

# Life history and distribution studies of the endangered Topeka shiner in Minnesota, 2000

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This document summarizes the research conducted during the 2000 field season on *Life History and Distribution Studies of the Endangered Topeka Shiner in Minnesota*. As per our agreement, our studies focused on 5 objectives:

- 1) sampling the remaining historical localities for current status
- 2) sampling the Des Moines drainage for Topeka shiner presence
- 3) determining the mortality rates caused by our marking and handling methods
- 4) conducting pre- and post-spawn population estimates at the Elk Creek off-channel pools and Mound Creek
- 5) conducting off-channel vs. main channel habitat comparison studies at an additional four site-pairs (including physical habitat measurements)

## Distribution

Last year, we sampled 22 historical localities for Topeka shiner presence and found them at 14 of these sites (64%). Additionally, we sampled 41 new locations in the Missouri drainage and found Topeka shiners at 17 new sites. This brings our total number of extant historical localities to 23 of 32 (72%), and the total number of new sites in the Missouri drainage to 109 (present). We also sampled 85 sites distributed throughout the Des Moines drainage. Even though much of the habitat sampled looked promising, we did not find Topeka shiners present at any locations. The records for all collections made during the 2000 field season (including date, location, and status) are attached in Appendix 1. (Note: we also have these records in our fish collection database format.)

## Mortality

We conducted a simple holding experiment to determine the mortality rates caused by our marking and handling techniques. Three holding nets (approx. 1 m<sup>3</sup> each) were constructed of 1/8" nylon mesh. The nets were staked in a farm pond containing Topeka shiners. Due to last year's high cage effects in a similar study, we tested our net design by holding ten Topeka shiners in a net for one week. All ten Topeka shiners survived. Next, we marked 15 Topeka shiners according to our mark-recapture population estimate methods. Five marked shiners and five unmarked shiners were placed into each of the three nets for one week. At the end of the week, 29 of 30 Topeka shiner were **found** alive. The missing Topeka shiner was a marked individual. No remains were found in the net. Assuming this fish died, the average marking mortality rate was 6.7%. In a similar study conducted on several species of freshwater fish (not including *N. topeka*), Lotrich and Meredith (1974) reported a mortality rate of 4%.

The same experiment was used to determine mortality rates caused by handling (or "processing") Topeka shiners. In this experiment, 15 Topeka shiners were anesthetized, measured for total length, standard length, and body mass, had scales removed for aging, and guts pumped for food analysis. Then five processed fish and five unprocessed fish were placed into each of the three nets for one week. Processed and unprocessed fish were

kept separate by a dividing panel in the middle of the nets. At the end of the week, 28 of 30 Topeka shiners were found alive. Two processed fish (one from two nets) were missing, and again no remains were found. Assuming these two fish died, the average mortality rate for processing was 13.3%. (Note: We realize that the "conservative" methods for this experiment lack statistical power; however, due to the endangered status of our subject, we felt it was prudent to reduce risk by minimizing sample sizes and repetitions.)

#### Abundance

We conducted two mark-recapture population estimates at the Elk Creek off-channel pools and Mound Creek, Blue Mounds State Park. The results (see Table 1) repeat the trend exhibited in 1999 of decreasing adult abundances during the summer months. Young-of-year Topeka shiners were too small to mark, thus excluded from these estimates. The low initial abundance and precipitous decline in the Elk Creek off-channel population is probably due to abnormally low and steadily declining water levels throughout the year. This population was probably at risk of extirpation over winter.

#### Habitat

During the month of May, we searched for and located four new site-pairs for our continuing off-channel vs. main channel habitat comparison study. Three of the sites were located on the Rock River (labeled Upper, Middle, and Lower) and the fourth on Elk Creek. We sampled each of the site-pairs four times between May and August. Catch-per-unit-effort (CPUE) was recorded for all species and compared by habitat type for Topeka shiners. Figure 1 shows that CPUE for Topeka shiners was higher in the off-channel habitats at 13 of the 16 trials (81 %). We analyzed the data using contingency table analysis and found that there was indeed a significant relationship between habitat type and relative abundance of Topeka shiners (see Table 2). We also measured several physical habitat characteristics of each of our eight study site-pairs and will analyze and compare any differences between off-channel and main channel habitats.

Please refer to our November 30, 1999 Progress Report for supplemental descriptions of our methods as well as citations.

Table 1: Population estimate data for Elk Creek off-channel pools and Mound Creek, Blue Mounds S.P.

Elk Creek	Marked	Captured	Recaptured	Estimate	95% C.I.
11-May-00	323	287	249	372	359 - 394
26-Jul-00	12	7	5	17	13 - 35
<u>Mound Creek</u>					
12-May-00	33	48	10	158	97 - 330
27-Jul-00	55	42	30	77	65 - 100

Table 2: Contingency table analysis of Topeka shiner Abundance (by order magnitude) vs. Habitat.

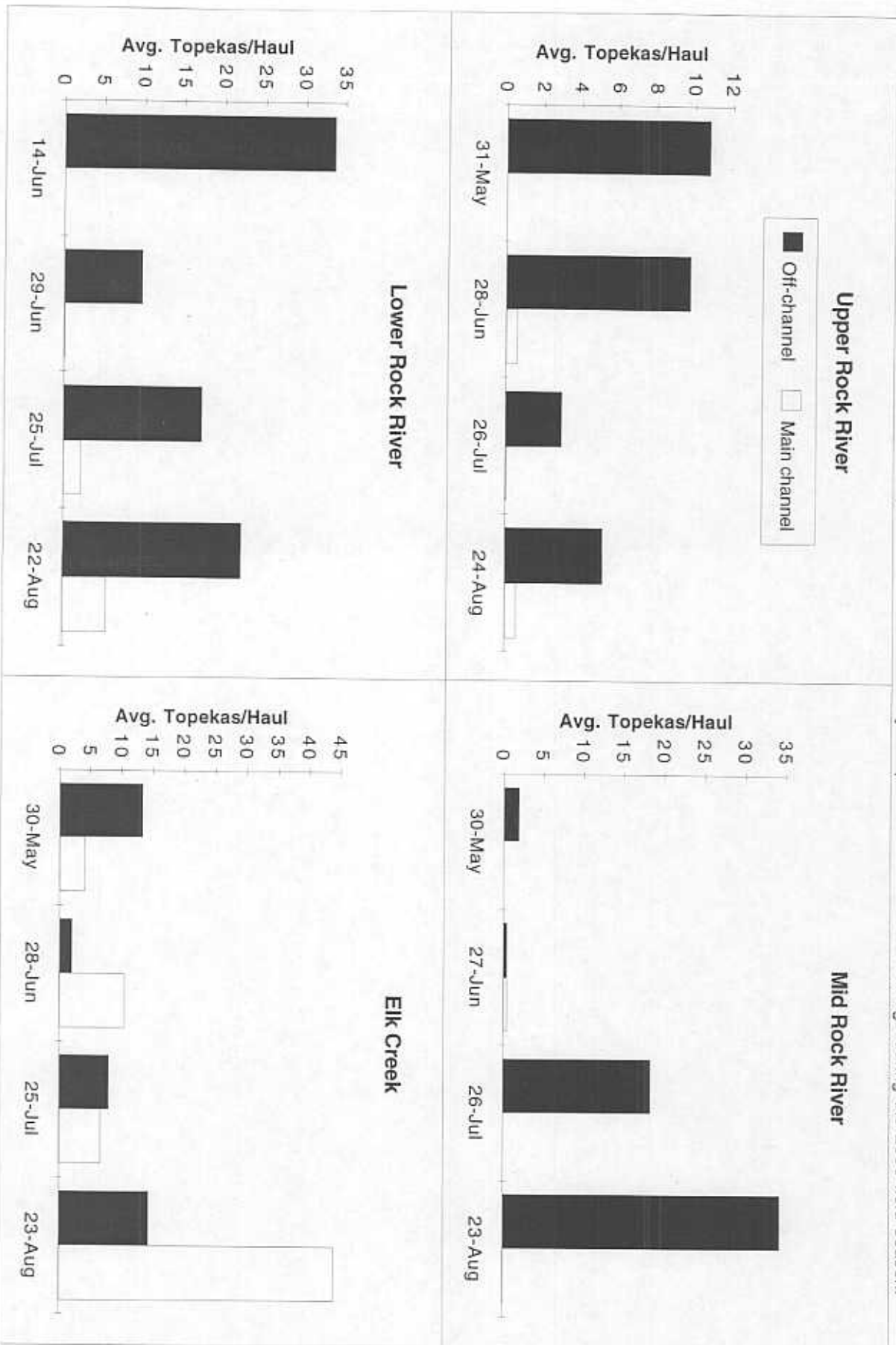
Observed	Habitat	Abundance (Topeka shiners/Haul)			R-Marginal Total
		0	1-9	10-99	
	Off-channel	44	50	14	108
	Main channel	101	27	6	134
	C-Marginal Total	145	77	20	242

Expected	Habitat	Abundance (Topeka shiners/Haul)			R-Marginal Total
		0	1-9	10-99	
	Off-channel	64.7	34.4	8.9	108
	Main channel	80.3	42.6	11.1	134
	C-Marginal Total	145	77	20	242

Chi-square= 30.0

P= < 0.001\* \* indicates a significant relationship between Habitat and Abundance

Figure 1: Graphs comparing catch-per-unit-effort of Topeka shiners at four study site-pairs in the Missouri drainage during the 2000 field season.



Appendix 1: Records of all collections made during the 2000 field season.

Status legend:

R\* = Historical redo      Y = present  
 R = New site redo      N, n = not present

Field Number	Date	Stream	Location	TRS	Status
SD00-01	4-May-00	Kanaranzi Creek	bridge on MN-IA border	T101N R44W S33	R*-N
SD00-02	4-May-00	Kanaranzi Creek	CR 1 bridge (Rock Co.)	T101N R44W S13	R*-N
SD00-03	5-May-00	Chanaramble Creek	near junct. Hwy 268 and CR 18 (Pipestone Co.)	T105N R44W S22,27	R*-N
SD00-04	5-May-00	Rock River	CR 59 bridge, -1.5 mi NW of Edgerton, MN	T105N R44W S17	R*-Y
SD00-05	5-May-00	Chanaramble Creek	near Pipestone-Murray Co. border	T105N R43W S18	R*-Y
SD00-06	5-May-00	Rock River (off-channel oxbow)	-1 mi S of Edgerton, Pipestone Co.	T105N R44W S33	R-Y
SD00-07	5-May-00	Lower Mound Springs Reservoir	BMSF, beach area	T103N R45W S24	R*-N
SD00-08	5-May-00	Rock River	CR 16 bridge (Rock Co.)	T102N R45W S23,36	R*-Y
SD00-09	5-May-00	Elk Creek, old channel ponds	below CR 4 bridge, 2 mi W of Magnolia	T102N R44W S16	R-Y
SD00-10	5-May-00	Beaver Creek	-2 mi NE of Beaver Creek, MN; 1.25 mi E of CR 6	T102N R46W S14	N
SD00-11	5-May-00	Beaver Creek	CR 17 bridge (Rock Co.), 0.25 mi N of Manley, MN	T102N R47W S35	R*-N
SD00-12	6-May-00	Unnamed trib to Kanaranzi Creek	near Adrian City Park, under I-90	T102N R43W S13	Y
SD00-13	6-May-00	Kanaranzi Creek	above CR 14 bridge (Nobles Co.)	T103N R42W S19	R*-Y
SD00-14	6-May-00	Kanaranzi Creek	1 mi N of CR 14 bridge (Nobles Co.)	T103N R42W S20	R*-Y
SD00-15	11-May-00	Elk Creek, old channel ponds	below & above CR 4 bridge, 2 mi W of Magnolia	T102N R44W S9,16	R-Y
SD00-16	11-May-00	Rock River (off-channel pool)	CR 63 bridge (Pipestone Co.), 0.5 mi W of CR 17	T105N R44W S8,17	Y
SD00-17	12-May-00	Mound Creek	BMSF, between lower dam and bridge on CR 8	T103N R45W S24	R-Y
SD00-18	16-May-00	Elk Creek, old channel ponds	above CR 4 bridge, 2 mi W of Magnolia	T102N R44W S9	R-Y
SD00-19	16-May-00	Mound Creek	BMSF, between lower dam and bridge on CR 8	T103N R45W S24	R-Y
SD00-20	23-May-00	Elk Creek	bridge on road between CR 9 & CR 55 (Rock Co.)	T102N R44W S30	Y
SD00-21	23-May-00	Elk Creek (split-channel pool)	CR 3 bridge, -1.75 mi N of Magnolia, MN	T102N R44W S1,2	Y
SD00-22	23-May-00	Champepedan Creek, unnamed trib	CR 8 bridge, 0.75 mi W of CR 3 (Rock Co.)	T103N R44W S23	Y
SD00-23	23-May-00	Rock River (off-channel pools)	2 mi N & 1 mi E of junct CR 8 & CR 19 (Rock Co.)	T103N R44W S8	Y
SD00-24	23-May-00	Poplar Creek (off-channel oxbow)	1 mi S of junct. CR 16 & Hwy 268 (Pipestone Co.)	T105N R44W S30	R-Y
SD00-25	24-May-00	Poplar Creek, unnamed trib	1 mi N of CR 12 & 0.75 mi E of CR 60 (Pipestone Co.)	T105N R45W S35	Y
SD00-26	24-May-00	Rock River (off-channel oxbow)	-1.75 mi N of MN-IA border (middle of section)	T101N R45W S25	Y
SD00-27	24-May-00	Champepedan Creek (off-channel oxbow)	0.5 mi N of CR 18, 0.25 mi E of Nobles-Rock border (No	T104N R43W S31	N
SD00-28	24-May-00	Rock River (off-channel oxbow)	0.5 mi N of CR 21 & 0.5 mi W of CR 2 (Rock Co.)	T104N R44W S16	N
SD00-29	24-May-00	Rock River	CR 17 bridge, -1.5 mi N of CR 2 (Pipestone Co.)	T106N R44W S33	R*-Y
SD00-30	24-May-00	Rock River	below CR 65 bridge (Pipestone Co.)	T106N R44W S29	R*-N
SD00-31	24-May-00	Rock River	0.5 mi N of Hwy 30 on State Trail path	T106N R44W S7	R*-Y
SD00-32	24-May-00	Rock River, unnamed trib to E. Branch	CR 18 bridge, 1.5 mi N of Woodstock, MN	T107N R44W S34	Y
SD00-33	24-May-00	Rock River, East Branch	CR 6 bridge, -0.5 mi W of CR 18 (Pipestone Co.)	T107N R44W S27	R*-Y
SD00-34	24-May-00	Rock River, East Branch	CR 6 bridge, -0.25 mi E of CR 84 (Pipestone Co.)	T107N R44W S33	R*-Y
SD00-35	25-May-00	Split Rock Creek	below dam at Split Rock Creek SP	T105N R46W S21	R-N
SD00-36	25-May-00	Split Rock Creek	0.5 mi E of junct. Hwy 23 & CR 53, near farm	T105N R46W S21	Y
SD00-37	25-May-00	Pipestone Creek, North Branch	CR 15 bridge, 0.25 mi S of Cazenovia, MN	T107N R46W S22	R*-Y
SD00-38	25-May-00	Flandreau Creek	CR 13 bridge (Pipestone Co.) near SD border	T107N R47W S12,13	R*-N
SD00-39	25-May-00	Medary Creek, unnamed trib	0.5 mi W of CR 1 & 1 mi N of CR 10 (Lincoln Co.)	T109N R46W S18	R*-Y
SD00-40	30-May-00	Rock River (off and main channel)	2 mi N & 1 mi E of junct CR 8 & CR 19 (Rock Co.)	T103N R44W S8	R-Y
SD00-41	30-May-00	Elk Creek (off and main channel)	CR 3 bridge, -1.75 mi N of Magnolia, MN	T102N R44W S1,2	R-Y
SD00-42	31-May-00	Poplar Creek (off and main channel)	1 mi S of junct. CR 16 & Hwy 268 (Pipestone Co.)	T105N R44W S30	R-Y
SD00-43	31-May-00	Poplar Creek (trib and main channel)	1 mi N of CR 12 & 0.5 mi E of CR 60 (Pipestone Co.)	T105N R45W S35	R-Y
SD00-44	31-May-00	Rock River (off and main channel)	CR 63 bridge (Pipestone Co.), 0.5 mi W of CR 17	T105N R44W S8,17	R-Y
SD00-45	1-Jun-00	Champepedan Creek, unnamed trib (of	CR 3 bridge, -0.25 mi S of CR 8 (Rock Co.)	T103N R44W S23	N
SD00-46	1-Jun-00	Rock River (off and main channel)	0.75 mi N of CR 6, 1 mi E of CR 16 (Pipestone Co.)	T107N R44W S29, 30	Y
SD00-47	1-Jun-00	Rock River, East Branch (off-channel)	CR 7 bridge, 0.25 mi W of CR 18 (Pipestone Co.)	T107N R44W S22	N
SD00-48	6-Jun-00	Des Moines River (oxbows)	-1 mi N of IA border, between CR 23 & CR 29 (Jackson	T101N R34W S34	n
SD00-49	6-Jun-00	Judicial Ditch #11 (Jackson)	bridge 0.5 mi S of CR 4, 0.5 mi W of CR 29	T101N R34W S26	n
SD00-50	6-Jun-00	DM River, unnamed trib	bridge 0.25 mi N of IA-border, between CR 23 & CR 25	T101N R34W S32,33	n
SD00-51	6-Jun-00	DM River (side-channel pool)	200 m S of junct. CR 23 & CR 25	T101N R34W S8	n
SD00-52	6-Jun-00	Stony Brook	bridge 2 mi N of CR 4 & 1.25 mi E of Hwy 71	T101N R34W S18	n
SD00-53	7-Jun-00	DM River, unnamed trib	CR 23 bridge, -3 mi SE of Jackson, MN	T101N R34W S8	n
SD00-54	7-Jun-00	DM River (side channel)	just S of Riverside Drive on N side of Jackson, MN	T102N R35W S23	n
SD00-55	7-Jun-00	DM River (oxbow)	CR 17, 0.25 mi S of CR 30 (Jackson Co.)	T104N R35W S30	n
SD00-56	7-Jun-00	DM River (oxbow)	0.25 mi E of CR 17 & 1.5 mi N of CR 82 (Jackson Co.)	T104N R35W S7	n
SD00-57	7-Jun-00	DM River, unnamed trib	CR 17 bridge, 0.25 mi N of CR 82 (Jackson Co.)	T104N R35W S18&13	n

Field Number	Date	Stream	Location	TRS	Status
SD00-58	7-Jun-00	Little Sioux River, unnamed trib	1 mi S of CR 68 & 1 mi W of Hwy 86	T101N R36W S6,7	N
SD00-59	7-Jun-00	Little Sioux River	1 mi N of CR 68 & ~1 mi E of CR 9	T102N R37W S27,34	N
SD00-60	8-Jun-00	Little Sioux River	CR 9 bridge, 0.25 mi N of I-90	T102N R37W S17,18	N
SD00-61	8-Jun-00	Judicial Ditch #28 (Jackson)	0.25 mi S of CR 34 & 1 mi W of CR 9	T102N R37W S28,29	N
SD00-62	8-Jun-00	Little Sioux River	CR 69 bridge on IA border	T101N R36W S31	N
SD00-63	8-Jun-00	Little Sioux River, unnamed trib	Hwy 86 bridge, 0.5 mi S of CR 66	T101N R36W S16,17	N
SD00-64	8-Jun-00	East Fork, DM River	CR 103 bridge, 0.25 mi N of I-90	T102N R33W S7,8	n
SD00-65	8-Jun-00	East Fork, DM River	Hwy 4 bridge, 2 mi N of Dunnel, MN (Martin Co.)	T102N R33W S34,35	n
SD00-66	8-Jun-00	DM River, East Fork/Co. Ditch #11	1 mi E of CR 119 & 2 mi N of CR 8	T101N R32W S10	n
SD00-67a	13-Jun-00	Rock River (old channel/pools)	Iowa border, 1 mi W of junct. CR 9 and CR 58	T101N R45W S36	R-Y
SD00-67b	14-Jun-00	Rock River	Iowa border, CR 58 (Rock)	T101N R45W S36	R-Y
SD00-68	14-Jun-00	Rock River (off and main channel)	CR 15 (old 59) bridge, ~4 mi S of Luverne, MN	T102N R45W S35	R*-Y
SD00-69	14-Jun-00	Rock River (oxbow)	~2 mi N of CR 4, on bend in CR 9	T102N R44W S6	N
SD00-70	14-Jun-00	Rock River (side-channel pool)	above CR 7 bridge (Rock Co.)	T104N R44W S28	Y
SD00-71	14-Jun-00	Rock River (off-channel ponds)	Edgerton City Park, above/below CR 1	T105N R44W S28	N
SD00-72	14-Jun-00	Chanazambie Creek (oxbow)	East egde of Edgerton, at E end of Maple St.	T105N R44W S27	N
SD00-73	14-Jun-00	Rock River (oxbow)	above bridge, 0.5 mi E of CR 17 & 1.25 mi N of CR 2 (P)	T106N R44W S33	N
SD00-74	15-Jun-00	Rock River (side-channel pool)	~2.25 mi N of IA border (middle of section)	T101N R45W S24	N
SD00-75	15-Jun-00	Rock River (old channel)	near gravel pits ~3 mi NE of Luverne, MN	T103N R44W S31	N
SD00-76	20-Jun-00	Rock River (oxbow)	below CR 65 bridge, 0.25 mi E of CR 63	T105N R44W S29	R*-N
SD00-77	20-Jun-00	Chappedan Creek (off-channel pond)	0.5 mi S of CR 8 & 0.5 mi W of CR 9 (Rock Co.)	T103N R44W S20	N
SD00-78	21-Jun-00	Beaver Creek	CR 86 bridge, 1.5 mi N of Hadley, MN	T107N R42W S35	n
SD00-79	21-Jun-00	Beaver Creek (off and main channel)	1.5 mi W of Hwy 59/30 & 2.5 mi N of Hwy 30, ~2.5 mi	T107N R41W S32,33	n
SD00-80	21-Jun-00	Lime Creek	junct. CR 6 & CR 36 (Murray Co.)	T106N R40W S32,33	n
SD00-81	21-Jun-00	Lime Creek	below CR 73 bridge, 0.5 mi E of CR 40 (Murray Co.)	T105N R39W S8	n
SD00-82	21-Jun-00	DM River	CR 9 bridge (Murray Co.)	T107N R40W S26	n
SD00-83	21-Jun-00	DM River (oxbow)	CR 15, between Lk. Talcot and Oaks Lk.	T105N R38W S18	n
SD00-84	22-Jun-00	DM River (off-channel pool)	0.25 mi S of Hwy 62 & 1 mi E of CR 6 (Cottonwood Co.)	T105N R38W S36	n
SD00-85	22-Jun-00	DM River (oxbow)	0.5 mi S of Hwy 62, ~1.5 mi W of CR 5 (Cottonwood Co.)	T105N R38W S36	n
SD00-86	22-Jun-00	DM River, unnamed trib	CR 14 bridge, 3.5 mi N of Hwy 62 (Cottonwood Co.)	T105N R37W S10,11	n
SD00-87	22-Jun-00	DM River (off and main channel)	west of CR 13, 1.25 mi N of CR 15 (Cottonwood Co.)	T105N R36W S16	n
SD00-88	27-Jun-00	Rock River (off and main channel)	2 mi N & 1 mi E of junct CR 8 & CR 19 (Rock Co.)	T103N R44W S8	R-Y
SD00-89	28-Jun-00	Elk Creek (off and main channel)	CR 3 bridge, ~1.75 mi N of Magnolia, MN	T102N R44W S1,2	R-Y
SD00-90	28-Jun-00	Rock River (off and main channel)	CR 63 bridge (Pipestone Co.), 0.5 mi W of CR 17	T105N R44W S8,17	R-Y
SD00-91	28-Jun-00	Poplar Creek (off and main channel)	1 mi N of CR 12 & 0.5 mi E of CR 60 (Pipestone Co.)	T105N R45W S35	R-Y
SD00-92	29-Jun-00	Rock River (off and main channel)	CR 15 (old 59) bridge, ~4 mi S of Luverne, MN	T102N R45W S35	R*-Y
SD00-93	18-Jul-00	Jack Creek, unnamed trib (headwaters)	2.5 mi N of CR 18, 1 mi E of CR 13 (Nobles)	T104N R41W S5,6	n
SD00-94	18-Jul-00	Jack Creek, unnamed trib	CR 2 bridge, just E of CR 34 (Murray)	T105N R40W S19,30	n
SD00-95	18-Jul-00	Jack Creek, unnamed trib	1.25 mi E of CR 36 & 0.5 mi S of CR 2 (Murray) ~2 mi S	T105N R40W S27,34	n
SD00-96	18-Jul-00	Jack Creek, unnamed trib	CR 18 bridge, 0.25 mi W of Hwy 59 (Nobles)	T104N R40W S11,14	n
SD00-97	18-Jul-00	Jack Creek (headwaters)	0.25 mi N of CR 16 & 2 mi W of CR 9 (Nobles)	T104N R41W S33,34	n
SD00-98	18-Jul-00	Jack Creek	Hwy 59 bridge, 2.75 mi S of CR 16 (Nobles)	T104N R40W S25,26	n
SD00-99	18-Jul-00	Jack Creek	2 mi E of CR 3 & 0.75 mi S of CR 16 (Nobles)	T104N R39W S35	n
SD00-100	19-Jul-00	Elk Creek	1 mi E of Hwy 59 & 1.75 mi S of CR 14 (Nobles)	T103N R40W S36&(31)	n
SD00-101	19-Jul-00	Elk Creek, unnamed trib	1 mi W of CR 3 & 2 mi N of CR 14 (Nobles)	T103N R39W S7,18	n
SD00-102	19-Jul-00	Elk Creek	0.5 mi W of Hwy 60 & 1 mi S of CR 14 (Nobles)	T103N R39W S27,34	n
SD00-103	19-Jul-00	Okabena Creek	CR 63 bridge, 0.5 mi N of CR 20 (Jackson)	T103N R38W S10,11	n
SD00-104	19-Jul-00	Jack Creek (oxbow)	CR 63, 0.5 mi W of Hwy 60	T104N R38W S34&(3)	n
SD00-105	19-Jul-00	Heron Lake outlet	CR 86, 1 mi W of CR 82 (Jackson)	T104N R37W S2,11	n
SD00-106	19-Jul-00	DM River	1.25 mi N of Hwy 62 & 2 mi W of CR 40 (Cottonwood)	T105N R37W S21	n
SD00-107	19-Jul-00	DM River	CR 6, 1.25 mi W of CR 44 (Murray)	T106N R39W S27,34	n
SD00-108	19-Jul-00	DM River	1 mi N of CR 7 & 1 mi W of CR 42 (Murray)	T106N R39W S7,8	n
SD00-109	19-Jul-00	Lime Creek	1.5 mi N of CR 72 & 0.75 mi W of Hwy 59 (Murray)	T105N R40W S11	n
SD00-110	19-Jul-00	Lime Creek	2 mi S of Slayton, 0.25 mi E of CR 33 (Murray)	T106N R41W S26,35	n
SD00-111	20-Jul-00	Beaver Creek	1 mi S of Hwy 30 & 0.75 mi W of CR 35 (Murray)	T107N R41W S24	n
SD00-112	20-Jul-00	Beaver Creek	1 mi W of Hwy 91 & 1.75 mi N of Hwy 30 (Murray)	T106N R43W S1,2	n
SD00-113	20-Jul-00	Beaver Creek (headwaters)	CR 25, 2.75 mi N of CR 10 (Murray)	T107N R43W S4,5	n
SD00-114	20-Jul-00	Long Lake inlet	1 mi S of US Hwy 14 & 2 mi E of CR 5 (Lyon)	T103N R41W S19,30	n
SD00-115	25-Jul-00	Rock River (off and main channel)	CR 15 (old 59) bridge, ~4 mi S of Luverne, MN	T102N R45W S35	R*-Y
SD00-116	25-Jul-00	Elk Creek (off and main channel)	CR 3 bridge, ~1.75 mi N of Magnolia, MN	T102N R44W S1,2	R-Y
SD00-117	26-Jul-00	Rock River (off and main channel)	2 mi N & 1 mi E of junct CR 8 & CR 19 (Rock Co.)	T103N R44W S8	R-Y
SD00-118	26-Jul-00	Rock River (off and main channel)	CR 63 bridge (Pipestone Co.), 0.5 mi W of CR 17	T105N R44W S8,17	R-Y
SD00-119	26-Jul-00	Elk Creek, old channel ponds	above CR 4 bridge, 2 mi W of Magnolia	T102N R44W S9	R-Y

Field Number	Date	Stream	Location	TRS	Status
SD00-120	27-Jul-00	Mound Creek	BMSF, between lower dam and bridge on CR 8	T103N R45W S24	R*-Y
SD00-121	1-Aug-00	County Ditch #1 (Martin Co.)	0.25 mi S of Hwy 4 & 0.75 mi W of CR 13	T102N R33W S12,13	n
SD00-122	1-Aug-00	County Ditch #11 (Martin Co.)	CR 22 bridge, 1 mi W of CR 23	T102N R32W S28	n
SD00-123	1-Aug-00	E. Fork DM River	Hwy 263 bridge, 1.25 mi S of CR 14 (Martin)	T101N R32W S13&(18)	n
SD00-124	1-Aug-00	E. Fork DM River	CR 13 bridge, 1.25 mi N of CR 8 (Martin)	T101N R32W S6&(1)	n
SD00-125	1-Aug-00	E. Fork DM River	CR 22 bridge, 1 mi W of CR 107 (Martin)	T102N R33W S20,21	n
SD00-126	1-Aug-00	DM River, unnamed trib of East Fork	1 mi N of CR 22 & 0.75 mi W of CR 103 (Martin)	T102N R33W S18,19	n
SD00-127	1-Aug-00	Judicial Ditch #11 (Jackson)	1 mi N of CR 4 & 0.5 mi W of CR 29	T101N R34W S14,23	n
SD00-128	1-Aug-00	DM River, unnamed trib	CR 23 Bridge, 0.5 mi SE of CR 4	T101N R34W S27,28	n
SD00-129	1-Aug-00	Stony Brook	US Hwy 71 bridge, 1.25 mi N of CR 4 (Jackson)	T101N R35W S23,24	n
SD00-130	1-Aug-00	DM River	CR 16 bridge, -6 mi N of Jackson, MN	T103N R35W S28	n
SD00-131	2-Aug-00	Okabena Creek	CR 9 bridge, 0.25 mi N of Okabena, MN	T103N R37W S7,8	n
SD00-132	2-Aug-00	Jack Creek	CR 9 bridge, 2 mi N of Okabena, MN	T104N R37W S31,32	n
SD00-133	2-Aug-00	East Graham Lake outlet	CR 7 bridge, 1.25 mi S of CR 24 (Jackson)	T104N R38W S34,35	n
SD00-134	2-Aug-00	East Graham Lake outlet	CR 16/24, 2 mi E of E. Graham Lk. (Nobles/Jackson bor	T104N R38W S30&(25)	n
SD00-135	2-Aug-00	Judicial Ditch #67 (Jackson)	CR 61 bridge, 0.75 mi N of Hwy 60	T103N R38W S17,18	n
SD00-136	2-Aug-00	Okabena Creek	CR 61 bridge, 0.5 mi S of CR 18 (Jackson)	T103N R38W S29,30	n
SD00-137	2-Aug-00	Okabena Creek	1 mi W of CR 1 & 0.5 mi S of CR 36 (Nobles)	T102N R39W S11,12	n
SD00-136	2-Aug-00	Elk Creek, unnamed trib	0.75 mi S of CR 16 & 1 mi W of Hwy 59 (Nobles)	T103N R40W S2	n
SD00-139	2-Aug-00	Jack Creek	CR 16 bridge, 0.5 mi W of CR 3 (Nobles)	T104N R39W S29,32	n
SD00-140	2-Aug-00	Judicial Ditch #26 (Nobles)	50 m N of Hwy 62, 2.5 mi E of Fulda, MN	T105N R39W S28	n
SD00-141	2-Aug-00	Judicial Ditch #12 (Nobles)	CR 18 bridge, 2.75 mi W of Hwy 59	T104N R40W S9,16	n
SD00-142	2-Aug-00	Jack Creek	CR 7, 1.25 mi N of CR 16 (Nobles)	T104N R40W S29,30	n
SD00-143	2-Aug-00	Jack Creek (headwaters)	1 mi N of CR 15 & 1 mi E of CR 13 (Nobles)	T104N R41W S30,31	n
SD00-144	2-Aug-00	Jack Creek, unnamed trib	0.5 mi E of CR 88 & 2 mi S of CR 2 (Murray/Nobles bor	T105N R41W S35&(2)	n
SD00-145	2-Aug-00	Jack Creek, unnamed trib	0.25 mi N of CR 2 & 2 mi W of CR 34 (Murray)	T105N R41W S22,23	n
SD00-146	2-Aug-00	Elk Creek, old channel ponds	above CR 4 bridge, 2 mi W of Magnolia	T102N R44W S9	R-Y
SD00-147	3-Aug-00	Mound Creek	BMSF, between lower dam and bridge on CR 8	T103N R45W S24	R*-Y
SD00-148	8-Aug-00	DM River, unnamed trib	CR 13 bridge, 1.75 mi W of CR 4 (Cottonwood)	T106N R36W S30,31	n
SD00-149	8-Aug-00	DM River, unnamed trib	CR 5 bridge, 0.5 mi N of CR 15 (Cottonwood)	T105N R37W S7,8	n
SD00-150	8-Aug-00	DM River	CR 7, 1.5 mi N of Hwy 62 (Cottonwood)	T105N R35W S20	n
SD00-151	8-Aug-00	Lime Creek	CR 3, 1.5 mi W of CR 42 (Murray)	T105N R39W S16,19	n
SD00-152	8-Aug-00	DM River	CR 42, 1.5 mi N of CR 6 (Murray)	T106N R39W S20,21	n
SD00-153	8-Aug-00	DM River (headwaters)	CR 38, N-side of Currie, MN	T107N R49W S17	n
SD00-154	8-Aug-00	Beaver Creek	1 mi E of Hwy 30/59, 1.5 mi N of CR 8 (Murray)	T106N R41W S2	n
SD00-155	8-Aug-00	Lime Creek, unnamed trib	CR 32, 1.5 mi S of Slayton, MN	T106N R41W S28	n
SD00-156	8-Aug-00	Lime Creek (headwaters)	0.25 mi E of Hwy 267, 1 mi N of CR 4 (Murray)	T105N R41W S4,9	n
SD00-157	9-Aug-00	Beaver Creek, unnamed trib	CR 28, 0.25 mi N of Hwy 30 (Murray)	T106N R42W S8,9	n
SD00-158	9-Aug-00	Beaver Creek, unnamed trib	1 mi S of Hwy 30, 1 mi E of CR 26 (Murray)	T106N R43W S14,24	n
SD00-159	9-Aug-00	Beaver Creek	CR 10, 2 mi W of Hwy 91 (Murray)	T107N R43W S14,23	n
SD00-160	9-Aug-00	County Ditch #20 (Murray)	CR 77, 0.5 mi E of CR 28	T107N R42W S21,28	n
SD00-161	9-Aug-00	Long Lake inlet	CR 23, at intersect. CR 29 & 5 (Murray-Lyon border)	T106N R42W S4&(33)	n
SD00-162	9-Aug-00	Unnamed creek between Long Lk. & Lk.	CR 61, 0.75 mi W of Hwy 59 (Murray)	T108N R41W S3,10	n
SD00-163	22-Aug-00	Rock River (off and main channel)	CR 15 (old 59) bridge, -4 mi S of Luverne, MN	T102N R45W S35	R*-Y
SD00-164	22-Aug-00	Rock River	bridge on CR 1, Rock Co.	T101N R45W S24	R*-Y
SD00-165	22-Aug-00	Beaver Creek	CR 17, 0.5 mi W of Beaver Creek, MN (Rock)	T102N R46W S21,26	N
SD00-166	22-Aug-00	Beaver/Little Beaver Creeks	1 mi S of CR 5, 2 mi E of CR 6 (Rock)	T102N R46W S11,12	R*-N
SD00-167	22-Aug-00	Little Beaver Creek	CR 5, 0.5 mi W of CR 11 (Rock)	T102N R45W S6,7	Y
SD00-168	22-Aug-00	Mound Creek	0.75 mi E of US75, 2 mi S of CR 7 (Rock)	T103N R45W S2,11	N
SD00-169	22-Aug-00	Rock River, unnamed trib	1 mi N of CR 8, 1 mi E of CR 9, 2.5 mi SW of Kenneth, M	T103N R44W S15,16	N
SD00-170	23-Aug-00	Rock River (off and main channel)	2 mi N & 1 mi E of junct CR 8 & CR 19 (Rock Co.)	T103N R44W S8	R-Y
SD00-171	23-Aug-00	Elk Creek (off and main channel)	CR 3 bridge, -1.75 mi N of Magnolia, MN	T102N R44W S1,2	R-Y
SD00-172	23-Aug-00	Kanaranzi Creek	CR 19, 0.5 mi S of CR 32 (Nobles)	T102N R43W S29	R*-Y
SD00-173	23-Aug-00	Little Rock River, West branch	CR 58, 1 mi E of CR 15 (Nobles)	T102N R42W S35	N
SD00-174	23-Aug-00	Little Rock River	CR 13, 0.75 mi N of CR 6 (Nobles)	T101N R41W S17,18	N
SD00-175	23-Aug-00	Kanaranzi Creek, East branch	0.75 mi E of CR 13, 2 mi S of CR 14 (Nobles)	T103N R41W S32	Y
SD00-176	23-Aug-00	Kanaranzi Creek	CR 68, 0.75 mi E of Hwy 91 (Nobles)	T103N R42W S7	Y
SD00-177	23-Aug-00	Champepedan Creek	Hwy 91, 2 mi N of CR 16 (Nobles)	T104N R42W S18&(13)	N
SD00-178	23-Aug-00	Chanaramble Creek	just S of CR 4, 2 mi W of Chandler, MN (Murray)	T105N R43W S3	Y
SD00-179	23-Aug-00	Rock River, unnamed trib	CR 16, 1.5 mi S of Hwy 30 (Pipestone)	T106N R44W S22	Y
SD00-180	23-Aug-00	Rock River, unnamed trib	0.5 mi S of Hatfield, MN	T106N R45W S36	Y
SD00-181	24-Aug-00	Rock River (off and main channel)	CR 63 bridge (Pipestone Co.), 0.5 mi W of CR 17	T105N R44W S8,17	R-Y