Upon approval by state and local authorities, the plan is implemented by local units of government. Water quality improvement is achieved through voluntary implementation of nonpoint source controls (Best Management Practices) and the adoption of ordinances. Landowners, land renters, counties, cities, villages, towns, metropolitan Sewerage Districts, sanitary districts, lake districts, and regional planning commissions are eligible to participate.

2. Implementation - Technical assistance is provided to aid in the design of best management practices. State level cost-share assistance is available to help offset the cost of installing these practices. Eligible landowners and local units of government are contacted by the county Land Conservation Departments to determine their interest in voluntarily installing the best management practices identified in the plan. Cost-share agreements are signed, listing the practices, costs, cost-share amounts, and a schedule for installation of management practices.

   Implementation of the watershed plan is assisted by an information and education component. Specific activities are undertaken according to the plan that will allow the agencies and local governments to conduct the project in a successful manner. The DNR and DATCP review the progress of the counties and other implementing units of government, and provide assistance throughout the eight-year project. The DNR monitors improvements in water quality resulting from control of nonpoint sources in the watershed.

Plan Organization

The remainder of this plan is divided into three parts: The Watershed Assessment, A Detailed Program for Implementation, and Project Evaluation. The contents of each part are described below:

Part 1 - The Watershed Assessment

This part includes Chapters 2, 3, and 4 and contains identification of the watershed and its subwatersheds, water quality problems, water quality objectives, pollutant load reductions, nonpoint sources, and the project management area.

Chapter 2 - "General Watershed Characteristics" is an overview of the cultural and natural resource features important to planning and implementation efforts for the priority watershed project.

Chapter 3 - "Water Quality Conditions, Objectives, and Nonpoint Sources" presents field inventory results and identifies the water quality or water resource problems and improvements that can be obtained through implementation of a nonpoint source control project. The chapter discusses the level of pollutant control needed to achieve the water resource objectives and describes the nonpoint sources and other sources of pollution.

Chapter 4 - "Management Actions" identifies the level of urban and rural nonpoint source pollution control needed to meet the water quality objectives. Eligibility criteria for funding to control nonpoint sources under the priority watershed project are also presented.

Part 2 - Detailed Program for Implementation

Chapters 5 and 6 are contained in this part and explain the administrative structure and procedures for conducting the project.

Chapter 5 - "Local Government Implementation Program" describes the manner by which the local units of government administer the project. Budgets for time and money are detailed in this chapter, along with a description of the information and education program.

Chapter 6 - "Integrated Resource Management Program" presents the strategy for involving DNR resource management programs (fisheries management, wildlife, and forestry) in the nonpoint source pollution abatement efforts in the Middle Trempealeau River Watershed.

Part 3 - Project Evaluation

Chapters 7 and 8 include the plan for evaluating the project for administrative and water quality achievements.

Chapter 7 - "Progress Assessments" discusses the means for assessing the amount of nonpoint source control gained through installation of best management practices in the watershed.

Chapter 8 - "Evaluation Monitoring" presents a strategy and schedule for monitoring to determine the water quality impacts of implementing nonpoint source controls in the Middle Trempealeau River Watershed.

CHAPTER TWO
General Watershed Characteristics

Location

The Middle Trempealeau River Priority Watershed Project area is located in the western Wisconsin counties of Trempealeau and Buffalo (map 1). The watershed is part of the larger Buffalo-Trempealeau basin which drains significant portions of adjacent counties to the Buffalo and Trempealeau Rivers. The Middle Trempealeau River project area lies between the lower Trempealeau and upper Trempealeau watersheds. This is a relatively large watershed project of 200 square miles (table 2-1). Waters draining from this watershed reach the Mississippi River above lock and dam #6.

Table 2-1. Watershed Project Areas by County

County	Square Miles	Acres	% of Watershed
Trempealeau	184	117,965	84
Buffalo	36	22,937	16
Total	220	140,902	100

Cultural Features

Civil Divisions and Population

Incorporated areas in the watershed project include the small cities of Blair, Whitehall, Independence, and Arcadia. Unincorporated areas include all or parts of seven townships. Lakes Coulee State Wildlife Area and Joe Pietrek Jr. County Park are publicly-owned lands within the watershed project. All four incorporated cities are located along the main stem of the Trempealeau River.

Trends in population indicate that no significant growth has occurred in these areas and in some cases there is slight decline in overall populations for rural agricultural areas in Wisconsin (table 2-2).

Table 2-2. Middle Trempealeau River Wathershed Civil Division and Population Estimates[1]

townships	Populations 1990	% of Total
Arcadia	1710	18
Burnside	451	5
Lincoln	621	6
Preston	642	6
Pigeon	70	1
Montana	140	1
Glencoe	112	1
		(38)
cities		
Arcadia	2166	23
Blair	1126	12
Independence	1041	11
Whitehall	1494	16
		(62)
Total	9573	100

[1] Source: Official 1990 census figures.

Land Use Characteristics

The watershed is located in a geographic area of narrow, steeply sided, wooded ridges and rolling valleys. Over 27 percent of the land surface in Trempealeau County is 20 or more percent in slope. Agricultural operations dominate the landscape and comprise the single largest land use category. A 1974 agricultural census figure reported 83 percent of land in the county as farmland. Land use changes over the last 14 years have been minimal in the relative proportions of the categories (table 2-3).

Table 2-3. Land Use Categories in the Middle Trempealeau River Watershed

Category	By County 1976	By Watershed 1990
Agricultural	67	73
Pasture & grazed woodlot	(19)	(19)
Grassland and cropland	(48)	(54)
Woodland	26	23
Urban and Developed	7	4
Wetlands	--	< 1

Water Sources

Residents of the watershed obtain water exclusively from groundwater supplies either through privately-owned wells or municipal wells. The collection, treatment, and discharge of wastewater is discussed and summarized in Chapter 3 of this plan. All four of the incorporated cities have wastewater collection and discharge to waters and land within the watershed area.

Physical Characteristics and Geography

Climate

The temperate climate in this area is characterized by extreme temperature changes between seasons. Annual precipitation is 31 inches per year with frequent heavy rains causing soil erosion. Record temperature recordings are -45° and 109° F. Sixty-five percent of all precipitation occurs from May through September during the growing season. Frozen ground conditions frequently aggravate late winter snowmelt runoff and rainfall runoff. The climate of this area is an important factor in determining the amount of pollutants which enter the watershed streams. Many of the practices to be used in this project are designed to control the runoff from the rain which we cannot control. Climate also plays an important role during spring runoff when air and water temperatures are low, but concentrations of pollutants are high. These low water temperatures are capable of a higher level of oxygen concentration, even though pollutants may be at a maximum. It is during the warmest periods that dissolved oxygen is most likely to show depletion from pollutants.

Soils

Soils of Trempealeau County have developed over sedimentary rock. Loess (windblown silt), outwash sediments, and alluvial material also characterize the development of the area's soils. Those soils formed in loess are most common in this area. The combination of climate and soil formation created a landscape of prairie grass and oak. Native trees originally covered less than 30 percent of the area. The sharply sloped ridge and valleys with exposure in various directions also plays an important role in controlling plant life, soil temperatures, and even wildlife distributions.

Water Resources

Streams

The project area is divided into 16 subwatersheds representing the middle portion of the Lower Trempealeau River Basin. The dendritic drainage pattern is characterized by a permanent flowing streams flowing into the Trempealeau River. Most frequently these tributaries are named after the valley they drain. The subwatersheds will usually have a number of intermittently flowing streams that flow into the permanent stream (figure 1). Total stream mileage is 163 miles, including the main stem of the Trempealeau River. The average length of a subwatershed stream is 3.5 miles. Although considered legally navigable, the subwatershed streams are used mostly for fishing and agriculture. Canoeing, swimming, and fishing are uses more common to the Trempealeau River. The source of water for most streams is a combination of springs and groundwater discharge. High flows reflect overland runoff as the dominant source of water.

Most of the streams in the project area are considered cold water forage streams, but recent surveys (Richardson, 1990) indicate trout waters of 22 miles of total stream length (see Appendix A for complete description of existing stream conditions). The Trempealeau River is a warm water sport fishery. Sedimentation and habitat degradation from eroding stream banks is a common problem in this watershed and can be witnessed along many of the road crossings or other areas providing a view of the stream banks. Many of the streams have substrates of shifting sand and appear to lack suitable substrate to support a diverse and healthy biota.

Lakes

The project area does not have any natural lakes, but there are some oxbows which do have surface water. Farm ponds and small dams are present, but do not provide functions normally associated with lakes.

Wetlands

There are 217 total acres of wetlands in the project area. The dendritic drainage pattern and lack of recent glaciation have created conditions that cause rapid drainage with only a relatively small amount of wetland development. Most of the wetlands are associated with the stream corridor along the Trempealeau River. Constructed drainage by tile or ditch have eliminated an unknown amount of wetland in the area.

Groundwater Resources

Water resources contributing to groundwater consist of rainfall and snowmelt in the project area. Water movement from the land surface to deeper geology passes through several different kinds of soil and rock material. The water quality characteristics of the area's groundwater is dependent on the type of land uses occurring in the area and the mineralogy of the soil and rock formations. The Trempealeau County area and the watershed are located in the groundwater area or province described by Kammerer, 1984, as province number 1. The area has some very old rock in Cambrian sandstones along with a more recent rock formation of Ordovician sandstone. These kinds of rocks are visible along the top edges of many ridges and steeply sided slopes in the project area. The valleys usually contain significant deposits of alluvial material deposited by surface water movement. Although the alluvial deposits contain quantities of groundwater, the sandstone aquifer is the most common source of well water.

Results of recent well water tests reveal the occurrence of some groundwater contamination. For example, a recent DATCP well survey conducted in 1990 analyzed 27 samples from Trempealeau County for nitrates and triazine. Results of this sampling showed that 8 samples had some level of triazine, while 4 samples had nitrate concentrations in excess of the public drinking water standard.

The most comprehensive survey of well water quality occurred recently in the project when wells were sampled as part of the priority watershed project inventory activity. Results of this sampling activity are reported in table 2-4. One of the purposes of the well tests was to determine if any pattern of nitrate contaminations could be linked to a specific land use activity. It has been reported, in ground water studies throughout the state of Wisconsin, that possible sources of contamination can be traced to livestock and agricultural fertilizers, as well as septic systems and waste disposal areas. The frequency of contamination shown in table 2-4 and the spatial distribution of nitrate exceedances does not show a clear connection between agricultural land use practices and groundwater contamination. The data does indicate some contaminations of nitrate which could be caused by any number of sources. The well water testing information does not mean that wells cannot be contaminated by agricultural practices, it only indicates that a clear and identifiable source is not apparent. There are specific management practices which can be adopted in the project area to help minimize the impact of contaminants on groundwater (see Chapter 4).

Table 2-4. Results of Well Sampling in the Middle Trempealeau River Project

Subwatershed	No. of Samples	No. of >10 mg/l	Percent >10 mg/l
Tappen Coulee	8	0	0
Reynolds Coulee	14	2	14
Lakes Coulee	22	0	0
Larkin Valley	17	3	18
Welch Coulee	13	0	0
Irvin Creek	20	1	5
Maule Coulee	7	1	14
Traverse Valley	50	3	6
Wickham Valley	16	1	6
Lewis Valley	16	1	6
Swinns Valley	29	1	3
Botana Valley	19	2	11
Meyers Valley	47	3	6
American Valley	28	0	0
North Creek	16	1	6
Plum Creek	23	3	13
	342	24	7

Endangered and Threatened Resources

The need for the protection and enhancement of fish and wildlife habitat, endangered resources, or other natural resources must be established in the watershed plan. The chapter on Integrated Resource Management in this plan discussed the need for various types of resource management related activities. The presence of threatened resources in this area underscores the need for protection and enhancement of these species. Table 2-5 lists the

various species along with their status as reported by the DNR Bureau of Endangered Resources, 1990.

Table 2-5. Threatened Species of the Middle Trempealeau River Priority Watershed

Species	Status
Torrey Sedge	Special concern
Pugnose Minnow	Special concern
Mud Darter	Special concern
American Eel	Special concern
Redfin Shiner	State - threatened
Common barn owl	--

The Bureau of Endangered Resources has reported the occurrence of these species as a result of occasional or incidental identifications. A complete survey has never been accomplished for this area, and the absence of other threatened or endangered species does not necessarily confirm their non-occurrence.

CHAPTER THREE
Water Quality Conditions, Objectives, and Nonpoint Sources

Introduction

This chapter will include an explanation of the water resource problems documented in the project area by subwatershed. The impact of nonpoint source pollutants on the major streams is also presented by watershed. The water resource appraisal conducted in 1990 described the existing water resource conditions, the potential for improvement, the existing nonpoint problems, and the water resource objectives. Pollutant load reductions for each category of nonpoint source pollution were established and are more fully described in Chapter 4. The actual nonpoint source types are described in this chapter, and the amount of each source is presented in table 3-5.

Water Quality Basics - Nonpoint source pollutants are the primary cause of water quality problems in the Middle Trempealeau River Watershed. Pollutants such as sediment, bacteria, organic material, and animal wastes contribute to the existing water quality problems associated with all of the project area streams. By controlling the sources of these pollutants, the expected improvements should allow these water resources to reach their potential. In addition to the pollutants which flow into waterways and streams, added problems are occurring due to degradation of valuable stream banks. Erosion and instability of stream banks is a common problem in the project area and results in increased sedimentation and removal of important habitat for aquatic life, especially trout. Sedimentation of pools and filling in of spawning substrate in riffle areas are results of stream bank erosion. The filling in of riffle areas reduces reproductive success of trout by reducing oxygen levels in stream bottoms. Sedimentation of stream bottoms also reduces the abundance of invertebrates that constitute a valuable fish food resource.

Stream bank erosion can also have an impact on water temperatures by causing channel widening and increased warming of the water. As stream banks erode and quickly widen the channel, they create a larger water surface exposure to the sun. A wider stream channel also decreases the stream velocity and adds to the warming effect. Slower moving water also means that sediment is much more likely to settle and accumulate at these wide points.

The types of nonpoint source pollutants that have been documented in the Middle Trempealeau River Watershed include the following:

Sediment

Sources of sediment have been identified as upland erosion and delivery of sediment to streams, stream bank erosion, and gully erosion. The amounts of sediment have been measured and are presented in detail later in this chapter.

Organic loading

The sources identified for this pollutant include barnyard runoff and manure spreading. The amounts of this pollutant have been measured and are also presented in detail later in this chapter.

Water temperature

Although this is not considered a nonpoint source, it is nevertheless a significant problem for trout survival in several streams, and is often elevated due to the effects of some of the nonpoint sources.

Bacteria

This pollutant is associated with organic loading and has been measured at several sites in the watershed. There are possibly multiple sources of this pollutant, but it is assumed that animal waste runoff from barnyards and manure-spread crop fields are most responsible for the high levels of bacteria measured in the Trempealeau River at Whitehall and at Joe Pietrek County Park between Independence and Arcadia.

Nitrates

This pollutant was found in well water tests taken during the inventory phase of this project. The frequency of its occurrence in high concentrations does not appear to indicate a serious problem with groundwater contamination from this source. Sources of nitrates can be associated with land applications of nitrogen-containing fertilizer and manure along with septic systems. Well construction or failure can also allow infiltration of contaminated surface water directly into the well shaft.

Water Quality Impacts of Nonpoint Sources

Uncontrolled nonpoint pollutants in this project are causing serious water resource problems. The consequences of sedimentation and stream bank erosion have been discussed in the Water

Quality Basics section. Organic loading can cause stream oxygen levels to be depleted, and this condition results in stress on fish and other aquatic life. Agricultural practices can also cause water resource problems by allowing wetland or spring areas to become disturbed from uncontrolled cattle grazing. This activity can cause spring flow to be altered, with possible effects on water temperature and supply. Agricultural land uses are often associated with increased runoff volume of water. For example, corn fields will contribute a significantly larger volume of runoff water to local streams than undisturbed lands will contribute. The cumulative effect of numerous crop fields in the watershed is frequent high flow events and increased stream bank instability on area streams. Although high flows and flooding events are not considered nonpoint sources in themselves, they contribute to the problems with the water resources in this project. High flows can be controlled and reduced to some extent by installing best management practices that provide secondary benefits for increasing infiltration and reducing peak runoff volumes.

Controlling and reducing the degrading water quality impacts of nonpoint sources by installing best management practices in the watershed would have a number of positive effects on the watershed fisheries. Stabilizing stream banks would increase available cover for adult trout and reduce sedimentation of riffles and pools. The effect of increased cover and overall habitat improvement would be an increase in carryover and survival of adult fish. Reduced sedimentation of riffle areas would increase trout reproduction, provided other factors such as oxygen and temperature conditions are suitable. Reduced sedimentation and bank erosion would also result in narrower and deeper streams, providing cooler temperatures and improved cover for adult fish. Reducing the intensity of stream bank grazing would increase bank stability and increase stream cover and shading by allowing growth of shrubs and grasses along the stream corridor. Reducing organic and associated bacterial loading would improve overall dissolved oxygen conditions and reduce fecal coliform bacteria levels for recreational users of the Trempealeau River.

Nonpoint Source Inventory Results

Sediment (upland erosion)

This inventory was conducted for all agricultural fields in the watershed. Erosion from crop fields and agricultural lands represents a significant source of sediment in streams. Not all sediment eroded from a field reaches a stream, and a certain proportion will be retained on land, while some will actually enter a water course. The amount of sediment entering a stream was measured for each subwatershed and is presented in table 3-1. Soil eroded from agricultural fields reaches streams by flowing from the field into a channel, ditch, or waterway that eventually leads to a stream. The steep topography of the area adds to the problem of rapid and excessive runoff.

Table 3-1. Upland Sediment Loading for Each Subwatershed in the Middle Trempealeau River Project by Source (in tons/year).

Subwatershed	Cropland	Developed	Grassland	Pasture	Woodlot Grazed	Ungrazed Woodlot	Wetlands	Totals
American Valley	4,686	265	2	73	76	39	1	5,142
Botana Valley	1,413	38	1	74	166	30	0	1,722
Irvin Creek	1,024	133	6	47	9	13	0	1,232
Larkin Valley	1,541	70	0	9	26	11	1	1,658
Lakes Coulee	2,837	90	4	49	35	12	3	3,030
Lewis Valley	4,493	135	2	19	152	8	0	4,809
Maule Coulee	2,200	132	1	47	15	4	0	2,399
Meyers Valley	1,924	79	1	20	15	23	0	2,062
North Creek	1,699	51	4	85	26	10	1	1,876
Plum Coulee	3,206	220	3	87	45	22	7	3,590
Reynolds Coulee	1,505	91	4	26	12	5	2	1,645
Swinns Valley	3,442	94	0	115	168	30	0	3,899
Tappen Coulee	1,045	58	0	23	9	2	0	1,137
Traverse Valley	5,461	109	1	112	248	52	0	5,983
Welch Coulee	831	80	6	33	4	0	3	957
Wickham Coulee	3,480	61	2	5	22	6	0	3,576
Totals	40,787	1,706	37	824	1,028	267	18	44,667

The upland inventory found a total of 44,667 tons of sediment which represents 56 percent of the total sediment load. This amount of sediment enters surface waters from crop lands, developed areas, pastures, woodlots, and grasslands. The inventory revealed that there is a relatively large amount of cropland erosion on lands that are considered to be highly erodible and have erosion rates above "T" (generally more than 4 tons/acre/year). In fact, by reducing all cropland erosion to at or below the T value, a total of 21,916 tons of sediment will be saved from entering streams in the watershed. This amount represents 49 percent of the total sediment loading from upland sediment sources.

Sediment (stream bank erosion)

The amount of sediment generated by eroding stream banks is also a very significant part of the overall sediment load to streams. A total of 18,695 tons of sediment comes from eroding stream banks which represents 24 percent of the total sediment load. There is a total of 41.4 miles of eroded stream bank in this project area, which is 22 percent of the total mileage of inventory. The significance of the problem of stream bank erosion is increased when the

added problem of habitat loss is considered. Table 3-2 summarizes the amount of stream bank erosion.

Table 3-2. Stream Bank Sediment Loading for Each Subwatershed in the Middle Trempealeau River Project (in tons/year)

Subwatersheds	Sediment Load (Tons/Year)	Sediment Loading Rate (Tons/Stream Mile)[1]
American Valley	2,204	124
Botana Valley	188	44
Irvin Creek	277	18
Larkin Valley	516	46
Lakes Coulee	1,491	92
Lewis Valley	72	6
Maule Coulee	1,203	81
Meyers Valley	208	90
North Creek	16	2
Plum Coulee	6,039	228
Reynolds Coulee	1,802	149
Swinns Valley	376	50
Tappen Coulee	433	89
Traverse Valley	3,055	122
Welch Coulee	614	82
Wickham Coulee	355	59
Totals	18,921	X 40 = 7,568

[1] Sediment loading rate indicates the tonnage of sediment loss for each stream mile and reveals the "intensity" of this problem.

Sediment (gully erosion)

The amount of sediment generated from gullies was not inventoried in this project; however, based on estimates by the county LCD offices, gully erosion constitutes 20 percent of the total sediment load or about 16,000 tons.

Organic pollutants (animal lot runoff)

Runoff from barnyards and feedlots was measured for each one of these sites in the project. The measurement made an estimate of the amount of phosphorous loading to project streams caused by a 10-year, 24-hour rainfall event. The analysis included a total of 666 individual barnyards located on 410 farms. A total of 8,150 pounds of phosphorus enters project area streams each time a 10-year, 24-hour storm occurs (equivalent to approximately 4.2 inches of rain in one day). Table 3-3 summarizes the organic loading inventory for the project area.

Table 3-3. Organic Pollutant Loading for Each Subwatershed in the Middle Trempealeau River Report (in lbs/year)

Subwatershed	Phosphorus Load (lbs)	Percent of Total
American Valley	905	11
Botana Valley	225	3
Irvin Creek	486	6
Larkin Valley	110	2
Lakes Coulee	229	3
Lewis Valley	284	3
Maule Coulee	449	6
Meyers Valley	423	5
North Creek	290	4
Plum Coulee	689	8
Reynolds Coulee	407	5
Swinns Valley	1420	17
Tappen Coulee	90	1
Traverse Valley	1491	18
Welch Coulee	84	1
Wickham Coulee	569	7
Total	8151	100

Organic pollutants (manure spreading)

Runoff from croplands that have received animal waste applications was inventoried by estimating the amount of acreage that received manure. Field studies have shown that of all the acres receiving manure, 4,628 of those acres are considered critical because they are prone to excessive runoff and consequent loss of manure to nearby streams. Some studies in the state of Wisconsin have estimated that for each acre of manure spreading on critical sites, one pound of phosphorous can be lost. There were 217 individual landowners who contributed to manure spreading on critical acres. Table 3-4 summarizes some of the data produced by the manure spreading inventory and analysis. Table 3-5 presents the amounts of inventoried pollutants in the project.

Table 3-4. Manure Spreading on Critical Acres in the Middle Trempealeau River Project

Range of Critical Acre Spreading	# of Landowners Within the Range	# of Acres Within the Range
0-10	95	254
10-30	100	2003
30-97	49	2371
	244	4628

Table 3-5. Amount of Inventoried Pollutant Sources in the Middle Trempealeau River Project

		Reduction Goal
Upland sediment	44,667 tons	T<T
Stream bank sediment	18,695 tons	7478 (4090)
Gullies sediment[1]	16,000 tons	6400 (4090)
Barnyard runoff	8,150 lbs	4482.5 (5590)
Critical acres spread	4,628 acres	2371 (5090)

[1] Estimate based on probable number and type of gully encountered on representative farm.

Water Quality Objectives

An important part of a watershed protection plan is deciding what accomplishments can be reasonably expected from implementing a program of best management practice application. The project team was consulted on several occasions to assist the DNR in developing a set of water resource objectives that considered the existing conditions of the streams and what potential existed for improvement. The subwatershed discussions contained in this chapter include a listing of the specific water resource objectives for each subwatershed. Setting water resource objectives is particularly important for the following reasons:

* Water resource objectives represent the desired future condition of the water resource.

* Objective setting provides a goal that can be used to measure the success of a nonpoint source pollution abatement project.

* Water resource objectives set the framework for developing a management strategy.

The development and listing of all water resource objectives, water quality conditions, and methods of water quality investigations are discussed in a separate report, "Middle Trempealeau River Priority Watershed Water Resource Appraisal," prepared by Ken Schreiber, DNR.

Subwatershed Discussion, Trempealeau River

The Trempealeau River is a large, low gradient stream originating in Jackson County and flowing southwest to the Mississippi River in Trempealeau County. The Middle Trempealeau River Priority Watershed includes all lands draining to the Trempealeau River between Blair and approximately three miles southwest of Arcadia, except for the Pigeon Creek and Elk Creek watersheds. The entire stream is about 80 miles in length, but the portion in the priority watershed is 35 miles (in Trempealeau County).

There are 16 subwatersheds that drain surface waters to the Trempealeau River in the project area. Table 3-6 lists the names and respective counties for each subwatershed.

Table 3-6. Subwatersheds of the Middle Trempealeau River Watershed.

Symbol	Subwatershed Name	County Location
TC	Tappen Coulee	Trempealeau
RC	Reynolds Coulee	Trempealeau
LC	Lakes Coulee	Trempealeau
LA	Larkin Valley	Trempealeau
WC	Welch Coulee	Trempealeau
IR	Irvin Creek	Trempealeau
MA	Maule Coulee	Trempealeau
TV	Traverse Valley	Buffalo, Trempealeau
WI	Wickham Valley	Trempealeau
LE	Lewis Valley	Buffalo, Trempealeau
SW	Swinns Valley	Buffalo, Trempealeau
BO	Botana Valley	Buffalo
ME	Meyers Valley	Trempealeau
AM	American Valley	Trempealeau
NO	North Creek	Trempealeau
PL	Plum Creek	Trempealeau

Water Resource Conditions

The Trempealeau River has a warmwater sport fishery consisting of northern pike and catfish, with some smallmouth bass, largemouth bass, white bass and rock bass present. The stream is primarily used for fishing, canoeing, and swimming at Pietrek County Park.

The Trempealeau primarily has a shifting sand substrate with some rubble near bridge abutments and other areas where rock riprap has been installed. Fallen trees and deep holes are the primary sources of fish cover in the stream. The river experiences frequent flooding which causes extensive streambank erosion in some areas, and considerable sedimentation of the riffles and pools. The Trempealeau River streamflow Q7,2* is 93 cfs and the Q7,10** is 63 cfs at Whitehall.

Water resource problems in the Trempealeau River include flooding, streambank and channel erosion, sedimentation of the stream bottom, scarcity of suitable fish habitat, and organic and bacterial loading from livestock waste. Sedimentation is resulting in an elevated stream channel and increasing groundwater levels in Arcadia, which is causing flooding of basements in some areas. Bacteriological sampling conducted in 1990 found fecal coliform levels consistently above the 400 colonies/ml water quality standard for body contact recreational use (table 3-7).

Water Resource Objectives

The following general water resource management objectives are recommended for the Trempealeau River and all subwatersheds in the Middle Trempealeau River Priority Watershed:

1. Improve warmwater sport fishery habitat and sedimentation in the Trempealeau River by reducing sediment and organic loading from the river corridor and subwatershed.

2. Reduce fecal coliform bacteria levels in the Trempealeau River sufficient to provide a more favorable environment for recreational users, by reducing bacterial loading from sources along the river corridor and subwatershed streams.

Table 3-7. Trempealeau River - 1990 Bacteriological Sampling Results

Sample Site	Date	F. Coli. Colonies/100ml	F. Strep. Colonies/100ml
Whitehall	7/19/90	1100	310
	7/23/90	<10	<10
	8/03/90	4300	970
	8/22/90	1100	440
	9/05/90	1200	620
	9/19/90	250	800
	10/05/90	17000	3700
	10/18/90	2200	1100
		Mean = 3566	Mean = 978
Pietrek County Park	6/18/90	3200	1600
	7/10/90	2000	350
	7/24/90	1500	700
	8/21/90	4600	3000
	9/05/90	2000	530

Sample Site	Date	F. Coli. Colonies/100ml	F. Strep. Colonies/100ml
	9/18/90	2400	320
	10/10/90	750	570
		Mean = 2350	Mean = 1010

* Q7,2 is the annual minimum 7-day mean flow below which the flow will fall on the average of once in 2 years.

** Q7,10 is the annual minimum 7-day flow below which the flow will fall on the average of once in 10 years.

Tappen Coulee Subwatershed

Tappen Coulee subwatershed (map 2) is the smallest subwatershed in the Middle Trempealeau Watershed with only 3,000 acres. It is located south of Blair with part of the city of Blair included in it. The east side of the subwatershed borders the Upper Trempealeau River Watershed, with the south end bordering the Beaver Creek Watershed. Tappen Coulee Creek drains to the Trempealeau River just below the Lake Henry dam in Blair.

Water Resource Conditions

Tappen Coulee Creek - is a 3.6-mile tributary of the Trempealeau River. Following a 1986 survey, the stream was de-classified from a Class III trout stream to a forage fishery. The 1990 fish survey found seven forage species with creek chub the most common. The stream is occasionally stocked with trout by a local sportsman's club to provide a put-and-take fishery.

Sand is the predominant substrate type in Tappen Coulee Creek, with lesser amounts of gravel and clay. The stream had an HBI of 4.48, indicating slight organic pollution, and a "fair" Habitat Rating.

Water resource problems include scarcity of instream cover, sedimentation of riffles and pools and elevated stream temperatures. The stream is shallow and wide and gravel in riffle areas is highly embedded. The maximum water temperature recorded during summer 1990 was 83° F, which is above the lethal temperature for trout survival. Currently, the stream has little potential to support trout due to inadequate springflow and excessive water temperatures. However, implementation of BMPs in the watershed is expected to restore the stream to its former Class III status. Land use in the stream corridor is mostly open pasture and woodland.

Water Resource Objectives

The following water resource objectives are recommended for the Tappen Coulee subwatershed:

1. Improve habitat conditions in Tappen Coulee Creek sufficient to upgrade the stream to a Class III trout fishery.

2. Improve fish habitat conditions by reducing sediment and organic loading to the subwatershed streams.

Reynolds Coulee Subwatershed

Reynolds Coulee subwatershed (map 2) is located south of Blair with part of the west side of Blair included in it. Tappen Coulee subwatershed is to the east of Reynolds Coulee, with Lakes Coulee to the west and the Beaver Creek Watershed to the south. Reynolds Coulee Creek runs directly into the Trempealeau River. This subwatershed has 5,500 acres.

Water Resource Conditions

Reynolds Coulee Creek - is a moderate gradient 3.6 mile tributary of the Trempealeau River south of Blair. The stream is managed as a Class II trout fishery. The 1990 survey found 14 brown trout (ranging from 3.5-11.9 inches) and nine minnow and forage species. Three age classes of trout were found in the furthest upstream station and some were young-of-year fish. The stream HBI was 4.07, indicating slight organic loading, and the Habitat Rating was "fair".

Water resource problems include streambank erosion, scarcity of instream cover, elevated water temperatures and sedimentation of riffles and pools. The stream has a shifting sand substrate with some gravel riffle areas. Gravel in the riffle areas is highly embedded with sand. Land use in the stream corridor is mostly open meadow and woodland. The stream has considerable potential for fishery improvement through a decrease in the sediment load and provision of more instream cover.