

Date 2/11/2002

Facility Name Northern Moraine Utility

Receiving Water Mullet River

Evaluated by Galarneau

This stream classification is not included in the revised code because (select one):

☐ The discharger is no longer at this location.

☐ A new classification has resulted in a full fish and aquatic life designation.  
New survey date \_\_\_\_\_ Please provide copy of new classification report.

☐ This receiving water should be added to the database and to the code. Specify information, as it should be included in code.

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☒ Other (please explain)

It was classified as Full Fish and Aquatic  
Life and still is.

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## **MULLET RIVER WATERSHED (SH05)**

(Excerpt from Water Resources of the Sheboygan River Basin, WDNR Publ# WR-669-01, May 2001)

### **INTRODUCTION**

The Mullet River originates at the outlet of Mullet Lake in Fond du Lac County, running northeast into Sheboygan County through the Old Wade House State Park at the village of Greenbush in Sheboygan County. The river further flows through five impoundments: Glenbulah Mill Pond, Camp Evelyn, Plymouth Mill Pond, Meyer Park, and New Paris. The river then runs east and drains into the Sheboygan River near Sheboygan Falls. Tributaries to the Mullet River in its 98 square mile watershed include two trout streams; La Budde Creek, and Jackson Creek, and nine unnamed tributaries.

The watershed includes 1.9 miles of Class I trout water, 9.9 miles of Class II trout water, and 34.8 miles of warm water sport fishery. Land use in the Mullet River watershed is primarily agricultural with municipal and industrial discharges in Plymouth and in the lower reaches near Sheboygan Falls. Water quality is impacted by rural and urban nonpoint source pollution along with the problems associated with human-made impoundments.

### **STREAMS OF THE MULLET RIVER WATERSHED**

#### ***MULLET RIVER - OVERVIEW***

T15N R22E Sec. 35      Stream Length = 39.7 miles

The Mullet River originates from the outflow of Mullet Lake and the Mullet River State Wildlife Area in Fond du Lac county and flows in an easterly direction for approximately 40 miles to its confluence with the Sheboygan River in the Town of Sheboygan Falls, 17 miles upstream of Lake Michigan. The water quality of the Mullet River is considered good from its headwaters to Plymouth (approximately 25 miles) and fair from Plymouth downstream to its confluence with the Sheboygan River (approximately 15 miles) (WDNR 1968, 1995). The middle of the river, from Plymouth to Glenbeulah, has an increase in spring flow that lowers stream water temperatures and is classified as a Cold Water Community stream (trout). Upstream of Glenbeulah, and downstream of STH 67 near Plymouth, the Mullet River is classified as a Warm Water Sport Fish Community stream. This classification difference is due primarily to the increase in spring flow between Glenbeulah and Plymouth. The Mullet River is unique in that it flows from the warm water headwaters into a cold water segment. All of the other major tributaries in the Sheboygan Basin, including the Sheboygan and Onion Rivers, originate as coldwater streams and change over to warm water further downstream. The existing chemical and biological water quality information support the Mullet River's current biological classification. The river segment that flows through the Kettle Moraine State Forest Northern Unit, the Mullet Creek State Wildlife Area, and the Old Wade House State Park are located within the warmwater sport fish community segment.

#### ***MULLET RIVER WARM WATER SEGMENT DOWNSTREAM OF STH67 (RM 0-18.1)***

This reach extends from the confluence of the Mullet and Sheboygan Rivers upstream to State Highway 67 north of Plymouth. This 18.1-mile reach of the Mullet River is classified as a Warmwater Sport Fish Community stream. Water quality in this segment of the Mullet River is fair to good. Water chemistry and macroinvertebrate samples collected during 1994 indicate an increase in nutrients and solids from upstream to downstream but overall are not limiting the

stream's biological potential. Point source dischargers as well as stormwater runoff, and cropland runoff result in increased nutrients, sedimentation, and bacteria to the stream. Fish barriers and water quality impacts from the New Paris, Meyer Park, and Plymouth dams present the greatest impact to the water quality of the Mullet River in this reach.

### ***NEW PARIS IMPOUNDMENT***

T15N R21E Sec. 27      Surface Acres = unknown      Maximum Depth = unknown

This is the downstream-most dam on the Mullet River located in the Village of New Paris just south of Plymouth. No water quality data is available for this impoundment.

### ***MEYER PARK IMPOUNDMENT***

T15N R21E Sec. 28      Surface Acres = 5.3      Maximum Depth = 4 feet

This relatively small impoundment is located in Meyer Nature Park in the City of Plymouth. Sedimentation has resulted in a shallow, nutrient enriched impoundment. No recent water quality data is available for this impoundment.

**Table 1. Sediment Survey Results for Meyer Impoundment on the Mullet River collected in 2000.**

| Parameters                  |              | SITES |            |            |
|-----------------------------|--------------|-------|------------|------------|
|                             |              |       |            |            |
| Total Organic Carbon (µg/g) |              | 33100 | 26400      | 21200      |
| Particle Size               | % Solids     | 43.8  | 49.1       | 45.8       |
|                             | % Sand       | 44    | 70         | 67         |
|                             | % Silt       | 33    | 18         | 19         |
|                             | % Clay       | 23    | 12         | 16         |
|                             | Soil Texture | Loam  | Sandy Loam | Sandy Loam |
| PCBs (total) (µg/g)         |              | <0.05 | <0.05      | <0.05      |
| PAHs (ng/g)                 |              | <100  | <160       | <100       |
| Metals (mg/kg)              | Selenium     | ND    | 5          | ND         |
|                             | Boron        | <11   | 18         | <11        |
|                             | Cadmium      | 0.5   | 1.6        | 0.7        |
|                             | Chromium     | 17    | 19         | 18         |
|                             | Copper       | 17    | 20         | 18         |
|                             | Nickel       | 15    | 18         | 17         |
|                             | Lead         | 16    | 21         | 17         |
|                             | Mercury      | 0.048 | 0.043      | 0.056      |

| Parameters               |      | SITES |       |        |
|--------------------------|------|-------|-------|--------|
|                          |      |       |       |        |
|                          | Zinc | 49    | 64    | 68     |
| Total Phosphorus (mg/kg) |      | 891.0 | 797.4 | 1107.6 |
| Ammonia (mg/kg)          |      | 120   | 53    | 50     |

### ***PLYMOUTH MILL POND***

T15N R21E Sec. 22

Surface Acres = 36

Maximum Depth = 6 feet

Plymouth Millpond is a moderately sized impoundment within the city of Plymouth on the Mullet River. The impoundment is very shallow with a soft mud bottom and very little rooted aquatic plant life. Periphytic blue-green algae are a problem as is high turbidity during months when carp activity is high. Carp have dominated the fish community and carp numbers are currently very high (pers. comm. John Nelson).

Up to 1,000 Canada Geese roost on the pond causing some nuisances to riparian landowners and providing some hunting opportunities during feeding flights. Several broods of geese are produced on the pond each year (pers. comm. Steve Klock).

Public access is available by several city streets, navigable water from the upper end of the pond, approximately two acres of city property at the dam site, and by approximately 1,000 feet of shoreline on city school property.

**Table 2. Sediment Survey Results for Meyer Impoundment on the Mullet River collected in 2000.**

| Parameters                  |              | SITES |            |            |
|-----------------------------|--------------|-------|------------|------------|
|                             |              |       |            |            |
| Total Organic Carbon (µg/g) |              | 33100 | 26400      | 21200      |
| Particle Size               | % Solids     | 43.8  | 49.1       | 45.8       |
|                             | % Sand       | 44    | 70         | 67         |
|                             | % Silt       | 33    | 18         | 19         |
|                             | % Clay       | 23    | 12         | 16         |
|                             | Soil Texture | Loam  | Sandy Loam | Sandy Loam |
| PCBs (total) (µg/g)         |              | <0.05 | <0.05      | <0.05      |
| PAHs (ng/g)                 |              | <100  | <160       | <100       |

| Parameters                  |          | SITES |       |        |
|-----------------------------|----------|-------|-------|--------|
|                             |          |       |       |        |
| Metals<br>(mg/kg)           | Selenium | ND    | 5     | ND     |
|                             | Boron    | <11   | 18    | <11    |
|                             | Cadmium  | 0.5   | 1.6   | 0.7    |
|                             | Chromium | 17    | 19    | 18     |
|                             | Copper   | 17    | 20    | 18     |
|                             | Nickel   | 15    | 18    | 17     |
|                             | Lead     | 16    | 21    | 17     |
|                             | Mercury  | 0.048 | 0.043 | 0.056  |
|                             | Zinc     | 49    | 64    | 68     |
| Total Phosphorus<br>(mg/kg) |          | 891.0 | 797.4 | 1107.6 |
| Ammonia<br>(mg/kg)          |          | 120   | 53    | 50     |

### ***MULLET RIVER COLD WATER SEGMENT (RM 18.1-23.0)***

The trout water reach of the Mullet River extends upstream from State Highway 67 to the confluence with Otter pond just downstream from Glenbeulah. This section of the Mullet River is the most heavily fished trout stream in Sheboygan County. Some agricultural pollution occurs within this segment, but is not considered limiting.

Water quality within this segment is rated as generally good, but is limited by a dam located at the Camp Evelyn Girl Scout facility. This impoundment alters the natural water temperature regime. The Northern Moraine Utility Commission wastewater treatment plant discharges to the groundwater of the Mullet River watershed. It is believed that after some treatment by the soil, the effluent mixes with the groundwater, which discharges directly to the Mullet River during part or all of the year. It is uncertain whether this occurrence is having an impact on surface water quality and bears investigation.

The fishery is represented by a good diversity of intolerant species, including brook and brown trout. The section of stream from Glenbeulah Springs to State Highway 67 is a Class II stream for brown trout and the diversity and number of individuals indicates a good fishery. The macroinvertebrate community is represented by a wide diversity of both intolerant and tolerant genera. The high water temperatures in the Camp Evelyn impoundment impair the trout habitat.

WDNR personnel surveyed the Mullet River downstream of the Crystal Lake Golf Course in August 1999. The fish community rated poor with species listed in Table ??? Stream habitat analysis showed excellent buffer area and shading; moderate streambank erosion; bottom substrate

with a mixture of rock, gravel, and sand; and moderate fish cover. Benthic macroinvertebrate rating for this location were good to very good.

WDNR personnel surveyed a portion of the stream, upstream of County Highway "CJ" in July 2000. Land use in the area is heavily wooded with wetland areas in the riparian corridor. The fish community rated fair with species listed in Table 51. Stream habitat analysis showed excellent buffer areas and shading, rocky substrate, and very little streambank erosion. Fish cover was limited due to shallow water depths.

**Table 3. Mullet River fish community assessment, 1999 & 2000.**

| Fish Species     | Ball Tolerance <sup>1</sup> | Lyons IBI Tolerance <sup>2</sup> | Mullet River 1999 | Mullet River 2000 |
|------------------|-----------------------------|----------------------------------|-------------------|-------------------|
| Common Shiner    | Tolerant                    |                                  | X                 | X                 |
| Longnose Dace    | Intolerant                  |                                  |                   | X                 |
| Creek Chub       | Tolerant                    | Tolerant                         | X                 | X                 |
| Hornyhead Chub   | Intolerant                  |                                  | X                 |                   |
| White Sucker     | Tolerant                    | Tolerant                         | X                 | X                 |
| Blacknose Dace   | Intolerant                  | Tolerant                         |                   | X                 |
| Stonecat         | Intolerant                  |                                  |                   |                   |
| Brown Trout      | Sport                       |                                  | X                 |                   |
| Brook Trout      | Sport                       | Intolerant                       |                   |                   |
| Largemouth Bass  | Sport                       |                                  | X                 |                   |
| Rock Bass        | Sport                       | Intolerant                       | X                 | X                 |
| Bluegill         |                             |                                  | X                 |                   |
| Bluntnose Minnow |                             |                                  | X                 |                   |
| Johnny Darter    |                             |                                  | X                 |                   |

<sup>1</sup> Ball (1982)

<sup>2</sup> Lyons (1992)

### ***CAMP EVELYN IMPOUNDMENT***

T15N R21E Sec. 6      Surface Acres = 2.8      Maximum Depth = 6 feet

This is a small impoundment in the trout water section of the Mullet River. The dam at the Camp Evelyn Girl Scout facility creates a fish barrier and increases water temperatures which are detrimental to trout and other cold water species. No recent water quality data have been collected in this impoundment.

### ***MULLET RIVER WARM WATER SEGMENT UPSTREAM OF GLENBEULAH (RM 23.0-39.7)***

This segment starts at Otter Pond near Glenbeulah and terminates at Mullet Lake. The segment runs through the Kettle Moraine State Forest Northern Unit, the Mullet Creek State Wildlife Area, and Old Wade State Park.

Water quality conditions are good. There are fewer springs in this reach, combined with altered flows resulting from channelization and impoundments. Because of these limiting factors the fishery changes from trout stream to warm water sport fish. A dam forms the Glenbeulah Millpond, and two additional impoundments are present in the Mullet Creek Wildlife area to provide habitat for waterfowl.

The Wisconsin State Historical Society in conjunction with the Kohler Foundation is actively pursuing the restoration of The Historic Old Wade House's former sawmill, which is located along the Mullet River in Greenbush, Sheboygan County. The sawmill site was researched and an archeological dig was conducted during the last few years. The information collected will be used in the proposed reconstruction of the mill by providing insight into the construction of the original structure. In addition to the construction of the sawmill, the State Historical Society has proposed that this be a functioning sawmill, which would include reconstruction of the dam once located on the Mullet River. The current project proposal calls for the construction of the dam at the original site, but not an impoundment of the Mullet River (WWC 1997). An impoundment would be constructed adjacent to the Mullet River from which the mill would be operated. The Old Wade House project proposal and the Environmental Assessment (WDNR 1998) were discussed in a public meeting in 1998. The reports are available at the WDNR Plymouth Service Center.

The Department of Natural Resources (WDNR) had agreed to assist the State Historical Society in collecting information required for the environmental assessment of the project on the Mullet River. The WDNR conducted an aquatic resource survey of the Mullet River at the Old Wade House site, which included chemical and biological data collections (Aartila 1995), and stream flow (Galarneau 1998). Table 65 depicts the Mullet River sample sites for the basin monitoring and aquatic resource study.

**Table 4. Mullet River Watershed Sample Site Locations**

| Stream       | SITE INFORMATION |                     |                                                    |
|--------------|------------------|---------------------|----------------------------------------------------|
|              | Site             | Site Description    | Sample Type                                        |
| Mullet River | MR-1             | At Spring Valley Dr | Water Chemistry, Macroinvertebrates                |
|              | MR-2             | At Plank Rd         | Water Chemistry, Macroinvertebrates, Fish, Mussels |
|              | MR-3             | At CTH A            | Water Chemistry, Macroinvertebrates, Fish, Mussels |
|              | MR-4             | At CTH PP           | Water Chemistry, Macroinvertebrates                |

A mussel survey identified eight species of mussels (WDNR 1995, Cummings and Mayer 1995, WWC 1997) including two statewide threatened species which inhabit the Mullet River at this site (Table 66).

**Table 5. Mullet River Mussel Community Assessment in the Vicinity of the Old Wade House**

| MUSSEL SPECIES         |                                                         |                          |
|------------------------|---------------------------------------------------------|--------------------------|
| Common Name            | Scientific Nomenclature                                 | State Threatened Species |
| Slippershell Mussel    | <i>Alasmidonta viridis</i> (Rafinesque, 1820)           | X                        |
| Ellipse                | <i>Venustaconcha ellipsiformis</i> (Conrad, 1836)       | X                        |
| Wabash Pigtoe          | <i>Fusconaia flava</i> (Rafinesque, 1820)               |                          |
| Fat Mucket             | <i>Lampsilis siliquioidea</i> (Barnes, 1823)            |                          |
| Creek Heelsplitter     | <i>Lasmigona compressa</i> (Lea, 1829)                  |                          |
| Fluted Shell           | <i>Lasmigona costata</i> (Rafinesque, 1820)             |                          |
| Giant Floater          | <i>Anodonta grandis</i> form <i>grandis</i> (Say, 1829) |                          |
| Cylindrical Papershell | <i>Anodontoides ferussacianus</i> (Lea, 1834)           |                          |

The fish community in the Mullet River upstream from Glenbulah was assessed as part of the Old Wade House Project in 1994 and 1997 (Table 67). No recent surveys have been conducted in the trout river section nor lower river reaches.

**Table 6. Mullet River Fish Community Assessment Upstream of Glenbulah**

| Fish Species     | Ball Tolerance <sup>1</sup> | Lyons IBI Tolerance <sup>2</sup> | Historical Fish Collections (Fago 1985) | 1994 and 1997 Fish Collections |
|------------------|-----------------------------|----------------------------------|-----------------------------------------|--------------------------------|
| Blacknose Shiner | Intolerant                  | Intolerant                       | X                                       | X                              |
| Blacknose Dace   | Intolerant                  | Tolerant                         | X                                       | X                              |
| Creek Chub       | Tolerant                    | Tolerant                         | X                                       | X                              |
| Johnny Darter    | Tolerant                    |                                  | X                                       | X                              |
| Rock Bass        | Sport                       | Intolerant                       |                                         | X                              |
| Golden Shiner    | Tolerant                    | Tolerant                         | X                                       |                                |
| Largemouth Bass  | Sport                       |                                  |                                         | X                              |
| Smallmouth Bass  | Sport                       | Intolreant                       |                                         | X                              |
| Fathead Minnow   | Very Tolerant               | Tolerant                         | X                                       | X                              |
| Iowa Darter      | Intolerant                  | Intolerant                       | X                                       | X                              |
| White Sucker     | Tolerant                    | Tolerant                         | X                                       | X                              |
| Hornyhead Chub   | Intolerant                  |                                  | X                                       | X                              |
| Common Shiner    | Tolerant                    |                                  | X                                       | X                              |
| Green Sunfish    | Sport                       | Tolerant                         |                                         | X                              |

| <b>Fish Species</b>    | <b>Ball Tolerance<sup>1</sup></b> | <b>Lyons IBI Tolerance<sup>2</sup></b> | <b>Historical Fish Collections (Fago 1985)</b> | <b>1994 and 1997 Fish Collections</b> |
|------------------------|-----------------------------------|----------------------------------------|------------------------------------------------|---------------------------------------|
| Southern Redbelly Dace | Intolerant                        |                                        | X                                              |                                       |
| Northern Redbelly Dace | Intolerant                        |                                        | X                                              | X                                     |
| Bluntnose Minnow       | Tolerant                          | Tolerant                               | X                                              | X                                     |
| Brook Stickleback      | Tolerant                          |                                        | X                                              | X                                     |
| Central Mudminnow      | Very Tolerant                     | Tolerant                               | X                                              | X                                     |
| Black Bullhead         | Sport                             |                                        | X                                              | X                                     |
| Brown Bullhead         | Sport                             |                                        | X                                              |                                       |
| Pumpkinseed            | Sport                             |                                        | X                                              |                                       |
| Rainbow Trout          | Sport                             |                                        |                                                | X                                     |
| Northern Pike          | Sport                             |                                        | X                                              | X                                     |

<sup>1</sup> Ball (1982)      <sup>2</sup> Lyons (1992)

According to the results of the Hilsenhoff Biotic Index (HBI) This reach of the Mullet River has good water quality and very good biological diversity including rare mussel species (Table 68). The WDNR continues to work cooperatively with the State Historical Society with their proposed project at the Old Wade House State Park to help them obtain their unique project while protecting this special resource.

**Table 7. Hilsenhoff Biotic Index (HBI) values for the Mullet River - 1994**

| Stream       | SITE | Spring - HBI <sup>1</sup> |                      | Fall - HBI <sup>1</sup> |                      |
|--------------|------|---------------------------|----------------------|-------------------------|----------------------|
|              |      | Avg. Score                | Water Quality Rating | Avg. Score              | Water Quality Rating |
| Mullet River | MR-1 | 6.53                      | Fairly Poor          | 5.83                    | Fair                 |
|              | MR-2 | 5.55                      | Fair                 | 4.55                    | Good                 |
|              | MR-3 | 5.29                      | Good                 | 4.48                    | Very Good            |
|              | MR-4 | 4.75                      | Good                 |                         |                      |

<sup>1</sup> Hilsenhoff Biotic Index (1987)

<sup>2</sup> Lyons (1992)

<sup>3</sup> Ball (1982)

<sup>4</sup> Simonson et al. (1994)

***GLENBEULAH MILLPOND, SHEBOYGAN COUNTY***

T15N R20E Sec. 1      Surface Acres = 6.9      Maximum Depth = 11 feet

Glenbeulah Millpond is an impoundment of the Mullet River in Glenbeulah at the site of an old sawmill formed by a 12 foot-head dam. The water quality problems identified in the 1968 Water Resources of Sheboygan report (WDNR 1968) likely still exist today; nutrient enrichment, sedimentation, and abundant carp are consistent with impounded rivers. Thermal increases associated with this impoundment and the Camp Evelyn impoundment warm the trout water portion of the Mullet River, which is a short distance downstream. No recent water quality data are available for this impoundment.

***MULLET RIVER STATE WILDLIFE AREA, FOND DU LAC COUNTY***

T15N R19E Sec. 24      Surface Acres = unknown      Maximum Depth = unknown

A dam was placed on the Mullet River just west of CTH G in Fond du Lac County at river mile 34.5 to restore wetlands lost by drainage practices. This wetland impoundment is located in the headwater reaches of the Mullet River that originates in Mullet Lake (at RM 39.7). No recent water quality data exist for this impounded reach of the Mullet River.

Northern Moraine

Sheboygan County

Survey Date: 8-26-75

The Northern Moraine STP, now under construction, is located near the Mullet River. Both the Mullet River and its tributary, LaBudde Creek, are Class II trout waters in the region of the plant. The Northern Moraine STP will use land disposal of its effluent.

Recommendations

Continuous, fish and aquatic life.

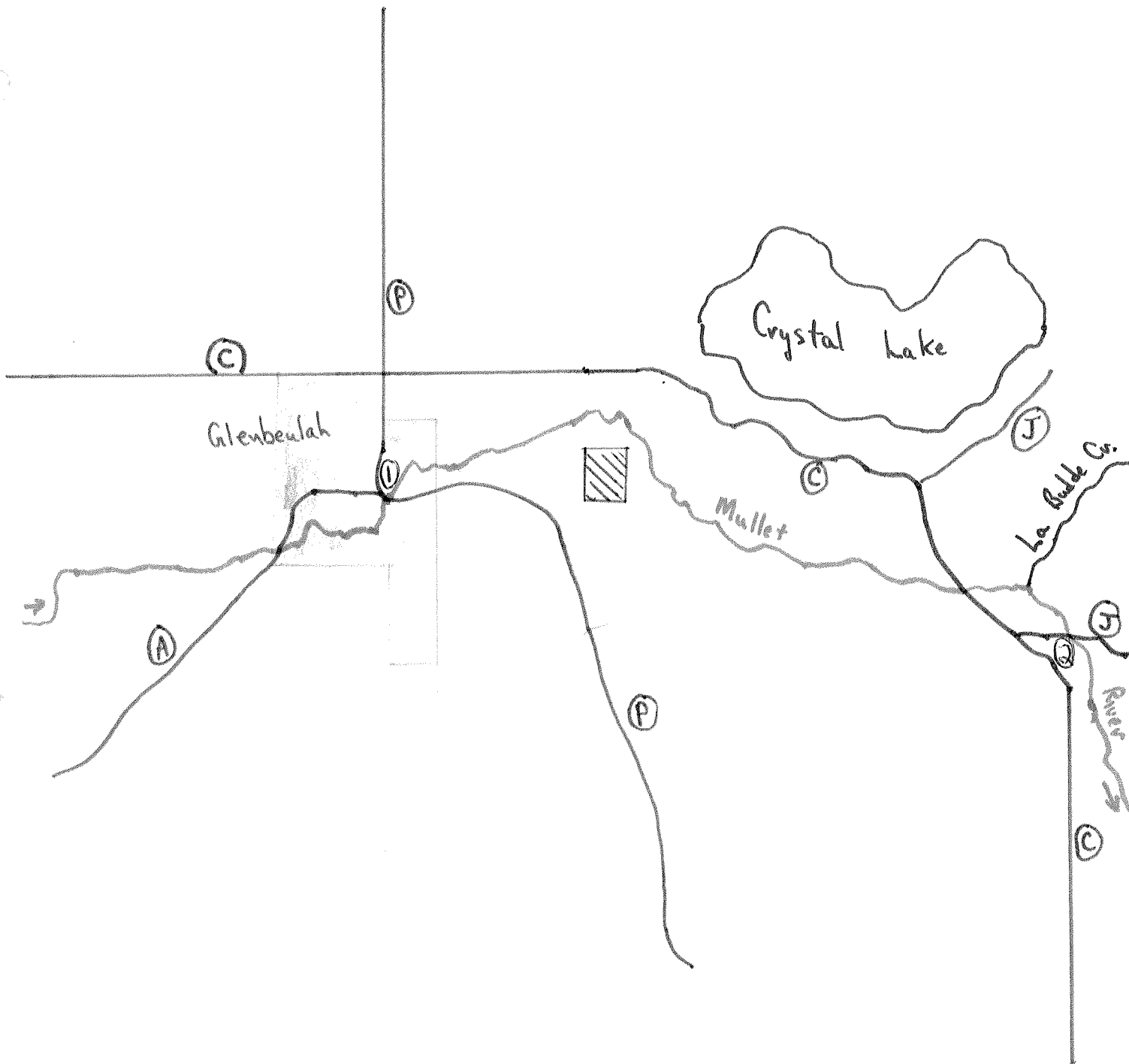


Robert B. Lucas  
Environmental Engineer



Dennis C. Weisensel  
District Biologist

RBL:DCW:sh



(I) = Photographs

 = Northern Moraine STP  
under construction  
(no discharge)

Northern Moraine S.D.



#1 Mullet River

Looking downstream



#2 Looking downstream