UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

SEP 0 7 2011

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act (NEPA), an environmental review has been performed on the following action.

TITLE: Environmental Assessment for the Warrenville Grove Dam Modification, Warrenville, Illinois

LOCATION: Warrenville, DuPage County, IL

SUMMARY: This project is a component of the proposed ecological enhancement of a portion of the West Branch DuPage River, in accordance with National Oceanic and Atmospheric Administration (NOAA) Grant Award No. FNA07NOS4630002, DuPage River Restoration. The Environmental Assessment (EA) was prepared under the requirements of the National Environmental Policy Act (NEPA) (42 USC 4321 *et seq.*) to consider and disclose any potential significant impacts to the quality of the human environment that may arise from the proposed modification of the Warrenville Grove Dam along the West Branch DuPage River, Warrenville, DuPage County, Illinois.

The overall goal of this project is to restore the ecological health of an impounded segment of the West Branch DuPage River. The preferred alternative – dam removal– would largely remove the Warrenville Grove Dam and would allow for re-creation of upstream channel conditions, thereby:

- Restoring the natural ecological functions and processes of a free-flowing river segment,
- Decreasing lake-like conditions upstream of the dam that support high algal biomass, high water temperatures, and intermittent substandard dissolved oxygen levels,
- Decreasing barriers to fish migration and mussel dispersion,
- Decreasing maintenance needs and costs of the dam,
- Improving public safety,
- Providing improved educational and recreational opportunities for the community,
- Improving the Qualitative Habitat Evaluation Index scores and functional aquatic habitat, and
- Improving sediment transport within the river section.

The preferred alternative was created through input from the Forest Preserve District of DuPage County (the landowner), the public, NOAA and other federal agencies. The project, as proposed, would not result in significant adverse environmental impacts. Short-term, temporary, and localized construction-related impacts to air quality and increases in noise from the use of construction equipment are anticipated. However, over the long-term, the proposed project is anticipated to markedly improve aquatic habitat, improve water quality, enhance the area's natural resources, and improve the public use and enjoyment of the area.

RESPONSIBLE OFFICIAL:

David M. Kennedy
Assistant Administrator for
NOAA National Ocean Service
SSMC4, 13th Floor
1305 East West Highway
Silver Spring, MD 20910
(301) 713-3074

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact (FONSI) including the supporting environmental assessment (EA) is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the responsible official named above.

Sincerely,

Paul N. Doremus, Ph.D.
NOAA NEPA Coordinator

Enclosure

ENVIRONMENTAL ASSESSMENT
Warrenville Grove Dam Modification
Warrenville, Illinois

Prepared by

National Oceanic and Atmospheric Administration
Office of Response and Restoration
4840 South State Road
Ann Arbor, Michigan 48108

In Partnership with

DuPage County Stormwater Management
421 North County Farm Road
Wheaton, Illinois 60187

&

Forest Preserve District of DuPage County
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August 12, 2011

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EXECUTIVE SUMMARY

This Environmental Assessment (EA) was prepared under the requirements of the National Environmental Policy Act (NEPA [42 USC 4321 et seq.]) to consider and disclose any potential significant impacts to the quality of the human environment that may arise from the proposed Warrenville Grove Dam Modification Project on the West Branch DuPage River, DuPage County, Illinois. This proposed project is a component of the proposed ecological enhancement of a portion of the West Branch DuPage River, in accordance with National Oceanic and Atmospheric Administration (NOAA) Grant Award No. FNA07NOS4630002, DuPage River Restoration.

The grant recipient, DuPage County Stormwater Management Division, proposes to modify the Warrenville Grove Dam by systematically cutting the dam crest/spillway to achieve an engineered notch configuration approximately four feet above the dam foundation, reestablishing and naturalizing the river channel to a free-flowing section. This action would be followed by river channel habitat restoration, public access enhancements, and educational opportunities. See Section 3.3, Preferred Alternative (Proposed Project): Dam Removal, for additional details. The preferred alternative was created through input from the Forest Preserve District of DuPage County, the public, and NOAA.

The overall goal of this project is to restore the ecological health of an impounded segment of the West Branch DuPage River. Removing the existing dam and allowing for re-creation of upstream channel conditions would serve to:

- Restore the natural ecological functions and processes of a free-flowing river segment,
- Decrease lake-like conditions upstream of the dam that support high algal biomass, high water temperatures, and intermittent substandard dissolved oxygen levels, considered a non-pollutant impairment by the Illinois Environmental Protection Agency,
- Decrease barriers to fish migration and mussel dispersion,
- Decrease maintenance needs and costs of the dam,
- Improve public safety,
- Provide improved educational and recreational opportunities for the community,
- Improve the Qualitative Habitat Evaluation Index scores (Yoder and Rankin, 1998 methodology) and functional aquatic habitat, and
- Improve sediment transport within the river section.

The proposed project would not result in significant adverse environmental impacts. Short-term, temporary, and localized construction-related impacts to air quality and increases in noise from the use of construction equipment are anticipated. However, over the long-term, the proposed project is anticipated to markedly improve aquatic habitat, improve water quality, enhance the area's natural resources, and improve the public use and enjoyment of the area. The proposed

project is part of larger environmental restoration and cleanup efforts along the West Branch. Efforts would complement one another to enhance the DuPage River watershed.

SECTION 1
PURPOSE AND NEED FOR PROJECT CONSTRUCTION

The National Oceanic and Atmospheric Administration (NOAA) prepared this Draft Environmental Assessment (EA), under the requirements of the National Environmental Policy Act (NEPA), to evaluate and determine potential impacts to the quality of the human environment that may arise from the implementation of the preferred alternative for the Warrenville Grove Dam Modification Project on the West Branch DuPage River, DuPage County, Illinois. The proposed project is a component of the proposed ecological enhancement of a portion of the West Branch DuPage River, in accordance with National Oceanic and Atmospheric Administration (NOAA) Grant Award No. FNA07NOS4630002, DuPage River Restoration.

Dams have been constructed for many different human uses, including power and irrigation. Dams of all sizes, however, can have negative impacts on the health of river and stream systems. Placing a fixed structure into a free flowing river creates changes in the river system and local habitat. These impacts effect physical (e.g., velocity of the water flow, temperature), chemical (e.g., amount of dissolved oxygen in the water), and biological (e.g., aquatic organisms) components of the river systems. Dams impede fish passage, negatively influence stream functions, and pose a safety threat to persons using the river for recreational purposes.

The purpose of this dam modification project would be to restore the ecological health of an impounded segment of the West Branch DuPage River. By removing a portion of the existing dam and allowing for re-creation of upstream channel conditions, this project would:

- Restore the natural ecological functions and processes of a free-flowing river segment,
- Decrease lake-like conditions upstream of the dam that support high algal biomass, high water temperatures, and intermittent substandard dissolved oxygen levels, considered a non-pollutant impairment by the Illinois Environmental Protection Agency,
- Decrease barriers to fish migration and mussel dispersion,
- Decrease maintenance needs and costs of the dam,
- Improve public safety,
- Provide improved educational and recreational opportunities for the community,
- Improve the Qualitative Habitat Evaluation Index scores (Yoder and Rankin, 1998 methodology) and functional aquatic habitat, and
- Improve sediment transport within the river section.

The DuPage County Stormwater Management Committee identified the Warrenville Grove Dam Modifications Project as a priority within the DuPage County West Branch DuPage River Watershed (Christopher B. Burke Engineering West Ltd.[CBBEWL], 2006). The West Branch watershed has incurred the most recent widespread development as compared to other County watersheds. Current stormwater management and environmental resource protection regulations

at the local, state, and federal levels have helped mitigate the potentially adverse effects of development. Although the West Branch watershed has benefited from these protection measures, flooding, degraded water quality, and natural area restoration issues remain to be addressed.

A Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund, cleanup recently undertaken at the Kerr-McGee Kress Creek/West Branch DuPage River Site, in the heart of the West Branch watershed, presents a unique opportunity for the County and its partner agencies to significantly improve the water resources of the watershed. Under the preferred alternative of this EA, the proposed project would provide environmental enhancements, restoration, and resource development complementary to cleanup actions taken or planned by the responsible party (Tronox, formerly Kerr-McGee) and the U.S. Environmental Protection Agency at the Superfund site. Tronox completed Superfund remediation in the vicinity of the Warrenville Grove Dam in the fall of 2010. The Superfund site is or was contaminated with radioactive thorium wastes that originated from the West Chicago Rare Earths Facility, which operated between 1932 and 1973. Kerr-McGee bought the facility in 1967, operating it until its closure. Surface run-off and facility discharges, both of which were carried by a storm sewer into Kress Creek, caused the contamination of Kress Creek and the West Branch. The County obtained grant funds through NOAA to further enhance the ecological restoration of Kress Creek and the West Branch DuPage River following Superfund cleanup activities (see Drawings OV1-OV2 and EX1-EX2).

1.1 PUBLIC PARTICIPATION

The public initially had opportunities to review and comment on the proposed project during the development of the West Branch DuPage River Watershed Plan (CBBEWL, 2006). The DuPage County Department of Economic Development and Planning (EDP) and the Forest Preserve District of DuPage County held a public meeting on October 2, 2005 to provide a forum to explain the proposed project, as well as several other proposed projects along the West Branch, and to seek public input. The public subsequently had an opportunity to comment on the proposed project during the draft plan's public review period held January 3 through February 1, 2006. The final plan was approved by the DuPage County Stormwater Management Board on February 7, 2006. The DuPage County Division of Stormwater Management maintains a public Web site with information on the West Branch River Restoration.

A public meeting was held at the Warrenville City Hall, Warrenville, Illinois June 12, 2008 to allow the public to review the proposed Warrenville Grove Dam and McDowell Grove Dam modification project plans. The public had the opportunity to talk to the construction design team and provide comments. The majority of people who commented strongly supported the proposed project, noting the positive effect it would have on water quality, stream ecology, wildlife habitat, and recreational uses in the West Branch DuPage River. Those who opposed the project mainly voiced concerns over the loss

of the aesthetic value they associate with the Warrenville Grove Dam. See Appendix A for a report of the proceedings.

Pursuant to Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344), the U.S. Army Corps of Engineers and the Illinois Environmental Protection Agency held a joint public notice period October 14 to November 15, 2010, giving the public the opportunity to comment on the Section 404 permit application submitted by the Forest Preserve District of DuPage County. Per Ms. Stasi Brown of the U.S. Army Corps of Engineers, the only comment received was a letter of support. The Illinois Environmental Protection Agency held a Federal Water Pollution Control Act, Section 401 Water Quality Certification public notice period from May 17 to June 7, 2011. No comments were received.

1.2 ADMINISTRATIVE RECORD

The administrative record for this project is maintained at:

NOAA Office of Response and Restoration
4840 South State Road
Ann Arbor, MI 48108
Contact: Paula Bizot
Phone: (734) 741-2272
Email: paula.bizot@noaa.gov

SECTION 2
ENVIRONMENTAL SETTING/AFFECTED ENVIRONMENT

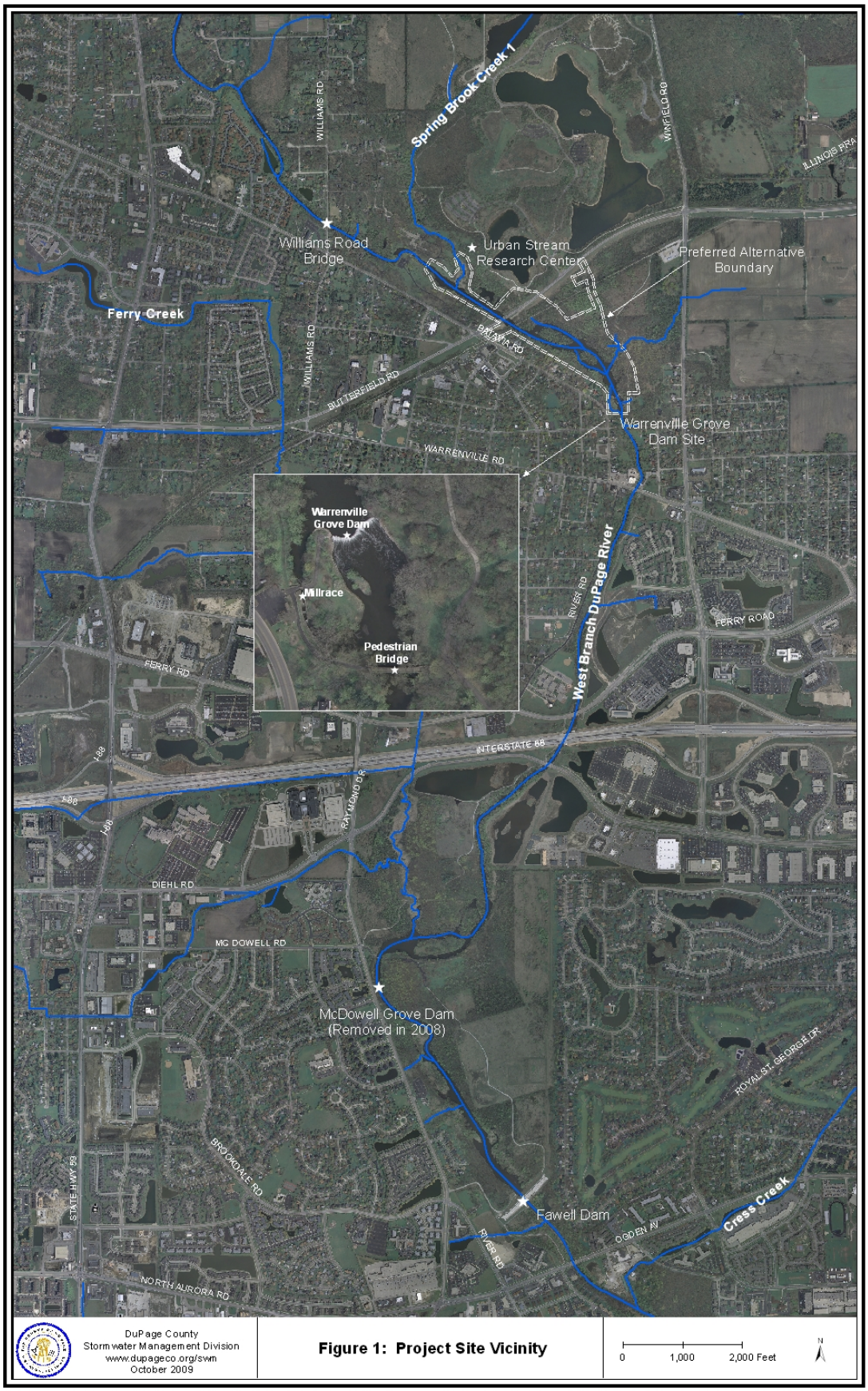
The DuPage River originates in Cook County, Illinois and is a large tributary to the Des Plaines River. The West Branch DuPage River (West Branch) is one of the river's three main catchments or subwatersheds. Warrenville Grove Dam is located in DuPage County, Illinois on the West Branch. The dam was one of three dams on the West Branch until the McDowell Grove Dam removal in 2008. The Fawell Dam remains approximately three miles downstream of the Warrenville Grove Dam. The Warrenville Grove Dam creates a 1.2 mile impounded section of the West Branch, extending from the dam upstream toward the Williams Road Bridge (Figure 1). The surface area of the impoundment is approximately 16.3 acres, encompassing two islands.

The project boundary for the preferred alternative (see Section 3.3) lies within Sections 26 and 35 of Township 39N, Range 9E. More specifically, the project boundary runs from about 300 feet downstream of the existing Warrenville Grove Dam and west-northwest (upstream) for approximately 4500 feet along the West Branch as shown in Figure 1 and Drawings EX1 and EX2. The project boundary accommodates site access and generally ranges from about 200-1200 feet in width. The limit of disturbance for the project, however, is generally contained within the existing limits of the river and ranges in width from about 100-400 feet.

The Warrenville Grove Dam is located within the Warrenville Grove Forest Preserve in the City of Warrenville, Illinois. The dam is just east of Batavia Road between Butterfield Road (upstream) and Warrenville Road (downstream) at latitude 41.82184 degrees north and longitude 88.17249 degrees west. The preserve is located on the northeast side of Batavia Road, west of Winfield Road, north of Warrenville Road, and south of Butterfield Road. The preserve is part of the Forest Preserve District of DuPage County (FPDDC) and owned by the FPDDC.

Historical records indicate that Warrenville Grove Dam construction began in 1936 by the Civilian Conservation Corps and was completed during the period of 1939-1941. This dam replaced a dam built in the mid to late 1800s to power a mill complex but was built 15 feet downstream of the prior dam. Presently, the dam and associated millrace do not serve a functional use. The immediate vicinity of the dam includes a millrace, pedestrian bridge, and various recreational amenities associated with the Warrenville Grove Forest Preserve (Figure 2).

The City of Warrenville is 5.5 square miles comprised of residential land (48%), commercial land (13%), open space (9%), undeveloped area (9%), and tax-exempt land (18%) (City of Warrenville, 2009). The area immediately adjacent to the Warrenville Grove Forest Preserve and proposed project area is primarily residential.


Spring Brook Creek 1
WILLIAMS RD
WINFIELD RD
ILLINOIS RTE
Williams Road Bridge
Urban Stream Research Center
Preferred Alternative Boundary
Ferry Creek
WILLIAMS RD
BATAVIA RD
BUTTERFIELD RD
Warrenville Grove Dam Site
WARRENVILLE RD
Warrenville Grove Dam
Millrace
Pedestrian Bridge
RIVER RD
West Branch DuPage River
FERRY ROAD
FERRY RD
INTERSTATE 88
I-88
RAYMOND DR
DIEHL RD
MC DOWELL RD
McDowell Grove Dam (Removed in 2008)
ROYAL ST. GEORGE DR
BROOKDALE RD
STATE HWY 59
Fawell Dam
OGDEN AV
Cress Creek
RIVER RD
NORTH AURORA RD
DuPage County
Stormwater Management Division
www.dupageco.org/swm
October 2009
Figure 1: Project Site Vicinity
0
1,000
2,000 Feet
N

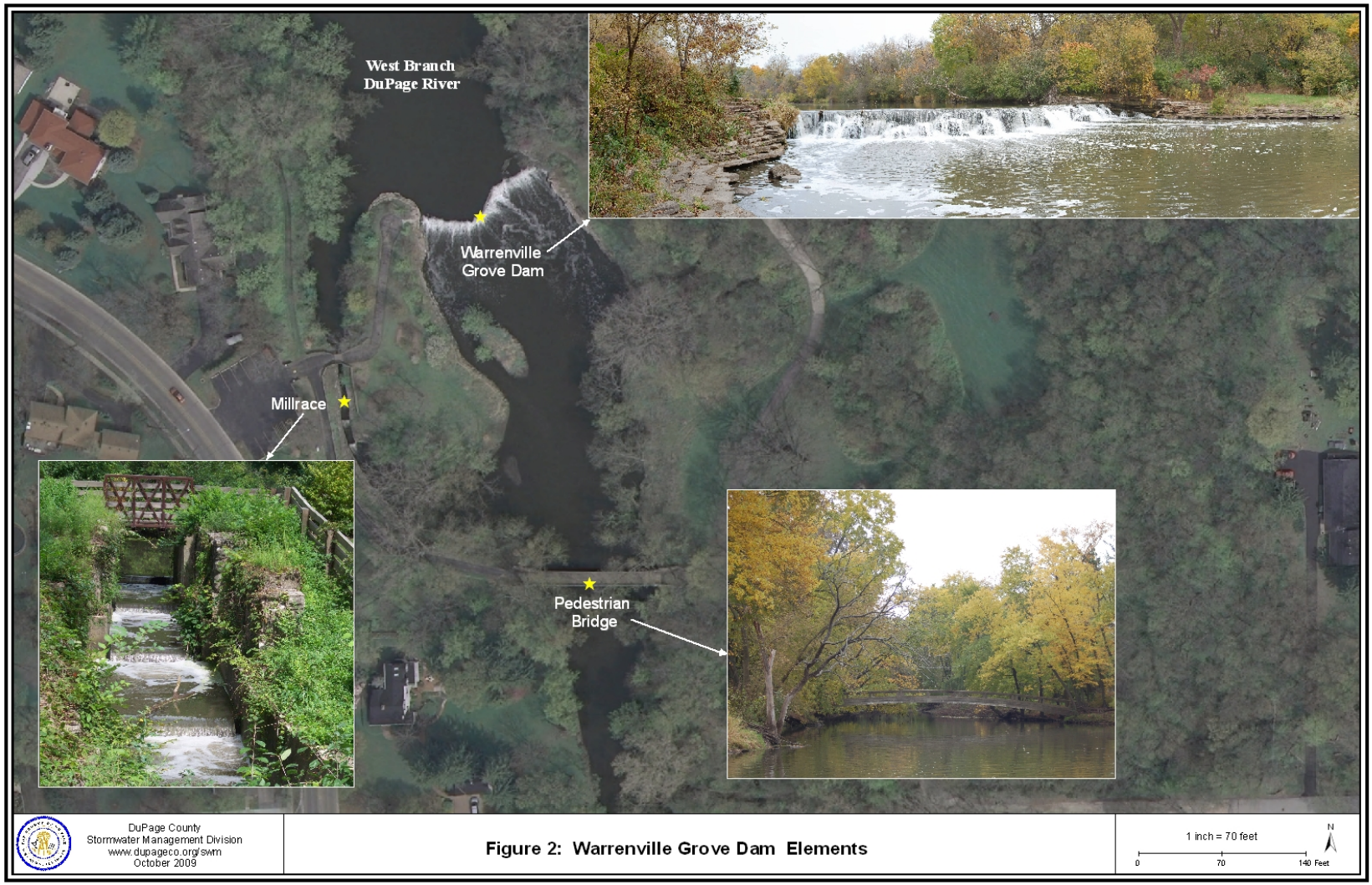


Figure 2: Warrenville Grove Dam Elements

2.1 AQUATIC BIOTA

Fish, macroinvertebrate, and freshwater mussel communities are indicators of changes in water quality and aquatic habitat in a watershed. Several studies consisting of physical, chemical and biological data collections from upstream and downstream of the Warrenville Grove Dam have been conducted (Hammer and Linke, 2003; Pescitelli and Rung, 2005; Midwest Biodiversity Institute, 2008).

2.1.1 Fish

Hammer and Linke (2003) found a total of 18 fish species within the Warrenville Grove Dam segment. Out of these 18 species, 16, 12, and 12 species were found downstream, within the pool, and upstream of the dam, respectively (Table 1).

Hammer and Linke evaluated stream conditions using the Index of Biotic Integrity (IBI), a widely used stream quality measurement based on the fish community, taking into account the number and types of species present, their tolerance to degradation, food, habitat and spawning preferences. These attributes are evaluated using 10 different parameters, or metrics, each with a possible score of 0-6. Scoring is based on comparison to established reference conditions for unmodified streams of similar size and region of the state. Total IBI scores range from 0-60, with higher scores indicating better quality. The IBI is the basis for determining the letter-based Biological Stream Characterization, which includes the following IBI ranges and descriptors:

51-60 = A (Unique Aquatic Resource)
41-50 = B (Highly Valued Aquatic Resource)
31-40 = C (Moderate Aquatic Resource)
21-30 = D (Limited Aquatic Resource)
0-20 = E (Restricted Aquatic Resource)

The IBI scores for the Warrenville Grove Dam segment were 22, 18, and 19 for the downstream free flowing, impounded pool, and upstream midsegment samples, respectively. Both the pool and upstream samples were characterized as restricted, whereas the downstream was characterized as limited.

The Illinois Department of Natural Resources (IDNR) and the Illinois Environmental Protection Agency (IEPA) surveyed the DuPage River Basin in 2003 as part of a statewide monitoring program to measure the health of Illinois streams. Six stations were sampled in the DuPage River Basin; the station located upstream of the dams along the West Branch (Station GBK-07) had the lowest number of fish and the lowest IBI score for the entire basin (Pescitelli and Rung, 2005).

Table 1. Fish Sampling Results for the Warrenville Grove Dam Segment

Common Name	Scientific Name	Downstream Warrenville Grove Dam	Warrenville Grove Dam Impoundment Pool	Upstream Midsegment Warrenville Grove Dam
gizzard shad	*Dorosoma cepedianum*	2	4	0
goldfish	*Carassius auratus*	1	0	0
carp	*Cyprinus carpio*	2	23	11
golden shiner	*Notemigonus crysoleucas*	0	1	0
creek chub	*Semotilus atromaculatus*	1	0	1
spotfin shiner	*Cyprinella spiloptera*	37	1	29
fathead minnow	*Pimephales promelas*	2	0	0
bluntnose minnow	*Pimephales notatus*	19	1	50
sand shiner	*Notropis ludibundus*	4	0	114
white sucker	*Catostomus commersoni*	1	4	5
yellow bullhead	*Ameiurus natalis*	0	0	2
mosquitofish	*Gambusia affinis*	4	1	0
black crappie	*Pomoxis nigromaculatus*	2	1	0
largemouth bass	*Micropterus salmoides*	6	8	2
smallmouth bass	*Micropterus dolomieu*	5	0	8
green sunfish	*Lepomis cyanellus*	11	5	15
bluegill	*Lepomis macrochirus*	24	2	14
orangespotted sunfish	*Lepomis humilis*	3	9	5
	Total Fish	**124**	**60**	**246**
	Total Species	**16**	**12**	**12**
	IBI Score	**22**	**18**	**19**
	Biological Stream Characterization	**D**	**E**	**E**

Source: Hammer and Linke, 2003

Midwest Biodiversity Institute (2008) also reported low fish IBI scores upstream of the Warrenville Grove, McDowell Grove, and Fawell dams during a 2006 survey. Additionally, this study reported the highest percent of fish showing deformities, eroded fins or barbels, and/or tumors located within the Warrenville Grove Dam impoundment. The abnormalities significantly decreased both upstream and downstream of the three dams.

The IDNR conducted a pre-construction/dam modification fish survey for the Forest Preserve District of DuPage County in the vicinity of the Warrenville Grove Dam in 2008 with permission of IEPA and Tronox (DeMartini, personal communication). A total of 19 fish species were found within the Warrenville Grove Dam segment, of which 16 species were found below the Warrenville Grove Dam and 13 species were above the dam (Table 2). The extrapolated IBI scores were 27 and 19 below and above the dam, respectively. The sample below the dam is characterized as limited, whereas the segment above the dam is restricted. Similar fish species and IBI scores were observed during the Hammer and Linke (2003) survey.

The Illinois Natural History Survey (INHS) Fish Collection Database contains 72 historic fish records from the West Branch DuPage River (INHS, 2008). None of the species historically found within the West Branch DuPage River watershed are listed in the State of Illinois as threatened or endangered.

Table 2. Illinois Department of Natural Resources – Division of Fisheries/Streams; Warrenville Grove Dam Special Survey (2008)

Common Name of Fish	**Scientific Name**	**Below Warrenville Grove Dam**	**Above Warrenville Grove Dam**
gizzard shad	*Dorosoma cepedianum*	14	38
carp	*Cyprinus carpio*	11	22
golden shiner	*Notemigonus crysoleucas*	0	2
creek chub	*Semotilus atromaculatus*	1	0
spotfin shiner	*Cyprinella spiloptera*	12	11
bluntnose minnow	*Pimephales notatus*	14	30
quillback	*Carpiodes cyprinus*	0	1
white sucker	*Catostomus commersoni*	15	23
channel catfish	*Ictalurus punctatus*	0	1
yellow bullhead	*Ameiurus natalis*	5	0
black bullhead	*Ameiurus melas*	1	0
black crappie	*Pomoxis nigromaculatus*	2	1
largemouth bass	*Micropterus salmoides*	1	11
smallmouth bass	*Micropterus dolomieu*	40	9
Green sunfish	*Lepomis cyanellus*	11	2
bluegill x green sunfish hybrid	*Lepomis macrochirus* x *L. cyanellus*	2	0
bluegill	*Lepomis macrochirus*	18	3
pumpkinseed	*Lepomis gibbosus*	5	0
orangespotted sunfish	*Lepomis humilis*	7	0
	Total Fish	**159**	**154**
	Total Species	**16**	**13**
	Extrapolated IBI	**27**	**19**
	Biological Stream Characterization	**D**	**E**

2.1.2 Macroinvertebrate

Hammer and Linke (2003) observed the macroinvertebrate community was extremely poor within the impounded segment of the Warrenville Grove Dam, with a Macroinvertebrate Community Index (MCI) score of 274 out of 700. The MCI scores range from 0 – 700, higher scores indicating a higher quality macroinvertebrate community. The impounded section was the lowest score recorded in the study; the downstream free flowing area and the upstream free flowing midsegment MCI scores were considerably higher (641 and 550, respectively). In

addition, more macroinvertebrate species were located within the free flowing areas of the Warrenville Grove Dam segment as compared to the impounded section.

The MCI is not appropriate for making comparisons to other studies or gauging ecological health relative to other rivers because only DuPage River kick-netting and hand picking data were used in its development (Hammer and Linke, 2003). However, the index provides a measure for documenting relative differences in macroinvertebrate communities among DuPage River sample stations.

The INHS Mollusk Collection Database has 85 records from the West Branch DuPage River. Within the West Branch DuPage River watershed, 16 species of mussels have been historically present (INHS, 2008). One of the 16 species historically present within the West Branch DuPage River watershed, rainbow (*Villosa iris*), is listed in the State of Illinois as endangered. Two other species, slippershell (*Alasmidonta viridis*) and spike (*Elliptio dilatata*), are listed in the State of Illinois as threatened. The INHS Mollusk Collection Database contains no live records for the rainbow. Additionally, the slippershell and spike have not been reported live within the stream since 1958 and 1956, respectively. Both the rainbow and the spike have been collected from the project area historically as dead shell material only. The first invasive Asian clam (*Corbicula fluminea*) was recorded in 1989, and it is still abundant in the West Branch (DeMartini, 2005 in Appendix B).

An unpublished study conducted by the Forest Preserve District of DuPage County in 2004 addressed sites within the footprint of the Kerr-McGee Kress Creek/West Branch DuPage River Superfund Site in search of freshwater mussel species (Appendix B). This study found five live mussel species above the Warrenville Grove Dam in limited numbers, two live species below the Fawell Dam in more abundant numbers, and three live species between the dams in limited numbers (Table 3). Two of the five species (giant floater and white heelsplitter) are considered tolerant of sedimentation and degraded habitat conditions. Historical data (1949-1958) from the INHS recorded 12 species below the Fawell Dam and 11 species above the Warrenville Grove Dam (INHS, 2008).

Relic mussel shells of 16 species were found throughout the 2004 survey areas (Table 4 and Appendix B). Dead shells are commonly found in mussel surveys and give valuable information and evidence that the water body was at one time capable of supporting said species and their host fish necessary for larval dispersion. Such data provides strong guidance for reintroduction potentials and management strategies once dam removals have been completed.

Table 3. Live Native Mussel Species Found within the West Branch during the 2004 Survey Conducted by the Forest Preserve District of DuPage County

Common Name	Scientific Name	Downstream	Upstream	Between
giant floater	*Pyganodon grandis*	X		X
lilliput	*Toxolasma parvus*	X		
paper pondshell	*Utterbackia imbecillus*	X		
famucket	*Lampsilis siliquoidea*	X		
ellipse	*Venustaconcha ellipsiformis*	X		
white heelsplitter	*Lasmigona complanata*		X	X
plain pocketbook	*Lampsilis cardium*		X	X

Source: DeMartini, 2005 (Appendix B)

Table 4. Relic Mussel Shells Recorded in the West Branch in 2004 Survey Conducted by the Forest Preserve District of DuPage County

Common Name	Scientific Name	Special Status
mucket	*Actinonaias ligamentina*	--
plain pocketbook	*Lampsilis cardium*	--
famucket	*Lampsilis siliquoidea*	--
white heelsplitter	*Lasmigona complanata*	--
giant floater	*Pyganodon grandis*	--
fluted-shell	*Lasmigona costata*	IL Species in Greatest Need of Conservation
round pigtoe	*Pleurobema sintoxia*	--
creeper	*Strophitus undulatus*	--
lilliput	*Toxolasma parvus*	--
pondhorn	*Uniomerus tetralasmus*	IL Species in Greatest Need of Conservation
paper pondshell	*Utterbackia imbecillus*	
ellipse	*Venustaconcha ellipsiformis*	IL Species in Greatest Need of Conservation
yellow sandshell	*Lampsilis teres*	--
spike	*Elliptio dilatata*	State Threatened
slippershell mussel	*Alasmidonta viridis*	State Threatened
rainbow	*Villosa iris*	State Threatened
Asian clam	*Corbicula fluminea*	Introduced

Source: DeMartini, 2005 (Appendix B)

2.2 HABITAT QUALITY

In-stream habitat is a key characteristic of a healthy stream ecosystem. Streams must exhibit well-developed and diverse habitats in order to support healthy macroinvertebrate and fish communities. Habitat takes into consideration attributes like substrate type, in-stream cover, flow diversity, channel formation (riffles, pools and runs), sinuosity, canopy cover, and riparian land uses. Many stream miles have been altered, directly or indirectly, by man through channelization, bridge crossings, dams, storm sewer, and wastewater effluent discharges. These changes have greatly impacted the quality of in-stream habitat.

In-stream habitat within Warrenville Grove Dam segment is fairly degraded due to past channelization and the effects of urban stormwater inputs (Hammer and Linke, 2003). The impoundment scores were low on both the Stream Habitat Assessment Protocol (SHAP) and the Qualitative Habitat Evaluation Index (QHEI), and QHEI scores were more favorable in free-flowing areas of the river (Table 5). According to Hammer and Linke (2003), pools were very silted in and relatively shallow with little to no diversity in substrate type, cover or flow.

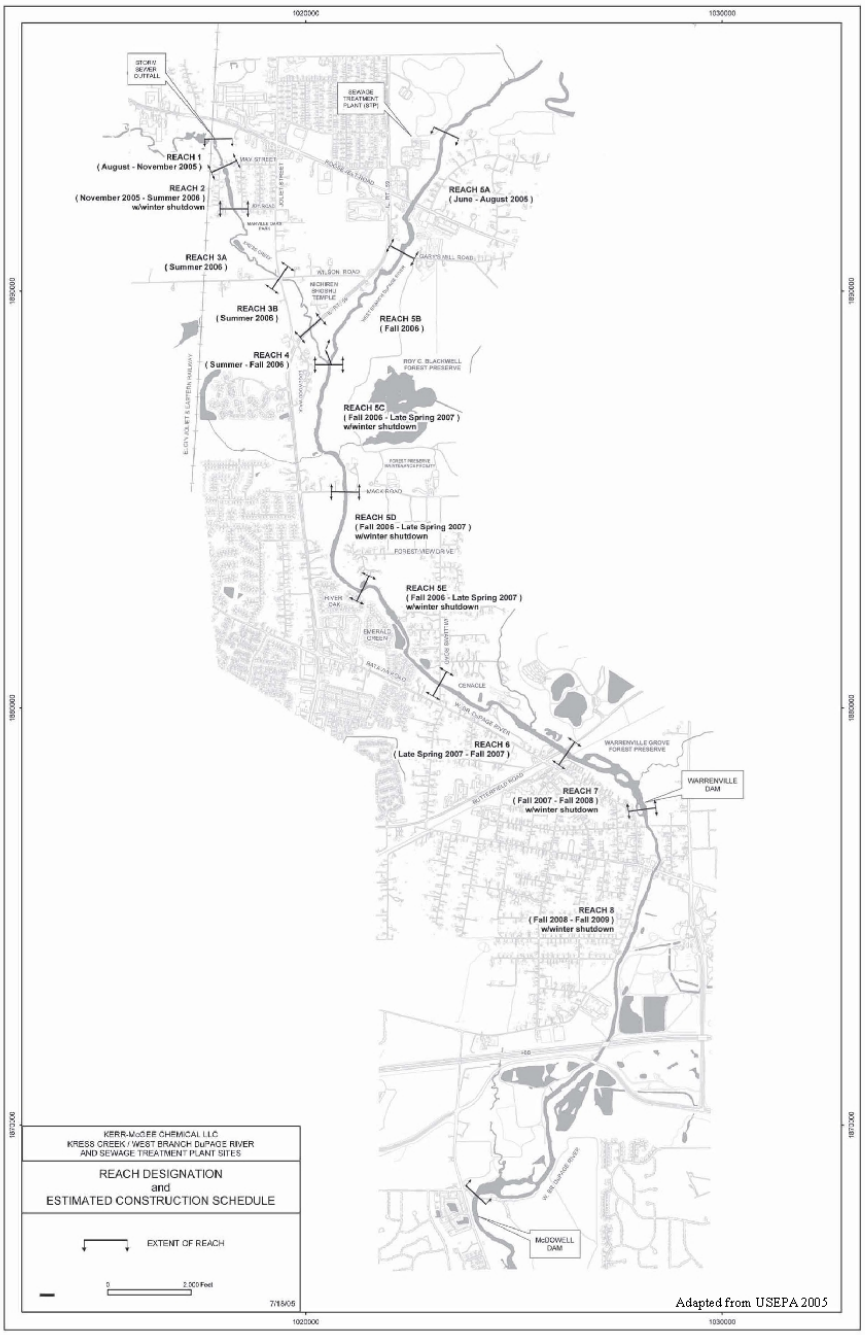
Table 5. Stream Habitat Assessment Protocol (SHAP) and Qualitative Habitat Evaluation Index (QHEI) Habitat Assessment Values for the Warrenville Grove Dam Segment

Site	SHAP Score	SHAP Rating	QHEI Score	QHEI Rating
Mack Road (Midstream Free Flowing)	86	Fair	56.5	Intermediate
Warrenville Dam Pool	81	Fair	43	Poor
Warrenville Downstream (Free Flowing)	80	Fair	62	Good

Source: Hammer and Linke, 2003

Midwest Biodiversity Institute (2008) reported a poor QHEI score (43) upstream of the Warrenville Grove Dam within the impoundment, which was the lowest score throughout the West Branch. This location lacked riffles, and the stream channel was rather constricted. However, the stream took on a decidedly more natural character for two miles starting downstream from the Fawell Dam where riffles, a developed channel morphology, and fast current speeds were noted.

Under Superfund, some habitat improvements have recently been made upstream of the Warrenville Grove Dam. Following 2010 Superfund cleanup activities in the West Branch reach 7 (see Figure 3), Tronox implemented in-stream aquatic native restoration techniques. These included the installation of root wads, snag cribs, bank loading, hummock and hollows, riffles, sills, boulder clusters, and mushroom caps, creating a variety of habitats.



DuPage County
Stormwater Management Division
www.dupageco.org/swm
July 2010

Figure 3: Kress Creek/West Branch DuPage River Superfund Site Reach Designation

2.3 WATER QUALITY

According to state classifications of Illinois waters, the West Branch DuPage River is designated as a General Use Waters. It is listed as a 303(d) impaired waterway with a non-support status for aquatic life. The potential causes of impairment are phosphorus, salinity/TDS/chlorides, flow alteration, other habitat alteration, and suspended solids. The potential sources of impairment are: municipal point sources, construction, stormwater (non-point source), flow regulation/modification, and channelization (CBBEWL, 2006). With the exception of dissolved oxygen, concentrations of most water quality parameters analyzed in the West Brach fell within Illinois water quality standards for the protection of aquatic life. Hammer and Linke (2003) reported that dissolved oxygen levels fall below the minimum 5 mg/L standard (IEPA) at the Warrenville Grove Dam impoundment for approximately 10 hours in a 24-hour sampling period.

Hammer and Linke (2003) also reported several other water quality data for the West Branch. During a 24-hour sampling period, the water temperature in the West Branch for morning collection was slightly higher at the downstream location (27.87ºC) compared to the impoundment (27.80ºC); however, the impounded section had a higher temperature during the afternoon compared to the downstream sample (28.92ºC and 27.42ºC, respectively). Hammer and Linke found that the West Branch is highly enriched with nutrients throughout the system. The Warrenville Grove Dam Pool contained the highest total nitrogen (10.24 mg/L) and total phosphorus (1.64 mg/L) throughout the West Branch. Table 6 summarizes results reported by Hammer and Linke.

Midwest Biodiversity Institute (2008) reported similar nutrient and dissolved oxygen results for the West Branch. According to Midwest Biodiversity Institute, nutrient enrichment was most pronounced in the impounded areas and elevated copper was observed following storm events during June, July, and August.

Turbidity is elevated in the West Branch DuPage River watershed due largely to fine particulates entering the river from bank erosion (CBBEWL, 2006). Turbidity is a measure of how much the material suspended in water decreases the passage of light through the water. Specific to this project, the slow moving water upstream of the dam provides favorable conditions for algae and algal blooms, which are a main source for turbidity. Increased turbidity disrupts the natural environment and hinders the growth of flora and fauna. Higher turbidity levels increase water temperatures and reduce the amount of light penetrating the water, which reduces photosynthesis and the production of dissolved oxygen. In addition, as the particles settle, they can blanket the stream bottom, especially in slower waters such as dam impoundments, and smother benthic habitats (USEPA, 1997).

Table 6. Water Chemistry Results from Warrenville Grove Dam

Parameter	Warrenville Dam Pool (AM)	Warrenville Dam Pool (PM)	Warrenville Downstream (AM)	Warrenville Downstream (PM)
Collection Time	04:47	15:35	04:50	15:32
Temperature (ºC)	27.80	28.92	27.87	27.42
Dissolved Oxygen (mg/L)	5.36	4.89	6.37	6.53
Dissolved Oxygen (% Sat.)	70.0	64.2	82.4	85
Conductivity (uS/cm)	1133	1149	1125	1266
pH	7.97	7.7	8.00	7.76
Total Organic Carbon (mg/L)	7.00	7.00	7.00	7.00
Suspended Solids (mg/L)	28	15	48	31
Turbidity (NTU)	39	22	43	24
Ammonia Nitrogen (M)	0.13	0.05	0.11	0.06
Total Kjeldahl Nitrogen (mg/L)	1.09	1.24	1.28	1.43
Nitrate-Nitrite (mg/L)	8.45	9.00	8.59	8.75
Total Nitrogen (mg/L)	9.54	10.24	9.87	10.18
Total Dissolved Phosphorus (mg/L)	1.39	1.54	1.42	1.51
Total Phosphorus (mg/L)	1.54	1.64	1.54	1.63
Collection Time	04:47	15:35	04:50	15:32
Chlorophyll-a Corrected (ug/L)	4.53	6.14	5.01	5.65
Chlorophyll-b (ug/L)	1	1	1	1
Chlorophyll-c (ug/L)	1	1	1	1
Pheophytin-a (ug/L)	3.84	1.47	5.78	1.78
Pheophytin-a (ug/L)	3.84	1.47	5.78	1.78
Chlorophyll Volume Filtered	360	570	400	470

Source: Hammer and Linke, 2003

2.4 TERRESTRIAL ENVIRONMENT AND WATERS OF THE U.S.

2.4.1 Wetlands/Waters of the U.S.

Planning Resources Inc. (PRI [PRI, 2009]) completed a wetland delineation along the portion of the West Branch DuPage River between Riverside Road and Main Street Warrenville, DuPage County, Illinois (Exhibit 7, Appendix C). Banks rose one to two feet above the normal water level, and the water quality was poor at the time of the wetland delineation field investigation. PRI identified five waters of the U.S., eight wetlands, and areas of wetland fringe. The waters of the U.S. include the West Branch DuPage River, Springbrook Creek, Bremme Creek (Unnamed Tributary #3), Little Bremme Creek (Unnamed Tributary # 1), and one unnamed tributary (#2). The eight wetlands and wetland fringe are hydrologically connected to the West Branch or Springbrook Creek. The fringe wetland areas are dominated by reed canary grass (*Phalaris arundinacea*) and wild golden glow (*Rudbeckia laciniata*).

Additionally, Wills Burke Kelsey Associates, Ltd. (formerly Christopher B. Burke Engineering West, Ltd.) conducted a wetland delineation of the Bremme Creek Watershed in November 2008. The limits of a ninth wetland, Wetland 9, and Bremme Creek (Unnamed Tributary #3) were delineated within the preferred alternative's project boundary.

PRI conducted an updated plant inventory during the growing season on September 9, 2009 (Appendix D) because the wetland delineation was conducted outside the DuPage County growing season. Wetland 8 has a Native Mean C-value of 3.6 (3.5 or greater is an indication of a critical wetland) and a Floristic Quality Index of 21.7, qualifying it as a Critical Wetland under the DuPage County Stormwater Ordinance. As such, a 100-foot buffer is required.

DuPage County Division of Environmental Concerns (DEC) evaluated areas surrounding the preferred alternative's project boundary to determine whether indirect impacts to off-site wetlands were a concern. DEC found no jurisdictional wetlands in the area evaluated. A Wetland Determination letter dated April 16, 2009 from Ms. Jenna Fahey of DEC is included in Appendix E.

The portion of the West Branch of DuPage River within the preferred alternative's project boundary is approximately 60 feet wide. The proposed project site is approximately 30 linear miles upstream from the DuPage River's confluence with the Des Plaines River, a traditional navigable waterway. The U.S. Army Corps of Engineers has regulatory authority over the proposed project.

2.4.2 Riparian Environment

In DuPage County, riparian environments are vegetative areas along waterways within the limits of the regulatory floodplain. All areas adjacent to the West Branch DuPage River as well as the unnamed tributaries are classified as riparian environment. The existing riparian environment

serves many functions including: reducing flood flow velocities, reducing erosion, serving as a denitrification site, providing habitat corridors for aquatic and terrestrial fauna and flora, and providing recreational and aesthetic value for human use. Riparian vegetation includes overstory of silver maple (*Acer saccharinum),* cottonwood (*Populus deltodies*), American elm (*Ulmus Americana*), red oak (*Quercus rubra*), and white oak (*Quercus bicolor*). The shrub layer includes Tartarian honeysuckle (*Lonicera tatarica*), common buckthorn *(Rhamnus cathartica),* wahoo (*Euonymous atropurpurea*), multiflora rose (*Rosa multiflora*), and silky dogwood (PRI, 2009).

2.5 SEDIMENT TRANSPORT AND CHARACTERISTICS

Sediment is important in determining the morphology of river systems. Rivers naturally evolve and change their shapes by eroding, transporting, and depositing sediment. The movement of sediment in rivers determines the course of the river, the shape of the channel bottom, the locations of pools and riffles, and the materials that make up the river bed. When a dam impounds a river system, the sediment carried by the river's water sinks to the bottom of the dam's impoundment, and the river no longer has a channel morphology. The river uses the energy of its flow to carry sediment in the water, so as the flow nearly stops in the impoundment, coarse silt, sand, and gravel settle on the bottom of the impoundment (Hammer and Linke, 2003); finer silt and clay suspended in the water can be carried past the dam. Large amounts of sediment may accumulate in the impoundment. A 2001 Illinois Environmental Protection Agency (IEPA) survey estimated that the Warrenville Grove Dam impoundment up to the first island upstream of the dam contained approximately 30,700 cubic yards of sediment (Hammer and Linke, 2003). Given sampling only extended 1,000 feet above the dam, the estimated volume may not include the entire volume of sediment accumulation caused by the dam. Woody debris such as branches also collects in the impoundment. Consequently, the river downstream of the dam becomes "starved" for sediment and woody debris, while the increase in sediment load in the impoundment can lead to elevated nutrient levels.

The boundaries for the proposed project overlap with the Kerr-McGee Kress Creek/West Branch of DuPage River Superfund Site. Within the Superfund site, creek and river sediments, banks, and floodplain areas are or were contaminated with radioactive waste, primarily thorium. The radioactive waste originated from a nearby facility known as the Rare Earths Facility, which Kerr-McGee purchased in 1967. The Rare Earths Facility operated from 1932 until 1973 and produced non-radioactive elements known as rare earths as well as radioactive elements. Radioactive mill tailings contained residual levels of thorium, radium, and uranium as well as certain other insoluble metals. The proposed project site became contaminated when radioactive-contaminated surface runoff and discharges from the Rare Earths Facility were carried by a storm sewer into nearby Kress Creek and, from there, downstream to the West Branch DuPage River. Low levels of radioactive thorium residuals attributed to the operations of the Rare Earths Facility have been documented in portions of Kress Creek, the West Branch

DuPage River, and their associated floodplains (USEPA, 2010). Tronox, formerly Kerr-McGee, conducted a Remedial Investigation to characterize locations where thorium is or was present (prior to remedial actions implemented to date), and prepared a feasibility study report to evaluate remedial alternatives for sediment and floodplain materials. These documents were finalized in 2004. The selected remedy includes excavation and off-site disposal of 125,300 cubic yards material from 8.2 miles of creek and river bed. Tronox initiated cleanup activities at the Superfund site in 2005. Removal of approximately 35,000 cubic yards of contaminated sediments from the 2,500-foot river stretch upstream of the Warrenville Grove Dam to Butterfield Road (designated reach 7 under Superfund) was completed in the fall of 2010 (Arcadis, 2010; Figure 3, Drawings EX1-EX2). Other aspects of the cleanup project are expected to continue until 2012 (USEPA, 2010).

During the IEPA's 2001 field survey of the Warrenville Dam impoundment, sediment samples were collected and analyzed for a variety of contaminants (Hammer and Linke, 2003). Analyses showed sediment phosphorus concentrations were >2,160 mg/kg and therefore considered to be above moderate levels. This was consistent with sediment data from other impounded areas. Eighty-three percent of samples from the impoundments of the four dams studied by Hammer and Linke were considered to have phosphorus above moderate levels. No PCBs were detected, and pesticides and alkylphenols detection was considered minimal. Cadmium, copper, lead, mercury, nickel, silver, and zinc concentrations exceeded U.S. Environmental Protection Agency or National Oceanic and Atmospheric Administration ecological screening levels at one or more location in the Warrenville Grove Dam impoundment. Some of this sediment was likely removed coincident with the 2010 Superfund remedial action; however, it was not the target of the Superfund cleanup.

Wills Burke Kelsey Associates surveyed sediment physical characteristics in March 2011 as part of the IEPA Section 401 Certification process. They obtained four sediment samples (A-D). Sample A was taken downstream of the Warrenville Grove Dam at the pedestrian bridge. Samples B and D were taken approximately 50 feet upstream of the dam. Sample C was taken approximately 50 feet upstream of Butterfield Road, Illinois Route 56, which is approximately 2000 feet upstream of the dam. Results of the sieve analyses for these samples are shown in Table 7.

In addition, Christopher B. Burke Engineering West, Ltd. (2008) conducted a sediment study approximately two miles downstream of Warrenville Grove Dam at the McDowell Grove Dam (CBBEWL, 2008; Appendix F). Three samples from the McDowell Grove Dam study area indicated that the sediments were loamy in nature with clay content from 6% to 22%; silt concentrations from 36% to 72%; and sand concentrations from 22% to 42%. The organic matter ranged from 6.7% to 18.2%. The sediment fraction that can remain suspended (material passing a number 200 sieve) ranged from 15.8% to 38.4%. Results from the McDowell Grove Dam study of physical sediment characteristics are summarized in Table 8 and included in Appendix F.

Table 7. Sieve Sample Analysis, Percent Passing through Sieve – Warrenville Grove Dam Vicinity

Sample I.D.	#10 (2 mm)	#35 (0.5 mm)	#60 (0.25 mm)	#140 (0.106 mm)	#200 (0.075 mm)	#230 (0.067mm)	#270 (0.053 mm)	Texture
A	47.4%	26.3%	18.7%	11.2%	9.0%	-	7.6%	Gravely Sand
B	65.9%	59.7%	52.3%	32.4%	25.0%	21.2%	14.2%	Sandy Loam
C	66.5%	17.6%	1.3%	0.5%	0.4%	-	0.3%	Coarse Sand
D	71.3%	60.3%	46.0%	-	29.0%	17.1%	12%	Sandy Loam

Table 8. Physical Sediment Sample Characteristics – McDowell Grove Dam

	Units	Analysis Method	Reporting Limit	Sample 1	Sample 2	Sample 3
Physical Properties						
% Clay	%	Soil Texture	0.0	6.0	22.0	17.9
% Silt	%	Soil Texture	0.0	72.1	36.0	48.4
% Sand	%	Soil Texture	0.0	22.0	42.0	33.7
Organic Matter (Combustion)	%	Soil LOI	0.1	18.2	9.6	6.7
Soil Classification		Soil Texture		Sandy Loam	Loam	Loam
-200 Analysis						
> 0.075 mm Diameter	%	Sieve	0.1	61.6%	84.2%	70.4%
<0.075 mm Diameter	%	Sieve	0.1	38.4%	15.8%	29.6%
Sediment Volumes			**Total**	**Sec. 1**	**Sec. 2**	**Sec. 3**
Calculated Sediment Volume			2,198.84	1,481.3	197.93	519.61

2.6 CULTURAL RESOURCES

Midwest Archaeology Research Services, Inc. (MARS, Inc.) conducted a phase I archaeological reconnaissance survey of the Warrenville Grove Dam modification project area totaling approximately 82 acres from May 31 through June 19, 2007 (Appendix G). The phase I survey identified a Depression Era Civilian Conservation Corps (CCC) dam (11-Du-513) on the Warrenville Dam parcel (refer to Figure 1 in Appendix G). MARS, Inc. (2007) believes the Warrenville Grove Dam and associated millrace are eligible for the National Register of Historic Places under criteria a, b, c, and d (36 CFR 60.6, National Register Criteria for Evaluation).

2.7 HUMAN USES

The Warrenville Grove Dam is located in the southwest portion of the Warrenville Grove Forest Preserve. The forest preserve consists of 126 acres of floodplain and upland woodlands, natural fens, and a portion of the West Branch. Recreational activities within the preserve include biking, fishing, hiking, picnicking, wildlife watching, and winter activities. Warrenville Grove Dam elements include the dam, millrace, and pedestrian bridge (Figure 2).

A public meeting was held on June 12, 2008 at the Warrenville City Hall regarding the Warrenville Dam modification project (the public comments are included in Appendix A). The majority of the residents who commented strongly supported the proposed project. These residents recognized the importance of the project and the positive effects it would have on water quality and stream ecology in the West Branch. Several of the supporters commented that the project would enhance the health of the river system, wildlife habitat, and recreational uses (e.g., kayaking, canoeing, fishing, etc.) Those who opposed the project mainly commented on the aesthetic value of the dam, stating that the dam is Warrenville's icon and that they fear the changes would devalue the area.

2.7.1 Safety

There are currently over 1,200 regulated dams on Illinois rivers and streams. While many of these dams are useful for water supply, navigation, recreation, power generation, and flood control, many others no longer serve their original function, and may present safety problems, in some cases resulting in loss of life. Run-of-river dams, such as the Warrenville Grove Dam, span the width of a river channel with water flowing continuously over the dams' crests. The drop from the crest to the downstream side creates dangerous currents known as hydraulic backwashes and submerged hydraulic jumps with reverse roller (Chambers, 2009; IDNR, 2007). River users and pedestrians that accidentally enter the water can become drawn into the backwash current, which will force them underwater and to the base of the dam. Victims are next pushed away from the dam toward the surface. Upon surfacing the hydraulic current can again push the victim under the overflowing water, thus beginning the cycle again (Chambers, 2009). Further exacerbating this dangerous situation is the air that becomes entrained in the turbulent water, decreasing water density and buoyancy, making it more difficult for one to stay afloat (IDNR, 2007). During the summer of 2006, there were several incidents at run-of-river dams in Illinois, resulting in drowning deaths (IDNR, 2007). In the 1970s, one person drowned at the Warrenville Grove Dam site.

2.8 SOCIO-ECONOMICS

Table 9 summarizes the study area populations for Warrenville, DuPage County, and Illinois in 1990, 2000, and 2007. The City of Warrenville population increased 15.3% from 1990 to 2007,

with a slight decline in recent years from 2000 to 2007. DuPage County has experienced a greater growth rate than Warrenville and the State of Illinois since 1990.

Table 9. Study Area Population in 1990, 2000, and 2007

	Illinois	DuPage County	Warrenville
1990	11,430,602	781,666	11,333
2000	12,419,293	904,161	13,363
2007	12,825,809	926,228	13,063
% Change 1990-2007	+ 12.2%	+ 18.5%	+ 15.3%

Source: 1990 and 2000 U.S. Census Data, and 2007 American Community Survey, U.S. Census Bureau

The City of Warrenville has a racial and ethnic composition similar to that of DuPage County (Table 10). The racial makeup of the city is 89.1% white, 2.4% African American, 0.3% Native American, 3.4% Asian, <0.1% Pacific Islander, 3.5% from other races, and 1.3% from two or more races. Hispanic or Latino of any race comprises 10.1% of the population. White residents are the majority of the population in Illinois, DuPage County, and Warrenville. DuPage County and Warrenville have a smaller percentage of African American residents than the state of Illinois as a whole. Census tract 8416.02, which includes the Warrenville Grove Forest Preserve, and Census tract 8464.03, which includes area south of Warrenville Grove, contains a racial and ethnic composition similar to that of Warrenville as a whole.

Table 11 summarizes median household income and percent of individuals below the poverty level for the proposed project area. In 1999 the median household income for DuPage County ($67,887) was 45.7% greater than that of the State of Illinois ($46,590). The median household income for Warrenville ($62,430) was 33.9% greater than that of the State of Illinois, but 8.7% less than DuPage County. The percent of individuals below the poverty level in DuPage County (3.6%), Warrenville (1.6%), census tract 8416.02 (1.4%) and census tract 8464.03 (5.7%) were much lower than the state average (10.7%).

DuPage County has a diverse business community, with major employers in the technology, manufacturing, retail, warehousing and logistics, and health care industries. Two national laboratories, Argonne National Laboratory and Fermi National Accelerator Laboratory, are located within DuPage County. Over 130 major corporations have headquarters in DuPage County, including six Fortune 1000 companies.

Table 10. Study Area Racial and Ethnic Composition- 2000

	Illinois		DuPage County		Warrenville		Census Tract 8416.02		Census Tract 8464.03	
	Total	%	Total	%	Total	%	Total	%	Total	%
Total Population	12,419,293		904,161		13,363		6,879		7,268	
White	9,125,471	73.5	759,924	84.0	11,910	89.1	6,234	90.6	6,185	85.1
Black or African American	1,876,875	15.1	27,600	3.1	319	2.4	135	2.0	331	4.6
American Indian/Alaska Native	31,006	0.2	1,520	0.2	39	0.3	28	0.4	14	0.2
Asian	423,603	3.4	71,252	7.9	459	3.4	186	2.7	577	7.9
Native Hawaiian/ Pacific Islander	4,610	<0.1	217	<0.1	5	<0.1	1	<0.1	1	<0.1
Some other race (alone)	722,712	5.8	28,166	3.1	463	3.5	202	2.9	66	0.9
Two or more races	235,016	1.9	15,482	1.7	168	1.3	93	1.4	94	1.3

Source: 2000 U.S. Census Data, U.S. Census Bureau

Table 11. Economic Indicators - Census 2000

	Illinois	DuPage County	Warrenville	Census Tract 8416.02	Census Tract 8464.03
Median Household Income-1999 (dollars)	46,590	67,887	62,430	61,202	66,563
Percent of Individuals Below Poverty Level in 1999	10.7	3.6	1.6	1.4	5.7

Source: 2000 U.S. Census Data, U.S. Census Bureau

SECTION 3
ALTERNATIVES

3.1 BACKGROUND

The DuPage River is a large tributary to the Des Plaines River. It originates in northwestern Cook County and joins the Des Plaines River near the border between Kendall and Will Counties southwest of the greater Chicago metropolitan area. This 376 square mile watershed is heavily urbanized, with 48.5% of the total surface area being developed (Hammer and Linke, 2003). The DuPage River is divided into three main catchments or subwatersheds: the West Branch DuPage River (124 sq.mi.) and the East Branch DuPage River (80 sq.mi.) where most of the development extends, and the main stem DuPage River (168 sq. mi.).

Until recently there were three dams located on the West Branch. The Warrenville Grove Dam is the upstream most dam located at River Mile 38.89 (approximately 0.33 miles upstream of Warrenville Road). It is approximately two miles upstream of the former McDowell Grove Dam at River Mile 36.55. The Fawell Dam is located at River Mile 36.00. The McDowell Grove Dam was removed in late 2008 with other grant opportunities. The Warrenville Grove Dam is owned by the Forest Preserve District of DuPage County, and it is found within the Warrenville Grove Forest Preserve in Warrenville, Illinois.

The impoundment created by the Warrenville Grove Dam is approximately 1.2 miles in length, extending from the dam upstream toward the Williams Road Bridge. The surface area of the impoundment is approximately 16.3 acres encompassing the two islands within the Warrenville Grove Preserve. The 10 year, 7-day low flow discharge at the dam is 20 cubic feet per second (cfs) with an annual average flow of 107 cfs (Hammer and Linke, 2003).

The Warrenville Grove Dam, in its current state, is a run-of-river structure constructed of a reinforced concrete upstream face supported by a reinforced concrete footing. Quarried limestone slabs laid in mortar make up the downstream face of the dam. Original plans indicate that the foundation is sealed by steel sheet piling. Clay fill was placed in front of the upstream face and a stone and cement apron extends about 15 feet from the downstream toe. The dam is 107 feet across with a curving spillway face that has a total crest length of about 125 feet. Its abutments are constructed of concrete wing walls that are faced with quarried limestone into the side of the bank. The sheet pile that extends through the dam continues east and west through the abutments into the upland. Limestone slabs that constitute the downstream face of the spillway were laid down in a stair step configuration. The dam's total height is approximately 8.5 feet above the downstream river channel bottom. The dam has a total hydraulic height of about 5.7 feet.

In 1995, the Forest Preserve District of DuPage County stabilized eroded river banks downstream of the dam using stone slabs and metal sheet piling to match the original appearance

of the Civilian Conservation Corps (CCC) dam appurtenances of the 1930s and offering improved visitor accessibility to the water's edge. At the same time, the Forest Preserve District partially retrofitted the dam's stone and concrete millrace to stabilize its walls and to improve its functions as a fish ladder and canoe chute. These features have many shortcomings and do not fully support the functions to which they were intended. The fish ladder is non-functional and in poor condition.

Several alternatives for dam modification were considered to meet the objectives outlined in Section 1. The following sections describe the details of these alternative scenarios. Please refer to Table 13 for a concise comparison of the alternatives.

3.2 NO ACTION ALTERNATIVE

The no action or "do nothing" alternative is where the present conditions are not changed. If the dam and impoundment were to remain, the river would continue to be fragmented and water quality would continue to decrease. The West Branch DuPage River is listed as a 303(d) impaired waterway with a non-support status for aquatic life. Should the Warrenville Grove Dam remain without modification, the status would also remain. No actions would be taken to improve the water quality and habitat of the river or to remove the impairments listed by the Illinois Environmental Protection Agency (IEPA) in this region. No actions would be taken to leverage the recent Superfund activities, which removed 35,000 cubic yards of contaminated sediment and implemented habitat restoration. The impoundment upstream of the dam would continue to fill with sediment. Additional sediment deposits would continue to degrade the benthic and macroinvertebrate population. The slow moving water in the impoundment would continue to provide favorable conditions for algae, which, in large quantities, are known to cause water clarity and dissolved oxygen problems. Species diversity would remain unchanged or would decrease as water quality continues to degrade.

Maintenance and safety issues would also remain unaddressed. The dam and millrace would remain unchanged and no additional access would be provided to the area from the existing trail.

The no action alternative does not support any of the goals for this project and thus is not the preferred alternative.

3.3 PREFERRED ALTERNATIVE (PROPOSED PROJECT): DAM REMOVAL

After careful consideration of this project's objectives (see Section 1) and anticipated environmental consequences (see Section 4), the National Oceanic and Atmospheric Administration (NOAA) and the DuPage County Stormwater Management Division selected dam removal of the Warrenville Grove Dam as the preferred alternative for the Warrenville Grove Dam Modification Project. This preferred alternative consists of: 1) removal of a portion

of the dam[1] to reestablish the river and naturalize the river channel to a free-flowing segment through the Warrenville Grove Forest Preserve; 2) habitat restoration upstream of the dam; and 3) enhancements downstream of the dam to improve public access, provide educational opportunities, and demonstrate best management practices. The new free-flowing river segment would support and sustain ecological functions and processes for a greater biological diversity within the aquatic community, adjacent floodplain and wetland habitats, returning the river to its natural fluvial state. The proposed design would serve to:

- Recreate a hydraulically diverse and stable fluvial channel system within this segment of the West Branch by re-loading mixed glacial aggregates as bed substrate and establishing appropriate pools, riffles, boulder clusters, crenulated banks, and point bars through adaptive management within 4 years of dam removal.
- Increase dissolved oxygen within this river segment to remove dissolved oxygen impairments and comply with standards required by the IEPA within 4 years of dam removal.
- Increase fish diversity and abundance, including the presence of one intolerant fish species over baseline conditions within 5 years after dam removal.
- Increase the diversity and abundance of the macroinvertebrate community over baseline conditions within 5 years.

Management and/or the removal of sediment upstream of existing dams is a critical component in any dam removal project. An extraordinary opportunity exists with respect to the management of sediment upstream of the Warrenville Grove Dam as a result of Tronox's cleanup activities at the Kerr-McGee Kress Creek/West Branch DuPage River Superfund Site. As part of these activities, Tronox notched a portion of the dam to facilitate dewatering of the cleanup area; removed contaminated sediments located within the footprint of the impoundment reach; and re-loaded an aggregate bed, 70 feet in width, within the historic river channel along the length of the impoundment reach. Non-historic channel areas around portions of the existing islands have been refilled with clean sediments at predetermined grades for wetland restoration. This work minimizes the sediment management effort that would be needed for the proposed removal of the dam and subsequently would serve to reduce overall project costs associated with the removal.

The total area of the proposed project construction site is estimated to be 88.6 acres, in which the total area of the site that is estimated to be disturbed by excavation, grading, or other activities is approximately 26.4 acres. The proposed project would be completed in two phases: Phase 1 - removal/notching of the existing dam with in-stream restoration immediately upstream and downstream of the dam and improvements to the existing island; and Phase 2 - restoration of the upstream pool area to allow for the re-creation of upstream channel conditions. These phases are described below.

[1] The preferred alternative, removal of the dam, refers to the dam head wall systematically cut to achieve an engineered notch configuration, approximately four feet above the dam foundation.

Phase 1

The Phase 1 construction would be completed in two stages in order to manage river flows so as to be able to complete the proposed work in the dry. Stage 1 work would include installing upstream and downstream sheetpile diversions and bypassing the river along the west side of the millrace island, through the existing millrace section. To construct the sheetpile diversions, temporary stone access roads would have to be constructed off of the millrace island to allow equipment to reach the east bank (see Drawing PR1).

The existing dam would then be notched as shown on Drawings PE1 and PE2. The notch would be placed on the outside of the river bend, to imitate/re-create a natural river section. The dam would next be notched in a stepped pattern before tying into the existing abutments. The dam abutments would be left in place and would appear as rock outcrops. Immediately upstream of the lowest notched section of the dam, a vortex rock weir would be constructed in order to facilitate flow and debris conveyance, watercraft passage, and higher flow velocity habitat for aquatic organisms (see Drawing ED1). Within the new step cuts of the dam, varied boulder sizes and configurations would be constructed to produce riffles, runs, and cascades. This in-stream work would provide for various sights and sounds of moving water, aeration of the water column, passage of fish upstream, and various niche habitat conditions for aquatic organisms. A representation of the proposed work in the areas immediately above and below the dam is shown in the Rock Enhancement Detail on Drawing ED2.

Following the completion of Stage 1 activities, the downstream sheetpile diversion would be removed in preparation for Stage 2 construction. During Stage 2, an upstream sheetpile diversion would be installed and the river would be directed through the newly modified dam as shown on Drawing PR2. A temporary stone access road would be constructed off of the millrace island to allow equipment to reach the west bank.

Once the Stage 2 construction area is dewatered, the millrace inlet system would be installed just off the western edge of the millrace island. The purpose of the inlet would be to maintain the historic function of the millrace by providing flows to it as conditions allow. Additional backfill material and topsoil would be placed per Drawing PR2. The millrace itself would remain in its current condition. Also as part of Stage 2, limestone stabilization along the eastern and southern edge of the millrace island would be installed. Once the grading has been completed, two canoe launch/takeout features would be constructed upstream and downstream of the modified dam structure. Lastly, an 8-foot wide pathway with 3-foot wide turf shoulders, as shown on Drawing C4.01, would be installed and the area would be restored per Drawings RP1 and L1.01.

Phase 2

Phase 2 would concentrate on river channel restoration north of the dam to restore the natural condition of the stream channel, riparian area, and surrounding wetlands. The efforts would focus on vegetative restoration to supplement and enhance the numerous in-stream aquatic native

restoration techniques (i.e., boulder clusters, mushroom caps, pools, riffle, root wad, and snag crib) that were put in place as part of the Superfund cleanup restoration activities. The vegetation communities introduced as a part of the river restoration would include emergent, sedge meadow, marsh, and floodplain. See Drawing PL1 for the plant species chosen for each of these communities. A combination of planting approximately 65,000 native plugs and seeding 13.2 acres would be used to get the desired effect of a natural river ecosystem. The areas and types of proposed seeding and planting are shown on Drawings RP1 thru RP5. Invasive species would be managed through herbiciding, controlled burns, and inter-seeding or planting plugs. Only herbicides approved by the Forest Preserve District of DuPage County for use in environmentally sensitive areas would be used, and no aquatic herbicides would be used. The contractor responsible for herbicide application would have a licensed herbicide applicator on site.

As the river geomorphology works towards equilibrium following removal of the dam, additional restoration techniques would possibly be implemented to further enhance and/or stabilize sections of the new free flowing reach of the West Branch DuPage River. The functions of proposed restoration techniques are described in Table 12.

3.4 ALTERNATIVES CONSIDERED BUT REJECTED

NOAA and the DuPage County Stormwater Management Division evaluated but rejected two alternatives. Consistent with National Environmental Policy Act regulations at 40 CFR 1504.14(a), brief descriptions of these alternatives and the reasons for their elimination are set forth below.

3.4.1 Notch Dam to Millrace Elevation

This option would entail notching the existing dam to the same elevation as the existing millrace elevation (687.8 ft). This option does not increase stormwater storage, aquatic/wildlife and habitat diversity, or water quality. Sediment would continue to accumulate upstream of the structure. The goals of the project would not be met with this option; therefore, notching the dam to the millrace elevation was rejected (Table 13).

3.4.2 Notch Dam to Downstream Channel Elevation

This option would entail notching the existing dam to the downstream channel elevation (684 ft). There would be a limited increase in stormwater storage, aquatic/wildlife and habitat diversity, and water quality. Sediment would continue to accumulate upstream of the structure. Achievement of the project goals would be limited with this option; therefore, notching the dam to the downstream channel elevation was rejected (Table 13).

Table 12. Functions of Restoration Techniques

Restoration Application	Function
Bank Loading	Decreases inefficient cross-sectional area of the stream and extends cobble substrate habitat further into the channel, more closely mimicking optimum channel configuration.
Boulder Cluster	Creates eddies, distributes the substrate and develops resting places and cover for fish.
Seeding	Stabilizes the shoreline and emergent floodplain areas.
Planting	Stabilizes the shoreline and creates habitat for fish and invertebrates.
Mushroom Cap	Provides a unique vertical structure that mimics 360 degrees of undercut bank habitat while providing horizontal habitat within the width of the extending root entanglement. The varied spaces within and below the root mass provide shade and protection for smaller fish, while larger fish patrol within the larger voids between the roots and substrate.
Pools	Provides cooler water and refuge during low flows.
Riffle	Increases dissolved oxygen in the water and creates habitat for fish and invertebrates that require higher flow and dissolved oxygen rates.
Root Wad	Increases shade and habitat for fish, and deflects erosive flow from the bank during periods of high flow.
Snag Crib	Provides basking, loafing, nesting, and perching areas for a variety of reptiles, amphibians, and birds.

Table 13. Warrenville Grove Dam Modification Scenario Matrix

Action At Dam (All scenarios include Tronox cleanup)	No Action Non-Preferred	Notch Dam to Millrace Elevation Non-Preferred	Notch Dam to Downstream Channel Elevation Non-Preferred	Dam Removal Preferred
Action in Upstream Channel	**Goal** of connectivity to river channel and floodplain is **not met.**	**Progress toward goal** of connectivity to river channel and floodplain is **limited**. In-stream flood storage limited to smaller flood event. Notch #1 ~1.66 feet of in-stream storage.	**Progress toward goal** of connectivity to river channel and floodplain is **limited**. In-stream flood storage notch #2 ~4.7 feet.	**Goal** of connectivity to river channel and floodplain is **met**. Hydrologic conditions improve with a more dynamic channel. Will restore high and low flow fluctuations that will influence shaping aquatic communities. In-stream flood storage maintained ~4.86 feet.
Millrace	Continued side-channel flow. Continued maintenance cost.	Continued and increased maintenance cost. Reduced side-channel flow.	Continued and increased maintenance cost. Discontinued side-channel flow unless further in-stream structures and/or excavation are incorporated.	Lowest maintenance and construction cost. Flow will be supplied from main channel via the newly installed inlet system to maintain the millrace in its current condition. Social, cultural, historic issues addressed through interpretation and educational kiosks.
Tributaries	Silt and sedimentation a continued influence. Low aquatic diversity, connectivity, sediment, and food transport. **Goals are not met.**	Silt and sedimentation a continued influence. Modest improvements in aquatic diversity, connectivity, sediment, and food transport. **Goals are not met**. Notch #1 Bremme Creek at 1.67 feet of heat-cut potential.	Silt and sedimentation a continued influence. Modest improvements in aquatic diversity, connectivity, sediment, and food transport. **Goals are not met.**	Head cutting into tributary channel substantially increases sediment and food transport, connectivity to river and floodplain, and aquatic diversity within tributary. **Goals are met**. Bremme Creek at 3.15 feet of head-cut potential.
Wetlands and Wildlife Habitat	**Does not meet goal** of connectivity to river and floodplain. Does not increase storage or increase wildlife and habitat diversity, nor increase any water quality benefits.	**Does not meet goal** of connectivity to river and floodplain. Does not increase stormwater storage or increase habitat diversity, nor increase any water quality benefits.	**Limited progress toward goal** of connectivity to river and floodplain. Limited increase in stormwater storage, wildlife and habitat diversity. Limited increase in any water quality benefits.	**Meets goal** of stormwater storage and connectivity to river and floodplain with increased wetland habitat surface area. Marked increase in wildlife and habitat diversity and water quality benefits. Increased emergent, aquatic and riparian vegetation.
Water Quality	**Goals** of increased water quality, increased dissolved oxygen, and improved aquatic diversity **are not met**.	**Goals** of increased water quality, increased dissolved oxygen, and improved aquatic diversity **are not met**.	**Limited progress toward goals** of increased water quality, increased dissolved oxygen, and improved aquatic diversity.	**Goals** of increased water quality, increased dissolved oxygen, and improved aquatic diversity **are met**.
Recreation	**Goal** of enhanced recreational opportunities **not met**. Regulatory requirements of the Dam Safety Program apply. Liability exposure and decreased safety to river users exist.	**Goal** of enhanced recreational opportunities **not met**. Regulatory requirements of the Dam Safety Program apply. Liability exposure and decreased safety to river users exist.	**Progress toward goal** of enhanced recreational opportunities **is limited**. Regulatory Safety Program may apply. Liability exposure and decreased safety to river users are possible.	**Goal** of enhanced recreational opportunities **met**. Increased kayaking/canoeing; increased fishing/access to river; increased wildlife diversity, abundance, and viewing on land and water; and increased future educational opportunities. Increased safety to river users, no regulatory requirements apply with decreased liability exposure.
Aquatic Fauna: Fish, Mussels, and other Invertebrates	Fish passage unavailable. Spawning and rearing habitats absent. Fish IBI scores will remain poor with little diversity of species and no intolerant species. No recruitment of mussel fauna. Little to no benthos habitat for invertebrate species. **Goals are not met.**	Fish passage limited. Spawning and rearing habitats absent. Limited mussel recruitment. Limited to little benthos habitat for invertebrate species. **Goals are not met.**	Fish passage possible for most species. Spawning and rearing habitats available downstream. Better possibility for mussel recruitment. Limited to better possibility of benthos habitat for invertebrate species downstream. **Progress toward goals is limited**.	Fish passage available in a free-flowing river increasing species diversity. Spawning and rearing habitats available upstream and downstream. Recruitment of mussel species possible. Benthos habitat available to a diverse amount of invertebrate species. Transport of allochthonous material and sediment are processed. **Goals are met.**
Roadway Crossings	Structure will not be affected.	Structures will be minimally affected.	Structures will most likely need rock enforcement due to some scour potential.	Structures will most likely need rock enforcement due to some scour.
Downstream Impacts		Extensive riffle apron and scour fill construction below dam.		
Morphological Development of Pool Area	Pool surface area stays the same with an increase in depth. The artificial structure in-stream will continue to accumulate sediments. No improvement in fish passage, water quality, transport of sediments, aquatic diversity and navigability. Water temperature stays elevated and dissolved oxygen low. Velocity is impaired. **Goals are not met.**	Open pool will be reduced in width but not necessarily in depth. The artificial structure in-stream will continue to accumulate sediments. Limited improvement in fish passage, water quality, transport of sediment, aquatic diversity, and navigability. Water temperature stays elevated and dissolved oxygen low. Velocity is impaired with a great degree of "bounce" in pool elevation in response to notched weir. **Progress toward goals limited**.	Open pool will be reduced in width and in depth. The artificial structure in-stream will continue to accumulate sediments. Better improvement in fish passage, water quality, transport of sediments, aquatic diversity, and navigability. Water temperature may stay elevated and dissolved oxygen low. Velocity somewhat impaired with a degree in "bounce" in pool elevation in response to notched weir. **Progress toward goals limited**.	Restoring natural functions and processes to the river system will remove the artificial lake-like habitat in-stream. Water temperature decreases with dissolved oxygen increasing. Sediment transport is restored as is the life within the river. **Goals are met.**

SECTION 4
ENVIRONMENTAL CONSEQUENCES

The proposed project would result in the removal of the Warrenville Grove Dam and allow for recreation of upstream channel conditions, leading to improved ecological health of an impounded segment of the West Branch DuPage River. The project plan consists of in-water habitat creation due to the river returning to a free-flowing stream. Mussel, fish and macro-invertebrate habitat would be created by removing the current lake-like condition of the river. Water quality of the West Branch DuPage River would be improved due to increased aeration of the water and decreased turbidity. Vegetation would be planted and seeded along the banks of the river, improving Qualitative Habitat Evaluation Index (QHEI) scores and functional habitat by creating additional water quality and diverse aquatic organism habitat. Crenulated banks would be installed in the West Branch that would be planted with hydrophytic vegetation according to the restoration plan.

Potential impacts would be short-term and due to construction activities. No violations of environmental protection laws at the federal, state, or local level would be anticipated. The project manager would ensure that all applicable permits are obtained prior to project implementation, and that all permit requirements, as well as applicable environmental laws and regulations, are followed.

The proposed project would complement cleanup and restoration actions taken or planned by Tronox (formerly Kerr-McGee) within the West Branch and Kress Creek. Additionally, the Warrenville Grove Dam removal is part of an overall restoration project along the DuPage River (CBBEWL, 2006). Specific details on environmental consequences are provided below.

4.1 AQUATIC BIOTA

Temporary impacts to the aquatic biota are expected during the construction phase of the dam removal; however, these impacts would be minimal. Following the construction phase, the removal of the Warrenville Grove Dam is anticipated to improve the fish, macroinvertebrate, and freshwater mussel communities. Removal of the dam will not increase the presence of invasive aquatic species upstream of the removal location; invasive species that are found downstream of the dam have also been found upstream of the dam (DeMartini, personal communication).

4.1.1 Fish

The removal of the Warrenville Grove Dam would eliminate lake-like conditions that allow sediments and other materials to drop out of the water column and create an accumulation of sediments, nutrients, and pollutants behind the dam. Significant accumulations, which bury and/or decrease the value of fish habitat and prey, would no longer occur.

Removing the dam would benefit fish populations by allowing migratory and resident fish populations to gain access to habitats that were previously blocked off; increasing access to spawning areas; improving reproductive success; improving aquatic organism communities; and enhancing sport fish populations. Illinois Department of Natural Resources (IDNR) studies have found that dams block spawning migrations of sensitive sucker species and sport fish to critical spawning and over-wintering areas (Santucci and Gephard, 2003). Pescitelli and Rung (2005) reported the lowest species diversity was located upstream of the dams on the West Branch in DuPage County. This is corroborated by Hammer and Linke (2003), whose study found fish abundance and diversity within the Warrenville Grove Dam's impoundment were reduced with the absence of intolerant species. Most fish favor free flowing portions of the river over impounded areas. This is reflected in the Index of Biotic Integrity scores, the presence of healthier species, more species, and more intolerant species within the free flowing segments. Reproductive success, which often depends on appropriate timing for reaching spawning or breeding habitats, can be improved by the removal of dams.

4.1.2 Macroinvertebrate

It is anticipated that the removal of the Warrenville Grove Dam would result in improved fish passage and aquatic substrates and hence enhanced macroinvertebrate dispersion and communities. Mussels depend on fish to distribute their larva and form new populations. By acting as barriers, dams limit fish movement and affect fish and mussel distributions throughout a river system. The start of new mussel populations is hindered, and existing mussel populations may be disconnected from each other.

Dams alter and degrade aquatic substrates primarily due to the accumulation of sediment behind the impoundment. Because of the lack of suitable substrates within impoundments, high proportions of pollution tolerant, silt-loving species such as midge larvae (*Chironomids*) and benthic worms (*Oligocheates*) dominate. Dam removal would restore free-flowing river known to support an abundance of caddisfly (*Tricoptera*) and mayfly (*Ephemeroptera*) species, indicators of healthy aquatic substrate (Santucci and Gephard, 2003). Biological communities in the West Branch are generally responsive to habitat quality (Midwest Biodiversity Institute, 2008); there is a strong positive relation between habitat quality and the quality of fish and macroinvertebrate communities.

4.2 HABITAT QUALITY

It is anticipated that habitat quality would improve by removing the Warrenville Grove Dam, and in turn, the biological communities in the West Branch would also improve. According to Midwest Biodiversity Institute (2008), the habitat quality along the entire reach of the West Branch is sufficient to support aquatic assemblages for the region. Biological communities in the West Branch are known to be responsive to habitat quality. The habitat quality upstream of the Warrenville Grove, McDowell, and Fawell dams, however, was poor and lacked riffles and

meanders. The sampling station within the Warrenville Grove Dam had the worst QHEI score throughout the entire West Branch. Pescitelli and Rung (2005) also reported low habitat and water quality in the West Branch, which appeared to be the result of fragmentation and the presence of dams. The Midwest Biodiversity Institute (2008) recommended that in degraded areas, restoration should be focused on restoring the natural channel function, including the removal of all revetments (e.g., dams) that do not serve a recognized function.

4.3 WATER QUALITY

It is anticipated that the removal of the Warrenville Grove Dam will improve water quality within the West Branch. By removing the dam and allowing for re-creation of upstream channel conditions, the proposed project would restore the natural ecological functions and processes of a free-flowing river segment, eliminate lake-like conditions upstream of the dam that support high algal biomass, high water temperatures, and substandard dissolved oxygen levels.

Several studies have documented the negative effects of low-head dams on stream quality. Water temperatures are often elevated upstream of dams, particularly during the summer months. This increase in temperature decreases the amount of dissolved oxygen present in the water. Also, the still water of an impoundment mixes less with the air above than free-flowing rivers, reducing the amount of oxygen added by contact with the air. This increase in temperature and decrease in dissolved oxygen affects the quality of the water in the impoundment and also affects the quality of the river downstream. Further, the rates of biological and chemical processes depend on temperature. Aquatic organisms from microbes to fish are dependent on certain temperature ranges for their optimal health (USEPA, 1997). Removal for the Warrenville Grove Dam is expect to improve water quality and lead to a healthier ecosystem overall.

4.4 TERRESTRIAL ENVIRONMENT AND WATERS OF THE U.S.

Minimal impacts are expected to the terrestrial environment due to the proposed project. The total area of the construction site is estimated to be 88.6 acres. The total area of the site that is estimated to be disturbed by excavation, grading or other activates is approximately 26.4 acres. The construction activities for site improvements would include tree and vegetation removal, installation of construction access roads, a temporary stream crossing to establish access to the east side of the river, placement of in-stream sheet pile diversion structures, removal of the limestone facing of the dam, removal of the dam substructure, removal of the diversion structures, and restoration of all disturbed areas. All construction traffic would enter and exit the project via Warrenville Grove Forest Preserve entrances from Batavia Road (west) and Main Street (east). The existing Forest Preserve parking lot would be used for contractor parking/staging area. An additional staging area would be placed on the island separating the millrace and the river. To access the millrace island staging area, a temporary crossing would have to be installed over the millrace. Disturbed areas within the project site will be restored with native seeding

immediately following construction activities as well as with plantings the following spring (Drawings RP1-RP5 and L1.01).

The DuPage County Stormwater Permit Application included a restoration plan. The plan contains many enhancement features to restore the natural condition of the stream channel, riparian area, and surrounding wetlands. The recovery of the vicinity is being and will continue to be monitored by the Forest Preserve District ecology staff.

4.4.1 Wetlands/Waters of the U.S.

The preferred alternative would temporarily divert water within the stream during dam removal and sheet pile installation. It would result in 0.525 acres of temporary waters of the U.S. impacts and 0.365 acres of permanent waters of the U.S. impacts (Table 14). Proposed impacts to the waters and/or wetland areas are illustrated in the Wetland Impacts Exhibit (Drawing WI) and detailed in Table 14. Permits from the U.S. Army Corps of Engineers (USACE) and the DuPage County Division of Environmental Concerns are required to implement the proposed project due to the impacts on these waters. An Individual Permit for the project from the USACE, Chicago District was issued to the Forest Preserve District of DuPage County on July 20, 2011. The DuPage County Division of Environmental Concerns provided a certification for Stormwater Management Permit #10-50-0004 (DEC Tracking No. T30907) on August 11, 2011 (Appendix H).

The USACE's permit requires compensatory mitigation at a ratio of 1.5:1 for the proposed permanent impacts to waters of the U.S. The project permit applicant, the Forest Preserve District of DuPage County, will purchase 0.548 acres of USACE-approved wetland bank credits to satisfy this requirement.

The proposed Warrenville Grove Dam Modification Project includes a restoration plan for enhancements to waters and wetlands, which would provide for an overall increase in wetland acreage. The implementation of the restoration plan would be completed following the Warrenville Grove Dam modifications. The objective of the restoration would be to improve wetland functions of the newly created floodplain and wetland complex.

Per the plan, the following vegetative communities are proposed to be created or restored: 4000-linear feet of recreated river channel within the reach; 9.01 acres of floodplain forest community restored; 1.72 acres of emergent wetland created; 0.79 acres of upland buffer restored; 1.84 acres of sedge meadow created within floodplain; and 2.32 acres of wetland marsh habitat created (Table 15). These would be introduced using a combination of native plugs and seed to get the desired effect of the natural river ecosystem. The restoration plan includes seed and plant lists to be used in various areas; however, decisions would be made only after the seed bank germinates once the water elevation is lowered. Invasive species would be managed through the application of herbicides, controlled burns, and inter-seeding or planting activities according to the restoration plan.

DuPage County Stormwater Management Division in consultation with the Forest Preserve District of DuPage County has created performance standards to be achieved by the construction contractor selected for the proposed project's implementation. The performance standards have been established to in order to evaluate the overall restoration success and to measure contractor compliance with approved plans and specifications. Restored and created wetland areas located within the project footprint would be monitored, and the county would submit a yearly monitoring report to regulatory agencies and the contractor. The contractor would maintain the wetland areas in accordance with performance standards. If the contractor cannot meet the performance standards at the end of three years, a maintenance bond submitted by the contractor prior to project construction and held by the county would be used to meet the requirements or held until the contractor can meet the requirements for final acceptance.

4.4.2 Riparian Environment

The preferred alternative would temporarily impact the riparian environment associated with the West Branch DuPage River due to construction activities. However, once the project is complete, the overall ecological health of the West Branch would improve. Native vegetation would be planted and seeded along the banks of the West Branch. This would help reduce flood flow velocities, reduce erosion, and provide habitat corridors for aquatic and terrestrial fauna and flora.

Table 14. Proposed Wetland/Waters of the United States Impacts

Site	Size (acres)	Temporary Wetland/ Waters Impacts (acres) On-site	Permanent Wetland/ Waters Impacts (acres) On-site	Buffer Requirements (feet)		DEC Classification
				USACOE	DEC	
Wetland 1	0.625	0	0	50	50	Regulatory
Wetland 2	1.113	0	0	50	100	Critical
Wetland 3	0.104	0	0	0	50	Regulatory
Wetland 4	0.52	0	0	100	100	Critical
Wetland 5	0.568	0	0	100	100	Critical
Wetland 6	0.065	0	0	0	50	Regulatory
Wetland 7	0.124	0	0	100	50	Regulatory
Wetland 8	0.388	0	0	100	100	Critical
*Wetland 9	0.01	0	0	100	100	Critical
Fringe Wetland	0.063	0	0	50	50	Regulatory
West Branch DuPage River	N/A	0.525	0.365	50	N/A	N/A
Springbrook Tributary	N/A	0	0	50	N/A	N/A
Unnamed Tributary #2	N/A	0	0	50	N/A	N/A
Little Bremme Creek (Unnamed Tributary #1)	N/A	0	0	50	N/A	N/A
*Bremme Creek (Unnamed Tributary #3)	N/A	0	0	50	N/A	N/A
TOTAL:	**3.58**	**0.525**	**0.365**			

* Denotes wetlands delineated by WBK May 5, 2008 and certified by DuPage County EDP May 20, 2008 within the Bremme Creek watershed.

Table 15. Warrenville Grove Dam Restoration Plan, Proposed Wetland Restoration

Existing Community	Proposed Community	Area
West Branch of the DuPage River	Sedge Meadow	1.84
	Marsh Wetland	2.32
	Emergent Wetland	1.72
	Floodplain Forest	9.01
	Bank Loading	0.43
	Upland Buffer	0.79
Total		**16.11**

4.5 SEDIMENT TRANSPORT AND CHARACTERISTICS

In general, dam removals can result in short-term adverse impacts such as downstream turbidity and sedimentation and/or scouring of the channel bed caused by the release of accumulated water and sediments. The resuspension of sediments can lead to the release of contaminants from sediments. In the long-term, however, beneficial impacts such as reduction in sediment contaminants and beneficial transport of sediments, nutrients, and organic materials to downstream habitats are expected as more natural hydrological processes are reestablished, improving aquatic habitat and water quality.

The proposed project is not expected to have significant adverse or beneficial impacts related to sediment transport and characteristics. In the long-term, the proposed project is expected to have the beneficial impacts typical of dam removal projects as described above. In the short-term, the proposed project could cause an increase in sediment transport. The degree of impacts, however, is expected to be minimal because the 2010 Superfund remedial action removed approximately 35,000 cubic yards of accumulated sediment and placed sand and gravel, suitable river bottom material, along the alignment of the resulting naturalized channel. This is expected to reduce the potential for movement downstream of fine sediment once the dam is removed. In the short-term, resuspension of sediments could lead to the release of cadmium, copper, lead, mercury, nickel, silver, and zinc from the sediments. Again, the Superfund remedial action likely served to decreased the potential magnitude of contaminants that might be released, and subsequently decrease the potential for human and wildlife exposure to these contaminants. Thorium-contaminated sediment was the target of the Superfund remedial action, but the removal occurred in the vicinity of sediments previously shown to contain heavy metals. It is likely that, to some degree, metal-contaminated sediment was removed from the proposed project site coincident with the Superfund action.

During and after the construction of the proposed project, several efforts would be made to mitigate and minimize potential sediment-related impacts. The proposed project would be constructed in the dry, serving to minimize temporary increases in sediment movement. Contractors would be required to comply with applicable state, local, and federal permit processes, conditions, and mitigation requirements. For example, the Illinois Environmental Protection Agency (IEPA) issued a certification under Section 401 of the Clean Water Act with the condition that any spoil material excavated, dredged or otherwise produced during project construction must not be returned to the waterway, but must be deposited in a self-contained area in compliance with all statutes, regulations and permit requirements with no discharge to the waters of the state unless a permit has been issued by the IEPA. The Section 401 certification also stipulates erosion control measures. Following construction, only short-term sediment impacts would be expected as a result of the lowering of water levels and subsequent exposure of sediment along the banks within the project reach of the West Branch DuPage River. This potential short-term source of sediment would be significantly reduced by establishment of vegetation and erosion control measures in these areas as part of the proposed project.

4.6 CULTURAL RESOURCES

Midwest Archaeology Research Services, Inc. identified the Warrenville Grove Dam and associated millrace as eligible for the National Register of Historic Places under criterion a, b, c, and d (36 CFR 60.6, National Register Criteria for Evaluation). The proposed project does not anticipate any impacts to the millrace; however portions of the Warrenville Grove Dam will be notched and/or removed (Section 3.3). Pursuant to Section 106 of the National Historic Preservation Act, the National Oceanic and Atmospheric Administration (NOAA) consulted with the Illinois Historic Preservation Agency (IHPA). NOAA and DuPage County proposed the following mitigation measures to the IHPA State Historic Preservation Officer:

- Historic American Buildings/Historic American Engineering Record Surveys: These surveys would provide archival level documentation of the dam and millrace prior to the commencement of the proposed project.

- Provide flow to the millrace: The millrace was modified from its original condition during construction conducted by the Forest Preserve District of DuPage County in 1995. The proposed project does not plan to further modify the millrace. It is believed that the millrace is of significance to the history of Warrenville. By modifying the dam and lowering the water level of the river, the water supply to the millrace would be cutoff. The proposed project design would provide an inlet system to the upstream end of the millrace. The inlet would provide a supply of water, as flow conditions allow, from the main channel through the millrace to maintain its present condition. Interpretive signs about the millrace and the inlet system would be created.

- Educational signage/historic interpretation: Interpretive signs would provide information about the history of the dam and millrace (as well as the environmental restoration associated with the proposed project). Remnants of the dam would be visible upon implementation of the proposed project.

The IHPA State Historic Preservation Officer and NOAA will sign a memorandum of agreement in August 2011 specifying these agreed upon activities. They have been agreed to verbally by both parties.

4.7 HUMAN USES

There would be some impacts to air quality and an increase in noise during the project construction. The construction area would be closed to the public during construction to minimize public health and safety hazards, but there would not be impacts to Warrenville Grove Forest Preserve recreational and educational activities during that time. The existing amenities associated with preserve (e.g., recreational paths) would not be affected and would be open in accordance to their normal operations, guidelines, and schedules. Upon completion of project

construction, the project area would provide improved educational and recreational (e.g., kayaking, canoeing) opportunities for the community.

4.7.1 Safety

In an effort to increase public safety at run-of-river dams, like the Warrenville Grove Dam, the Illinois Department of Natural Resources (IDNR) commissioned a study to evaluate public safety at these dams. The study's report stated that in general, "…dam removal would provide a substantial benefit to public safety by eliminating the hazard posed by the dam..." (IDNR, 2007). The proposed project would remove the Warrenville Grove Dam, and thus would be expected to increase the safety of recreational users of the river.

4.8 SOCIO-ECONOMICS

Residents in the vicinity of the project area would not experience any negative long-term impacts as a result of the activities associated with the proposed project. Due to the localized nature of the project within Warrenville Grove, there would be no activities that influence the long-term social structure or character of the immediate community. Short-term impacts to the adjacent community would be primarily associated with minor noise during the construction phase of the proposed project.

There are no minority groups within the project area, and no discrimination against Title VI groups would occur as a result of the proposed project. The proposed improvements would not exert high or disproportionate adverse impacts upon low-income populations. The project would comply with all the requirements stated in the "Americans with Disabilities Act (ADA) Accessibility Guidelines."

Improvements associated with the removal of Warrenville Grove Dam would be expected to decrease liability insurance costs, decrease maintenance costs, and increase safety for river users. Thus, benefits would be foreseen for all residents of DuPage County and individuals who visit Warrenville Grove Forest Preserve.

Area employers would not experience any negative long-term or short-term impacts as a result of activities associated with the Warrenville Grove Dam Modification Project.

4.9 CUMULATIVE IMPACTS

When considered with other unrelated activities that are planned within the area or within the same timeframe, the preferred alternative (Section 3.3) is not anticipated to have adverse cumulative effects. Direct and indirect negative impacts of this alternative would be short-term and would only occur during the construction period. The construction period would result in temporary air, noise, and visual impacts due to increased volume of vehicles at the proposed site and on local roads, in addition to temporary loss or disturbance of vegetation.

The proposed Warrenville Grove Dam Modification Project is part of a watershed restoration effort laid out in the West Branch DuPage River Watershed Plan (CBBEWL, 2006). Specific goals of the plan include:

- Improve fish spawning, mollusk, and macroinvertebrate habitat along a 4-mile stream reach,
- Increase dissolved oxygen in the 4-mile reach by creating riffle/pool sequences,
- Provide the public improved recreational canoe/boating access on the river by removing man-made obstructions and improving access to the stream corridor for fishing, hiking, birding, and other passive activities, and
- Enhance the water quality in the 4-mile reach to meet the county's goal of a fishable/swimable stream.

Over the long-term, the preferred alternative and restoration activities would be anticipated to markedly improve aquatic habitat, improve water quality, enhance the area's natural resources, and improve the public use and enjoyment of the area.

Details of other activities that are planned within the area or within the same timeframe along the West Branch are provided below. These efforts would complement one another to enhance the DuPage River watershed.

Cleanup and Restoration Efforts Along the West Branch DuPage River

The Kress Creek/West Branch DuPage River Superfund Site includes creek and river sediments, banks, and floodplain soils contaminated with or previously contaminated with radioactive thorium residue. The site stretches about a mile and a half along Kress Creek from a storm sewer outlet to where the creek empties into the West Branch DuPage River. From there, it stretches about five miles down the West Branch past the Warrenville Grove Dam to the McDowell Dam.

The United States Environmental Protection Agency (USEPA) mandated the radioactive waste cleanup of portions of Kress Creek and the West Branch DuPage River along with a basic level of restoration. Tronox, formerly Kerr-McGee (the responsible party), under the oversight of the USEPA, has successfully removed contamination within the upstream reaches of the Superfund site, specifically reaches 1 through 7 (Figure 3 [USEPA, 2005 and 2010]). In 2010, numerous in-stream aquatic native restoration techniques were put in place as part of the Superfund cleanup restoration activities in reach 7. These techniques included the installation of root wads, snag cribs, bank loading, hummock and hollows, riffles, sills, boulder clusters, and mushroom caps. DuPage County has obtained grant funds through the National Oceanic and Atmospheric Administration (NOAA) to further enhance the ecological restoration of Kress Creek and the West Branch DuPage River in reach 7. Cleanup of reach 8, which stretches between the Warrenville Grove Dam and the McDowell Dam, is anticipated to occur in 2011 and 2012.

The Superfund cleanup involves isolating the thorium-contaminated areas along the river, and dewatering them by pumping out the water to allow dry excavation. Excavated radioactive soil

and mud have been sent off site for disposal (USEPA, 2004 and 2005). The cleanup standard is 7.2 pCi/g combined radium and is based on federal and state standards of 5 pCi/g above background, with average background levels at the sites of 2.2 pCi/g (USEPA, 2004).

Management and/or removal of contaminated sediment upstream of existing dams is a critical component in dam removal projects to prevent mobilization of these sediments. A cost-saving and ecologically synergistic opportunity exists with respect to the management of the sediment as a result of Tronox's implementation of Superfund cleanup activities.

Water Quality Projects along the West Branch DuPage River

In addition to the Warrenville Grove Dam Modification project, the McDowell Grove Dam Modification project is located along the West Branch. The McDowell Grove Dam was constructed by the Civilian Conservation Corps in the 1930s. The dam created a small recreation lake used by Camp McDowell Army Base that was located in the now McDowell Grove Forest Preserve. The dam was found to severely impact water quality on the West Branch DuPage River as well as limit fish passage and recreational opportunities. The dam was recommended to be removed by the DuPage River Salt Creek Workgroup as well as the County's West Branch DuPage River Watershed Plan. The County applied for federal funding for the project and received a grant from the Natural Resources Conservation Service. The project was substantially completed in November 2008.

The purpose of the above project as well as the proposed project was/would be to improve the ecological heath of impounded segments of the West Branch. These projects seek to restore the natural ecological functions and processes of a free-flowing river segment, decrease barriers to fish migration and mussel dispersion, improve the aquatic habitat, and improve sediment transport within the river system. Both dam removal projects are identified as priorities within the DuPage County West Branch DuPage River watershed, and are key components in improving the water resources of the West Branch.

Urban Stream Research Center (USRC)

The USRC project, funded under a grant from the National Oceanic and Atmospheric Administration (NOAA), is currently under construction on the publicly owned Roy C. Blackwell Forest Preserve (part of the Forest Preserve District of DuPage County) in unincorporated Warrenville. The USRC is sited on approximately 7.5 acres in the south section of the Blackwell Forest Preserve, northeast of Springbrook 1 Creek and approximately 100 yards upstream of the West Branch DuPage River (Figure 4).

The USRC project is part of the overall river enhancement and restoration approach proposed in the West DuPage River Watershed Plan (CBBEWL, 2006). The USRC will support the biological enhancement component of the plan, and allow for the Forest Preserve District of DuPage County to meet its objectives for urban aquatic habitat restoration and enhancement.

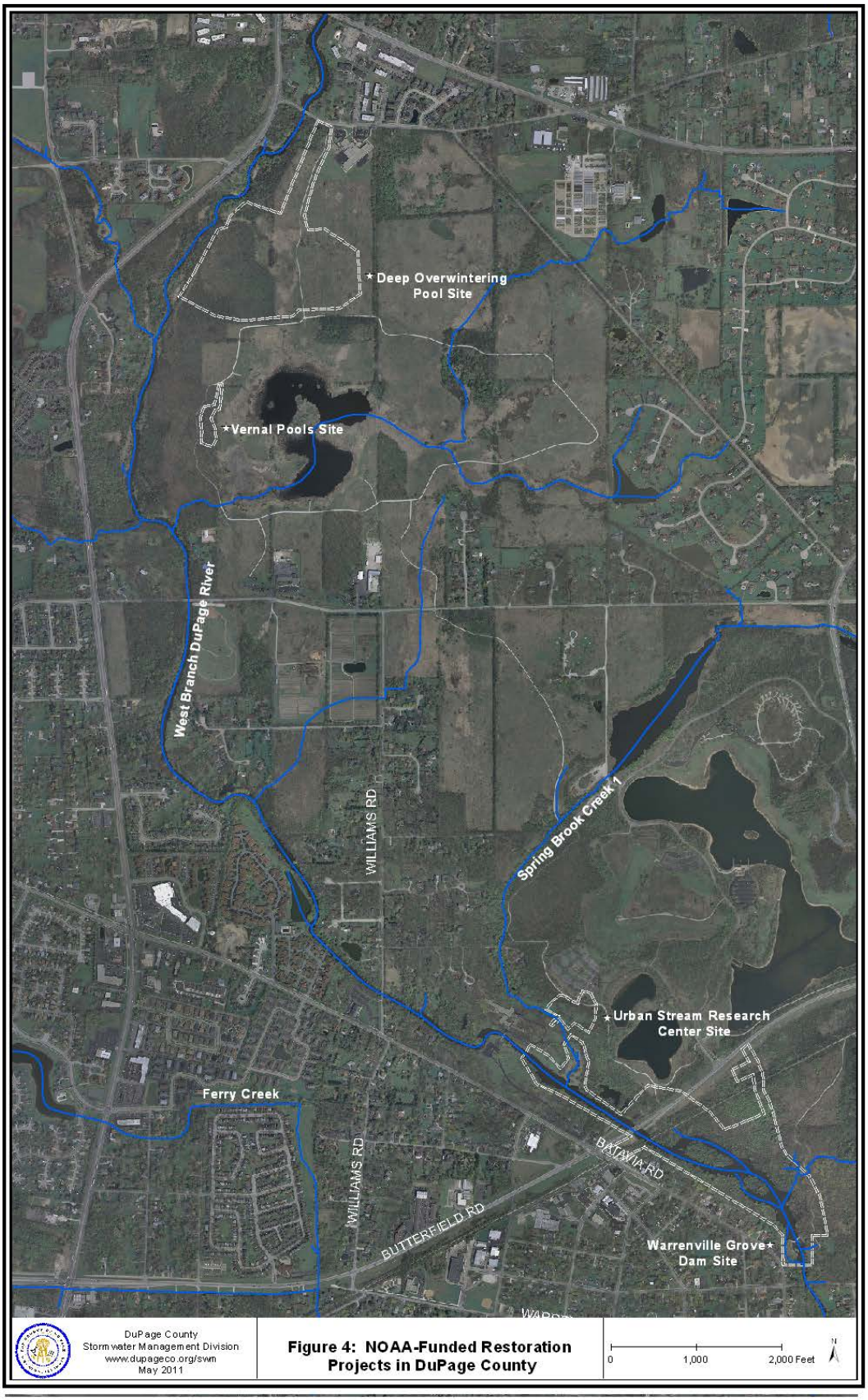
Deep Overwintering Pool

The Deep Overwintering Pool is part of the overall river enhancement and restoration of the West Branch DuPage River Watershed. The project, funded under a grant from NOAA, is located along the eastern side of the West Branch, just south of Gary's Mill Road and approximately 3.5 miles upstream of the Warrenville Grove Dam (Figure 4).

This project, as constructed, provides over-wintering habitat as an element of a created marsh and wetland in order to diversify and improve fish spawning and macroinvertebrate habitat along the West Branch. This type of deep aquatic habitat is rare along the West Branch. The pool and wetland depth were designed and selected to meet the various needs of the native plant and animal community, such as the reproductive, feeding, and shelter requirements of native fish species, and wetland plant water depth requirements. The project created deep-water pool habitat ranging from 10 to 15 feet in depth with an open water surface area of about 4.2 acres at normal water level. Aspects of the pool and channel, such as the littoral shelf, limestone slabs, and downed snags, did not previously exist at the project site location. A littoral zone (wetland shelf) within the pool provides deep emergent habitat and structure as a fish nursery for various species. Additional shallow (0" to 6") wetland is graded within the pool's perimeter hydric soils, creating microhabitats and seasonally inundated flats, affording a full complement of aquatic and semi-aquatic transition to the surrounding landscape. The pool is connected to the river by a pool-riffle sequenced channel 10 to 30 feet wide, using natural rock and vegetation for stabilization.

Additional habitat variation is found in limestone slabs and overhangs along portions of the pool and channel side slopes; the built-in habitat structures are designed to maximize sheltering and spawning opportunities for fishes. Downed snags are provided in the littoral zone to provide further protection from birds and terrestrial predators. Native tree species are planted in locations around the pool to provide shading. Amphibians and reptiles benefit from the littoral and transitional wetland zone, which provides food and shelter for all stages of their life cycles. Water sources to support the pool and channel include groundwater, overland flow, and floodwaters from the river.

The Deep Overwintering Pool is in place to support the biological enhancement component of the West DuPage River Watershed Plan, and allow for the Forest Preserve District of DuPage County to meet its objectives for urban aquatic habitat restoration and enhancement.


* Deep Overwintering Pool Site
*Vernal Pools Site
West Branch DuPage River
WILLIAMS RD
Spring Brook Creek 1
+Urban Stream Research Center Site
Ferry Creek
WILLIAMS RD
BATAVIA RD
BUTTERFIELD RD
Warrenville Grove+ Dam Site
DuPage County
Stormwater Management Division
www.dupageco.org/swm
May 2011
Figure 4: NOAA-Funded Restoration Projects in DuPage County
0
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Vernal Pools

In 2008, using NOAA grant funds, DuPage County implemented a project to create vernal pools within the Roy C. Blackwell Forest Preserve, owned and managed by the Forest Preserve District of DuPage County. Two shallow pool depression sites were excavated to a depth of 1 to 3 feet within forested habitat and adjacent, but not connected, to McKee Marsh wetland complexes or the West Branch of the DuPage River (Figure 4). Within these two sites, called North Pool and South Pool, additional depressions were excavated to create a more complex habitat system. Each of the vernal pool sites is approximately 0.3 acres in size. Approximately 1,000 feet separates the two pools.

About 2,000 cubic yards of soil was excavated in total during the creation of the vernal pools. The peripheries of the pools were fine-graded into the existing landscape. The excavation and grading were conducted around existing trees and root systems to create an undulating topography, create diverse temperatures from varied sun exposure, and increase the detritus levels in the pools as a source of energy. All dead tree snags and a few downed trees were left on site. Native seed mix appropriate to surrounding soils was planted as well as plugs within the pools themselves.

DuPage County, as in other regions in the Midwest, has decreasing numbers of vernal pools due to many anthropogenic influences. This unique wetland type near managed high quality areas in the forest preserve provides habitat for many amphibian species and supports their unique terrestrial-aquatic life cycle.

Cenacle Compound Demolition

In October 2011, the Forest Preserve District completed the demolition of the former Cenacle Retreat Center, two single-family residences, and associated garage improvements. Careful attention was made to preserve the numerous mature oaks around the Cenacle footprint. A new loop limestone screenings trail extending around the site was constructed as an extension from the existing river bridge. Then the entire landscape was re-graded and seeded with native vegetation. The former building site is now designated for passive, open space recreation for the public and will be nurtured toward restoration of an oak savanna community uniquely situated between the West Branch DuPage River and Springbrook1 Creek. The newly constructed Urban Stream Research Center lies to the southeast just over Springbrook1 Creek, approximately 900 feet from the restored Cenacle footprint. The Forest Preserve District will complete a trail extension in the near future by likely replacing a small existing culvert bridge over the Creek near the new loop trail and extending the trail southeast adjacent to the Urban Stream Research Center and connecting with the Regional Trail within Blackwell Forest Preserve.

SECTION 5
COORDINATION AND CONSULTATION

5.1 AGENCY CONSULTATION

All appropriate local, county, state, and federal agencies have been consulted related to obtaining required clearances for proceeding with the preferred alternative, including:

- U.S. Fish and Wildlife Service (USFWS), Chicago Ecological Services Field Office: Endangered Species Act, Section 7 consultation
- Illinois Department of Natural Resources (IDNR), Office of Realty and Environmental Planning: State threatened and endangered species consultation
- Forest Preserve District of DuPage County: State threatened and endangered species consultation
- Illinois Historic Preservation Agency: Historic Preservation Act of 1966, Section 106 Consultation

Wills Burke Kelsey Asssociates, Ltd. (WBK) (formerly Christopher B. Burke Engineering West, Ltd.) requested consultation and sign-off from IDNR for the presence of any state-listed threatened or endangered species, Illinois Natural Area Inventory (INAI) sites, dedicated Illinois Nature Preserves, and/or registered Land and Water Reserves that may be impacted from the proposed project. Based on its evaluation of the proposed project, the IDNR concluded that adverse impacts to state resources resulting from the removal of the Warrenville Grove Dam (preferred alternative) do not appear likely, and IDNR terminated the consultation process (see Appendix E for copy of the IDNR consultation letters dated March 27, 2008 and February 24, 2009).

Planning Resources, Inc. requested consultation and sign-off from the USFWS for the presence of any federally-listed endangered or threatened species under Section 7 of the Amended Endangered Species Act of 1973 that may be impacted by this project. A response from the USFWS received December 9, 2008 indicated the proposed project will not likely adversely affect any federally listed threatened or endangered species (see Appendix E).

Additionally, WBK performed a threatened and endangered species consultation for the USFWS on June 14, 2010. A memorandum describing the listed species found in DuPage County and their habitat is located in Appendix E. WBK determined that habitat for federally listed threatened or endangered species is not present within the project site and adverse effects on the species are not likely (see Appendix E for copy of the USFWS consultation correspondence).

The Forest Preserve District of DuPage County (FPDDC) completed an Internal Action Report--Endangered and Threatened Species Review on March 13, 2008. The results indicated the presence of black crowned night heron (*Nycticorax nicticorax*) near the proposed project area. The black crowned night heron is in danger of extinction as a breeding species in Illinois, and is

listed on the Illinois endangered and threatened species list (IDNR). However, the FPDDC indicates that this species is unlikely to be disturbed as a result of the dam modification project because sufficient habitat is available throughout the West Branch DuPage River corridor (see Appendix E for a copy of the FPDDC Internal Action Report).

The National Oceanic and Atmospheric Administration (NOAA) and representatives of DuPage County Stormwater Management have provided the Illinois Historic Preservation Agency (IHPA) with detailed materials on the proposed project's background and planning as well as a copy of a phase I archaeological study conducted at the site of the proposed project. NOAA, DuPage County, and IHPA concur that the Warrenville Grove Dam and millrace are eligible for the Nation Register and that removal or changes to them would constitute an adverse effect. NOAA has consulted with IHPA per the National Historic Preservation Act, Section 106. NOAA and the IHPA deputy state historic preservation officer, Anne Haaker, have agreed to actions that will be undertaken to prevent, minimize or mitigate the proposed project's effects on historic properties and will sign a memorandum of agreement in August 2011.

A majority of the proposed project area is contained within property owned by the Forest Preserve District of DuPage County, and as such the proposed project requires approval by the Forest Preserve District of DuPage County Commission. Based on the information provided in meeting notes and from discussions with the design team, the Commission is in favor of the proposed project.

5.2 LIST OF AGENCIES AND PERSONS CONSULTED

- DuPage County Department of Economic Development and Planning, Stormwater Management Division—Anthony J. Charlton, P.E., Director; Sarah Ruthko, Project Engineer
- Forest Preserve District of DuPage County—John Oldenburg, Director; Jessi DeMartini, Ecologist
- Illinois Department of Natural Resources, Division of Ecosystems and Environment—Rick Pietruszka
- Illinois Historic Preservation Agency—Anne Haaker, Deputy State Historic Preservation Officer; Patrick Gleason, Cultural Resource Manager
- Midwest Archaeological Research Services, Inc.—Consultant to DuPage County Stormwater Management Division
- National Oceanic and Atmospheric Administration, Office of General Counsel, Natural Resources Division—Gwendolyn McCarthy, Attorney
- National Oceanic and Atmospheric Administration, Office of Response and Restoration—Tony Penn, Deputy Division Chief; Paula Bizot, Environmental Scientist; Sarah Morison, Grant Manager
- U.S. Environmental Protection Agency— Timothy Fischer, Remedial Project Manager
- U.S. Fish and Wildlife Service, Chicago Ecological Services Field Office—John Rogner, Field Office Supervisor

- Wills Burke Kelsey Asssociates, Ltd. (formerly Christopher B. Burke Engineering West, Ltd.—Scott Randall, Project Engineer/ Manager

5.3 PERMITTING

The project manager would ensure that project implementation and monitoring is in compliance with all applicable permit conditions. The following permits are required and have been issued for the implementation of the proposed project. See Appendix H for copies of permits.

- DuPage County Department of Economic Development and Planning, Division of Environmental Concerns Permit (Certification for permit provided August 11, 2011)
- Illinois Department of Natural Resources/Office of Water Resources, Dam Safety Permit (Issued May 10, 2011)
- Illinois Environmental Protection Agency, 401 Water Quality Certification (Certified June 20, 2011)
- Army Corps of Engineers, Chicago District, Individual Permit (Issued July 20, 2011)

SECTION 6
LIST OF PREPARERS

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National Oceanic and Atmospheric Administration
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SECTION 7
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FINDING OF NO SIGNIFICANT IMPACT

for the

Warrenville Grove Dam Modification, West Branch DuPage River, DuPage County, Illinois

The proposed action (i.e., Preferred Alternative) would substantially remove the Warrenville Grove Dam by systematically cutting the dam crest/spillway to achieve an engineered notch configuration approximately four feet above the dam foundation, reestablishing and naturalizing the river channel. River channel habitat restoration, public access enhancements, and educational opportunities would also be conducted as part of the action. The overall project goal would be to restore the ecological health of an impounded segment of the West Branch DuPage River by allowing for re-creation of upstream, free-flowing channel conditions. The proposed action would serve to:

- Restore the natural ecological functions and processes of a free-flowing river segment,
- Decrease lake-like conditions upstream of the dam that support high algal biomass, high water temperatures, and intermittent substandard dissolved oxygen levels, considered a non-pollutant impairment by the Illinois Environmental Protection Agency,
- Decrease barriers to fish migration and mussel dispersion,
- Decrease maintenance needs and costs of the dam,
- Improve public safety,
- Provide improved educational and recreational opportunities for the community,
- Improve the Qualitative Habitat Evaluation Index scores and functional aquatic habitat, and
- Improve sediment transport within the river section.

Alternatives to the proposed project include: (1) notch dam to millrace elevation; (2) notch dam to channel elevation; and (3) no action. The alternatives to notch the dam to millrace or channel elevation would provide no to limited improvements in stormwater storage, aquatic wildlife, habitat diversity, and water quality. Sediment would continue to accumulate upstream of the dam, degrading the benthic habitat and macroinvertebrate populations. Overall project goals would not be met.

The no action alternative would involve leaving present conditions unchanged. The river would continue to be fragmented and water quality would continue to decrease. No actions would be taken to improve the habitat of the river or to remove the impairments listed by the Illinois Environmental Protection Agency. The impoundment upstream of the dam would continue to fill with sediment. The slow moving water in the impoundment would continue to provide favorable conditions for algae, which, in large quantities, are known to cause water clarity and dissolved oxygen problems. Species diversity would remain unchanged or would decrease as water quality continues to degrade. Maintenance and safety issues would also remain unaddressed.

National Oceanic and Atmospheric Administration Administrative (NOAA) Order (NAO) 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 CFR 1508.27

state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria as follows:

1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?

NOAA expects the proposed action would benefit biodiversity, fish habitat, and overall ecosystem function. The proposed action would reestablish and naturalize the river channel, which is currently impounded, to a free-flowing section. Specific benefits of the implementation of this action include: 1) decreased barriers to fish migration and mussel dispersion; 2) decreased lake-like conditions upstream of the dam that support high algal biomass, high water temperatures, and intermittent substandard dissolved oxygen levels; 3) improved safety; 4) decreased dam maintenance needs and costs; 5) improved educational and recreational opportunities for the community, 6) improved the Qualitative Habitat Evaluation Index scores and functional aquatic habitat, 7) improved sediment transport within the river section, and 8) restoration of 16 acres of wetlands.

NOAA does not expect significant adverse impacts. Anticipated short-term adverse impacts include: localized construction-related impacts to air quality; increased noise from construction equipment; and 0.525 acres of temporary waters of the U.S. impacts due to in-stream grading, sheet pile installation and removal, and construction access. These impacts would be temporary and have minimal effects associated with the project vicinity. Additionally, the action would result in 0.365 acres of permanent waters of the U.S. impacts. This impact would be mitigated. See item 3 below for mitigation details.

2. Can the proposed action reasonably be expected to significantly affect public health or safety?

NOAA expects the proposed action would not have significant beneficial or adverse impacts on public health or safety. Upon completion, the proposed action would improve safety in the vicinity of the dam. During implementation of the action, the public would not be in close proximity to the construction site. Any potential impacts to the quality of the human environment at the proposed project site would be short-term and due to temporary and localized construction-related impacts to air quality, aesthetics, and noise levels. Sediments behind the dam that would be transported downstream have been analyzed and do not pose human health concerns.

3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?

NOAA does not expect significant impacts to unique characteristics of the geographic area. The Warrenville Grove Dam and associated millrace are eligible for the National Register of Historic Places under criterion a, b, c, and d of 36 CFR 60.6 (National Register Criteria for Evaluation). The proposed action would adversely impact the Warrenville Grove Dam and have an indirect adverse impact on the millrace by affecting its water supply. Proposed mitigation includes

documenting the dam and appurtenances in accordance with the Historic American Engineering Record; posting educational signage with historic interpretation; and constructing an inlet system to the upstream end of the millrace to maintain water supply as flow conditions allow. Pursuant to Section 106 of the National Historic Preservation Act, NOAA consulted with the Illinois Historic Preservation Agency (IHPA) and will enter into a memorandum of agreement with the IHPA regarding the mitigation.

The preferred alternative would result in 0.525 acres of temporary waters of the U.S. impacts and 0.365 acres of permanent waters of the U.S. impacts. Permits from the U.S. Army Corps of Engineers (USACE) and the DuPage County Division of Environmental Concerns are required to implement the proposed project due to the impacts on these waters. An Individual Permit for the project from the USACE, Chicago District was issued to the Forest Preserve District of DuPage County on July 20, 2011. A permit from DuPage County was issued on July 29, 2011. The USACE's permit requires compensatory mitigation at a ratio of 1.5:1 for the proposed permanent impacts to waters of the U.S. The permit applicant, the Forest Preserve District of DuPage County, has initiated the purchase of 0.548 acres of USACE-approved wetland bank credits to satisfy this requirement. The proposed Warrenville Grove Dam Modification Project includes a restoration plan for enhancements to waters and wetlands, which would provide for an overall increase in wetland acreage.

NOAA does not expect the project to affect prime farmlands, wild and scenic rivers, or ecologically critical areas.

4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?

The proposed action is not likely to be highly controversial. The public has had a variety of opportunities to review and comment in writing or verbally on the proposed action. The public's initial opportunity was during the development of the West Branch DuPage River Watershed Plan. The DuPage County Department of Economic Development and Planning and the Forest Preserve District of DuPage County held a public meeting on October 2, 2005 to provide a forum to explain the proposed action, as well as several other proposed projects along the West Branch DuPage River, and to seek public input. The public subsequently had an opportunity to comment on the proposed action during the draft plan's public review period held January 3 through February 1, 2006. The final plan was approved by the DuPage County Stormwater Management Board on February 7, 2006.

A public meeting was held at the Warrenville City Hall, Warrenville, Illinois June 12, 2008 to allow the public to review the proposed Warrenville Grove Dam and McDowell Grove Dam modification project plans. The public had the opportunity to talk to the construction design team and provide comments. The majority of people who commented strongly supported the proposed project, noting the positive effect it would have on water quality, stream ecology, wildlife habitat, and recreational uses in the West Branch DuPage River. Those who opposed the project mainly voiced concerns over the loss of the aesthetic value they associate with the Warrenville Grove Dam.

The Illinois Environmental Protection Agency held a Federal Water Pollution Control Act, Section 401 Water Quality Certification public notice period from May 17 to June 7, 2011. No comments were received.

5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The effects are not likely to involve uncertain or unknown risks. In general, the impacts of small dam removals are well understood. No violations of environmental protection laws at the state, federal, or local level are anticipated. The project manager would ensure that all applicable permits are obtained prior to project implementation, and that all permit requirements, as well as applicable environmental laws and regulations, are followed.

6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

NOAA does not expect the proposed action would establish a precedent for future actions with significant effects or a decision in principle about a future consideration. Until recently the Warrenville Grove Dam was one of three dams located on the West Branch DuPage River. In 2008, the McDowell Grove Dam approximately two miles downstream of the Warrenville Grove Dam was removed under other grant opportunities. The Fawell Dam remains approximately three miles downstream of the Warrenville Grove Dam.

7. Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?

The proposed action would not have significant impacts, nor would it cause cumulatively significant impacts when considered in conjunction with other projects. The proposed action is part of an overall restoration plan along the DuPage River to improve water quality, stream habitat, wildlife, and recreational activities. Efforts occurring under the overall restoration plan complement one another to enhance the DuPage River watershed. As such, the proposed action, considered in relation to other past, present, and reasonably foreseeable future actions, is anticipated to have beneficial cumulative effects on water quality, stream habitat, wildlife, and recreational activities.

8. Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural, or historical resources?

As noted in item 3 above, the proposed action would adversely impact structures eligible for listing in the National Register of Historic Places. Mitigation measures would offset the impacts.

9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?

NOAA expects no significant impacts to endangered or threatened species or their critical habitat. There are no federally threatened or endangered species present at the site of the

proposed action, nor is there critical habitat that would be impacted. Consultations with Illinois Department of Natural Resources, U.S. Fish and Wildlife Service, and the Forest Preserve District of DuPage County were conducted, and no impacts are anticipated to federal or state threatened or endangered species. The black crowned night heron (*Nycticorax nicticorax*) listed on the Illinois endangered and threatened species list is present in the proposed project vicinity. As stated in the Internal Action Report Review by the Forest Preserve District of DuPage County, the entire West Branch corridor is considered habitat for this species. Because of the minimal amount of impacts on the river corridor and tributaries from the proposed action, the impact to potential black crowned night heron habitat is considered negligible as ample, alternative habitat remains within the vicinity.

10. Can the proposed action reasonably be expected to threaten a violation of federal, state, or local law or requirements imposed for environmental protection?

NOAA does not expect the proposed action to violate federal, state, or local environmental laws. The proposed action requires the consultation, approval, and issuance of permits from several federal, state, and county organizations, including NOAA, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, state of Illinois, and DuPage County. The project would be constructed in compliance with all required permits. NOAA evaluated the proposed action under factors specified by the NEPA regulations (40 C.F.R. § 1508.27).

DuPage County Stormwater Management Division and/or NOAA consulted with all appropriate agencies and officials to obtain required permits and clearances for proceeding, including:

- U.S. Fish and Wildlife Service, Chicago Ecological Services Field Office: Endangered Species Act, Section 7 consultation
- U.S. Army Corps of Engineers, Chicago District: Individual Permit
- Illinois Department of Natural Resources, Office of Realty and Environmental Planning: State threatened and endangered species consultation
- Illinois Historic Preservation Agency: National Historic Preservation Act of 1966, Section106 consultation
- Illinois Department of Natural Resources/Office of Water Resources: Dam Safety Permit
- Illinois Environmental Protection Agency: 401 Water Quality Certification
- Forest Preserve District of DuPage County: State threatened and endangered species consultation
- DuPage County Department of Economic Development and Planning: DuPage County wetland verification in accordance to the DuPage County Stormwater Ordinance

11. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

NOAA does not expect the proposed action to result in the introduction or spread of non-indigenous species. Sufficient precautionary measures would be taken to ensure that no introduction or spread of nonindigenous species occurs. Disturbed areas will be replanted with native vegetation and managed to minimize the reestablishment of invasive plant species. Any herbicides used will be approved for environmentally sensitive areas. No aquatic herbicides will

be used. The removal of the dam would not significantly increase the potential for infestation of *nonindigenous* species upstream of the removal location because *nonindigenous* species that are found downstream of the dam have also been found upstream of the dam.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment and appendices prepared for the Warrenville Grove Dam Modification Project, Warrenville, Illinois, it is hereby determined that the proposed action to remove the Warrenville Grove Dam would not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.

Chu Carty

David M. Kennedy
Assistant Administrator, National Ocean Service
National Oceanic and & Atmospheric Administration

9/6/11

Date