

Minnesota
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Area 315
Study 3
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**Minnesota Department of Natural Resources
Division of Fish and Wildlife
Section of Fisheries**

Stream Survey Report

**Kinzer Creek
Progress Report 2005**

By

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

General Information

Stream Name: Kinzer Creek
Alternate Name: N/A
Tributary Number: M-074-005
Counties: Stearns
Nearest Town: Cold Spring
Source of flow: Wetland complex south of Knaus Lake (Sauk River chain)
Waterway sequence: Wetland /Kinzer Creek/Sauk River/ Mississippi River
Stream Length: 2.9 miles from wetland complex to mouth
Gradient: 22.4 ft/mile
Sinuosity: 1.3
Classification: Class I C/D (Semi-wild or Marginal Trout)

Watershed Description

Watershed Name and Number

Major: Mississippi River (1) – Sauk River (16)
Minor: Sauk 16057
Watershed Area: 4,256 acres
Watershed Land Use: 66.3% agricultural, 15.3% grassland/pasture, 11.3% forested, and 3.3% residential, based on 1991 land use cover data (Table1, Figure 2).

Riparian Zone:

The surrounding land near the west channel headwater is farmed with less than five feet of buffer between the stream bank and crop land. As the stream joins the east branch, buffer areas increase to nearly 150 ft through the gravel pit area. As the stream flows through the cattle pasture area upstream of Kinzer Lake, no vegetative buffer is present due to grazing. The area below Kinzer lake has an area nearly 200 ft from each bank that remains reasonably intact.

Introduction and study area

Kinzer Creek is a designated trout stream located in south central Stearns County, approximately two miles south of the City Cold Spring, MN (Figure 1). Only 1.7 miles of the entire stream length (2.9 miles) is actually designated. A significant portion of the stream has been ditched (0.73 miles) upstream of the designated area.

Kinzer Creek was first surveyed in 1949 and later surveyed in 1981, 1989 and 1999. The stream was stocked with 200-400 yearling brook trout annually during 1968-1969, 1971-1976 and 1979-1980.

Although trout have been found in past surveys (1981, 1989), no trout have been found in recent surveys (1999, 2005).

The Sauk River Watershed District (SRWD) applied for and received a grant in 2005 for more thorough monitoring and potential restoration of Kinzer Creek as a functional trout stream. This survey included electrofishing, invertebrate sampling, temperature and discharge monitoring. This monitoring was done in an effort to collaborate with the SRWD and gain information prior to making potential changes in the Kinzer Creek watershed.

Methods

Electrofishing was conducted on Kinzer Creek on November 1, 2005, with the use of a Smith-Root model 15-D backpack electrofisher. Electrofishing was conducted in an upstream direction from a downstream riffle to an upstream constriction or riffle. Fish were identified and counted.

Invertebrate sampling was conducted using two methods: Hester-Dendy area samplers and D-net scoop samples. Hester-Dendy area samplers were placed in the stream by anchoring to the stream bed in two locations during October and allowed to colonize for a period of six weeks. Discs were removed and the invertebrates were carefully collected from the surfaces. D-Net samples were performed in the same area where Hester-Dendy samplers were placed and at the time the Hester-Dendy samplers were collected. D-

net samples were taken on substrate, overhanging vegetation, and woody debris in the area.

Invertebrates were collected and sorted. Identification and enumeration was done by Gary Montz (DNR Eco-services invertebrate lab, St. Paul).

Temperatures were recorded using a Stoway Tidbit® remote temperature logger. The logger was programmed to record a temperature each hour and was deployed between 19 April, 2005 and 1 November, 2005.

Discharge was calculated through the use of a stage logger installed in May 2004 at the intersection of Stearns CR 49 and Kinzer Creek. Individual flow measurements were taken at varying stages and a discharge-stage relationship was calculated ($R^2 = 0.99$). The stage logger was programmed to record stage hourly from May 2004 through September 2005.

Results

A single electrofishing run was made in the area above Kinzer Lake. Total energized time was 1,196 seconds (Figure 1). Water clarity was good and the water temperature was 6.7°C (44°F). Species sampled included: central mudminnow, white sucker, northern redbelly dace, common shiner, green sunfish, creek chub, and brook stickleback. The substrate was mostly silt and coontail was found throughout the station. Although the substrate was not ideal for trout, the high sinuosity in the area resulted in high habitat complexity. A run-pool sequence was common with pools as deep as 2.5 ft and a relatively narrow stream width (about 5 ft).

Hester-Dendy and D-net samples were combined for both upper and lower stations on Kinzer Creek in 2005. Invertebrate samples contained low taxa diversity with more tolerant taxa (Table 2). The results found taxa that are more tolerant of low dissolved oxygen and organic enrichment (ie *Hyalella azteca*, *Caecidotea*). There are few aquatic insects overall.

Temperatures recorded from Kinzer Creek above Kinzer lake suggest the stream is cold enough to support trout. A maximum temperature of 21.6° (70.2°F) and an average temperature of 11.3°C (53.4°F) with limited consecutive hours (eight) above 20°C (68°F) suggest reasonable water temperatures are present (Table 3, Figure 3).

Monitoring discharge since May of 2004 has provided valuable records for the Kinzer Creek watershed. The stream has carried a maximum flow of 13.9 ft³/second with average daily discharge of 3.19 ft³/second (Table 4). Peak discharge events appear to occur with a relatively slow rise and fall through most of the year. However, spikes did occur during periods of heavy snowmelt in March and heavy rain in April (Figure 4).

Discussion/Management recommendations

The 1949 stream survey of Kinzer Creek reported the stream had the ability to support light to heavy fishing pressure, water with low fertility, substrates consisting 50% sand and 50% gravel and cobble. During both 1999 and 2005 surveys, substrates observed did not include any cobble or gravel. General land use practices within the upper portion of the watershed have likely lead to increased sediment loading in the stream since the initial survey in 1949.

Providing that land use practices improve in the watershed due to enrollment in buffer programs and using best management practices (BMP), sediment transport and supply issues could be resolved. Bank stability could improve through aggressive re-vegetation in areas where cattle grazing has made bank failure common. Substrate conditions will improve if sediment supply was reduced and a more uniform discharge curve was achieved. Similarly, the potential exists to have an improved temperature profile if bank vegetation becomes more abundant and offers increased shading of the stream.

Monitoring of temperatures and stage should continue on Kinzer creek to determine if land use changes will positively affect the stream. The SRWD has installed their own stage logging and water quality

monitoring systems (through the MN Pollution Control Agency) in an effort to continue monitoring discharge on Kinzer Creek.

Reclassification of the same reaches measured in 1999 should be performed after any major land use changes are implemented. Measurements of geomorphology can offer suggested bank stabilization measures and can assess whether depositional patterns are changing. Stocking of brown trout could be considered if private sources were interested in establishing a fishable population; however, unless public property becomes available on the upper portions of Kinzer Creek, the introduction of brown trout by DNR Fisheries is not permitted at this time.

REFERENCES

Kinzer Creek Survey. 1999, 1989, 1981, 1949. Minnesota Department of Natural Resources, St. Paul Minnesota.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

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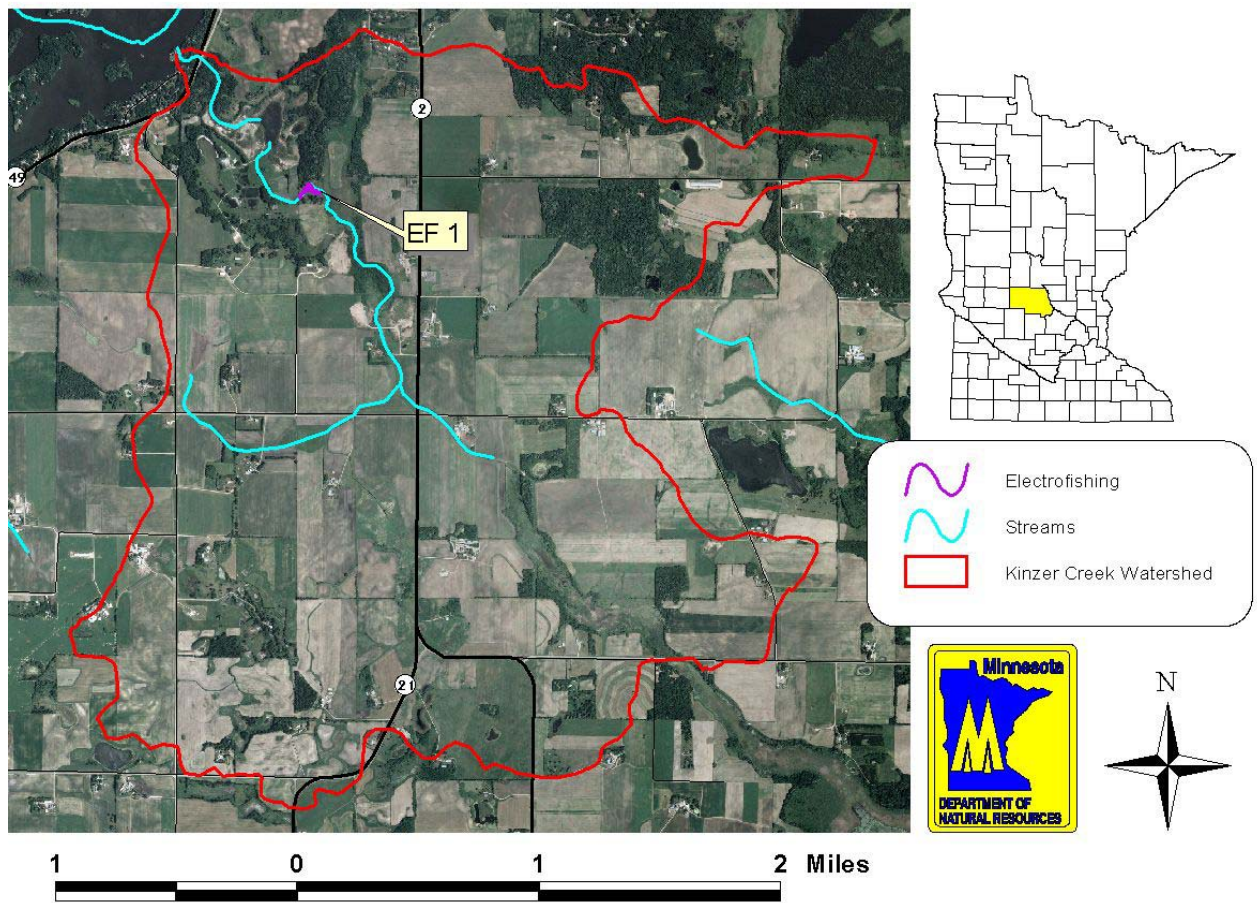


Figure 1. Location of Kinzer Creek, Stearns County, Minnesota.

Kinzer Creek Land Use

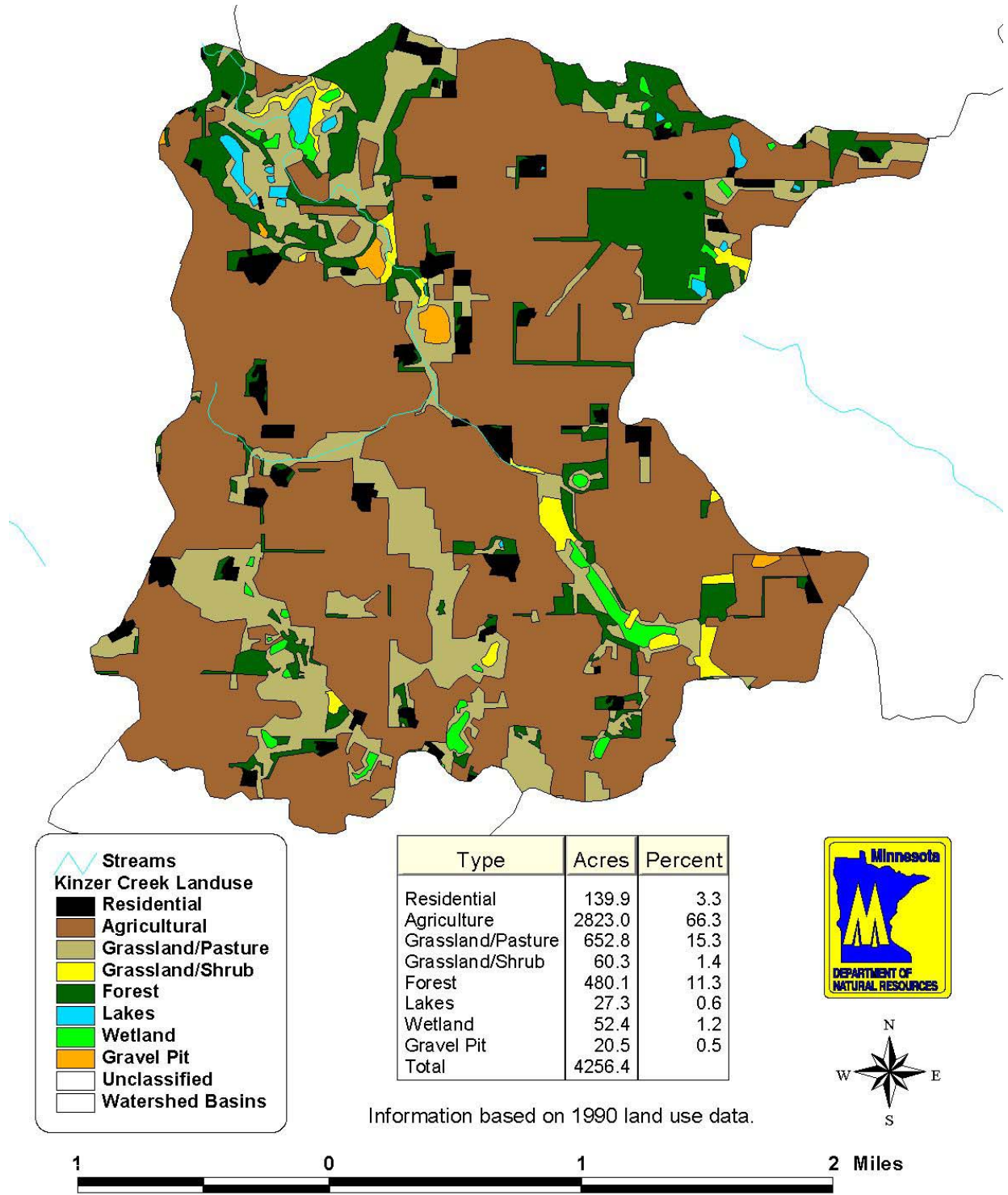


Figure 2. Estimated 1991 land use with in the Kinzer Creek (M-74-4) watershed.

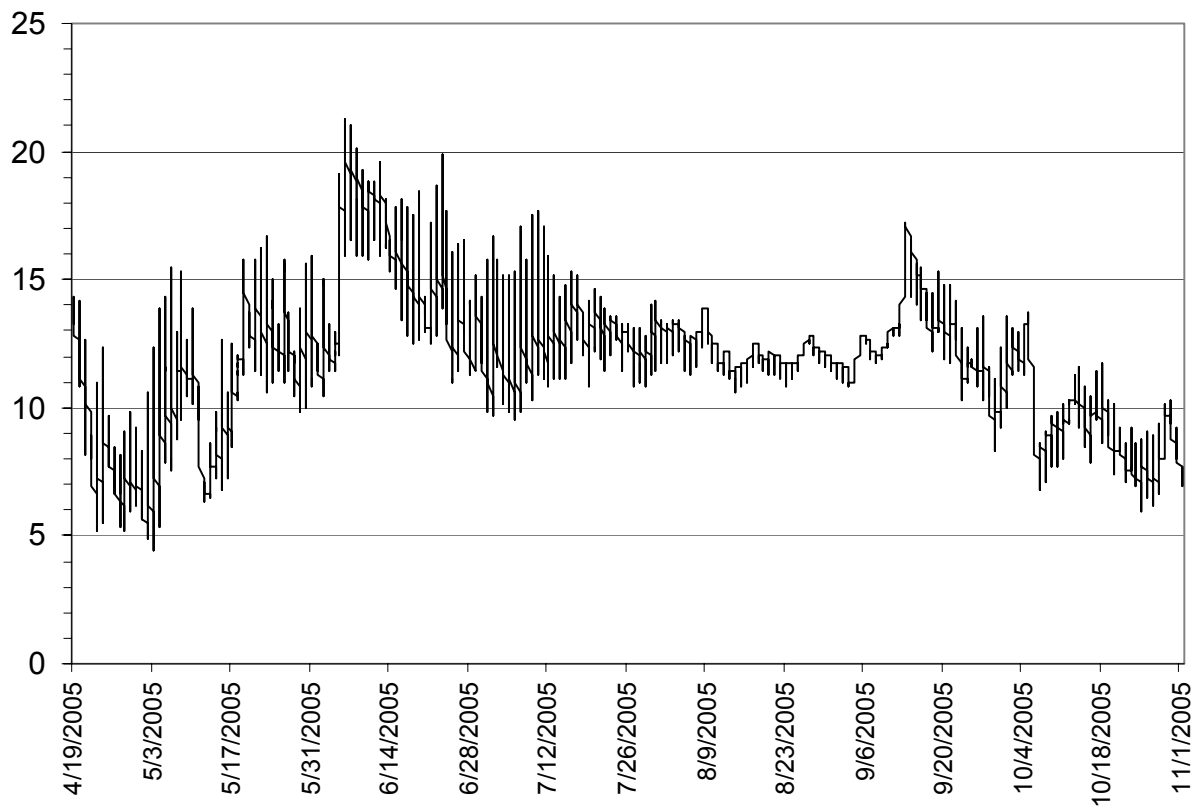


Figure 3. Daily temperatures (°C) recorded by a remote Stow Away Tidbit monitor located in Kinzer Creek from 19 May through 1 November 2005.

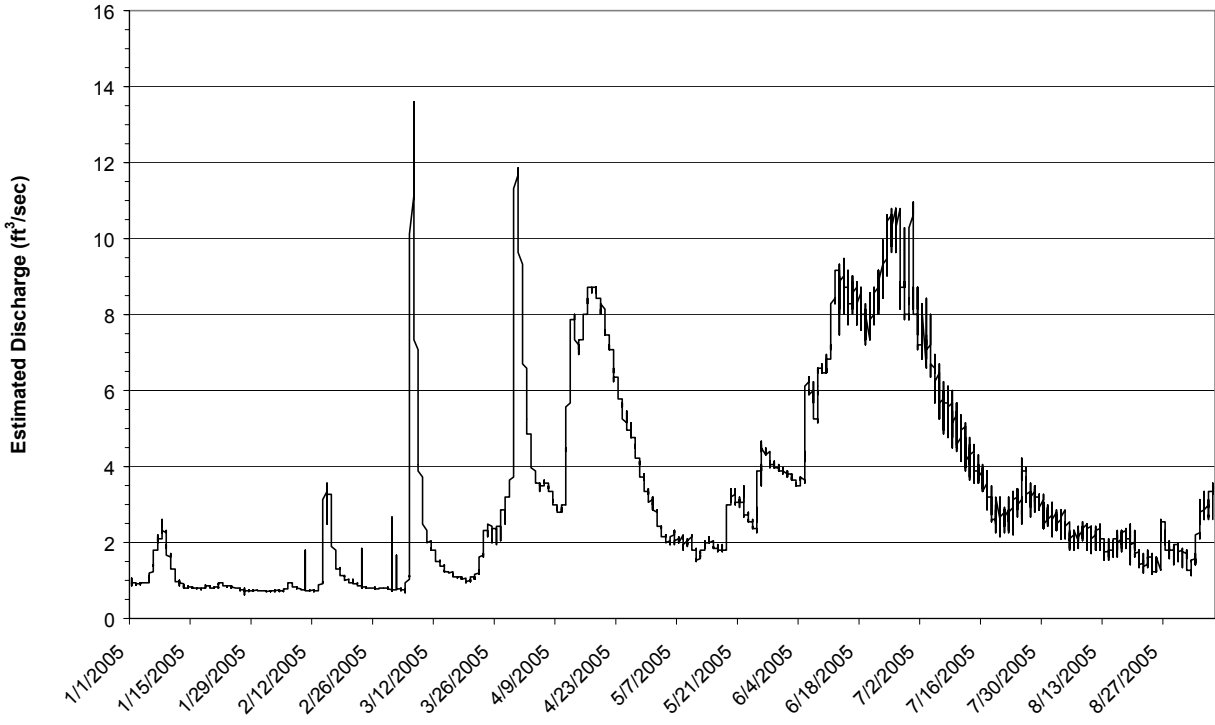


Figure 4. Estimated hourly discharge (ft³/second) recorded by a remote water level monitor located near the mouth of Kinzer Creek off of CR 49, 1 January through 7 September 2005.

Table 1. Kinzer Creek (M-74-4) watershed estimated land use by acres and percent (1991 data).

Land use	Acres	Percent
Agricultural	2,823.0	66.3
Grassland/pasture	652.8	15.3
Residential	139.9	3.3
Forest	480.1	11.3
Grassland/shrub	60.3	1.4
Wetland	52.4	1.2
Lakes	27.3	0.6
Total	4,256.4	100.0

Table 2. Invertebrate identification and enumeration from samples taken on the west channel and near CR 49, Kinzer Creek November 2005.

<i>Kinzer Creek</i>		
Taxa	Upper	Lower
TRICHOPTERA		
Limnephilidae		
Pycnopsyche sp.		1
Hydropsychidae		
Ceratopsyche sp.		
Cheumatopsyche sp.		2
Hydropsyche sp.		2
Phryganeidae		
Ptilostomus sp.	4	
HETEROPTERA		
Belostomatidae		
Belostoma sp.	2	
DIPTERA		
Tipulidae		
Tipula sp.		1
Prionocera sp.		
Simuliidae		
Simulium sp.		2
Muscidae		
?Limnophora sp.		
Chironomidae	11	2
CRUSTACEA		
Amphipoda		
Gammarus sp.		
Hyalella azteca	23	3
Isopoda		
Caecidotea sp.		
MOLLUSCA		
Gastropoda		
Physella sp.		1
?Stagnicola sp.		
?Planorbula sp.		
Amnicola sp.		2
Sphaeriidae		1

Table 3. Kinzer Creek temperatures (⁰C) recorded between 19 April and 1 November 2005.

	2005
Number of readings	4704
Percent > 18 °C	2.1
Percent > 20 °C	0.4
Percent > 22 °C	0
Max	21.2
Overall Mean	11.8
Consecutive hours > 20 °C	8

Table 4. Kinzer Creek mean, minimum, and maximum estimated discharge (ft³/second) recorded between 4 May 2004 and 7 September 2005.

Year	Discharge (ft³/Second)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2004	Minimum					0.41	0.94	0.68	0.64	0.29	0.86	1.42	0.86
	Average					1.68	2.76	1.37	0.77	2.06	1.92	2.24	1.24
	Max					5.15	5.46	2.43	0.94	4.22	6.35	7.46	2.05
2005	Minimum	0.62	0.71	0.68	2.79	1.50	3.49	2.15	1.16	1.13			
	Average	1.02	1.03	2.47	5.59	2.68	7.47	4.28	1.96	2.23			
	Max	2.60	3.57	13.61	9.32	4.67	10.96	8.72	3.06	3.57			
Overall	Minimum	0.62	0.71	0.68	2.79	0.41	0.94	0.68	0.64	0.29	0.86	1.42	0.86
	Average	1.02	1.03	2.47	5.59	2.21	5.12	2.82	1.37	2.09	1.92	2.24	1.24
	Max	2.60	3.57	13.61	9.32	5.15	10.96	8.72	3.06	4.22	6.35	7.46	2.05

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Author Date

Area Fisheries Supervisor Date

Regional Fisheries Supervisor Date

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