator/homeowner/farmer to water treatment plant will help this water quality problem. Applications of chemicals, especially fertilizer, to residential and commercial lawns are not closely controlled, and runoff from recently treated lawns or adjacent impervious surfaces contributes to water loading and further degrades water quality. The not-to-exceed numeric standard for nitrate nitrogen in rivers is 10 mg/L.

River Segment BPG09 (p.11)

This segment of the river starts at the confluence with Painter Creek and extends downstream 5.91 miles, directly flowing into BPG05. The impairment in this reach of the river is for pathogens, more specifically fecal coliform. "The Illinois fecal coliform standards for general use requires that during the months May through October, based on a minimum of five samples taken over not more than a 30-day period, fecal coliform shall not exceed a geometric mean of 200 colony forming units (cfu) per 100 mL (cfu/100 mL), nor shall more than 10 percent of the

samples during any 30 days period exceed 400 cfu/100 mL in protected waters" (Tetra Tech, 2006). The IEPA does not list any potential sources for this contaminant in their 2006 303(d) listing. The planning committee's list of possible sources include sewage treatment plants (point source), residential septic systems, and other animal waste inputs from farm and domestic animals, and perhaps certain wildlife. Bismarck (pop. 542) and Alvin (pop. 316) septic systems and runoff may well contribute to both nitrates and pathogens in this segment of the NFVR.

River Segment BPG10 (p.11)

This stretch of the river begins at the confluence of the Middle Branch and extends upstream for 24.1 miles. This reach of the river is impaired for total nitrogen according to the most recent IEPA 303(d) listing. This listing has been confirmed by the Lake Vermilion Water Quality Coalition's analysis of their periodic water quality sampling data (See Resource Inventory, Table 16, page 40), which in this stretch indicate elevated nitrate concentrations. Even though no TMDL will be developed for this segment because there are no numeric water quality standards for total nitrogen in streams, excess nitrate concentrations from agricultural drainage losses need to be addressed. Additionally Hubbard Trail Golf Course just north of Rossville, Illinois could potentially be adding to the nutrient load in this segment of the river through its intensive turf management practices.

Hoopeston Branch BPGD (p.11)

The Hoopeston Branch is impaired for total phosphorus (P) as well as total nitrogen. Neither of these pollutants currently have water quality standards therefore a total maximum daily load (TMDL) is not currently being developed on this segment of the river.

The Hoopeston Branch was also originally listed for low Dissolved Oxygen (DO) in the 2006 Illinois Integrated Water Quality Report and Section 303(d) List (http://www.epa.state.il.us/water/water-quality/report-2006/2006-report.pdf). However, the TMDL Stage 2 water quality sampling indicated that the DO no longer violated the standard. As a result of this finding DO was delisted as an impairment and TMDL development on that particular impairment was halted.

Septic Systems

Untreated wastewater from individual homes, subdivision development, and unsewered communities may well be causing impairments to water quality and /or hazards to public health. On-site wastewater treatment permit applications are on the rise, especially in Newell Township as indicated by the number of septic system permits in Table 11, page 34. Periodic maintenance and inspections are necessary to ensure that untreated wastewater is not flowing into the NFVR.

In addition, Hoopeston has a combined storm water / sewage system, risking nutrient and pathogen contamination during high flows; communities in the watershed such as Bismarck, IL currently do not have a sewer system and/or sewage treatment plant; and improperly

functioning septic systems may be a potential source of nutrients and pathogenic organisms, especially if a large percentage of the systems in a sub-watershed are malfunctioning. Another related watershed-wide drainage concern is residential septic treatment drains or basement drains that outlet directly into the roadway ditches. The physical problems with this type of discharge are that it is continuous and does not provide time for the ditches to dry. The continuous wet condition promotes weeds and woody plant growth and is only controlled by herbicides. The wet ditches also promote insect populations especially mosquitoes that are a West Nile virus threat. Resident complaints of the odor and insects can be expected.

Stream Bank Erosion

In places along the NFVR channel, stream bank erosion is removing soil and contributing to the sediment loading in the stream as well as Lake Vermilion. According to the 2006 streambank survey conducted by Eastern Illinois University (EIU) all but 1.76% of the NFVR's banks from Rossville, IL downstream to the river's inlet into Lake Vermilion have measurable erosion. In fact, almost 50% (47.85%) of the erosion was considered to be moderate to severe. (See Table 12 on page 36).

In addition, a visual inspection around the Bismarck area has revealed that there are approximately 100 cattle, 40 horses, and 150 goats. Perhaps half the cattle and smaller fractions of the horses and goats are still pastured on marginal riparian areas with free access to the stream channel, subjecting the stream banks to increased erosion and degradation of riparian vegetation. It is important to note that this visual inventory was completed on a very small portion of the watershed therefore more information is needed as to the number and location of these particular sites in the rest of the watershed. Newly channelized or maintained drainage ditches may also be subject to short term bank erosion and so contribute to downstream sediment load and/or deposition.

Water Quality Monitoring

Lack of monitoring in the NFVR watershed has often times been identified as a limiting factor in support of organized efforts to reduce inputs such as nitrates, phosphorus, and sediment. Besides identifying pollutant amounts and sources, monitoring is helpful in judging the impact of educational efforts and the implementation of best management practices on changes that can be seen in water quality data over time.

Illegal Dumping

Trash and garbage dumping occurs throughout the watershed especially along the roadsides and around bridges. This habitual problem is not only an eye sore, but also adds to right-of-way cleanup costs and even creates dangerous situations for those handling the cleanup. Certain types of trash have the potential to leak fluids. Oil and/or organic solutions are especially detrimental to water quality and aquatic life. County-wide there were about 180 reports of illegal dumping in 2006. Most of these involved roadside dumping or garbage accumulation near residences.

Wildlife

The land use in the NFVR watershed is predominately row crop production and as a result there are concerns about the lack of habitat diversity available to wildlife. Periodic total removal of woody vegetation as a technique for maintaining drainage ways also further reduces wildlife habitat. Deer populations have increased substantially to nuisance numbers in the last 20 years, perhaps because of habitat created by conservation easements and other non-farm residences and developments. More and more private lands are posted, and hunting leases are increasing in popularity and are used to access land for hunting purposes. This can include land specifically under contract for conservation practices.

Another concern of the planning committee is exotic and invasive species. Some of the species identified as potential problems within the NFVR include autumn olive, garlic mustard, multi-flora rose, purple loosestrife, and zebra mussels. Invasive, non-native plant species in particular, have a tendency to take over natural areas and kill off existing native vegetation that normally holds the soil in place. An increase in erosion is ultimately the result.

Channel Obstructions/Flooding

Tributaries immediately downstream of municipalities are particularly prone to flooding due to the high density of impervious surfaces. In the NFVR watershed, this could affect river segments below Hoopeston, Rossville, and Bismarck. Water falling on impervious surfaces can not be absorbed by the ground and as a result it runs off into storm sewers which eventually overwhelm stream channel capacity.

Channelized drainage practices force water into engineered ditches without the volume buffering capacity offered by natural or manmade floodplains, riparian wetlands, or retention areas. Periodic rural flooding and associated bank erosion is the result. The extent of channelization in the NFVR watershed is unclear; however it is apparent upstream in Indiana as well as other drainage ditches located within the watershed.

Accumulation of woody debris and scouring at bridge sites during periods of high flow can cause damage to bridge structures and create excessive bank erosion.

Other Water Pollutants

Concentrations of the herbicide Atrazine in the NFVR just below Lake Vermilion at the water treatment plant intake for Danville annually exceed the safe drinking water standard of 0.003 mg/L (3ppb). As a result it becomes necessary to add steps in the overall treatment process to remove the Atrazine and Aqua Illinois' treatment costs increase accordingly.

Spraying roadside ditches for weed and brush control is a practice that is sometimes utilized in the NFVR watershed to help maintain drainage. Through careless use of equipment or inattention, chemicals sprayed directly onto water surfaces along the road and onto streams crossed by the road (in violation of label restrictions), potentially resulting in damage to downstream wildlife and farm animals. Lack of training and/or education of the applicators

may be a factor in this type of water pollution.

Residential lawns, streets, and driveways close to Lake Vermilion and its sub-watershed, contribute runoff directly to the lake. Fertilizer and/or pesticides heavily or carelessly applied to these surfaces have a direct route into the lake's waters, and therefore a high potential to contribute to the pollutant load.

Watershed activities may affect shallow groundwater aquifers, and therefore shallow, uncased wells. Pollutants could include nitrate, pesticides, and organics such as solvents and fuels. Risks to groundwater from most of these potential pollutants arise from leakage, runoff, or spillage into unprotected wellheads. Deeper aquifers such as the Mahomet across the northern part of the watershed should not be affected.

VI. Goals and Objectives

In the previous section, problems were listed and described in order of priority as determined by the Planning Committee. The following listing for Goals and Objectives follows the same prioritization. Priorities were established based on the Committee's sense about a listed problem's overall importance to the health and sustained use of the watershed resources, not on the likelihood of correcting the problem with current resources and knowledge.

IEPA Identified Water Quality Impairments

Lake Vermilion (RBD)

There are three goals that the planning committee has identified for the lake. They are as follows:

1.) Reduce nitrate levels below the drinking water standard of 10 mg/L.
2.) Decrease algae blooms
3.) Reduce in-lake sedimentation

Reduce nitrate levels below the drinking water standard of 10 mg/L in Lake Vermilion. The existing TN load is 14,627 lb/day in the lake. The TMDL calls for a 33% reduction in the total annual load to reach 10 mg/L (Tetra Tech 2006). The planning committee has also set the 33% reduction in total nitrogen as their goal. The source is tile drainage, which in turn can be attributed to fertilizer N applications to corn production fields, and lack of cover crops during the winter months to retain unused nitrate. In addition, runoff from fertilized residential and commercial lawns may carry away soluble nitrate fertilizer. Practices to reduce inputs/transport anywhere along the nitrate movement route from applicator/homeowner/farmer to water treatment plant will help this water quality problem.

Decrease algae blooms in Lake Vermilion by reducing P inputs in both dissolved and particulate (sediment) form from the watershed, so that in-lake TP concentrations remain below 0.05 mg/L, and secchi disk depths remain at or greater than two feet

(current mean depths at mid-lake at 1.5 to 2 feet). (Existing TP load 582 lb/day, TMDL calls for 77% reduction (Tetra Tech 2006)). Excess phosphorus typically associated with sediment from high runoff events, known point sources, and failing residential septic systems close to the lake can cause algal blooms.

Reduce in-lake sedimentation to 0.5 % lake volume per year. Field and stream bank erosion in the watershed are likely the major sources for sediment carried into Lake Vermilion by the NFVR. It has been estimated that a 50% reduction in the sediment load is equivalent to a 50,000,000 lb. total reduction which is equivalent to about 0.21 tons/ac/yr (based on 121,000 acre total Vermilion County watershed). Shoreline erosion on Lake Vermilion is another likely source of sediment. Aqua Illinois has recently addressed the areas with the most severe shoreline erosion (See text on page 28 as well as Figure 17 on page 29). Therefore, although the lake shoreline is still considered to be a source, it is most likely not the major contributor to the overall sediment load in the lake.

River Segments BPG05 and BPG10

The goal is to **reduce nitrate concentrations** below 10 mg/L in these NFVR segments. The existing total N load is 14,627 lb/day into the lake. The TMDL calls for a 33% reduction in total annual load to achieve the concentration standard. Again, one source of the nitrogen is tile drainage, which can be attributed to fertilizer applications to corn fields as well as lack of cover crops during the winter months to retain unused nitrate. Lawn and turf management practices may also contribute to the nitrate load in the NFVR. Practices to reduce nitrogen inputs and /or transportation of them anywhere along the nitrate movement route from field to stream will help this water quality problem.

River Segment BPG09

The goal is to **reduce fecal coliform bacteria** counts to levels that are considered acceptable by the IEPA as well as safe for human contact in NFVR. The goals outlined to reduce fecal coliform bacteria in River Segment BPG-09 are also the goals listed in the Septic Systems section (See below). (Existing coliform load ranges widely from 134 to 11,300 E+9 cfu/day depending on flow, TMDL calls for about 55% reduction at all flows).
Hoopeston Branch (BPGD)

There are several goals that the planning committee has identified for this river segment. They include the following:

1.) Reduce total phosphorus concentrations by 25% within 5 years.
2.) Reduce total nitrogen concentrations by 25% within 5 years.
3.) Promote best management practices in the sub-watershed area contributing to this river tributary segment.

Septic Systems

Work with the Vermilion County Health Department and take a more proactive approach to

addressing private landowner's sewage disposal system problems in Vermilion County. Watershed goals include:

1.) Inform and educate all homeowners in the watershed that use an on-site sewage disposal system about the value and cost-effectiveness of regular maintenance.
2.) Replace individual on-site septic systems with a community sewage collection and treatment system for the town of Bismarck, IL (population 542) by 2010.
3.) Maximize the number of properly functioning on–site septic systems, especially in the sub-watershed contributing to river segment BPG-09 (See Figure 27 below). This number has been estimated to be approximately 1,175 systems.
4.) Seek funding for a Vermilion County Health Department "septic system inspector".

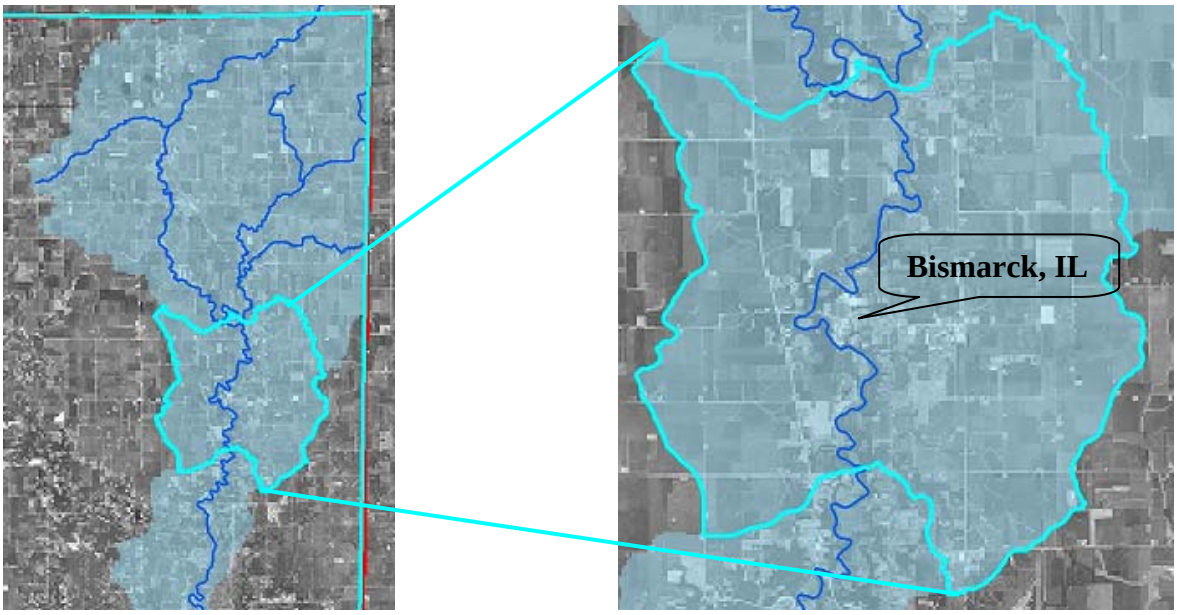

Figure 27. Location of sub-watershed contributing to BPG-09.

Stream Bank Erosion

Sites of stream bank erosion were identified on the NFVR through an aerial assessment completed by Wayne Kinney of Midwest Streams, Inc. in 2004. A total of 188 sites of stream bank erosion were identified along the stretch of the NFVR from the upper end of Lake Vermilion to IL Route 9 just east of Hoopeston, IL. This data has been confirmed by a survey conducted by Eastern Illinois University in 2006. Goals will be to:

1.) Prioritize stream bank erosion sites on the main stem for immediate remediation.
2.) Conduct an annual survey on the entire NFVR as well as the two main tributaries (Jordan Creek and Miller Creek) to assess stream bank erosion and channel obstructions, and success of implemented practices.
3.) Work with the Lake Vermilion Water Quality Coalition and the North Fork Special Services Area to address stream bank erosion.
4.) Seek grant funding to address prioritized stream bank erosion sites.
5.) Stabilize at least one site per year.

In addition to the goals listed above, the committee would like to:

1.) Identify stream bank erosion sites on the two main tributaries (Jordan Creek and Miller Creek) as well as other drainage ditches throughout the watershed.
2.) Conduct aerial surveys of the two main tributaries as well as other drainage ditches throughout the watershed.

Where stream bank erosion has been confirmed, the committee would like to:

1.) Certify that livestock are fenced out of the stream channel and kept away from areas with known stream bank erosion.
2.) Increase the number of livestock producers applying for the Environmental Quality Incentives Program (EQIP) for stream protection and fencing by 1 producer per year.

Water Quality Monitoring

The NFVR watershed planning committee recommends more water quality monitoring be conducted throughout the watershed. The planning committee has outlined several goals in regard to water quality monitoring.

1.) Develop and implement a monitoring strategy to identify exactly how, when, and where to conduct water quality monitoring.
2.) Conduct water quality monitoring upstream and downstream of suspected pollutant inputs.
3.) Promote and actively participate in the Illinois Stream Team.
4.) Secure additional funding for a part-time position to monitor the water quality within the NFVR watershed.
5.) Implement regular monitoring on two stations for fecal coliform on river segment BPG-09. Ideal locations for monitoring would include one station above Painter Creek and one station at the Bismarck bridge.
6.) Conduct an annual canoe survey to visually note and identify any obvious pollutant inputs.

Illegal Dumping

The goals that the planning committee has identified are to:

1.) Increase the number of individuals by two per year that participate in the Lake Cleanup Day.
2.) Decrease the amount of trash being taken to the landfill on Cleanup Day by partnering with the Vermilion County Recycling Program to promote recycling as well as educating the public about illegal dumping to decrease waste quantities entering the Lake.
3.) Estimate the amount of garbage requiring removal as well as removal costs by site, within the townships in the NFVR watershed.
4.) Facilitate a NFVR Cleanup (in addition to the Lake Cleanup event).
5.) Identify funding to conduct a mailing in the NFVR watershed to educate homeowners about the hazards of illegal dumping and to provide local contact information to report for dumping complaints.
6.) In addition the committee feels it is important to support clean-up efforts of Keep

Vermilion County Beautiful (KVCB) by maintaining membership on the KVCB Board and recruiting volunteers when requested for KVCB cleanup and recycling projects.

Wildlife

The planning committee has identified the following objectives in regard to wildlife:

1.) Increase native grass and wooded riparian habitat by 10% of current acreage by the year 2020.
2.) Increase the diversity of habitat available.
3.) Minimize exotic and invasive species such as autumn olive, bush honeysuckle, garlic mustard, multi-flora rose, purple loosestrife, Asian carp, and zebra mussels. This should apply especially to public lands, with a focus on local parks and township rights-of-way.

The wildlife habitat that is provided by woody cover and permanent grassland is limited in extent. It primarily occurs adjacent to streams, CRP acreages, along railroad rights-of-way, and a few scattered woodland tracts located in the downstream portion of the watershed.

Channel Obstructions/Flooding

The North Fork Special Services Area (NFSSA) activities have provided key NFVR channel maintenance on a continuing basis since their inception in 1987. Drainage district commissioners and members can also play a key role. Goals include:

1.) Continue working with the NFSSA on an annual basis to maintain free flow of the NFVR as well as its two main tributaries – the East Branch (Jordan Creek) and the Middle Branch (Miller Creek).
2.) Contact 20% of the drainage district commissioners within the NFVR watershed per year to provide them information to encourage water-quality related maintenance and construction practices such as man-made flood plains, wetland buffers, and retention areas.
3.) Promote 50 % increase in landowner enrollments of flood prone areas into CRP, especially filter strips, riparian forest buffers, etc. in the next 5 years.

Other Water Pollutants

Excessive herbicide and pesticide use are of concern in the watershed. The data from Aqua Illinois shows that Atrazine in particular continues to be a problem in the NFVR Watershed. In addition, there are concerns that herbicides, pesticides, fertilizer, and other contaminants may end up in groundwater supplies. The goal in regard to these other water pollutants will be to:

1.) Reduce the number of days the Water Treatment Plant needs to utilize activated charcoal in order to treat and remove Atrazine from the community drinking water supply.
2.) Reduce the number of incidents of off-target applications of herbicides and pesticides particularly when spraying ditches and around bridgeheads.
3.) Hold two educational and/or implementation events for all watershed landowners for reducing groundwater contamination through leaky wellheads or casings, via

abandoned well filling and sealing, and wellhead protection.

VII. Implementation Strategies/Alternatives

IEPA Identified Water Quality Impairments

Lake Vermilion (RBD)

Reduce nitrates - According to the TMDL Report, Tetra Tech's estimate indicates a 33% reduction in nitrates is needed in order to meet water quality standards in the Lake. Based on Tetra Tech's loading information a 33% reduction equates to the removal of approximately 1,445,400 lbs. of nitrogen per year. This reduction amount would equate to a 10 lb. per acre reduction on the cropland acreage and is based on the entire NFVR watershed which would include Indiana and Iroquois County. If the 33% reduction is only made on the 104,000 cropland acres of Vermilion County, the reduction amount would be equivalent to approximately a 14 pound reduction in nitrate nitrogen per acre per year. Nitrate reductions will be accomplished on a watershed basis through education, technical assistance, and incentives for homeowners and producers not only in the Lake sub-watershed, but also in the river segments identified below that have elevated nitrate concentrations (See River Segments BPG05 and BPG10 for more details).

Reduce algae blooms - Algae blooms can be attributed to excess phosphorus. Tetra Tech's TMDL Report calls for a 77% reduction of phosphorus in the lake. Steps can be taken to help reduce the amount of phosphorus entering the lake and would include:

1.) Promoting reduced tillage on a total of 20,000 acres by 2015.
2.) Educate, inspect, and correct faulty and/or failing residential septic systems (See **Septic Systems** below).
3.) Address streambank erosion (See **Streambank Erosion** below).
4.) Promoting and using best management practices such as filter strips and riparian buffers which are proven to reduce phosphorus loads. Establish 300 new acres by 2015.
5.) Investigate the use of algaecides such as copper sulfate to treat the symptoms of excess phosphorus. Although this is not treating the source, or the root of the problem it may be a practical alternative at times.
6.) Investigate the use of barley straw. Barley straw floated in small bodies of water at a rate of 80 lbs/acre has proven to act as a long term algistat, if specific guidelines for application are followed. Effectiveness in a lake as large as Lake Vermilion is not known. Again, this methodology is not treating the source of the problem, but could be an alternative method to improve the aesthetic quality of the lake.

Reduce sedimentation to 0.5 % lake volume per year (a 50% sediment load reduction).
Reduce tillage on 20,000 acres by the year 2015 throughout the NRVR watershed, and

reduce streambank erosion at prioritized sites on the NFVR and its main tributaries selected for remedial action. Reduce sediment mobilizing bank failures that result from destabilizing maintenance practices on upland streams and ditches in the watershed by promoting bank stabilizing maintenance strategies, including the restriction of livestock access to streams. It has been estimated that a 50% reduction in the sediment load is equivalent to a 50,000,000 lbs. total reduction, or approximately 0.21 tons/ac/yr (based on 121,000 acres total Vermilion County watershed).

Increase water retention areas at and around Heron Park on West Newel Road, to allow more nutrient and sediment removal by "natural" means upstream of the Lake. Survey this and other potential retention sites in the watershed for feasibility, cost, etc.

River Segments BPG05 and BPG10

Reduce Nitrate concentrations

According to the TMDL Report, Tetra Tech's estimate indicates a 33% reduction (1,445,400 lbs. reduction per year) in nitrates is needed in order to meet water quality standards in the Lake and BPG-05. This reduction amount would equate to a 10 lb. per acre reduction on the cropland acreage and is based on the entire NFVR watershed which would include Indiana and Iroquois County. If the 33% reduction is only made on the 104,000 cropland acres of Vermilion County, the reduction amount would be equivalent to approximately a 14 pound reduction in nitrate nitrogen per acre per year. This reduction can be met by implementing best management practices which could include the following for the entire VC watershed:

1.) The implementation of nutrient management plans on 50,000 acres by 2015 which would include reducing the amount of N applied as well as the timing of applications so that they are closer to the primary corn uptake period.
2.) Identify and secure funding over the next 5 years to provide a cost share program to implement 2 water control structures and 5 Bio-reactors which are edge-of-field tile water treatments that utilize wood chips to sequester nitrogen.
3.) The promotion of best management practices that help to keep N from moving off site including but not limited to filter strips and wetlands.
4.) The promotion of winter cover crops on 100 acres by 2010 which would include annual field days that would highlight their effectiveness in capturing unused end-of-season nitrate in the soil profile.

River Segment BPG09

Reduce fecal coliform counts to acceptable levels.

According to the TMDL Report, pathogen contamination occurs almost entirely during the summer months of May through October, so corrective practices should be in place during this time. The planning committee's list of possible sources include sewage treatment plants (IEPA permitted point sources), residential septic systems, animal waste inputs from farm and domestic animals, and perhaps certain wildlife. Fecal coliform counts can be reduced by implementing best management practices which could include the following:

1.) Limiting the amount of time farm animals have free access to rivers, ditches, and other surface waters (see **Stream Bank Erosion** below).

The Bismarck Community Water District as well as the Bismarck Community Unit School are both permitted water releases and would not be expected to be a pathogen source. However, septic systems and runoff in and around the Bismarck area may be contributing nitrates and pathogens to this segment of the NFVR. These impacts can be minimized by:

1.) Implementing practices that retain polluted runoff such as water and sediment control basins or the creation of wetlands near the Bismarck/Painter Creek sub-watershed that remove sediment and chemicals from storm water runoff.
2.) Upgrading wastewater treatment in or around Bismarck (pop. 542) via a residential sewage collection and treatment system has been highly recommended (see **Septic Systems** below).

Hoopeston Branch (BPGD)

The goals will be met by

1.) Working with the City of Hoopeston (pop. 5,965) to manage urban runoff amounts and quality.
2.) Implement one practice per year such as a water and sediment control basin which will not only retain runoff from the impervious surfaces within the city of Hoopeston, but it should also improve the water quality before it enters the Hoopeston Branch.
3.) Implement one best management practice per year along the Hoopeston Branch. This may consist of 300 feet of filter strips and/or one-half acres of riparian forest buffers installed per year.

Septic Systems

Work with the Vermilion County Health Department (VCHD) and take a more proactive approach to address private landowner's sewage disposal systems in Vermilion County. This would include

1.) Put together a mailing list for the approximately 1,175 homeowners within the sub-watershed contributing to river segment BPG-09. The mailing list will be used for future mailings.
2.) Utilize a brochure to do a mailing to homeowners regarding the importance of on-site septic system maintenance. This would include either the purchase of ready made brochures or the creation of one which pertains to Vermilion County.
3.) Work with the VCHD to create a county wide septic maintenance and/or inspection program. A separate committee will need to be formed to investigate the concepts and costs of such a position.
4.) Work with the Vermilion County Health Department to identify and secure funding for a "septic system inspector" position. A committee may need to be formed to investigate potential sources of funding.
5.) Work with and provide assistance to the village of Bismarck (pop. 542) to facilitate the process of replacing approximately 200 individual on-site septic systems with a community sewage collection and treatment system serving the Bismarck population. Ideally nearby rural residents could also hook into the proposed system.

Stream Bank Erosion

Stream bank stabilization is site specific and will be dependent on the width to depth ratio at each location. The recommendations put forth by Wayne Kinney (2005) only address lateral bank migration to protect eroding banks and include the following:

1.) Use Stone Toe Protection at sites with narrow width to depth ratios.
2.) Use Stream Barbs and/or Bendway Weirs in areas with larger width to depth ratios.

A more comprehensive study and/or survey will need to be conducted in order to ascertain the number of livestock that are in the watershed and whether or not these animals currently have access to surface waters. This can be accomplished by:

1.) Recruiting a volunteer or intern to complete a livestock survey **OR,**
2.) Hire a part-time employee or consultant to conduct the livestock survey.
3.) Seek funding to assist with associated costs of the survey.
4.) Once livestock numbers are established, work to encourage producers to implement best management practices that separate livestock from streams, ditches, and other surface waters.

Water Quality Monitoring

The NFVR watershed planning committee would like to see more water quality monitoring throughout the watershed. This can be achieved by:

1.) Identifying actual sampling locations for water quality monitoring and obtain permission from landowners. This would also include identifying locations on river segment BPG-09, which is impaired for fecal coliform.
2.) Contacting Prairie Rivers Network in order to obtain information on the Illinois Stream Team and receive proper training to do some simple water quality monitoring via trained volunteers.
3.) Identify and secure additional funding for a part-time position to monitor surface water quality within the NFVR watershed. A potential source would be through an IEPA Section 319 Grant. The application for funding would need to include a Quality Assurance Program Plan.

Illegal Dumping

The Vermilion County SWCD will continue to apply for the IEPA's Streambank Cleanup and Lakeshore Enhancement (SCALE) grant which provides funding for items such as cleanup supplies, disposal fees, etc. for clean ups conducted on streams or lakes. The planning committee also recommends:

1.) Continued and increased promotion of the Lake Vermilion Cleanup Day.
2.) Identify potential partners as well as funding to conduct a NFVR Cleanup
3.) Create a committee to research the concept of an Environmental Court as well as the feasibility of implementing it in Vermilion County. This process includes working closely with appropriate county deputies and VCHD regulators, and a county court judge dedicated to specifically issuing environmental judgments.
4.) Promote the development of township budgets for site specific cleanup dates at bridgeheads and other known dumping areas.

Wildlife

The goal is to increase bird and aquatic habitat, increase plant diversity and minimize exotic and invasive species. This will be done by:

1.) Promoting landowner incentive programs that are currently available to assist in the establishment of wildlife habitat. These programs would provide cost share to landowners to implement practices such as riparian forest buffers and filter strips.
2.) Identify and secure funding to provide for an individual to conduct one-on-one contacts and provide landowners with much needed information on wildlife friendly practices, programs, funding, and technical assistance.
3.) Study the feasibility of installing in-stream practices such as pool and riffles and rock riffles to provide much needed habitat for aquatic species.
4.) Working with agencies such as the Illinois Department of Natural Resources (IDNR) and Pheasants Forever that have similar wildlife goals and objectives.
5.) Contact drainage district commissioners within the NFVR watershed and provide them information to encourage maintenance and construction practices (man-made flood plains, wetland buffers, retention areas) that establish and expand wildlife habitat.
6.) Continue to work with Pheasants Forever to provide free food plot seed. Seed varieties currently consist of corn, sunflower, and sorghum.
7.) Promote the NRCS Wildlife Habitat Incentive Program (WHIP). It is important to note that at the time this document was written this program was not currently being funded.

Channel Obstructions/Flooding

The Vermilion County SWCD will work with the NFSSA to achieve the goals as listed earlier. These goals can be achieved by

1.) Creating an educational and/or informational brochure outlining best management practices with regard to drainage (man-made flood plains, wetland buffers, and retention areas), OR holding a workshop highlighting the same types of information.
2.) Identifying and securing funding to provide for an individual to conduct one-on-one riparian landowner contacts. This person would provide landowners with much needed technical assistance as well as encourage landowners to enroll flood prone areas into CRP. CRP practices could include wetland restoration, filter strips, and riparian forest buffers.

Other Water Pollutants

Atrazine was among the other water pollutants identified as a problem within the NFVR watershed. The following items can be implemented in order to reduce the need of treatment and/or removal of Atrazine at the Water Treatment Plant.

1.) Identify and secure funding to implement an in-stream and tile water monitoring program for Atrazine to establish general watershed areas contributing to Atrazine concentration spikes in the lake.

2.) Utilize a brochure to remind agricultural producers about Atrazine application set back zones. This would include either the purchase of ready made brochures or the creation of one which pertains to Vermilion County. The brochure would include the IDoA's information for reporting pesticide use complaints.
3.) Work with the three watershed fertilizer/chemical dealers to distribute the brochures mentioned above.
4.) Hold informational workshops regarding pesticide and herbicide use.
5.) Conduct a survey of producers within the watershed to ascertain what the actual use of Atrazine is.

VIII. Cost Summary

It is important to note that figures appearing in this section are for planning purposes only, are subject to revision, and are representative of costs available at the time the document was written. A partial cost summary has been included in Table 17 at the end of this section.

IEPA Identified Water Quality Impairments

Lake Vermilion (RBD)

Nitrate Nitrogen
The reduction of nitrates in Lake Vermilion will be a direct result of reducing nitrate fertilizer applications and reducing nitrate losses for the entire NFVR watershed (see *River Segments BPG05 and BPG10* below).

Phosphorus (P)
Costs to reduce phosphorus in the lake include the following:

1.) Conservation tillage programs – see #1 in Total Suspended Solids below.
2.) A residential septic system education program would have minimal costs. The costs of workshops and/or mailings would be estimated to be $5,000 for approximately 2,500 households @ $2 per household per year. The LVWQC would most likely take the lead in providing educational workshops and mailings with assistance from the Vermilion County Department of Health.
3.) Residential septic maintenance and inspection program is covered in #3 of Septic Systems below. Average cost to owner is estimated to be about $2,000 per renovation.
4.) Stream bank stabilization – see #2 in Total Suspended Solids below.
5.) Algae treatment with an algaecide like copper sulfate would be approximately $44,000 - $52,800. This figure is based on an 880 acre lake with treatment costs of $50 - $60 per acre. It is assumed that the cost of treatment would be provided by Aqua Illinois.
6.) The cost of using barley straw in Lake Vermilion to combat algae problems is estimated to be about $20 per acre (880 acres) per year or approximately $17,600 per year.

Total Suspended Solids (TSS)

Costs to reduce in-lake sedimentation to 0.5 % lake volume per year would include:

1.) Reduced tillage cost share programs available through the SWCD and NRCS. Costs of promotion and participation in these programs would be about $500,000 for 20,000 acres by 2015 @ $20 - $25 per acre (assuming no limit on acreage enrolled). The LVWQC would also actively participate.
2.) Stream bank stabilization costs are estimated to be about $43,000 per year. This would cover the costs of two sites, each approximately 400 feet long @ $53.86 per linear foot on average. This practice would continue indefinitely until all stream bank erosion has been addressed and would be completed by the Vermilion County SWCD, the NFSSA, and others.
3.) The cost of installing a retention area at Heron Park (a wetland area immediately upstream of Lake Vermilion) is currently unknown. A feasibility study would need to be completed, with initial estimates upward of $25,000

River Segments BPG05 and BPG10

Costs to reduce nitrate nitrogen in these two segments of the river would include:

1.) Nutrient Management Planning is typically done under cost share programs through the Vermilion County SWCD or the NRCS. These costs would include $10/acre for plan implementation and $3/acre for plan preparation. The costs of enrolling 50,000 acres into a nutrient management program by the year 2015 would be approximately $650,000.
2.) The installation of 5 edge-of-field tile water treatment wood chip bio-reactors over a 5 year period would cost approximately $1,000 each for a project total of $5,000. The Lake Vermilion Water Quality Coalition would promote this program.
3.) The installation of water control structures is estimated to cost around $1,500 each. There is a potential for drainage districts to have a technical and financial role in the installation of 2 structures in the next five years, for a total of $3,000.
4.) The installation of BMPs for surface water like filter-strips, wetlands, retention areas, etc. are usually installed through cost-share programs through the NRCS and SWCD. Costs are dependant upon the practice that is installed but could be estimated at $9,000 per year for 300 acres @ $30 per acre per year.
5.) The utilization of 100 acres of cover crops after corn is estimated to be $2,000 per year @ $20 per acre per year.

River Segment BPG09

Costs to reduce fecal coliform in this segment of river would include:

1.) Correct malfunctioning septic systems – see #2 and #3 above in the Phosphorus (P) section of Lake Vermilion (RBD).
2.) Establishing the number of livestock having direct access to the channel or tributary channels (see #1 and #2 in Stream Bank Erosion section below for costs) and conduct a directed information session or mailing @ $50 each. Partners to complete this task would include the LVWQC and SWCD.

3.) The installation of a wastewater collection and treatment system at Bismarck, IL is estimated to be upwards of $3 million.

Hoopeston Branch (BPGD)

The costs of removing total N and total P impairments in the Hoopeston Branch (BPGD) would include the following:

1.) The installation of at least one small retention basin, 1 acre in size, to improve water quality from impervious surfaces that drain into the Hoopeston Branch is estimated to be approximately $10,000.
2.) Stream-side plantings such as filter strips or riparian areas to filter direct runoff, 5 acres @ $200 - $1,000.

Septic Systems

The associated costs would include:

1.) Staff time to complete a mailing list of 2500 addresses. The costs of developing a mailing list of this size would be approximately $2,000 (100 hours @ $20 per hour).
2.) The costs associated with the brochure are highly dependant on whether it is purchased or created as well as the quantity of brochures that will be used for the mailing. Costs could range from $200 to $2,000.
3.) A sub-committee made up of volunteers, agency staff and landowners is required to develop criteria and costs to develop a "county wide septic inspector" position in cooperation with the Vermilion County Health Department (VCHD). Costs would be minimal, identified as in-kind services and meeting costs.
4.) The costs associated with a county wide septic maintenance and/or inspection program are unknown at this time, but would require additional staff to oversee the program. Salary and benefits for this additional staff person could be upwards of $75,000. Outside funding would be sought by this sub-committee working with the VCHD, the administrative unit for such a position.
5.) Only staff time would be required to provide assistance to the village of Bismarck to facilitate the process of replacing individual on-site septic systems with a community sewage treatment plant. Again this cost would be $20 per hour and would most likely be considered in-kind service. Estimated at 40 hours over a two year time period for a total of $800.

Stream Bank Erosion

As estimated from Wayne Kinney's 2004 aerial assessment (Kinney, 2005), the cost to treat 76,500 feet of stream bank at 188 sites at an average cost of $25.00 per foot of bank treated would be $1,912,500.00. It is important to note that at the time of Kinney's assessment the cost per foot of bank treated listed above was program dependant. For this area a more realistic cost is $53.86 per foot of bank treated. Therefore the cost to treat 76,500 feet of stream would probably be closer to $4,120,290.00.

The costs to acquire an individual or company to conduct a comprehensive study and/or survey

on livestock numbers within the NFVR watershed are difficult to estimate. Costs would be highly dependant on:

1.) If a quality volunteer or intern could be found that was willing to complete the project for little to no cost…..estimated costs could be between $0 and $5,000
2.) If a part-time employee or an environmental consulting company were hired to complete the project…..estimated costs could be between $10,000 and $50,000

Water Quality Monitoring

The costs associated with additional water quality monitoring throughout the NFVR watershed will be highly dependant on who is doing the sampling and/or monitoring. Our best estimates of costs are:

1.) Minimal for the identification of sampling locations for water quality monitoring as well as the acquisition of permission from landowners to access their property. Costs for completing this task would include hourly rates of employees estimated to be between $15 - $25 per hour and would be considered in-kind
2.) Also minimal to obtain information and training to be a part of the Illinois Stream Team to conduct simple water quality monitoring. Costs would include the cost of the kit which is $150. Funding for this item could be provided by the Lake Vermilion Water Quality Coalition.
3.) Highly dependant on who will be doing the sampling and/or monitoring. Ideally an additional part-time staff position could be funded. A salary for a part-time individual without benefits would be around $20,000 per year. There will also be costs associated with the analysis of the samples which could be upwards of $50,000 per year (approx. 10 samples per week, @ $100 per sample). Funding for this would most likely come from an IEPA Section 319 Grant and would require development of a Quality Assurance Program Plan (QAPP). Funds may also be available from Aqua Illinois to do some of the analysis.

Illegal Dumping

Current costs associated with the Lake Vermilion Clean Up Day range from $500 to $1,000 and are highly dependant upon the amount of debris that is taken to the local landfill. Similar costs could be expected upon implementation of a cleanup on the NFVR.

The costs associated with implementing a county wide Environmental Court are unknown at this time. More information will be needed before an accurate estimate of cost can be made. At the very least a staff person in the States Attorney's office would need to be in place to manage the program. Salary for this position could range from $50,000 to $75,000. Additional staff may be necessary.

Wildlife

The costs associated with increasing wildlife habitat are highly variable and are increasingly dependant on cost-share programs administered by state and/or federal agencies. Estimated implementation costs include:

1.) Approximately $500 per year on the promotion of various landowner incentive programs through mailings and workshops. This cost would also include partnering with other agencies such as IDNR and Pheasants Forever.
2.) A part-time staff person to be housed at the Vermilion County SWCD/NRCS office to conduct one-on-one contacts with landowners. Costs for this individual would be $20,000 per year and does not include any type of benefits.
3.) Costs of installing in-stream practices such as rock riffles and pool and riffles to provide habitat for aquatic species is unknown at this time. It will be dependant on the feasibility as well as the identification and quantity of sites.

Channel Obstructions/Flooding

A majority of the costs associated with addressing problems associated with channel obstruction and/or flooding are related to educational activities.

1.) Costs of creating and mailing an educational and/or informational brochure outlining best management practices with regard to drainage could cost approximately $2,000. The cost to hold a workshop highlighting the same types of information would cost approximately $500.
2.) Costs to conduct a river survey by canoe would be between $200 to $500 depending on whether canoes had to be rented or their use was donated.
3.) The cost of a part-time staff person to conduct one-on-one contacts with riparian landowners would be approximately $20,000 per year. This individual would encourage landowners to enroll flood prone areas into CRP, particularly practices like filter strips, riparian forest buffers, and wetlands. In addition this staff person could encourage landowners to seek technical and financial assistance to implement stream bank stabilization practices where needed.

Other Water Pollutants

A majority of the costs associated with addressing the Atrazine problem in the NFVR watershed will be related to educational activities. These costs include

1.) Staff time and postage to conduct one mailing a year to producers in the watershed would be approximately $200 - $300 per year.
2.) Staff time to work on ordering or creating an Atrazine brochure. Total average costs would be $1,600 (80 hours @ $15-$25 per hour). Similar rates of cost could be expected for working with the fertilizer dealers to promote distribution of the brochure (10 hours total for the watershed for a total of $200).
3.) Funding for mailings, speakers, meals, etc. for informational workshops. Costs can be estimated to be approximately $500.00 per year.
4.) Funding for a monitoring program for Atrazine. See employee costs (#3) under Water Quality Monitoring.

Table 17. Partial Cost Summary List

Category	Strategy	Landowner Cost	External Funding Needs	Staff	Funding Source	Partners
Water Quality	Nutrient (nitrate) management on 50,000 corn acres	Nutrient Management Plan Development $3/acre = $150,000	Incentive payments $10/acre = $500,000	2 hrs/client @ $25/hr x 500 clients = $25,000	IEPA (319) IDOA (CPP) USDA-NRCS	Landowners USDA-NRCS IDOA, IEPA SWCDs
	Conservation tillage on 20,000 acres by 2015	None	Incentive payments $15 - $20/acre $300,000 - $700,000 (assuming no limit on acreage enrolled)	2 hrs/client @ $25/hr x 200 clients = $10,000	IEPA (319) IDOA (CPP) USDA-NRCS	Landowners USDA-NRCS IDOA, IEPA SWCDs
	Bismarck Community Sewage Collection System In place by 2010	Currently unknown Sewer hookup charge?	$4,647,000	40 hours @ $20/hour $800	USDA	Residents of Bismarck
	On-site residential septic systems inspected and/or renovated	System renovation $2,000 each	Vermilion County Department of Health staff person $75,000	Included in External Funding Needs	Currently unknown	SWCD VCDOH
	Filter strips, riparian Buffers, 300 acres	Costs of seeding Drill rental available at SWCD	Incentive payments Seeding costs $54 - $188 / acre $16,200 - $56,400	2 hrs/client @ $25/hr x 100 clients = $5,000	USDA-FSA	Landowners, USDA-NRCS, USDA-FSA, SWCDs
	2 water control structures, and 5 edge-of-field bio-reactors by 2015	To Be Determined	2 @ $1,500 = $3,000 5 @ $1,000 = $5,000	5 hrs/client @ $25/hr x 7 clients = $875	IEPA (319) LVWQC USDA-NRCS	Landowners, LVWQC, SWCD USDA-NRCS
	Restrict livestock access from NFVR streambanks	Dependant on practices	Cost-share	40 hours @ $20/hour per client	USDA-NRCS	Landowners USDA-NRCS
	Stabilize 1 priority streambank erosion sites per year	None	400 feet each @ $53.86 $21,544	40 hrs/site @ $75/hr x 1 site $3,000	IDOA (SSRP) IEPA (319) LVWQC, NFSSA	Landowners, IDOA, IEPA LVWQC, NFSSA
	Establish 100 acres of covercrops by 2010	Seeding costs	Incentive payments $20 / acre = $2,000	2 hrs/client @ $25/hr x 10 clients = $500	IDOA (CPP) IEPA (319)	Landowners IDOA, IEPA, SWCD
	Education for lawn & turf management, on-site residential septic maintenance	None	Each year, 2 mailings@ $1,000= $2,000; 2workshops @ $1,500= $3,000 Half-time staff, $40,000	80 hours @ $20/hr = $1,600	IEPA (319) LVWQC	IEPA, LWWQC SWCD, VCDoH
	NFVR water quality monitoring (coliform, atrazine, nitrate, phosphorus, sediment)	None	Average of 500 samples per year @ $100= $50,000; Half-time staff, $40,000	Included in External Funding Needs	currently unknown IEPA (319) Aqua Illinois ? LVWQC ?	Aqua Illinois, IEPA, LVWQC, SWCD
Channel obstructions/ flooding	Log jam clearing “urban” retention basins	No additional costs	Log jam/beaver dam removal 10 @ $5,000 = $50,000 Urban Retention basins 2 @ $10,000 = $20,000	300 hours / year $30/hr = $9,000	NFSSA SWCD	Landowners NFSSA, SWCD
Wildlife	Wildlife conservation practices	40% cost share up to $1,000, 50 landowners= $50,000	Incentive Payments $1,500 / participant $75,000	2 hrs/client @ $25/hr x 50 clients = $2,500	IDNR, USDA-FSA USDA-NRCS Pheasants Forever	Landowners, USDA-NRCS, SWCDs, IDNR

IX. Selection of Implementation Strategies/Alternatives

The planning committee has selected implementation strategies based on cost-effectiveness as well as feasibility. The strategies have been listed below in order of priority. It is also important to note that these activities and timelines are subject to revision and are presented for planning purposes only.

IEPA Identified Water Quality Impairments

Lake Vermilion (RBD)

Reduce Nitrates in Lake Vermilion, River Segments BPG05, BPG10, and Hoopeston Branch (BPGD)

A majority of the implementation strategies outlined to reduce nitrates focus on education and the implementation of best management practices (BMPs) such as filter strips, nutrient management plans, and wetlands. These types of practices are currently promoted and are actively being implemented. Additional "alternative" best management practices that could be promoted more throughout the watershed include bio-filters, water control structures, and winter cover crops. The promotion of these activities will begin in year 1 of implementation.

Reduce algae blooms in Lake Vermilion

The number and intensity of algae blooms can be decreased by decreasing the amount of phosphorus reaching the lake. The most cost-effective solution to this problem is the implementation of BMPs such as filter strips, reduced tillage, and riparian forest buffers. Promotion of these practices is currently underway and will continue throughout the implementation of the plan. The education, inspection, and maintenance of faulty or failing residential septic systems are of highest priority, but are not as cost-effective as the BMPs. More on this is discussed in the Septic System section below. Similarly the phosphorus attached to sediment particles created by stream bank erosion is also a big priority, but again is just not very cost effective. This is discussed further in the Stream Bank Erosion section below. The use of algaecides and barley straw will not be implemented simply because they do not directly work to decrease the amount of phosphorus in the watershed.

Reduce Sedimentation in Lake Vermilion

Again, the most cost effective solution to this problem is the implementation of BMP practices such as filter strips, reduced tillage, and waterways. The promotion of these practices is ongoing and will continue throughout the implementation of the plan. Streambank erosion is of highest priority but unfortunately streambank stabilization projects are not nearly as cost-effective as upland BMPs. Streambank Stabilization will nevertheless be promoted as funds become available. Another alternative strategy is the creation of water retention areas at and/or around Heron Park. This would allow more nutrient and sediment removal by "natural" means upstream of the Lake. Although good in theory, this option is neither cost-effective nor feasible and therefore will not be considered by this committee.

River Segment BPG09

Reduce Fecal Coliform
Of highest priority is the community wide sewer system that Bismarck, IL is currently pursuing and implementation is expected in years 2-3 (see **Septic Systems** below). There are additional best management practices such as water and sediment control basins (WASCBs) and wetlands that can be promoted. These practices are offered but are not currently targeted specifically to the watershed contributing to this river segment. This task will be implemented in year 1 of implementation. Another best management practice is limiting the amount of time farm animals have free access to rivers, ditches, and other surface waters (see **Stream Bank Erosion** below).

Hoopeston Branch (BPGD)

Reduce total N (nitrate) and total P in Hoopeston Branch BPGD via riparian practices like filter strips, retention basins, infiltration areas.

Septic Systems

Ensuring that Bismarck, IL gets funding to install its community wide sewage treatment plant is the planning committee's top priority. The initial planning and fund seeking process is already underway. This project will be ongoing and completion is expected within 1-2 years. Also of high priority is the formation of a committee to investigate the feasibility and costs of a septic system inspector as well as incorporating a county-wide septic system maintenance and inspection program. This committee would also identify potential project partners as well as potential funding sources. This task would be completed in year 1 of the implementation.

Stream Bank Erosion

This problem is unique in that each individual site will most likely dictate which stream bank stabilization method is used. However, with the kind of costs associated with treating stream bank stabilization as outlined in the Cost Summary section it would be imperative that funding be sought in order to fully address this problem. Funding, typically in the form of a cost-share payment for stream bank stabilization may be available through:

1.) IEPA Section 319 Grant Program – this seams to be the best option to secure funding to tackle this problem.
2.) IDoA's Stream bank Stabilization and Restoration Practice (SSRP) Program - this program is highly dependant on IDoA's funding levels. At the time this document was finalized this program was without funding.
3.) North Fork Special Services Area – does about one stabilization project per year, as their budget allows.
4.) Lake Vermilion Water Quality Coalition – currently the Coalition has limited funding and would not be able to carry the costs of such a project. This is not to say that funding levels could not change.
5.) Vermilion River Ecosystem Partnership – there is a possibility that a grant could be written to seek funding for stream bank stabilization projects.

6.) There may be other sources of funding available as well.

In regard to stream bank erosion caused primarily by livestock, the recommendation is to seek a volunteer or an intern that is willing to complete the study and/or survey on livestock numbers within the NFVR watershed by

1.) Contacting local community colleges and universities for students studying agriculture who may be looking for internships
2.) Seeking funding for associated costs such as a stipend or mileage

In addition, EQIP programs appropriate to livestock exclusion will be promoted to limit the amount of time farm animals have free access to rivers, ditches, and other surface waters. This activity is ongoing and will continue throughout the implementation of this plan.

Water Quality Monitoring

Adding additional water quality monitoring sites is a very high priority to the planning committee, but unfortunately it is also the most costly. Realistically this particular item may not be implemented unless a long-term funding source can be identified and secured. An IEPA Section 319 Grant may be a source of funding for additional monitoring. Seeking a funding source for additional water quality monitoring as well as staff to do the water quality monitoring will begin in year 1 of plan implementation. A more realistic approach to the lack of monitoring is to identify sampling locations and do periodic sampling through the Lake Vermilion Water Quality Coalition. This can be started in year one of the implementation of this plan.

Illegal Dumping

The Vermilion County Soil and Water Conservation District will continue to apply for the IEPA SCALE grant on an annual basis to help defray the costs of the annual Lake Clean Up. Grant applications are typically solicited in the fall with grant monies distributed in the spring. In addition, once a NFVR Clean Up is established, the SCALE grant can be utilized to help defray the costs of this cleanup as well. Planning is already underway to begin a NFVR Clean Up sometime in 2008. It is hoped that this will become an annual event and be as successful as the Lake Clean Up Event.

The creation of a committee to research the concept of an Environmental Court as well as the feasibility of implementing the Court in Vermilion County will be completed in year one of plan implementation. Some of the tasks of this committee will be to:

1.) Estimate costs associated with the Environmental Court – year 1 of implementation
2.) Seek funding sources and partners – year 1 of implementation
3.) Implement the Environmental Court (if conditions are favorable) – years 2-3

Wildlife

All of the implementation strategies could be completed in a timely manner by the part-time staff person. However, additional funds would need to be secured in order to bring this person on board. Many of the practices that are recommended for wildlife also have water quality benefits. Therefore, it may be possible to seek funding from an IEPA Section 319 Grant.

Additional funding sources may include various IDNR grants and Vermilion River Ecosystem Partnership grants.

Channel Obstructions/Flooding

Most of the implementation strategies dealing with Channel Obstructions and Flooding are relatively low cost and could be completed in the first year of plan implementation. Funding sources may include the Lake Vermilion Water Quality Coalition and the North Fork Special Services Area. Funding for the part-time staff person could come from a Vermilion River Ecosystem Partnership Grant or an IEPA Section 319 Grant. This position would most likely be housed at the Vermilion County SWCD office.

Other Water Pollutants

Most of the implementation strategies dealing with Atrazine are relatively low cost and could be completed in the first year of plan implementation. The Lake Vermilion Water Quality Coalition and Aqua Illinois may be sources of funding. The most costly implementation strategy – to implement a monitoring program for Atrazine is also likely to be the most beneficial. Funding for this item may be funded in part by Aqua Illinois; however it is likely that additional funding in the form of an IEPA Section 319 Grant would be needed.

X. Measuring Progress/Success

The most positive measure of success is to have Lake Vermilion and the NFVR fully support their designated uses and be completely de-listed from the IEPA's 303(d) list. It is important to note that it may take several years before improvements are evident enough to be measurable in all segments of the watershed. This will be the case for specific parameters such as sedimentation rates, fecal coliform counts, and nitrate and phosphorus concentrations. As a result it will become necessary for progress to be measured in an alternative way. Increased participation rates in voluntary conservation and education programs will serve as a way to measure progress in the interim.

IEPA Identified Water Quality Impairments

Lake Vermilion (RBD)

Nitrate Reduction in Lake Vermilion and BPG-05
Success in the reduction of nitrates in Lake Vermilion will be a direct result of the reduction of nitrates in the entire NFVR watershed (see *River Segments BPG05 and BPG10* below).

Reduce Algae Blooms
The reduction of algal blooms in Lake Vermilion can be measured directly by showing an increase in the Secchi disk depth readings to two (2) feet or more in the lake during summer months. In addition, other measures of success would include:

1.) An increase in the number of septic systems that are inspected by 10% a year

especially those that are immediately adjacent to the NFVR and its main tributaries, Miller and Jordon Creeks.

2.) A decrease in field and stream bank erosion through reduced tillage and bank stabilization (See next section for more details).

Reduce In-lake Sedimentation

Success for reducing the sedimentation rate in Lake Vermilion by 2,500,000 lbs a year, 5% of the called for 50% filling reduction will be measured by:

1.) The stabilization of at least one stream bank site per year equaling approximately 400 feet (costs around $22,000) on the main channel and/or the Miller and Jordon Creeks.
2.) Reduce soil erosion to less than "T" on all row crop production acres that have been identified to be highly erodible through changes in tillage methods. This could include the adoption of strip till and/or no-till methods.
3.) Increase the number of sites of shore line stabilization on Lake Vermilion.

River Segments BPG05 and BPG10

Success will be measured by recording a greater number of days with nitrate concentrations below 10 mg/L, with an increase in the number of days of 1% (3 days) per year. Progress will be measured by the following milestones over a ten (10) year period:

1.) An increase in the number of acres enrolled in nutrient management planning in the BPG-05 and BPG-10 sub-watersheds by 500 acres/year. This will decrease N applications 20 lbs/ac on average for a cumulative reduction of 10,000 lbs/yr.
2.) The installation of one edge-of-field bio-reactor and/or water control structure a year.
3.) The adoption of cover crops on 25 additional acres per year ideally within one-half mile of the NFVR.

River Segment BPG09

Real progress to reduce fecal coliform counts will be made once Bismarck, IL installs their municipal sewage collection and treatment system. Success also depends on the installation of a continuous long term monitoring system for this segment.
Progress will be made along the way by:

1.) Monitoring the NFVR and tributaries as well as Lake Vermilion for a 5% reduction in the average fecal coliform load each year in order to achieve a 50 % reduction over a 10 year period.
2.) Reducing the number of livestock that have direct access to the NFVR and its tributaries. This will be measured by acquiring one funded EQIP contract per year.
3.) An increase in the number of individuals that participate and are reached via mailings regarding information and education on issues of septic system inspection and maintenance.
4.) The addition of 3 retention basins and/or wetlands within the BPG09 sub-watershed over the next 10 years to retain excess runoff from the impervious surfaces in Bismarck, IL.

At the time this document was written, Aqua Illinois had begun a two-year schedule of water sampling at the water treatment plant for fecal coliform counts.

Hoopeston Branch (BPGD)

Success will be achieved when there are no longer any impairments to aquatic life in this river segment. As stated previously, it may take several years before progress is evident. In the meantime, success will be measured when

1.) At least one diversion or retention basin is installed within the Hoopeston Branch sub-watershed. This would serve to retain excess drainage that may be coming from adjacent impervious surfaces before entering the NFVR.
2.) A minimum of five (5) acres are planted to grasses or trees within the Hoopeston Branch sub-watershed in order to improve the water quality of surface waters before they enter the NFVR.

Septic Systems

Progress towards the goals will have been made when:

1.) The residents of Bismarck (pop.542) hook up to a municipal sewage collection and treatment system.
2.) An additional employee is hired by the Vermilion County Health Department to serve as a septic system inspector.

In addition, success will be measured by:

1.) The number of homeowners participating in workshops or receiving informational mailings on septic inspections and maintenance.
2.) Increasing the number of inspected and properly functioning septic systems by 10% (20 residences) a year in the NFVR watershed, above and beyond the approximately 40 systems inspected per year now.

Stream Bank Erosion

Progress will be measured by:

1.) The number of stream bank sites that are stabilized in any given year. The goal is to stabilize at least 1 site per year with the average site being 400 feet in length.
2.) A decrease in the number of bank erosion sites on the NFVR identified as priority sites for correction.

Success will be achieved when:

1.) At least one (1) stabilization practice per year is completed.
2.) Annual river and tributary surveys show a decrease in the number of erosion sites.

Once the number of livestock with access to the NFVR has been identified, progress will be measured by the number of livestock that have been restricted from the river. Success will be achieved when 100% of the livestock in the NFVR watershed are restricted from the river. This will be measured by the number of successful EQIP applications per year.

Water Quality Monitoring

Real progress will be made when a water quality specialist is hired to plan and acquire water quality samples as well as organize and analyze the data on a regular, long term basis. In the interim, success will come with continued limited sampling by the Lake Vermilion Water Quality Coalition as well as the ongoing sampling by Aqua Illinois.

Illegal Dumping

Success will be measured by

1.) The number of individuals participating in the Lake Cleanup Day
    Milestones would include an increase in participation by 1 person each year.
2.) A decrease in the amount of trash being taken to the landfill as a result of the Cleanup by 10 % each year.
3.) A smaller amount of trash collected from around township and county bridges, and other illegal dump sites.
4.) The number of complaints.

Wildlife

Initially progress will be measured by the number of participants enrolling in programs that promote wildlife habitat such as the CRP, WHIP, and WRP. Success can be measured on an annual basis and will be achieved when:

1.) Bird habitat (pheasant and quail) has increased by 1% of the current acreage each year through 2020.
2.) The diversity of habitat that is available provides suitable breeding, nesting, and winter cover.
3.) Exotic and invasive species such as autumn olive, bush honeysuckle, garlic mustard, multi-flora rose, and purple loosestrife, are reduced by 1% of the total area per year. Information to prevent invasive threats like zebra mussels will be made available to residents, boaters and other users of county recreational facilities.

Channel Obstruction/Flooding

Progress will be measured by a decrease in the number of landowner complaints received regarding log jams that are impeding the natural flow of the NFVR and its tributaries. Another measure of success is the amount of money spent annually by the NFSSA removing these log jams.

Other Water Pollutants

Progress can be measured by:

1.) The number of days the Water Treatment Plant needs to utilize activated charcoal in order to treat and remove Atrazine.
2.) The number of reported incidents of off-target applications of herbicides and pesticides particularly when spraying ditches and around bridgeheads.

Success will be achieved when:

1.) There is a 10% (3 days) decrease per year in the number of days the Water Treatment plant has to treat and remove Atrazine.
2.) There is a 25% reduction relative to current complaints per year in the number of reported incidents of herbicide and/or pesticide misuse.

THE FUTURE

This document is intended to be dynamic, and therefore, the work is never truly done. The next step in this process is to start implementing the recommendations outlined in this document. Fortunately the Lake Vermilion Water Quality Coalition is already in place and will serve as the primary implementers of this plan. This plan will continue to be reviewed on an annual basis and amendments can and will be made to the document on an as needed basis. The only challenge now facing us is the uncertainty of the future and what it holds as it is quite difficult to foresee what changes may occur in the NFVR watershed over the next decade.

For question or comments on this document please contact the Vermilion County Soil and Water Conservation District. Their office is located at 1905-A U.S. Route 150 in Danville, IL. They can also be reached by calling (217) 442-8511 ext. 3.

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