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**Subject: Plymouth Mill Pond Background Watershed Assessment**

## Introduction

The purpose of this technical memorandum is to summarize background information on the Plymouth Mill Pond and the Mullet River watershed tributary to the mill pond. Also summarized are the findings of a windshield survey of the watershed looking for potential land use impacts to the water quality of the Mullet River and the mill pond. In addition a summary of information for known endangered resources in the project area is provided.

## Historical Review

Jim Stahlman, a member of the Plymouth Mill Pond committee provided the following history of the Plymouth Mill Pond. The original dam was constructed in the late 1840s, probably the spring of 1849. There is speculation that the river was rerouted when the dam was built but there is no supporting evidence for this and it is unlikely. The dam and mill pond are shown in roughly their present configuration in both the 1875 and 1889 plat books found in the Plymouth Historical Society Museum. Another dam and mill (Jones Mill) existed upstream on the Mullet River north of the present day Industrial Park in the 1870s and 1880s in the Town of Mankato. This dam was abandoned around 1900. The County Fairgrounds were started in 1897. In 1906 a flood washed out the Plymouth mill dam, which was later reconstructed. The present dam was constructed in the early 1950s. The mill pond was drained down in the late 1950s. During this drawdown the river was on the east side of the island.

## Watershed Delineation

The Mullet River watershed tributary to the Plymouth Mill Pond was delineated using a combination of Wisconsin Department of Natural Resources (WDNR) Mullet River watershed GIS information, City of Plymouth storm sewer drainage mapping, and U.S. Geological Survey (USGS) topographic quadrangle maps. The watershed drains about 62 square miles in Fond du Lac and Sheboygan counties as shown in the attached watershed map. The Mullet River originates at Mullet Lake and runs east, gathering drainage from La Budde Creek to the north near Elkhart Lake and Jackson Creek to the northwest of the City of Plymouth.

## **Land Use**

Based on WDNR GIS land use mapping and Earth Tech's windshield survey, the land use in the watershed is primarily agricultural with extensive wooded areas and significant wetland areas buffering the drainage ways of the Mullet River and its tributaries. Extensive areas of wetland also form the headwaters of the Mullet River. The majority of urban land use is in the City of Plymouth.

The Sheboygan County Land & Water Conservation Department (LWCD) was consulted regarding agricultural practices in the project area. The LWCD contact said they do not have information readily available in that regard and referred Earth Tech to WDNR.

## **WDNR Background Information**

John Masterson, of the WDNR Plymouth Service Center, was interviewed regarding potential impacts to surface water quality in the watershed. According to WDNR records, there are no point sources of pollution such as wastewater discharges to the Mullet River upstream of the mill pond. There are no significant sources of non-point source pollution, such as barnyards or badly eroded farm fields, in the watershed which stand out.

Curtis Nickels also of the WDNR Plymouth Service Center was interviewed about measures taken at the Sheboygan county Fairgrounds to reduce non-point source pollution. Over the last several years he has worked with the County Fairgrounds to install a sediment trap by the racetrack grandstands, a French drain in the infield, and another on the west side of the racetrack.

Sediment samples from the Plymouth Mill Pond were collected and analyzed by WDNR in 2004. Results of this sampling were not available for Earth Tech review. A review of online USGS water quality data revealed no data collected for the Mullet River.

## **Watershed Windshield Survey**

A windshield survey of the watershed to assess land use practices, as they would impact water quality, was conducted on June 20th, 2006. Eleven different locations were characterized throughout the watershed. These eleven locations are labeled on the attached watershed map. Photographs of the locations are included in Attachment A. The following is a summary of findings for each location.

### *Site 1) County Fairgrounds*

The County Fairgrounds are east of mill pond in the City of Plymouth. The fairgrounds drain directly to mill pond via storm sewers. The fairgrounds have a dirt racetrack for car racing with associated grand stands and barns for livestock. Midget car racing occurs throughout the summer with the County Fair occurring in late summer. This is when the livestock barns are most used, but at the time of the survey fresh horse manure was found near the barns.

The fairgrounds may be a significant source of non-point source pollution to Mill Pond. The dirt track racetrack could generate loadings of mud, oil, grease and gasoline. According to Curtis Nickels of the WDNR, a sediment trap by the racetrack grandstands, a French drain in the infield, and another on the west side of the racetrack has been installed in the past several years in an effort to prevent this non-point source pollution from entering the mill pond. There have been anecdotal observations of the storm sewer outfall going into Mill Pond from the race track area, flowing brown during rain storms. The areas near the barns are paved and are drained by storm sewer inlets. Manure from these areas could easily enter Mill Pond directly from these areas.

*Site 2) Bare Field West of CTH OJ*

This is a farm field bordering CTH OJ to the west and just north of State HWY 23. This field drains to the Mullet River upstream of the mill pond. At the time of the windshield survey on June 20<sup>th</sup>, the field was bare with no apparent crop showing. A crop may have been planted and it may not have been apparent at the time.

There was no significant erosion evident from the highway. The field slopes were not severe. It appeared that there was a green space buffer between the field and the river. Overall, as long as the field is vegetated with a crop or other cover, this field is probably not a major source of sediment to the Mullet River.

*Site 3) Oat Field by CTH J*

This site is an oat field just south of CTH J and west of State HWY 67. The field drains to the Mullet River upstream of Mill Pond. At the time of the survey the oats were well established. Non row crops, such as oats, provide good ground cover and have less potential sediment erosion than row crops, such as corn and soy beans.

*Site 4) Corn Field by CTH C*

This site is west of CTH C just north of Woodland Road. The field drains to the Mullet River north of the mill pond. At the time of the survey the corn appeared well established and the field well managed.

*Site 5) Bare Field West of Racetrack Road*

This is a farm field west of Racetrack Road and south of CTH JJ. This field drains to La Budde Creek southeast of Elkhart Lake. At the time of the windshield survey on June 20<sup>th</sup>, the field was bare with no apparent crop showing. A crop may have been planted and it may not have been apparent at the time.

There was no significant erosion evident from the highway. The field slopes were not severe. It appeared that there was a green space buffer between the field and the river. Overall, as long as the field is vegetated with a crop or other cover, this field is probably not a major source of sediment to La Budde Creek.

*Site 6) Corn Field at Southeast Corner of Racetrack Road and CTH JJ*

This corn field drains to the corner of this intersection with no apparent outlet. If this field did freely drain it would drain to La Budde Creek. There is an accumulation of eroded sediment at the corner of this field as well as an eroded flow path through the field as shown in the photo. The corn is not growing very well in this field as compared to other corn fields in the watershed, perhaps due to relatively poor soil conditions. If there is free drainage from this field, it could be a source of sediment to La Budde Creek.

*Site 7) La Budde Creek Near Golf Course Road*

La Budde Creek was observed at a bridge crossing near Golf Course Road southeast of Elkhart Lake and just west of the railroad tracks. The creek water was relatively clear and had aquatic vegetation growing on the bottom. The stream appears to have been straightened, probably due to the construction of the railroad tracks. Despite being straightened, the creek banks are well buffered with

dense vegetation. Field observation and map review indicates the most of La Budde Creek is well buffered with green space (woods and wetlands) throughout its course.

*Site 8) Glenbeulah Mill Pond*

The Glenbeulah Mill Pond is the largest man made impoundment on the Mullet River upstream from the Plymouth Mill Pond. Two smaller impoundments, Otter Pond and the Camp Evelyn Pond, are located within a mile downstream from the Glenbeulah Mill Pond. The Glenbeulah dam is an earthen dam with a concrete gated section located in a Village park.

The Glenbeulah Mill Pond has an accumulation of sediment along the upstream side of the dam. There is also aquatic vegetation growth, however it is not as abundant as that in the Plymouth Mill Pond. There is little development around the shores of the pond, and the Village of Glenbeulah is small compared to the City of Plymouth. The river flowing downstream of the dam is swift flowing and relatively clear but more turbid than La Budde Creek. There are clumps of filamentous algae growing on the shallow rocks below the dam. The Glenbeulah Mill Pond and the other two smaller impoundments downstream act as sediment traps to remove sediment before it reaches the Plymouth Mill Pond.

*Site 9) Bare Field North of CTH A*

This is a farm field north of CTH A about one mile northeast of the Village of Greenbush. To the north of the field is the Mullet River. At the time of the windshield survey on June 20<sup>th</sup>, the field was bare with no apparent crop showing. A crop may have been planted and it may not have been apparent at the time.

There was no significant rill erosion evident from the highway. The field slopes were flat. There is a wooded buffer area between the field and the river. Overall, as long as the field is vegetated with a crop or other cover, this field is probably not a major source of sediment to the Mullet River.

*Site 10) CTH T and Spring Valley Road*

This site consists of farm field to the east and west of Spring Valley Road just north of CTH T about two miles west of the Village of Greenbush. These fields drain north to the Mullet River. The east field is in hay and the west field is in corn as shown in the photos. These fields appeared in good condition and there was a wooded buffer area along the river. These fields were typical of what was seen throughout the watershed.

*Site 11) Outlet to Mullet Marsh*

This site is the outlet to Mullet Marsh as it crosses CTH G. Mullet Lake and Mullet Marsh form the headwaters of the Mullet River. These two water bodies are surrounded by wetlands and are well buffered from sediments from the surrounding watershed. The flow at this outlet is rather sluggish. The water is clear but stained by tannins. Duckweed is present on the surface.

Watershed Windshield Survey Summary

Overall agricultural practices in the watershed appear to be following good management practices from a water quality perspective. While the survey did find three fields that were bare and possible sources of eroded sediment, it appeared that they were just planted or about ready to be planted. The majority of the farm fields were in good condition and planted in corn, oats, or hay. One eroded corn field was

found by Racetrack Road but it appeared to be an enclosed depression without a discharge to La Budde Creek. No large dairy herds or other livestock operations were seen. Substantial parts of the watershed are woodland, wetlands, or grassland that can be beneficial from a water quality aspect.

The one site that perhaps deserves some additional investigation is the County Fairgrounds. Given its proximity to and direct discharge to Mill Pond, non-point source pollution from this site could have a significant impact to the water quality of the pond. Drainage routes from both the racetrack and livestock area, as well as other possible pollutant sources, should be further investigated. If it is found that non-point source pollution from this site is making its way to the mill pond there are a number of practices that could be employed to try and improve the situation. These could include disconnecting the flow paths to the pond, removing the pollutant sources, or treating the runoff before it reaches the pond.

### **Project Area Endangered Resources**

The Endangered Resources Review Request has been submitted to the WDNR Bureau of Endangered Resources. No results were available from WDNR prior to the date of this Technical Memorandum.

**ATTACHMENT A**  
**PHOTOGRAPHS**

Photo Log – Plymouth Mill Pond Watershed Survey



Site 1 - Dirt Racetrack



Site 1 - Manure near livestock barns



Site 2 - Bare Farm Field West of CTH OJ



Site 3 - Oat Field South of CTH J



Site 4 - Corn Field West of CTH C



Site 5 - Bare Field West of Racetrack Road



Site 6 - Eroded Corn Field at SE Corner of Racetrack Road and Hwy. JJ



Site 7 - La Budde Creek



Site 8 - Glenbeulah Dam



Site 9 - Bare Field north of Hwy A looking toward the Mullet River



Site 10 - Alfalfa Field



Site 10 - Corn Field



Site 11 - Mullet Marsh Outlet