

GENERAL SITE INFORMATION, CHARACTERISTICS, AND STATUS

Project Name	<u>STARKWEATHER CREEK</u>	ProjectID: 05-33
Last Updated:	02/09/00	
City:	Madison	
County:	Dane	
State:	WI	
Country:	USA	
Bodies of Water:	Starkweather Creek; Lake Monona	
US EPA Region:	V	
Status (Active, Complete, or Monitoring Only):	Complete	
Date On NPL:	N/A	
ROD/ESD Date:	N/A	
Operable Unit:	N/A	
Areas of Concern (length or acres):	The full length (~1 mile) to the confluence of the east and west branches of Starkweather Creek.	
Other Characteristics of Water Body:	The creek is located in Wisconsin on the northeast side of Madison and drains 23 sq. miles of urban watershed into Lake Monona. Historically, the creek and watershed have been extensively altered through ditching, channelization, wetland draining and filling, and impervious structure development. Starkweather Creek was identified as the largest single source of mercury to Lake Monona.	
Contaminants of Concern:	Mercury (primary); also lead, zinc, cadmium, and oil and grease	
Source of Contamination:	The primary source was identified as the direct discharge of untreated wastewater from a former battery manufacturer up until the 1950s. Other sources include both point and nonpoint sources over time. The creek drains a heavily industrialized area that presently includes metal fabrication, battery manufacturing, meat packing, and food processing. Urban nonpoint runoff was also shown to contribute significant pollutant loading to the creek.	
Contaminated Area Physical Characteristics:	The stream was shown to average 50 feet wide near the confluence of the east and west branches, and have an average pre-remediation water depth of 1.5 feet (max. 2 feet). The banks of the creek exhibited significant undercutting, adding significantly to the creek's sediment loading. The areas of the creek selected for remediation were located in the back waters of Lake Monona, resulting in the water surface elevation of the creek being the same as the water surface elevation of the lake.	
Type of Regulatory Action:	Demonstration Project. State Lead. Final	
Overall Status Summary:	As a result of years of urbanized growth within its watershed, Starkweather Creek became contaminated with mercury, lead, zinc, cadmium, and oil and grease. The creek was identified as the largest source of mercury to Lake Monona, contributing to establishment of a fish advisory for mercury in large sport fish in the lake. Pre-remediation data collected from the creek showed mercury levels averaging 1.1 ppm (3.5 ppm max.) in sediment and 1.7 ppt total mercury (0.042 ppt methyl mercury) in the water column. From the sampling, it was estimated that 40 pounds of mercury were distributed throughout the creek sediments. Six fish tissue samples were also collected and analyzed for mercury with analysis results showing mercury levels ranging from 0.16 to 0.48 ppm for three freshwater drum samples and 0.09 to 0.11 ppm for three carp samples. In addition to mercury, sediment data revealed lead levels averaging 130 ppm (2.4 tons total in sediment).	
	In the winter of 1992-93, remediation of the creek bed was performed through a cooperative	

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effort between the WDNR and the City of Madison. The project was developed as a demonstration for two purposes: 1) to remove a mercury "hot spot" and 2) restore habitat in an urban watershed area. Approximately 15,000 cy of contaminated sediments, with mercury as the primary COC, were removed from the creek bed by wet excavation (conventional backhoe) and deposited directly into dump trucks. Small sections of the creek (approximately 100 yards) were under remediation at any one time. The sectional work included other sediment removal and creek bed and bank stabilization before moving to the next downstream section. Reportedly, this method helped to minimize resuspension of sediment during removal and confine elevated downstream turbidity levels to smaller areas.

A double silt curtain was placed across the width of the creek downstream of the work area to minimize the downstream movement of construction debris and suspended sediments resulting from removal activities. Sediment removal began on the upstream end of the west branch of Starkweather Creek on November 19, 1992 and proceeded downstream to the confluence with the east branch. The east branch was then remediated, again starting at the most upstream point, and was completed on January 27, 1993. No further excavation work was performed.

The removed sediment was transported by truck directly to a sediment retention and dewatering facility located approximately 6 miles from the creek. The facility covered 2.8 acres and was built on county-owned land adjacent to a local municipal waste landfill. The facility used 7 foot berms built of local clay soils to contain the sediments. A concrete drop-inlet spillway was installed to allow excess water to be removed and sent to a sanitary sewer as required. Leachate tests indicated that metals and PAHs in the sediments were sufficiently low that the sediments could be handled as nonhazardous materials. The sediments and soils from the dewatering facility were eventually used as construction fill at the landfill.

Following remediation, bank shaping and stabilization was completed in February 1993. Final replanting of remediated creek banks and greenway areas was performed in Spring 1993. Due to high water levels throughout much of 1993, much of the lower lying vegetation did not survive. Subsequently, these areas were temporarily stabilized using straw mats and silt curtains until replanting could occur in Spring 1994.

Remedial Action Planned: ☒

Risk Assessment: ☐

Remedial Action Implemented: ☒

Status of Dredging ☐

PRPs: ☐

Contacts: ☒

References: ☒

Modeling: ☐

Fishing Advisory: ☒

Key Conditions: dredge spoil reuse/fill, habitat/streambank restoration

REMEDIAL ACTION PLANNED

Project Name	<u>STARKWEATHER CREEK</u>	ProjectID: 05-33
Last Updated:	02/09/00	
Target Sediment Cleanup Standards (TSCS):	None selected. Source control to Lake Monona by mass removal of mercury and other metals.	
How TSCS Established:	N/A	
Target Bank and Floodplain Cleanup Levels (if applicable):	N/A	
Other Target:	Mass removal; to increase the average depth of the creek channel from 1.5 to 4 ft. and the maximum depth from 2 to 7 feet.	
Environmental Sample Data References:	<ul style="list-style-type: none">• Sediment: Reference A-517• Water: Reference A-517• Fish: Reference A-517	
Estimated Target Volume:	15,000 cy	
Planned Disposal Method:	Temporary dewatering and storage facility	
Estimated Calendar Time to Implement Remedy:	Unknown	
Estimated Time to Implement Remedy:	Unknown	
Estimated Cost to Implement Remedy:	\$1 million	
Stated Remedial Action Objectives (and Source):		
Measures of Success to be Used:	"Reduce loading to the creek, control the impacts of in-place contaminants, and restore the recreational value and aquatic habitat." (Source: Reference A -517)	
Planned Monitoring and Restoration:	Extensive post-remediation monitoring and restoration of aquatic habitat will follow the removal action.	
Agency Position on Sediment Removal (and Source):		

REMEDIAL ACTION IMPLEMENTED

Project Name:	<u>STARKWEATHER CREEK</u>	ProjectID: 05-33
Last Updated:	02/09/00	
Physical Target:	Remove sediments down to an average of 4 feet (7 feet maximum).	
Goals:	(Source: Reference A -517): To reduce pollutant loading to Lake Monoma, restore the aquatic habitat and fishery, and improve recreational use and access to the creek.	
Primary Contractor:	Speedway Sand and Gravel, Inc.	
Other Contractors:		
Generic Remediation Method:	Wet excavation	
Equipment:	Backhoe and dump trucks	
Material Handling:	<p>(Source: Reference A-517):</p> <p>"A double silt curtain of geotextile fabric was placed across the creek at the downstream end of the project in mid November 1992. The silt curtains were intended to trap debris in the streamflow generated by construction activities . In addition, the porous fabric was intended to trap sediments resuspended by the dredging. The curtains were held in place at their top by a half inch steel cable tied to trees on the bank and weighted at their bottom by heavy logging chain."</p> <p>"All pipelines, cables, and utility facilities along the creek in the project area [were identified and marked]. Site clearing and grading for heavy equipment access followed the installation of the silt curtains and identification of utility lines. Access roads and trees to be left undisturbed were clearly identified to minimize site disturbances and the cost of restoring the vegetation."</p> <p>"Dredging began on the upstream end of the west branch of Starkweather on November 19,1992. Dredging was performed with a backhoe and the dredged sediments were directly loaded into dump trucks for hauling to the project sediment retention and dewatering facility. Dredged sediments were not allowed to be stockpiled in order to prevent losses of the sediment back to the creek or to adjacent areas."</p> <p>"Construction activities were staged through the project area such that approximately 100 yards of streambed was dredged, then the banks were shaped to a stable slope then the site was riprapped. The goal of this sequence was to minimize the size of the project area opened by construction. In addition, since the project was in a residential neighborhood, keeping the principal work confined to a limited area at one time minimized noise and dust through the area."</p> <p>"Dredging, bank shaping, and stabilization proceeded in a downstream direction on the west branch to the confluence with the east branch. When the west branch was finished, construction activities moved to the upstream end of the east branch. Approximately 12 dump trucks were used to haul the dredged sediments to the retention facility. Trucks were loaded on average every five minutes. To prevent leakage from the trucks, the tailgates were fitted with neoprene seals and chain binders were used to provide a backup to the tailgate lock. No spills of the sediment occurred during hauling. Dredging was completed on January 27, 1993."</p>	
Volume Removed:	15,000 cy	
Calendar Time:	November 19, 1992 to January 27, 1993	
Time To Implement:	2 ½ months	

REMEDIAL ACTION IMPLEMENTED

Project Name:	<u>STARKWEATHER CREEK</u>	ProjectID: 05-33
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Total Cost:	\$1 million; \$67 per cubic yard	
Dredging Cost:	N/A	
Disposal of Sediment:	(Source: Reference A -517): "A sediment retention and dewatering facility, 6 miles southeast of the project area, was built in January 1992 to contain sediment from Starkweather Creek. The site covered 2.8 acres and was built on county owned land at the local municipal solid waste landfill. The sediment retention facility was designed to dewater the sediments and contain the sediment and carriage water. The facility was square in plan view with 7 ft. berms built of local clay soils. The bottom was unlined but consisted of several feet of native site clay soil. A concrete drop-inlet spillway was built into the facility to allow excess water to be pumped to a sanitary sewer, if necessary. The retention site was built to contain 17,000 yards of sediment with a 25% bulking factor and provide a minimum of 1.5 feet of freeboard to contain direct precipitation and provide a margin of safety. Sediments and soils from the dewatering facility were reused as construction fill at the county solid waste landfill in the summer of 1994." Leachate tests on the sediments indicated that metals and PAHs were sufficiently low to classify the sediment as nonhazardous, allowing ultimate disposal in the county municipal landfill.	
Volume of Water:	Unknown	
Method of Water Treatment:	Excess water from the retention and dewatering facility was to be pumped to a sanitary sewer if necessary; it is unknown if this action was ever taken.	
Water Discharge Limit:	N/A	
Air Monitoring During Remediation:	None performed	
Water Monitoring During Remediation:	(Source: Reference A -517): "Monitoring during the dredging and other construction work was performed to track the impact of these activities on the creek and Lake Monona. Visual observations were made daily of the degree of turbidity changes caused by construction. Best management practices related to the work on site were used to minimize the in stream and off site impacts. Water sampling for chemical analyses was performed on a weekly basis at upstream reference sites, downstream of the dredging, and above and below the silt curtains. Creek water samples were analyzed for metals (arsenic, cadmium, calcium, copper, chromium, iron, lead, magnesium nickel, zinc), nutrients (ammonia, nitrate and nitrite, total Kjeldahl nitrogen, total phosphorus), and general water quality parameters (suspended solids, chemical oxygen demand, biochemical oxygen demand, conductivity, pH, alkalinity, hardness, temperature, dissolved oxygen)." "Monitoring results indicate that there was no significant difference between the water quality parameters at the upstream reference sites and at the downstream end of the project on the dates of sampling. Selected water quality parameters were measured on December 3, 1992 during the dredging activities. On this date, dredging was performed on the West Branch approximately 300 yards downstream of the upstream reference sampling site on the West Branch. Sampling was also performed at the first bridge downstream of the dredging site. Other data were obtained on the same date at a reference site on the East Branch above the project and at two locations on the downstream end at the silt curtains. Data from the dredging site show significantly higher values than at other sampling sites. However, the concentrations from the downstream end of the project (at the silt curtains) were equivalent to the undisturbed reference sites for most parameters	

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	<p>indicating that the resuspension of sediment and pollutants from the dredging had minimum off-site impacts. Lead and zinc values did exhibit an increase at the downstream site samples as compared to the upstream reference sites, however the values at the downstream sites were within the range of values measured over time at the undisturbed reference sites. Lead and zinc concentrations in water at the downstream end of the project were well below NR105 (State Water Quality Criteria) for acute and chronic toxicity in all water samples."</p> <p>"Operational controls on construction activities appeared to have been successful in minimizing disturbances to the creek and adjacent areas. Observations of the creek and construction activities indicated that by confining dredging and construction activities to relatively small lengths of the creek of approximately 100 yards at one time that resuspended sediment and temporary increases in turbidity could be confined to relatively small areas. In addition, disturbances of the local water quality seemed to have been minimized by dredging from upstream areas to downstream areas of the creek."</p>	
Outcome:	Removal of targeted volumes only; it is unknown how or if sediment removal depth was verified.	
Restoration and Post-Monitoring:	<p>(Source: Reference A -517):</p> <p>Restoration : "The bank of the creek were stabilized by regrading the slopes to 3:1 (horizontal: vertical) and placement of protective riprap. Approximately 14,000 tons of riprap and 3,400 tons of crushed stone were used on the project. The portion of the streambank above the average water elevation was covered with a six inch seed bed planted to native grasses, shrubs, and trees. The near shore areas of the creek banks were planted to provide a vegetative buffer zone to filter sediments and pollutants carried by overland flows to the creek. Public access to the creek was provided by low lying shore areas and fishing/canoe access platforms constructed into higher creek banks near the water line. Bank shaping and stabilization work finished in February 1993."</p> <p>"The project area was replanting in the spring of 1993. Native and park grasses were used on open areas. White ash, basswood, oaks, and maple plantings were located to provide optimum wildlife habitat areas along the shore."</p> <p>Post-Monitoring: "The Department will continue to monitor the water quality in the creek, the recovery of the aquatic habitat, and the stability and success of non-point source erosion control at the project site over the next few years. Monitoring will include surveillance of the site to evaluate the continuing stability of non-point erosion control measures, water quality sampling, fish shocking, sediment chemistry, qualitative habitat assessment, and macroinvertebrate sampling (sediment and artificial substrate)." Details not yet obtained.</p>	
Site-Specific Difficulties:	<p>(Source: Reference A -517):</p> <ul style="list-style-type: none">• "The silt curtains had little effect on the water quality of the stream – nearly all parameters were at the same levels above and below the curtains. Sediments and associated contaminants resuspended by the dredging work settled fairly quickly in the creek channel and downstream loading to Lake Monona remained at background levels during the construction work. This project deployed the silt curtains normal to the streamflow (i.e., across the width of the channel) in an attempt to trap debris generated by the construction activity and to control resuspended sediments. The curtains were effective in trapping floating debris, however, they were not always effective in filtering solids from the streamflow. A slight drop in solids concentration was shown to occur across the silt curtain, however the difference in concentration is fairly low and was not seen in most water sampling days. Field observations of the performance of the curtains showed that	

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during all but the lowest base flow, the curtains would "billow out" to the downstream allowing the streamflow to pass beneath the curtains."

- "High water levels in the creek occurred throughout much of 1993 due to backwater flooding from historically high lake levels in Lake Monona. This flooding killed much of the lower lying vegetation on the stream banks. Due to a concern for preventing gulling along unvegetated areas of the stream banks, straw mats and silt curtains were installed on 3000 feet of the banks to protect the site through the winter of 1993-94. The exposed soils were reseeded in the spring of 1994."

Monitoring Data

References:

- *Sediment*
- *Water:*
- *Fish:*

POTENTIALLY RESPONSIBLE PARTIES

Project Name **STARKWEATHER CREEK**

ProjectID: 05-33

PRP Name: PRP INFORMATION NOT RELEASED

PRPID:

Street Address:

City:

State:

KEY CONTACTS

Project Name **STARKWEATHER CREEK**

ProjectID: 05-33

Last Name: KEY CONTACT INFORMATION NOT RELEASED

Contact ID:

First Name:

Title:

Company:

Address:

City:

State:

Postal Code:

Work Phone # :

Other Phone #:

Fax # :

Email Address:

REFERENCES

Project Name **STARKWEATHER CREEK**

ProjectID: 05-33

Reference Type: A

ReferenceID: 517

Title: ***Remediation of Mercury Contaminated Sediments in an Urban Stream, Starkweather Creek***

Location: AEM

Category: Close-Out Report

Prepared by/Author: Wisconsin Department of Natural Resources

**Preparer/Author
Address:**

Prepared For: US EPA

Date Published: 1995 circa

**Key Words and
Phrases:**

Reference Type: B

ReferenceID: 318

Title: ***Starkweather Creek***

Location: AEM

Category: Site Update

Prepared by/Author: Wisconsin Department of Natural Resources

**Preparer/Author
Address:**

Prepared For: General Public

Date Published: 1995

**Key Words and
Phrases:**

Reference Type: E

ReferenceID: 111

Title: ***An Overview of Wisconsin's Sediment Management Program***

Location: AEM

Category: Contaminated Sediments: Management Issues

Prepared by/Author: William P. Fitzpatrick

**Preparer/Author
Address:** Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921

Prepared For: Cooperative Programs for Sediment Management, NJ Maritime Resources,
Newark, NJ

Date Published: February 10, 1997

**Key Words and
Phrases:**

REFERENCES

Project Name **STARKWEATHER CREEK**

ProjectID: 05-33

Reference Type: L

ReferenceID: 85

Title: ***Memo re: Precedent for Extended Sediment Remediation in Rivers and Streams***

Location: AEM

Category: Contaminated Sediments: Overview of Issues

Prepared by/Author: AEM, Inc.

Preparer/Author Address: Malvern, PA 19355

Prepared For: Distribution

Date Published: August 15, 2000

Key Words and Phrases:

FISH ADVISORIES

Project Name **STARKWEATHER CREEK**

ProjectID: 05-33

<i>Advisory:</i>	Lake Monona	<i>AdvisoryID:</i>	786
<i>Extent:</i>	Dane County		
<i>Pollutant:</i>	mercury		
<i>Species:</i>	walleye		
<i>Population:</i>	NCSP		
<i>Population Definition:</i>	No Consumption-Subpopulation(s): Advises against consumption for populations that are potentially at greater risk, e.g., pregnant or nursing women, and small children.		
<i>Advisory Type:</i>	Lake	<i>Advisory Number:</i>	993
<i>Status (Active or Rescinded):</i>	Rescinded	<i>Date Rescinded:</i>	00/00/02
<i>Contact Name:</i>	Candy Schrank	<i>Contact Number:</i>	608-267-7614
<hr/>			
<i>Advisory:</i>	Lake Monona	<i>AdvisoryID:</i>	787
<i>Extent:</i>	Dane County		
<i>Pollutant:</i>	mercury		
<i>Species:</i>	walleye		
<i>Population:</i>	RGP		
<i>Population Definition:</i>	Restricted Consumption-General Population: Advises the general population to restrict the size of the organisms and/or the frequency of meals consumed.		
<i>Advisory Type:</i>	Lake	<i>Advisory Number:</i>	993
<i>Status (Active or Rescinded):</i>	Rescinded	<i>Date Rescinded:</i>	00/00/02
<i>Contact Name:</i>	Candy Schrank	<i>Contact Number:</i>	608-267-7614
<hr/>			
<i>Advisory:</i>	Lake Monona	<i>AdvisoryID:</i>	788
<i>Extent:</i>	Dane County		
<i>Pollutant:</i>	mercury		
<i>Species:</i>	walleye		
<i>Population:</i>	RSP		
<i>Population Definition:</i>	Restricted Consumption-Subpopulation(s): Advises subpopulations potentially at greater risk, e.g., pregnant or nursing women, and/or small children, to restrict the size of the organism and/or frequency of meals consumed.		
<i>Advisory Type:</i>	Lake	<i>Advisory Number:</i>	993
<i>Status (Active or Rescinded):</i>	Rescinded	<i>Date Rescinded:</i>	00/00/02
<i>Contact Name:</i>	Candy Schrank	<i>Contact Number:</i>	608-267-7614

FISH ADVISORIES

Project Name **STARKWEATHER CREEK**

ProjectID: 05-33

Advisory: Lake Monona

AdvisoryID: 1110

Extent: Dane County

Pollutant: PCBs (total)

Species: Bass-white

Population: RGP

Population Definition: Restricted Consumption-General Population: Advises the general population to restrict the size of the organisms and/or the frequency of meals consumed.

Advisory Type: Lake

Advisory Number: 993

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Candy Schrank

Contact Number: 608-267-7614

Advisory: Lake Monona

AdvisoryID: 1111

Extent: Dane County

Pollutant: PCBs (total)

Species: Bass-white

Population: RSP

Population Definition: Restricted Consumption-Subpopulation(s): Advises subpopulations potentially at greater risk, e.g., pregnant or nursing women, and/or small children, to restrict the size of the organism and/or frequency of meals consumed.

Advisory Type: Lake

Advisory Number: 993

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Candy Schrank

Contact Number: 608-267-7614

Advisory: Lake Monona

AdvisoryID: 1112

Extent: Dane County

Pollutant: PCBs (total)

Species: carp-common

Population: RSP

Population Definition: Restricted Consumption-Subpopulation(s): Advises subpopulations potentially at greater risk, e.g., pregnant or nursing women, and/or small children, to restrict the size of the organism and/or frequency of meals consumed.

Advisory Type: Lake

Advisory Number: 993

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Candy Schrank

Contact Number: 608-267-7614

FISH ADVISORIES

Project Name **STARKWEATHER CREEK**

ProjectID: 05-33

Advisory: Lake Monona

AdvisoryID: 1113

Extent: Dane County

Pollutant: PCBs (total)

Species: carp-common

Population: RGP

Population Definition: Restricted Consumption-General Population: Advises the general population to restrict the size of the organisms and/or the frequency of meals consumed.

Advisory Type: Lake

Advisory Number: 993

Status (Active or Rescinded): Active

Date Rescinded:

Contact Name: Candy Schrank

Contact Number: 608-267-7614
