Branch River

Priority Watershed

Surface Water Quality

Appraisal Monitoring Plan

Prepared by

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I. INTRODUCTION

The Branch River watershed was selected as a priority watershed project in 1993 under the Wisconsin Nonpoint Source Pollution Abatement Program. Before implementation of nonpoint source pollution abatement measures, a water resources appraisal must be conducted to evaluate the condition of the water resources. This report provides a description of surface water appraisal monitoring activities in the Branch River watershed. Preliminary water resource objectives will be developed from this appraisal.

The Branch River watershed ranked high priority for both surface and groundwater under the nonpoint source watershed selection process. Both groundwater and surface water quality will be addressed in the priority watershed project; However, for the purpose of the appraisal, the groundwater component will be addressed separately.

II. DESCRIPTION OF THE WATERSHED

The Branch River watershed (Figure 1) is 97 square miles and is located in Brown (37%) and Manitowoc (63%) Counties. The Branch River and several unnamed intermittent tributaries to the Branch River make up the watershed drainage area. The Branch River discharges to the Manitowoc River near Branch, Wisconsin.

Dairy farming is the primary land use in the watershed. The intensity of cropland, pasture and cattle access to streams appears to be greatest in the Brown County portion of the watershed.

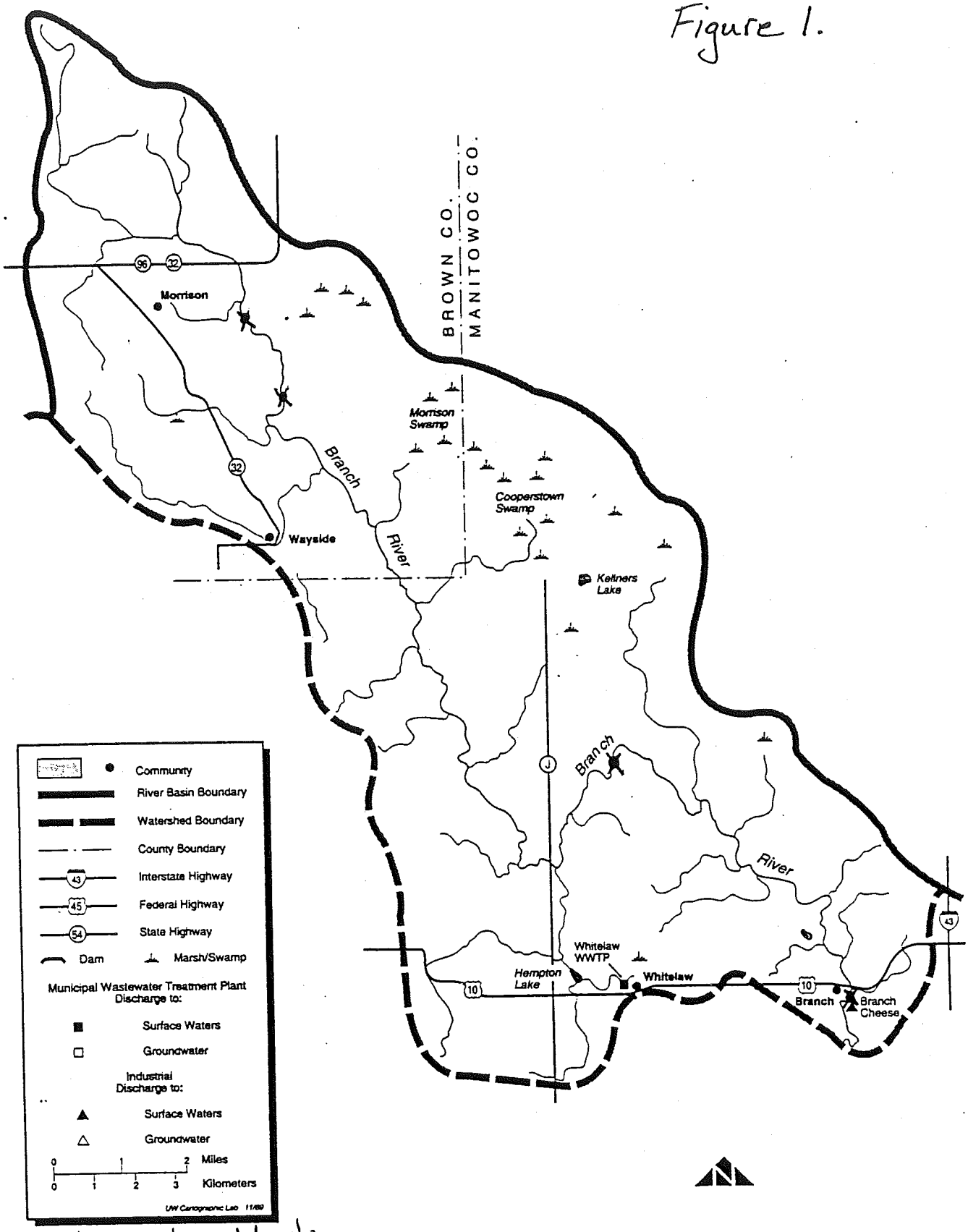
The Branch River is designated as exceptional resource waters due to the steelhead trout fishery. It also supports the Greater Redhorse, a threatened species that is sensitive to chemical pollutants, turbidity and siltation.

III. SUMMARY OF EXISTING DATA

Appendix A contains a summary of existing water quality data for the Branch River watershed. Because the fisheries data is extensive, only a brief summary is provided in Appendix B. Additional data can be found in the fish management files located in the Manitowoc DNR field office.

Branch River (MA 03)

Figure 1.



X Macroinvertebrate monitoring locations.

IV. MONITORING ACTIVITIES

A water resource appraisal was initiated for this project in fall 1993 and is scheduled for completion in winter 1994/95.

Following is a summary of appraisal monitoring activities for the watershed project. It is hoped that this monitoring will help identify factors affecting the surface water quality of the Branch River watershed.

Macroinvertebrate

Aquatic macroinvertebrate samples were collected in fall 1993 at four locations on the Branch River (Mill Road and Way-Morr Park near Park Road in Brown County; middle crossing of West Hillcrest Road and above the golf course on Branch River Road in Manitowoc County - see figure 1). Macroinvertebrate samples will be collected in spring at these same four locations. Samples will be sent to UW-Stevens Point for sorting and identification. Sample results will be evaluated using Hilsenhoff Biotic Index which provides a relative measure of organic loading to streams (Hilsenhoff, 1987).

Habitat Evaluations

Stream habitat conditions will be evaluated at the same stream sites as the macroinvertebrate samples plus at several others locations throughout the watershed. A matrix is used to numerically rank habitat characteristics from excellent to poor to assess physical factors that may limit the quantity and quality of aquatic life (Ball, 1982).

Water Temperature Monitoring

Water and air temperature will be monitored at two locations on the Branch River upstream and downstream of the confluence of intermittent tributaries. The effects of the tributaries and ambient air temperature on the Branch River water temperature will be determined. Exact monitoring locations will be identified by Manitowoc County Soil and Water Conservation Department staff around June 1, 1994. It is suspected that the tributaries significantly increase water temperatures of the Branch River. Warm waters may limit the use of the upper reaches of the Branch River by trout.

Dissolved Oxygen/Temperature/pH

Dissolved oxygen, temperature and pH will be monitored at several locations in the Branch River and its watershed. In addition, a continuous dissolved oxygen and temperature meter will be placed at two sites on the Branch River during critical low flow high temperature conditions. Wisconsin Administrative Code NR 102 states that dissolved oxygen in great lakes tributaries used by stocked salmonids for spawning runs shall not be lowered below natural background during period of habitation.

Lake Monitoring

Hempton Lake and Kellners Lake will be sampled once per month during June, July and August, 1994. Samples will be collected to determine the trophic state index of these lakes. Parameters will include specific conductance, temperature, dissolved oxygen, and pH profiles and surface total phosphorus, chlorophyll a, nitrate-nitrogen, ammonia, and total kjeldahl nitrogen water samples. Sampling procedures will conform to the DNR ambient lakes sampling protocol.

V. WORKLOAD ANALYSIS

The following is a summary of activities, date, and hours needed by DNR staff to conduct proposed surface water appraisal monitoring for the Branch River Watershed project:

Activity	Date	Hours
Macroinvertebrates:	Fall 1993 and Spring 1994	16
Habitat evaluations:	Fall 1993, Spring and Summer 1994	16
Temperature monitoring:	Summer 1994	32
Continuous dissolved oxygen, temperature, pH:	Summer 1994	32
Lakes monitoring:	Summer 1994	30
Report preparation:	Winter 1994/95	100
	Total Hours:	226

VI. REFERENCES

Wisconsin Department of Natural Resources, 1991. Manitowoc River Basin Water Quality Management Plan.

Ball, Joe, 1982. Stream Classification Guidelines for Wisconsin: Wisconsin Department of Natural Resources.

Wisconsin Department of Natural Resources, 1988. Field Procedures Manual. Draft 2nd Edition.

Wisconsin Department of Natural Resources. Lake Michigan District Water Quality Files.

Hilsenhoff, William, 1987. An Improved Biotic Index of Organic Stream Pollution.

Wisconsin Department of Natural Resources, Manitowoc Field Office. Fisheries Management files.

Appendix A.

Branch River Watershed: Summary of existing water quality data in the Lake Michigan District Water Resource Management files.

1. Lemberger Landfill Superfund Sites

A WPDES permit to discharge treated groundwater from this superfund site to the Branch River is currently being developed. There has been extensive monitoring done in the stretch of river between CTH J downstream to West Hillcrest Road as part this effort. Monitoring includes:

- aquatic toxicity testing
- water column and sediment sampling
- macroinvertebrate monitoring (biotic index ratings of fair, fairly poor, and poor)
- fish community and habitat surveys
- Freshwater mussel surveys (all species found are wide spread and relatively common. None are on the endangered or threatened species list for either the state or federal level)
- several private wells are contaminated

2. Manitowoc-Branch River Fishery Area Feasibility Study/ Environmental Analysis. Feb. 1993.

A proposed project involving a 30 mile corridor (from Clarks Mills on the Manitowoc River and CTH J on the Branch River downstream to the city of Manitowoc) to enhance and protect the developing anadromous salmonid fishery (especially steelhead) in the Manitowoc and Branch Rivers by acquiring riparian lands where possible and by encouraging proper land practices on non-acquired properties. Other goals are to provide adequate public access and other outdoor recreational activities.

3. Wastewater Treatment Facility Dischargers

Currently, there are two municipal wastewater treatment plants (WWTP) and one industrial discharger in the Branch River watershed.

- Whitelaw WWTP dischargers to an intermittent tributary to Hempton Lake to the Branch River.
- Morrison S.D.#1 began operation in 1993 and discharges to an unnamed tributary to the Branch River (T21N, R21E, SEC9, NESW).
- Branch Cheese (B.C. Acquisitions, Inc) discharges to the Branch River about one mile upstream from its confluence with the Manitowoc River.

4. Exceptional Resource Waters (ERW)

As defined in NR102.11, the Branch River is designated as ERW. This designation means that this river provides valuable fisheries, hydrologically or geologically unique features, outstanding recreational opportunities, unique environmental setting and which are not significantly impacted by human activities but may receive wastewater discharge or may receive future discharges necessary to correct environmental or public health problems.

5. Lake Management Files

The only lake with information in our files is Hempton Lake. A survey was conducted in 1977 because the Whitelaw WWTP discharge. The survey found this shallow 10-acre lake has poor water quality indicated by the low dissolved oxygen levels, algae bloom, high bacteria levels, lack of surface or emergent vegetation, and reportedly lack of fish present.

6. Stream Classification Studies

- The Branch River was recently re-classified as Great Lakes Aquatic Community downstream of the Brown County line and Warm Water Forage Fish above the Brown County line.

- A survey was conducted in 1987 to determine stream classifications at two locations. The first site at CTH G on the Branch River found an average biotic index value of 6.466 which indicates fair water quality. A habitat evaluation at Hill Road rated this section as fair habitat. The second site, a tributary to the Branch River at the junction of CTH G and Wayside Road near Wayside, found an average biotic index value of 8.897 which indicates very poor water quality. This tributary is classified as Warm Water Forage Fishery.

- A survey was conducted in 1984 above Branch Cheese discharge for macroinvertebrates. The average biotic index value was 2.73 indicating good water quality.

- A phosphorus study for one year in 1973 on the Branch River 1/4 mile upstream from its mouth found an average phosphorus concentration of 0.07 mg/l. The maximum concentration was 0.16 mg/l and the minimum was 0.02 mg/l.

7. Manitowoc River Basin Water Quality Management Plan. 1991.

The basin plan contains an overview of existing water quality data for the Branch River watershed, Since so much has happened in this watershed in the last couple years, much of the information in the basin plan is outdated or incorrect.

8. Surface Water of Brown County (1972) and Surface Waters of Manitowoc County (1968)

These two reference materials have a brief description of the river system in each county. The information is very general and somewhat outdated.

CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Appendix B.

Date: May 4, 1994 *File Ref:* 3600

To: Mary Gansberg

From: Steve Hogler

Subject: Branch River-Surface Water Quality Appraisal

In researching fishery records for the Branch River, the enclosed summaries are the most recent surveys of the area. It is interesting to note, the quality and variety of the fishery. Before the Manitowoc Rapids dam was removed from the Manitowoc River in 1983, the Branch River was widely known for it's smallmouth bass fishery, indeed it was designated as a smallmouth bass water. Minnows were heavily seined for bait in the river, and a very strong population of crayfish were also present. Invertebrate populations were diverse and indicated good water quality.

After 1983, the Branch River became accessible to anadromous trout. Large migrations of trout in spring and fall made the river a popular location to fish steelhead. Although our surveys were intended to sample trout, panfish as well as some forage species were observed. Some years we did a more through job of sampling all types of fish, but the general trends hold for all years. Rock bass and smallmouth were found during spring surveys, but were very common during the early fall surveys, as well as other fish. This difference is a function of water temperature.

As I have mentioned before, I have a set of thermographs from the Rahr property for the years of 1984-1987. I don't know if they have been analyzed. The Rahr property is very important for fish in the river because spring feed ponds and feeder streams add volume and cooler water during the warm summer months. Conversely, during the cold months, this added water moderates stream temperatures. Fish are then able to inhabit these stream reaches for a longer period of time each year, adding stability to the system.

In reviewing your monitoring plans, the only questions I had were about the location of your sample sites. Could you indicate their locations on a map for me? Some roads cross the river at several locations, and I'm not sure of which road crossing you are referring to.

We will be collecting fish for contaminant analysis from the Branch River below the Lemberger Landfill site. Hopefully, we'll have time to do this before the end of June. I'll let you know what we find.

If you need anymore information from my files, give me a call at 683-4923.

Steve Hogler
Fisheries Biologist