

# Quality Assurance Project Plan

## Melancthon Creek TMDL

**Purpose:** Melancthon Creek flows through Vernon and Richland counties located in southwest Wisconsin. It is a tributary to the Pine River and is part of the Lower Wisconsin River Basin. The portion of the creek covering the mouth to 1 mile north of the Richland-Vernon county line is classified as a trout stream: the first 6.4 miles is listed as Class II, followed by a reach of 3.5 miles classified as Class I (WDNR 1980). The entire stream has been designated as Exceptional Resource Water (ERW) and supports some natural reproduction of Brook and Brown Trout.

In 1998, the upper segment from Highway 80 crossing at the limit of Richland and Vernon Co. to the headwaters was designated as impaired water and added to the 303(d) list due to habitat degradation caused by sediment input. The existing use of the impaired segment was warm water forage fish (Ripp et al. 2002) and did not meet the designated use (trout stream Class I). Meanwhile, the land use improvements using contour strip cropping implemented recently probably contribute to maintain more stable vegetated soils and then to reduce erosion and sediment input. Recent visits to Melancthon Creek for water quality monitoring in 2006 and 2007 showed that the exposed soil was minimal and abundant riparian vegetation was present.

**Objective:** The Department conducted water quality monitoring on a monthly basis in 2006 (from May to October) and 2007 (in March, and from June to August). Water samples for total suspended solid (TSS) analysis were collected and surface water temperature and pH measured with a YSI probe at station 1 (Figure 1).

A macroinvertebrate survey using D-frame nets was done in November 2006 at station 2 to determine the biotic integrity (Hilsenhoff biotic index). Fish surveys were performed in May 2007 at stations 1 and 2 (Figure 1). Another fish survey was done just south of the impaired segment (nearby Walsh Creek) at stations 3 and 4 in August 2003 (Figure X). The method of electrofishing was used on a distance of 100 meters of stream for both fish surveys. The results obtained from the fish survey were used to determine the Index of Biotic Integrity (IBI) using the method developed for cold water streams (Lyons et al. 1996).

**Outcome:** The listed segment of Melancthon Creek, is a small and high gradient stream. Its watershed includes agricultural land, stretches of deciduous forest surrounding some reaches of the stream, a few habitations and two quarries located in the upper limit of the watershed (Figure 1). Observations made recently at station 1 reveal a well vegetated stream bank with no erosion and the implementation of culture rotation in the watershed (Photos 1 and 2).

The stream width at station 1 varied between 0.8 and 1.4 m and the maximum depth, from 20 and 34 cm (water quality monitoring 2006 and 2007). The stream bed of both the listed segment (stations 1 and 2) and the southern section (stations 3 and 4) of the stream is composed mainly of cobbles, gravel and sand (Table 1). This type of bottom constitutes a suitable habitat for the reproduction of salmonid species as Brook and Brown Trout.

### 3.2 Water quality

The TSS concentration in the Melancthon Creek was constantly low and varied between 5 and 17.8 mg/l (n=10) in 2006 and 2007. The heavy rain observed in the area the night and day before the sampling on August 14 caused only a slight increase of TSS concentration (17.8 mg/l) in the listed segment of Melancthon Creek while other streams in the same area experienced TSS concentrations as high as 362 and 546 mg/l on the same day (Little Willow Creek and Otter Creek, respectively). The water transparency depth was consistent with the low TSS with values higher than 120 cm except the measurement of 89 cm obtained on August 14, which remained fairly clear. The observations made during the fish (2003 and 2007)

and the macroinvertebrate surveys (2006) also reported clear water at stations 1 to 4.

### 3.3 Temperature

The water temperature recorded from May 2006 to August 2007 varied between -0.2 and 21.6°C and the maximum daily mean temperature was of 15.8°C (Appendix A). These figures meet the guidelines for coldwater streams which refer to a maximum daily mean temperature of 22°C and an instantaneous maximum temperature of 25°C (WDNR 2004).

### 3.4 Macroinvertebrate community

The macroinvertebrate community was composed of a total of 20 different taxa. The caddisflies (Trichoptera) and aquatic amphipods (Amphipoda) were the most abundant (36 and 41%, respectively) (Table 2). The Hilsenhoff biotic integrity calculated from the macroinvertebrate survey was of 2.814 which correspond to a water quality rating of "excellent", indicating no apparent organic pollution (Lillie et al. 2003).

### 3.5 Fish communities

The 2007 fish survey show that the fish assemblage of the upper segment of the Melancthon Creek is exclusively composed of cool and coldwater species: Brook Trout, Brown Trout and sculpins (Table 3 and 4). The exclusive presence of cool and coldwater species, the low number of fish species, and the presence of Mottled Sculpin (coldwater indicator) confirm the current use of the stream by coldwater communities. The 2003 fish survey performed south of the listed segment (stations 3 and 4) show similar results.

The Brook Trout specimens captured during the 2007 survey ranged in size from 1.9 to 8.8 inches. The length distribution for the 2003 and 2007 surveys are presented in Appendix B. The five specimens of Brown Trout captured in 2007 in the listed segment measured between 5 and 9 inches. Since three year classes of brook trout are represented in the data, natural reproduction is likely taking place. This assertion is supported by the fact that the last stocking date for Melancthon Creek was in 2000. The recently collected biological data supports the designated use of Coldwater Class I for the upper segment of Melancthon Creek.

Comments:

The data available from the recent monitoring of Melancthon Creek reveal consistently low TSS concentrations which indicate



## People

Name	Role	Status
NICOLE L CLAYTON	Coordinator of the project	Active
JAMES A MORTON	Team member	Active

## Summary

Number of Monitoring Stations: 1

Number of Fieldwork Events by Status: Complete 14

Number of Quality Control Samples by Type:

## Methods

- ELECTROFISHING: MULTIPLE GEAR TYPES
- Macroinvertebrate Baseline Protocols 2004 D-frame Kick Net
- Multi-Parameter Field Data - 2006 Sondes Guidelines
- Open Channel Flow Measurement
- Temperature - Electronic (2502)
- WATER GRAB SAMPLE 2005 Guidelines and Procedures

## Equipment

Equipment Type	Description
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## Form Parameters

Type	Parameter	Description
DNR_STORET	20	AMBIENT AIR TEMPERATURE - FIELD
DNR_STORET	99426	BOTTOM OF SAMPLING INTERVAL (METERS)
DNR_STORET	99196	BOTTOM OF SAMPLING INTERVAL - (FEET)
DNR_STORET	32	CLOUD COVER
DNR_STORET	94	CONDUCTIVITY FIELD
DNR_STORET	72002	DEPTH TO GROUNDWATER
DNR_STORET	300	DISSOLVED OXYGEN FIELD
DNR_STORET	50050	FLOW RATE MGD
DNR_STORET	65	GAGE HEIGHT FEET
DNR_STORET	301	OXYGEN, DISSOLVED, PERCENT OF SATURATION %
DNR_STORET	400	PH FIELD
DNR_STORET	78	SECCHI DEPTH
DNR_STORET	49701	SECCHI DEPTH - FEET
DNR_STORET	99420	SECCHI DEPTH HIT BOTTOM
SWIMS	400	Stream Characteristics: Ave. Width, Depth, Meanders (Description)
DNR_STORET	61	STREAM FLOW - CFS
DNR_STORET	10	TEMPERATURE FIELD
DNR_STORET	99424	TOP OF SAMPLING INTERVAL (METERS)
DNR_STORET	99195	TOP OF SAMPLING INTERVAL - (FEET)
DNR_STORET	61190	TRANSPARENCY TUBE
DNR_STORET	82078	TURBIDITY, FIELD NEPHELOMETRIC NTU

## Intended Parameters

Type	Parameter	Description
DNR_STORET	625	NITROGEN KJELDAHL TOTAL
DNR_STORET	608	NITROGEN NH3-N DISS
DNR_STORET	665	PHOSPHORUS TOTAL
DNR_STORET	666	PHOSPHORUS TOTAL DISS
DNR_STORET	530	RESIDUE TOTAL NFLT (TOTAL SUSPENDED SOLIDS)
DNR_STORET	136	TEMPERATURE AT LAB

## Collected Parameters

Type	Parameter	Description	# Results
DNR_STORET	20	AMBIENT AIR TEMPERATURE - FIELD	8
DNR_STORET	32	CLOUD COVER	3
DNR_STORET	65	GAGE HEIGHT FEET	1
DNR_STORET	625	NITROGEN KJELDAHL TOTAL	5
DNR_STORET	608	NITROGEN NH3-N DISS	5
DNR_STORET	400	PH FIELD	13
DNR_STORET	665	PHOSPHORUS TOTAL	5
DNR_STORET	666	PHOSPHORUS TOTAL DISS	5
DNR_STORET	530	RESIDUE TOTAL NFLT (TOTAL SUSPENDED SOLIDS)	10
DNR_STORET	61	STREAM FLOW - CFS	4
DNR_STORET	136	TEMPERATURE AT LAB	10
DNR_STORET	10	TEMPERATURE FIELD	3953
DNR_STORET	61190	TRANSPARENCY TUBE	4
DNR_STORET	76	TURBIDITY	1

# Lab Fee Budget

Test Code	Description	Test Group	# Planned	Unit Cost	Total Cost
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