

Minnesota  
F-29-R(P)  
Area 315  
Study 3  
April 2011

**Minnesota Department of Natural Resources  
Division of Fish and Wildlife  
Section of Fisheries**

**Stream Survey Report**

**Willow Creek Population Assessment  
2010**

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**Montrose Area Fisheries Office**



Your purchase of fishing equipment  
and motor boat fuel supports boating  
access and Sport Fish Restoration.



## **General Information**

Stream Name:	Willow Creek
Alternate Name:	None
Tributary Number:	M-071-005
Counties:	Stearns
Nearest Town:	Kimball
Source of flow:	Wetland complex southwest of the town of Kimball
Waterway sequence:	Wetland /Willow Creek/Clearwater River/ Mississippi River
Stream Length:	3.6 miles from wetland complex to mouth
Gradient:	25-53 ft/ mile
Sinuosity:	1.9
Classification:	Class I-C (Coldwater, brown trout)

## **Watershed Description**

Major Watershed:	Mississippi River (17) – Clearwater River (17010)
Minor Watershed:	Willow Creek Unnamed
Watershed Area:	8,821 acres
Watershed Land Use:	43.1% agricultural, 26.9% grassland/shrub/pasture, 15.5% forested, 9.0% residential and 4.6% wetland (Based on 2001 National Land Cover Data; Figure 1)
Riparian Zone:	The surrounding land is primarily farmland with an increasing proportion becoming residential. The stream is bordered by wetland or reed canary grass in upper reaches, with some willow and alder downstream. Significant springs are found within the Willow Creek Park area, which also receives considerable runoff from impervious surfaces in the City of Kimball.

## Introduction

Willow Creek is a small, coldwater stream in southeastern Stearns County (Figure 1). Brook trout were stocked historically over many years, but natural reproduction was limited. From 1996 to 2005, yearling brown trout were stocked in an attempt to establish a naturally reproducing population. Electrofishing catches of adult brown trout were low, likely due to high natural mortality, angling mortality or both and few young-of-year brown trout were captured. Fingerling brown trout have since been stocked in 2006 and 2009 to evaluate their potential for survival and reproduction. Results from electrofishing in 2007 showed much higher survival from the 2006 fingerling stocking and substantial reproduction. Sampling in 2008 found only a few larger adults from the 2006 stocking, but good survival of the naturally produced 2007 year class. Fingerling brown trout were again stocked in 2009 and evaluated by electrofishing on October 14, 2010.

## Results

Backpack electrofishing was conducted on two sections of Willow Creek in 2010, within Willow Creek Park. The two sites covered approximately 1,529 feet and took a total of 50 minutes to survey. A total of 74 brown trout were captured, including at least 10 young-of-year (Figure 2). Most adult fish appear to be from the 2009 fingerling stocking, with only a few older adults. Survival of stocked fingerlings from 2006 and 2009 to yearlings compares favorably to stocked yearling survival from years prior to 2006 (Table 1). Catch per unit of effort (CPUE) in 2010 was 88.3/hr, similar to 2007 results (80.2/hr) and higher than years when yearlings were stocked.

A stage logger has been in place since 2002, approximately 400 meters from the mouth of the creek at Lake Betsy. A discharge/stage relationship has been calculated and used to develop an annual hydrograph (Figure 3, Figure 4). Stage data from 2010 was recorded between January 1 and October 14 and reflected relatively high summer and fall precipitation.

Temperature monitors have been placed at various locations in Willow Creek since 2002. Water temperatures have consistently been favorable from Willow Creek Park and continuing upstream. A temperature monitor was deployed between March 24 and October 14, 2010 under the walking bridge upstream of State Highway 15. Temperatures in 2010 were again favorable with a maximum temperature of 20.2° Celsius, despite high summer flows (Figure 5).

## Summary and Recommendations

Fingerling brown trout seem to be the most effective and cost efficient method of stocking Willow Creek. Natural reproduction occurs in the stream, but may not be consistent enough to sustain the fishery by itself. The relative lack of brown trout older than age two may be due to a shortage of deeper pools and cover preferred by larger trout. Efforts have been made in recent years to improve habitat using root wad placements, rock vanes and brush layering. This should be expanded as time permits. Brown trout fingerlings should continue to be stocked every third year until more consistent recruitment from natural reproduction is seen. The next stocking is scheduled for 2012 and electrofishing again in 2011 would be beneficial to assess both natural reproduction and adult survival.

Efforts are underway by the City of Kimball and other entities to divert stormwater flow away from Willow Creek. A reduction of flow, sediment, and other substances from streets would likely benefit the stream. The effect of stormwater flows on fall spawning and spring egg hatch in Willow Creek are unknown, but may be detrimental to reproduction.

## References

Minnesota Department of Natural Resources. 2008. Willow Creek Stream Survey Report. Division of Fish and Wildlife, St. Paul, MN.

Minnesota Department of Natural Resources. 2007. Willow Creek Stream Survey Report. Division of Fish and Wildlife, St. Paul, MN.

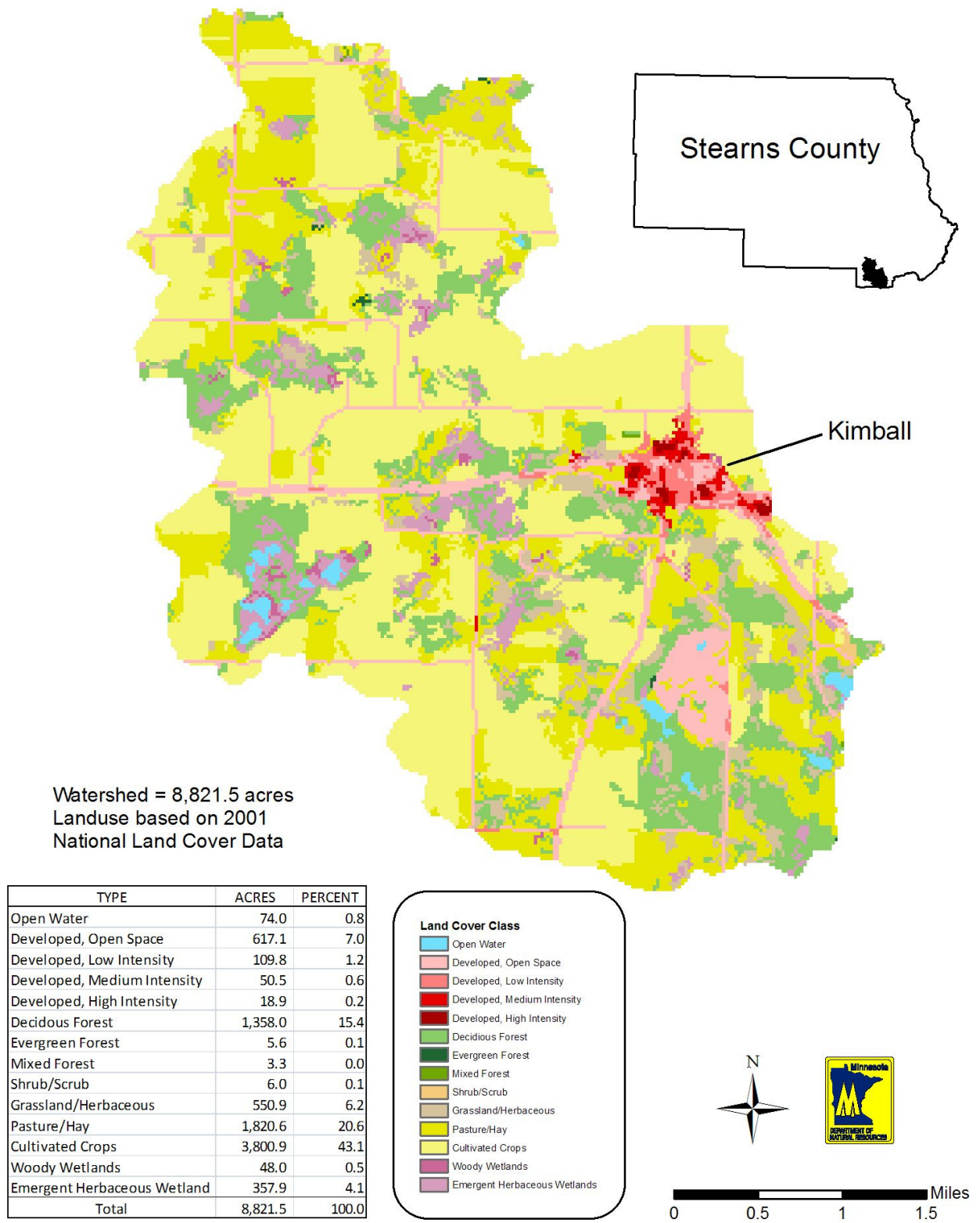


Figure 1. Watershed land use, Willow Creek, MN.

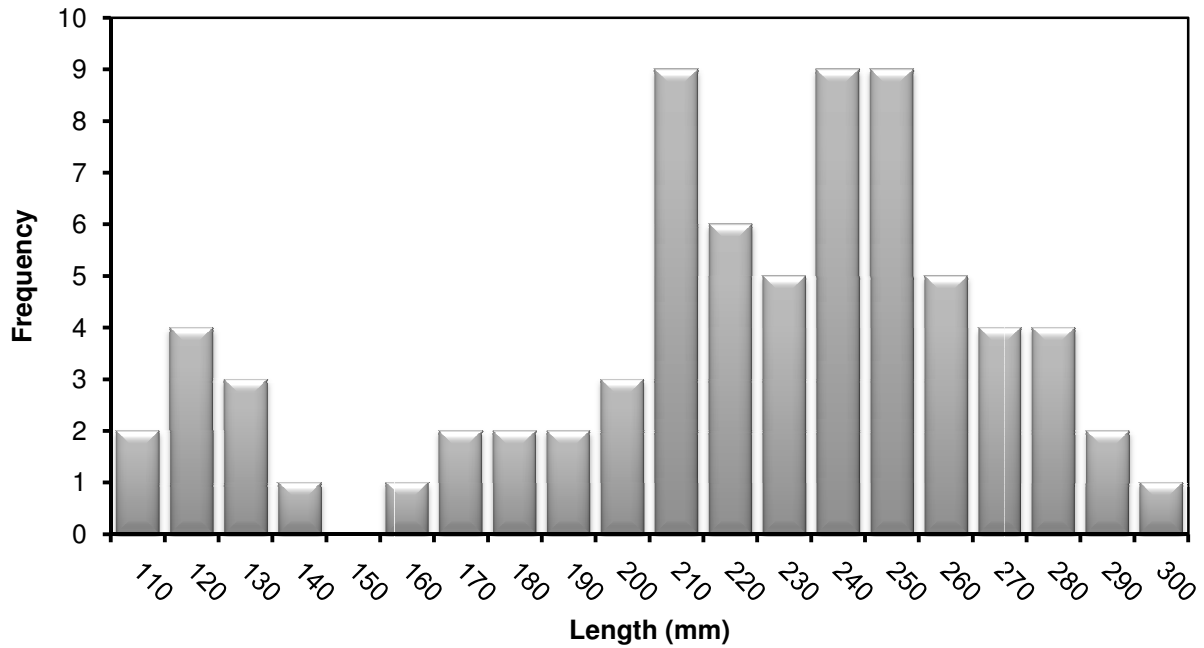


Figure 1. Length frequency of brown trout captured by electrofishing, Willow Creek, MN 2010.

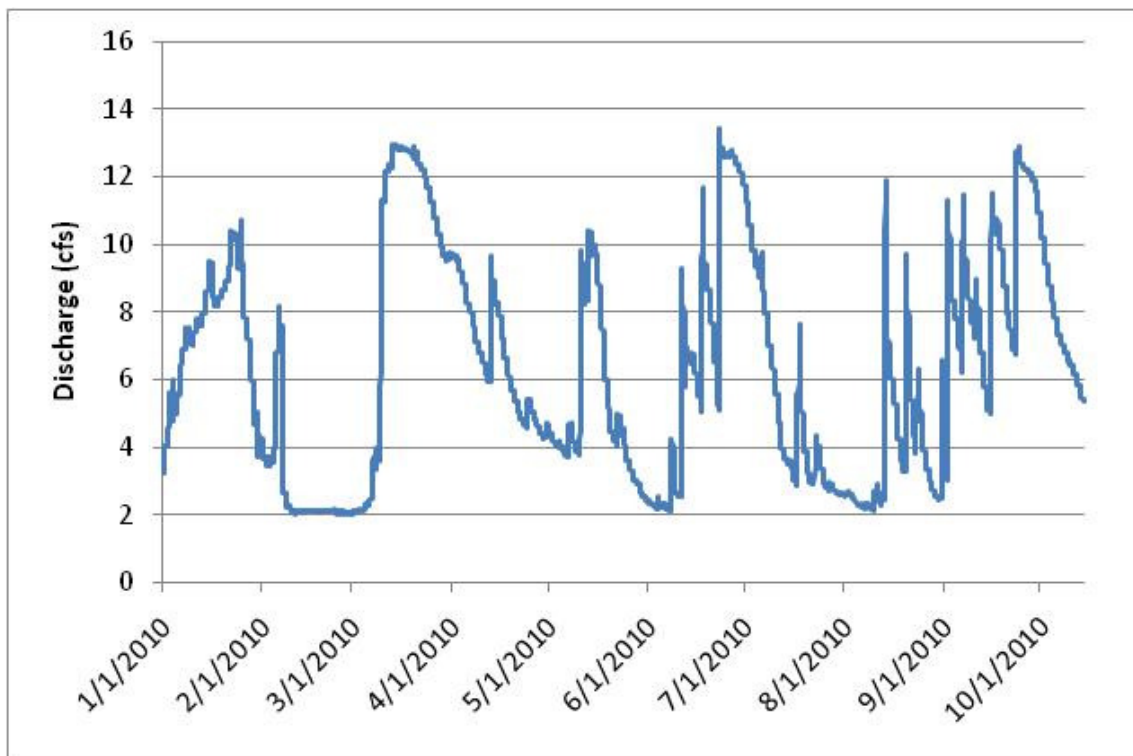


Figure 2. Estimated hourly discharge (ft<sup>3</sup>/second) , Willow Creek MN, 2010.

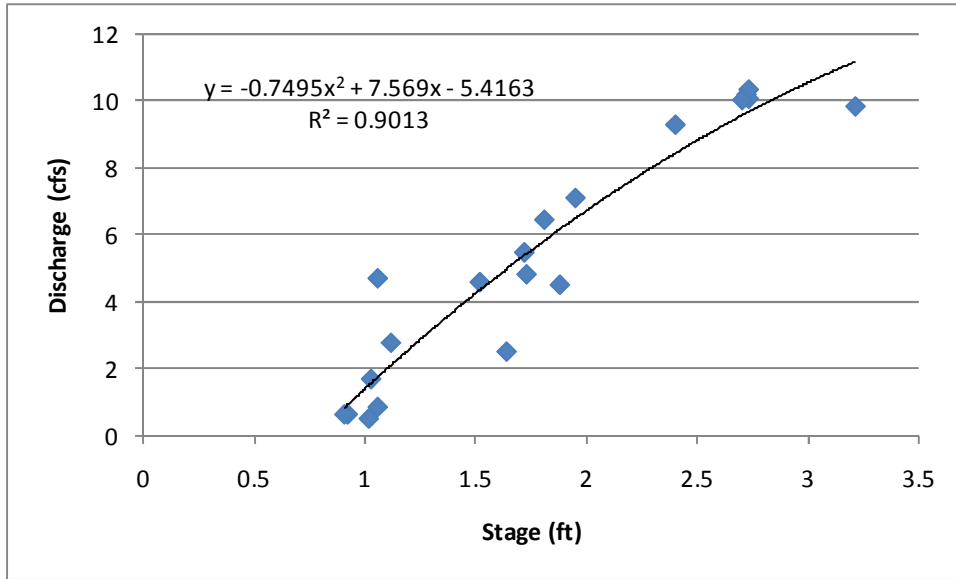


Figure 3. Rating curve (2009-2010 measured flows) for Willow Creek MN.

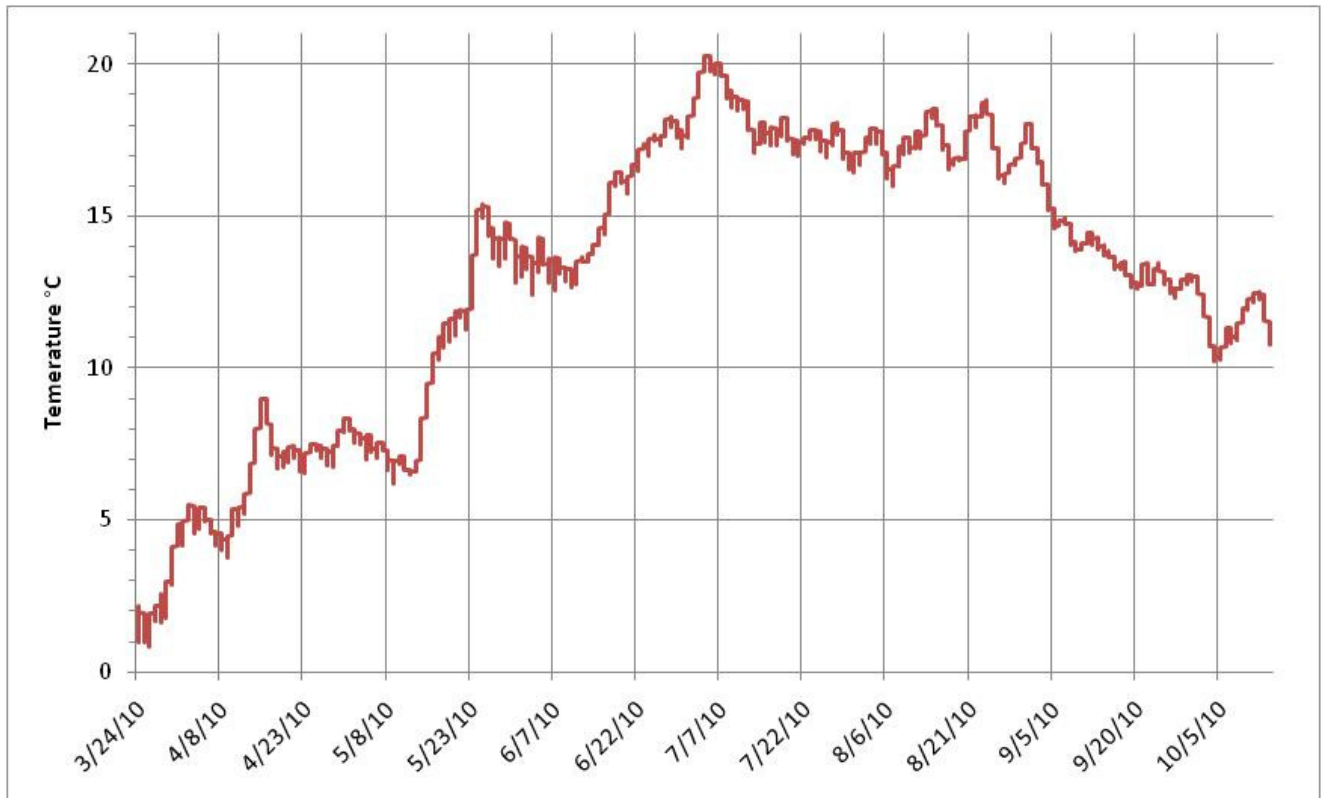


Figure 4. Hourly temperatures (°C) near Highway 15, Willow Creek, MN, March-October 2010.

Table 1. Length frequency of brown trout and catch statistics from backpack electrofishing, Willow Creek MN, 2002-2010.

Length Group (mm)	Brown Trout							
	2002	2003	2004	2005	2006	2007	2008	2010
70					1			
80					4	5		
90					7	8		
100					12	12	1	
110					29	8		2
120					30	6	1	4
130					19			3
140				1	24	1		1
150				1	12	3		
160				4	10	9		1
170				10	2	12		2
180		1		13	1	12		2
190				14		13	1	2
200	2	1		20		6	4	3
210	1			11		15	6	9
220	3			8		13	3	6
230	6	4		3	2	8	2	5
240	4			4		2		9
250	3	1		4	2	8		9
260	7	1		1	3	1		5
270	7	3		1	2	1		4
280		2			1		1	4
290	2	4			1			2
300	1	2						1
310	1	3		1				
320	2						1	
330								
340	1	1						
350							1	
360								
370								
<b>Total</b>	40	23	0	96	162	143	21	74
<b>Unmeasured</b>	0	0	0	0	255	0	0	0
<b>Effort (hr)</b>	4.64	2.11	1.78	1.76	1.31	1.78	0.91	0.84
<b>Length (ft)</b>	8,485	5,275	5,275	5,275	5,470	4,391	1,672	1,529
<b>CPUE</b>	8.6	10.9	0	54.7	318.3	80.2	23.1	88.3



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