ANALYSIS OF

THE JORGENSON RIVER

TOWN OF PEEVER
ROBERTS COUNTY, SOUTH DAKOTA

JANUARY 2007

SOUTH DAKOTA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL SERVICES
PIERRE, SD

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Executive Summary

Name of Waterbody: Jorgenson River

Location: Roberts County, South Dakota

Boundary of Waterbody under Assessment:
The Jorgenson River, from the 6, 8 beneficial use classification in Section 21, Township 124 North, Range 50 West to Section 5, Township 124 North, Range 50 West, Roberts County.

Condition/Description of Creek Segment: Department of Environment and Natural Resources (DENR) personnel assessed the Jorgenson River on two separate occasions, May 4 and 5, 2005, and September 28 and 29, 2005.

On both sampling occasions, the Jorgenson River at Site #1 and Site #2 was flowing. Site #3 on the Jorgenson River is the end of the 6, 8 classification and was photographed to illustrate those beneficial uses. Big Coulee Creek, Site #4, was photographed to display its influence as a tributary to the Jorgenson River.

Recommendation:
It is recommended that the assigned beneficial use classification of the Jorgenson River, from the end of the 6, 8 assigned beneficial use classification in Section 21, Township 124 North, Range 50 West, Roberts County, to the unnamed wetland in Section 5, Township 124 North, Range 50 West, Roberts County be upgraded to include the beneficial use classifications of (6) Warmwater marginal fish life propagation water; and (8) Limited contact recreation waters. The unnamed wetland will remain classified as (9) Fish and wildlife propagation, recreation, and stock watering waters.

Introduction

Peever is a small community located in northeastern South Dakota. Based on the 2000 Census, its population is 209. Peever's wastewater treatment facility (WWTF) is located in the southwest ¼ of Section 5, Township 124 North, Range 50 West, Roberts County, South Dakota. The facility receives wastewater from residential users and flows to a two cell pond system followed by an artificial wetland. There are no known industrial users to the system. The primary cell is 1.75 acres, the secondary cell is 1.75 acres, and the artificial wetland is 1.45 acres. Wastewater from the facility is discharged at the southeast corner of the artificial wetland basin and travels via pipeline to the southeast corner of the facility property where it is discharged to a tributary of an unnamed wetland of the Jorgenson River.

General Waterbody/Drainage Area Description

Surface Water

The Jorgenson River originates approximately four miles north of Peever from a wetland area named Peever Slough. The wetland measures approximately six square miles in area and overflows into a smaller unnamed wetland one half mile northeast of Peever. The unnamed wetland overflows into the Jorgenson River about a mile east of Peever. The river flows in a southerly direction for approximately three miles, flows east for approximately one mile, then turns north and flows approximately seven miles to the confluence with the Little Minnesota River.

The drainage basin of this segment of the Jorgenson River includes approximately 75 square miles and is part of the Minnesota River drainage basin.

Current Assigned Beneficial Uses

The Jorgenson River is assigned the beneficial use classification of (9) Fish and wildlife propagation, recreation, and stock watering waters; and (10) Irrigation waters, from its origin in Roberts County to the 6, 8 classification in Section 21, Township 124 North, Range 50 West, Roberts County. The Jorgenson River is then classified with the beneficial uses of (6) Warmwater marginal fish life propagation waters; (8) Limited-contact recreation waters; (9) Fish and wildlife propagation, recreation, and stock watering waters; and (10) Irrigation waters to the confluence with the Little Minnesota River.

National Wetlands Inventory

The Jorgenson River contains several areas that are classified as wetlands by the National Wetlands Inventory, two large wetland areas and several smaller wetland areas. The first large wetland location is near Site #1 at the southern end of the wetland that is the origin of the Jorgenson River. The second large wetland area is located at the confluence of the Jorgenson River and Big Coulee Creek. The wetland areas along the Jorgenson River are classified by the National Wetlands Inventory as palustrine wetlands that are mostly of the emergent class but having areas of the scrub shrub class. These areas are identified as being temporarily flooded and seasonally flooded.

Palustrine systems are dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. These wetlands are less than 20 acres in size; lack wave-formed or bedrock shoreline features, and are less than 2 meters in depth. The emergent wetland class is characterized by erect, herbaceous hydrophytes (trees, shrubs, persistent emergents), excluding mosses and lichens. The scrub shrub wetland class includes areas dominated by woody vegetation less than 6 meters tall. The temporary flooded water regime can have surface water present for brief periods during the growing season, but the water table usually lies well below the soil surface. In a seasonally flooded water regime, the surface water is present for extended periods of time, especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface.

Geology and Ground Water

The Veblen aquifer is located beneath portions of Roberts County and areas of the Jorgenson River and the Little Minnesota River. The aquifer is near the surface of the land along its western boundary; however, available data suggest ground water does not surface along the Jorgenson River. It does not appear the Jorgenson River has a ground water connection to the Veblen aquifer.

The Revillo aquifer underlies portions of the Jorgenson River and Big Coulee Creek in Roberts County. The depth from land to the top of the Revillo aquifer in and around the area of the Jorgenson River does not suggest hydrologic contribution from the Revillo aquifer to the Jorgenson River.

The soil and rock formation associated with the Jorgenson River segment in Roberts County is the Ludden-Lamour-Ladelle Association. The Ludden-Lamour-Ladelle Association is composed of moderately well drained and poorly drained, nearly level, silty soil formed in alluvium.

DENR Assessment Results

On May 4 and 5, 2005, and September 28 and 29, 2005, DENR personnel visited the town of Peever to assess the Jorgenson River.

Jorgenson River

Site #1 is located one half mile east of Peever on 127th Street, Section 5, Township 124 North, Range 50 West, near the confluence of the Jorgenson River and the unnamed wetland to which the town of Peever discharges wastewater. Attachment 2 is a photograph taken May 4, 2005 of the creek channel at Site #1.

Field water quality measurements were taken and water samples were collected for laboratory analysis. Results indicate water quality meets standards for the current beneficial uses and the proposed beneficial uses. Attachment 14 is a summary of water quality data.

Water was flowing at Site #1 during both visits; however flow was not measured in May 2005. On September 29, 2005, flow measured 0.25 cubic feet per second (cfs). The channel depth measured approximately 6 inches and the width measured 20 feet. Attachment 15 is a summary of flow data.

In May 2005, fish collection was attempted using an Engineering Technical Services (ET) Model APB-3 electrofisher; however, no fish were collected.

Fish were collected on September 29, 2005, using an Engineering Technical Services (ET) Model APB-3 electrofisher. Species collected include carp and stickleback minnow. Field personnel noted the escape of fish under the duckweed. Attachment 3 is a photograph of a young carp collected at Site #1. Attachment 12 is a summary of fish

collection data.

Site #2 is located on the Jorgenson River two miles south and one half mile east of Peever on 129th Street, Section 17, Township 124 North, Range 50 West. Attachments 4 and 5 are photographs of Site #2.

Field water quality measurements were taken and water samples were collected for laboratory analysis. Results indicate water quality meets standards assigned for the current beneficial uses and the proposed beneficial uses. Attachment 14 is a summary of water quality data.

On September 29, 2005, water flow measured 0.23 cfs; the channel measured 15 feet in width and a maximum of 1.6 feet in depth. Attachment 16 is a summary of flow data at Site #2.

Fish were collected at Site #2 on May 4, 2005, and September 29, 2005, using an Engineering Technical Services (ET) Model APB-3 electrofisher. Species collected include: creek chub, common shiner, mad tom, longnose dace, brook stickleback, sucker, northern pike, and black bullhead. Multiple age classes of creek chub and common shiner were observed. Attachments 6 and 7 are photographs of fish collected at Site #2. Attachment 13 is a summary of fish collection data.

Site #3 is located on the Jorgenson River about two miles south and two miles east of Peever on 129th Street, Section 21, Township 124 North, Range 50 West. Attachments 8 and 9 are photographs of Site #3. The Jorgenson River is classified as (6) Warmwater marginal fish life propagation waters; (8) Limited contact recreation waters; (9) fish and wildlife propagation, recreation, and stock watering waters; and (10) Irrigation waters from the confluence with the Little Minnesota River to Site #3. Field water quality measurements and water samples were not collected at Site #3. The site was photographed to show the 6, 8 beneficial use classification of the Jorgenson River.

Site #4 is located on Big Coulee Creek about one half mile south of the confluence with the Jorgenson River on 130th Street, Section 21, Township 124 North, Range 50 West. Field water quality measurements and water samples were not collected at Site #4. Big Coulee Creek is a tributary of the Jorgenson River. The site was photographed to show the water contribution from Big Coulee Creek to the Jorgenson River. Attachments 10 and 11 are photographs of Site #4.

Recreation Waters

The Jorgenson River meanders through private property with the only public access at road crossings, creating very limited access for recreation. The average water depth in the channel is less than one foot, with some areas estimated at a maximum of two feet in depth. Further, there is a visibly poor water quality condition at times (See Attachment 5)and minimal physical habitat that is conducive to immersion recreation. There are no signs of recreational use for the length

of the river segment under review. Available evidence indicates immersion recreation is not occurring or likely to occur in the Jorgenson River. Other types of recreation, such as boating, are not possible due to the narrow width and shallow depth of the channel. For these reasons, DENR is not recommending the Jorgenson River classification include (7) Immersion recreation waters.

Due to the presence of fish, (8) Limited contact recreation is possible. The recommendation by DENR is to include (8) Limited contact recreation waters in the beneficial use classification for this segment of the Jorgenson River.

Conclusion and Recommendation

An assessment of the Jorgenson River was conducted on May 4 and 5, 2005, and September 28 and 29, 2005. The segment of the Jorgenson River under review, from the unnamed wetland in Section 5, Township 124 North, Range 50 West, to the 6, 8 classification in Section 21, Township 124 North, Range 50 West, Roberts County, had water flow on both visits. Water quality meets standards for its current beneficial uses and for the recommended beneficial uses. Fish were collected on both visits; species include: carp, stickleback, brook stickleback, creek chub, shiner, mad tom, longnose dace, sucker, northern pike, and black bullhead. Multiple age classes of fish were present for creek chub and common shiner. Based on the results of field and laboratory data, flow data, and field reconnaissance, it is recommended this segment of the Jorgenson River be reclassified to include (6) Warmwater marginal fish life propagation waters; and (8) Limited contact recreation waters. The unnamed wetland will remain classified as (9) Fish and wildlife propagation, recreation, and stock watering waters. The intermittent and low flow conditions of the Jorgenson River, coupled with average shallow depth, preclude the attainment of an the (7) Immersion recreation beneficial use and is not recommended by DENR.

References

United States Environmental Protection Agency. 1983. Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020. Cincinnati, Ohio.

South Dakota Department of Environment and Natural Resources. 1999. Recommended Procedures for Reviewing Beneficial Use Designations, With Special Emphasis on Fishery and Recreational Uses.

South Dakota Department of Environment and Natural Resources. Chapters 74:51:01 and 74:51:03, Surface Water Quality Standards.

South Dakota Department of Environment and Natural Resources. Town of Peever, Statement of Basis.

South Dakota Department of Transportation, 1980. General Highway Map, Roberts County, South Dakota.

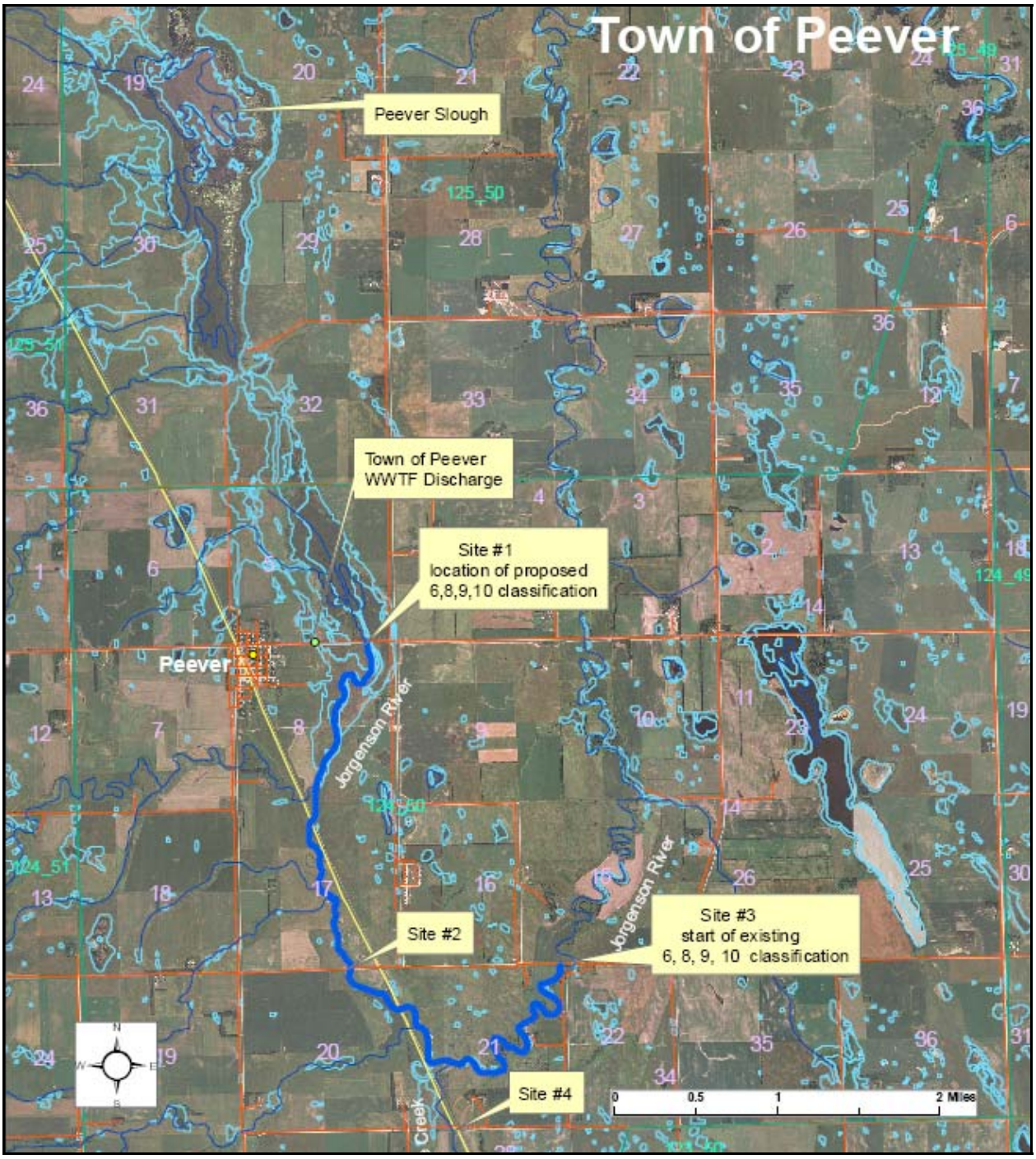
DeLorme, 1997. South Dakota Atlas and Gazetteer.

United States Department of the Interior, Fish and Wildlife Service. National Wetlands Inventory GIS Data Layer, South Dakota.

United States Department of Agriculture, Soil Conservation Service, in cooperation with United States Department of the Interior, Bureau of Indian Affairs, and South Dakota Agricultural Experiment Station. May 1977. Soil Survey of Roberts County, South Dakota.

United States Department of the Interior, United States Geological Survey, prepared in cooperation with the South Dakota Department of Natural Resources, Geological Survey Program; Sisseton-Wahpeton Sioux Tribe, and Roberts County. 2000. Water Resources of the Lake Traverse Reservation, South and North Dakota, and Roberts County, South Dakota.

ATTACHMENT 1



Site Map of Jorgenson River.
The proposed beneficial use reclassification segment of the Jorgenson River is illustrated in bold blue.

ATTACHMENT 2

Site #1 This photograph was taken May 4, 2005, on the Jorgenson River facing downstream.

ATTACHMENT 3

Site #1 This photograph was taken September 29, 2005, of a young common carp collected on the Jorgenson River.

ATTACHMENT 4

Site #2 This photograph was taken May 4, 2005, facing upstream on the Jorgenson River.

ATTACHMENT 5

Site #2 This photograph was taken September 29, 2005, facing downstream on the Jorgenson River.

ATTACHMENT 6

Site #2 This photograph was taken May 4, 2005. The five gallon bucket contains various species of fish and freshwater clams collected on the Jorgenson River.

ATTACHMENT 7

Site #2 This photograph was taken September 29, 2005, of a sucker collected on the Jorgenson River.

ATTACHMENT 8

Site #3 This photograph was taken September 29, 2005, facing upstream. This segment of the Jorgenson River is classified as 6, 8, 9, and 10 beneficial uses.

ATTACHMENT 9

Site #3 This photograph was taken September 29, 2005, facing downstream. This segment of the Jorgenson River is classified as 6, 8, 9, and 10 beneficial uses.

ATTACHMENT 10

Site #4 This photograph was taken September 29, 2005, facing downstream on Big Coulee Creek.

ATTACHMENT 11

Site #4 This photograph was taken September 29, 2005, facing upstream on Big Coulee Creek.

ATTACHMENT 12

Site #1 FISH COLLECTION SUMMARY Length in Millimeters September 29, 2005					
Electroshock 200 feet	**Carp**		**Stickleback**		
	60	60	50	55	
	48	55	50	50	
	45	55	45	45	
	65	40	50	55	
	60	50	55	55	
	50	50	53	45	
		40	50	50	
			52	55	
Number of fish:	13		16		
Maximum Length:	65		55		
Minimum Length:	40		45		
Average Length:	52		51		
Comments:	**Many fish escaped under the duckweed.**				

ATTACHMENT 13

Site #2 FISH COLLECTION SUMMARY Length in Millimeters May 4, 2005								
Electroshock 100 yards	***Creek Chub**	***Common Shiner**				**Mad Tom**	**Blacknose Dace**	**Brook Stickleback**
	94	34	72	64	38	93	71	42
	108	44	34	33	48			
	92	53	42	39	71			
	73	58	88	41	54			
		32	128	42	33			
		52	62	44	53			
		62	44	38	38			
		43	40	49	44			
		44	60	38	36			
			52	58	44			
Number of fish:	4	39				1	1	1
Maximum Length:	108	128				93	71	42
Minimum Length:	73	32				93	71	42
Average Length:	92	50				93	71	42
Comments:	***Multiple age classes present.**							

Site #2 FISH COLLECTION SUMMARY Length in Millimeters September 29, 2005			
Electroshock 300 feet	**Sucker**	**Northern Pike**	**Black Bullhead**
	190	230	60
	175	185	50
	165	178	
	190	210	
	190		
	195		
Number of fish:	6	4	2
Maximum Length:	195	230	60
Minimum Length:	165	178	50
Average Length:	185	201	55
Comments:			

ATTACHMENT 14

FIELD ANALYSIS PARAMETERS, INSTRUMENTS, AND RESULTS					
PARAMETER	INSTRUMENT / REFERENCE METHOD	RESULTS			
		Site #1 5/5/05	Site #1 11/29/05	Site #2 5/5/05	Site #2 11/29/05
Temperature					
Air (^{0}C)	Thermometer / EPA (170.1)	18	18	20	20
Water (^{0}C)	Jenko 6007 portable pH meter / EPA (170.1)	13.3	12.1	15.7	16.2
Dissolved oxygen (mg/L)	Azide Modification of Winkler / EPA (360.2)	9.0	9.0	15.1	17.2
pH (su)	Jenko 6007 portable pH meter / EPA (150.1)	7.50	7.63	8.21	8.12

LABORATORY ANALYSIS PARAMETERS, METHODS, AND RESULTS					
PARAMETER	METHOD / REFERENCE	RESULTS			
		Site #1 5/5/05	Site #1 11/29/05	Site #2 5/5/05	Site #2 11/29/05
Fecal Coliform Bacteria (#/100 ml)	SM 9222 B EC	40	40	10	50
Ammonia (mg/L)	SM 4500 NH3 H	<0.02	< 0.02	<0.02	< 0.02
Nitrate (mg/L)	SM 4500 NO3 F	<0.1	< 0.1	<0.1	< 0.1
Biochemical Oxygen Demand (mg/L)	5 day incubation, 20°C / EPA Method (405.1)	<2	< 2	<2	< 2
Total Suspended Solids (mg/L)	SM 2540 D	<1	3	4	2
Total Dissolved Solids (mg/L)	SM 2540 C	-	1620	-	1267

< = *Not detected, followed by a number documenting the detection limit;*
- = *Not measured;*
ml = *Milliliter;*
mg/L = *Milligrams per liter;*
su = *Standard Unit;*
EPA = *Environmental Protection Agency; and*
SM = *Standard Method.*

ATTACHMENT 15

Velocity Measurements and Flow Calculations Site #1 September 29, 2005			
Location (feet from shore)	**Depth (in feet)**	**Velocity (feet per second)**	**Calculated Flow (cubic feet per second)**
1	0.10	0.00	0.000
2	0.45	0.00	0.000
3	0.60	0.00	0.000
4	0.60	0.00	0.000
5	0.60	0.00	0.000
6	0.60	0.06	0.036
7	0.60	0.10	0.060
8	0.60	0.06	0.036
9	0.60	0.07	0.042
10	0.60	0.01	0.060
11	0.60	0.00	0.000
12	0.60	0.00	0.000
13	0.60	0.00	0.000
14	0.60	0.00	0.000
15	0.60	0.00	0.000
16	0.60	0.00	0.000
17	0.60	0.03	0.018
18	0.60	0.00	0.000
19	0.60	0.00	0.000
Total Width: 20 feet	Calculated flow rate at Site # 1:		**0.25**

ATTACHMENT 16

Velocity Measurements and Flow Calculations Site #2 September 29, 2005			
Location (feet from shore)	**Depth (in feet)**	**Velocity (feet per second)**	**Calculated Flow (cubic feet per second)**
0.5	0.60	0.00	0.000
1.5	0.85	0.00	0.000
2.5	0.70	0.01	0.007
3.5	0.90	0.00	0.000
4.5	0.90	0.00	0.000
5.5	1.00	0.00	0.000
6.5	0.90	0.02	0.018
7.5	1.00	0.03	0.030
8.5	1.20	0.07	0.084
9.5	1.30	0.03	0.039
10.5	1.10	0.05	0.055
11.5	1.40	0.00	0.000
12.5	1.10	0.00	0.000
13.5	0.90	0.00	0.000
14.5	0.60	0.00	0.000
Total Width: 15 feet	Calculated flow rate at Site # 2:		**0.23**