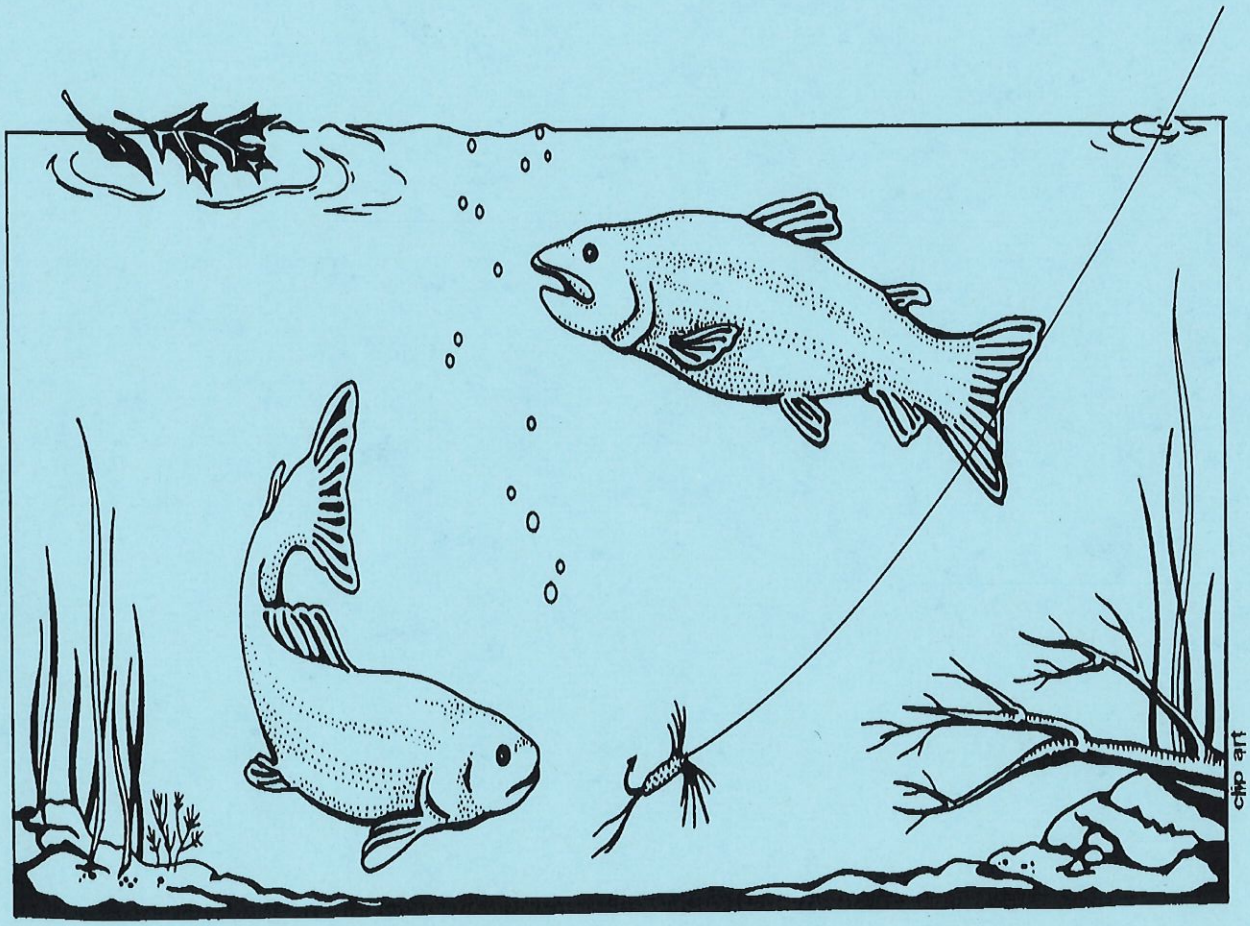
Stony Brook Water Quality Assessment



Cheryl A. Bougie
Wisconsin Department of Natural Resources
September 1997

STONY BROOK - Water Quality Assessment JULY 9, 1996
Conducted by C. Bougie, B. Johnson, & G. Cleereman
Watershed Number: MA05 South Branch Manitowoc River

PURPOSE: To assess water quality conditions, determine fish species inhabiting Stony Brook and to complete monitoring recommendations in the 1997 Manitowoc River Water Quality Management Plan Update. This survey will determine if Stony Brook is still capable of supporting a cold water fishery.

BACKGROUND: Stony Brook is a 6-mile cold, clear, hard water stream located in Calumet County. The stream flows primarily through agricultural lands with some wetlands and woodlands before discharging to the South Branch Manitowoc River. Stony Brook is listed in the Wisconsin Trout Streams Book as a class III trout stream containing brown trout (*Salmo trutta*), (WDNR 1980). Class III trout streams sustain no natural reproduction and require annual stocking of legal-size fish for sport fishing (between 7 and 13 inches).

Brown trout were stocked in Stony Brook in 1939, 40, 47, and every year from 1973-1994 (WDNR 1996). For additional stocking information refer to Attachment A, Fish Stocking Report for Stony Brook. During the 1970's, Fisheries Management implemented a brown trout stocking program to provide a trout fishery in the area. The stream does not support the natural reproduction of brown trout; however, fish managers thought there may have been some carry over of stocked fish. Many farm ponds were developed near the headwaters of Stony Brook, which altered the hydrology of the springs and wetlands in that area (Meyers, 1996). This may have decreased the flow and increased temperatures in the headwater portion of the stream. Stocking of brown trout ceased in 1996 due to the lack of data on the stream. In order to determine whether this stream could be managed as a cold water fishery, additional water quality data was needed. Water quality monitoring was conducted in July-August 1996 to gather additional data.

METHODS: Four stations (see Figure 1) were identified and surveyed with a backpack shocker. Sites were monitored above and below the bridge crossings. Most of the fish species collected were identified in the field. Becker (1983) was used to identify any unknown species not identified by the regional fisheries biologist.

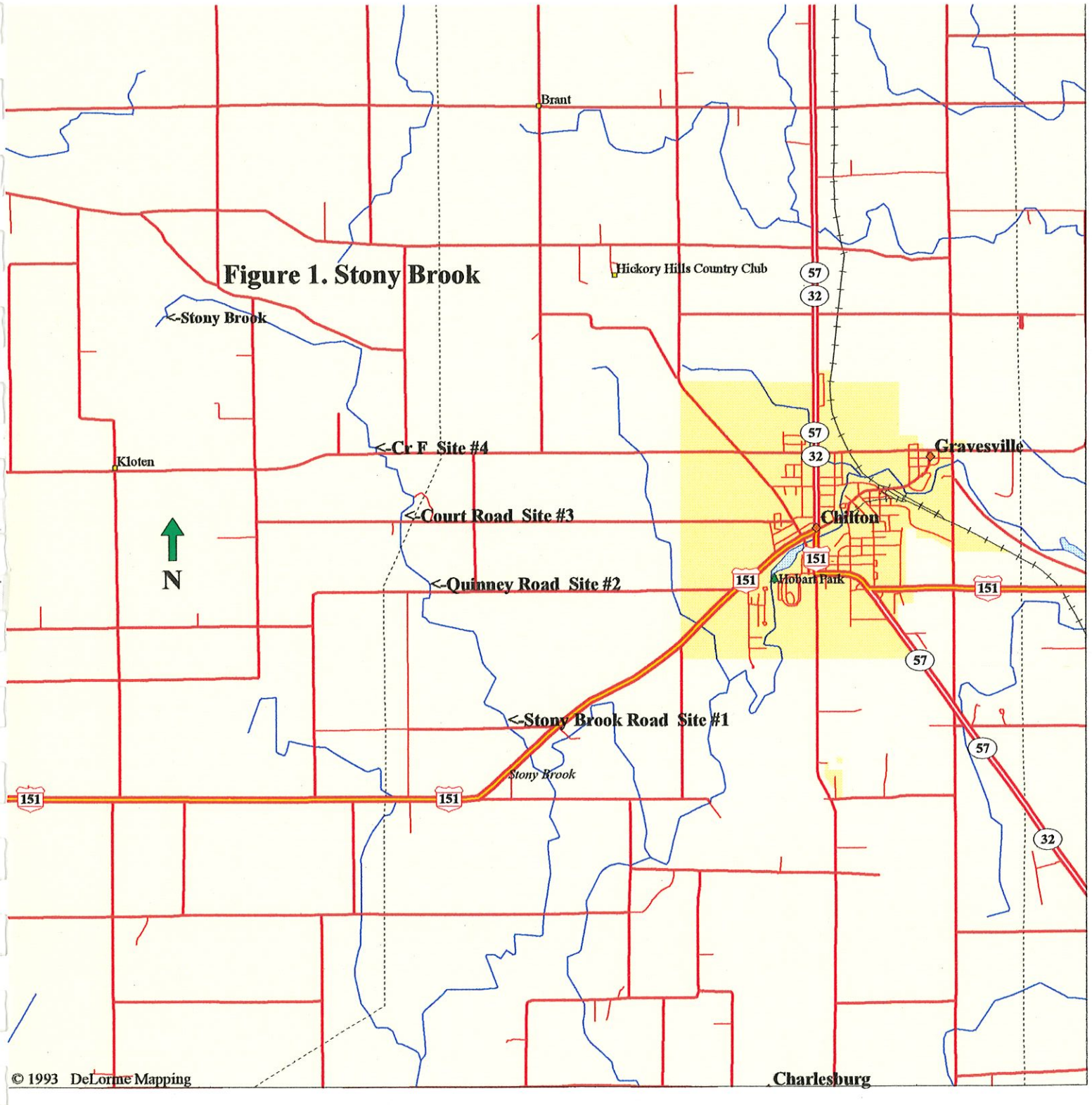
Stream habitat conditions were evaluated at the four stations and recorded on the Stream Habitat Evaluation Form # 3200-68 (Ball 1982). This rates the quality and quantity of habitat available in the stream for aquatic life. Other aquatic life were also reported (i.e., plants and crustaceans).

Two Hydrolab Recorder Multiprobes were deployed in Stony Brook during typical summer low flow conditions at two road crossings: Stony Brook Road and Court Road. The meters began recording pH, dissolved oxygen, temperature, and conductivity on Friday, July 26, 1996. The meters were removed from the stream sites on August 1, 1996, seven days later.

Macro invertebrates were collected at two road crossings: Stony Brook Road and Court Road. Samples were collected using a D-frame net and methods outlined in Hilsenhoff (1977-87). Lab Form # 3200-81 was used and samples were sent to the University of Wisconsin Stevens Point Entomology Lab for identification. Biotic Index Values were used to determine the degree of organic pollution in Stony Brook and the species list was used to note the food source available to the fishery.

Sites:

1. Stony Brook Road
2. Quinney Road
3. Court Road
4. County Hwy. F



LEGEND

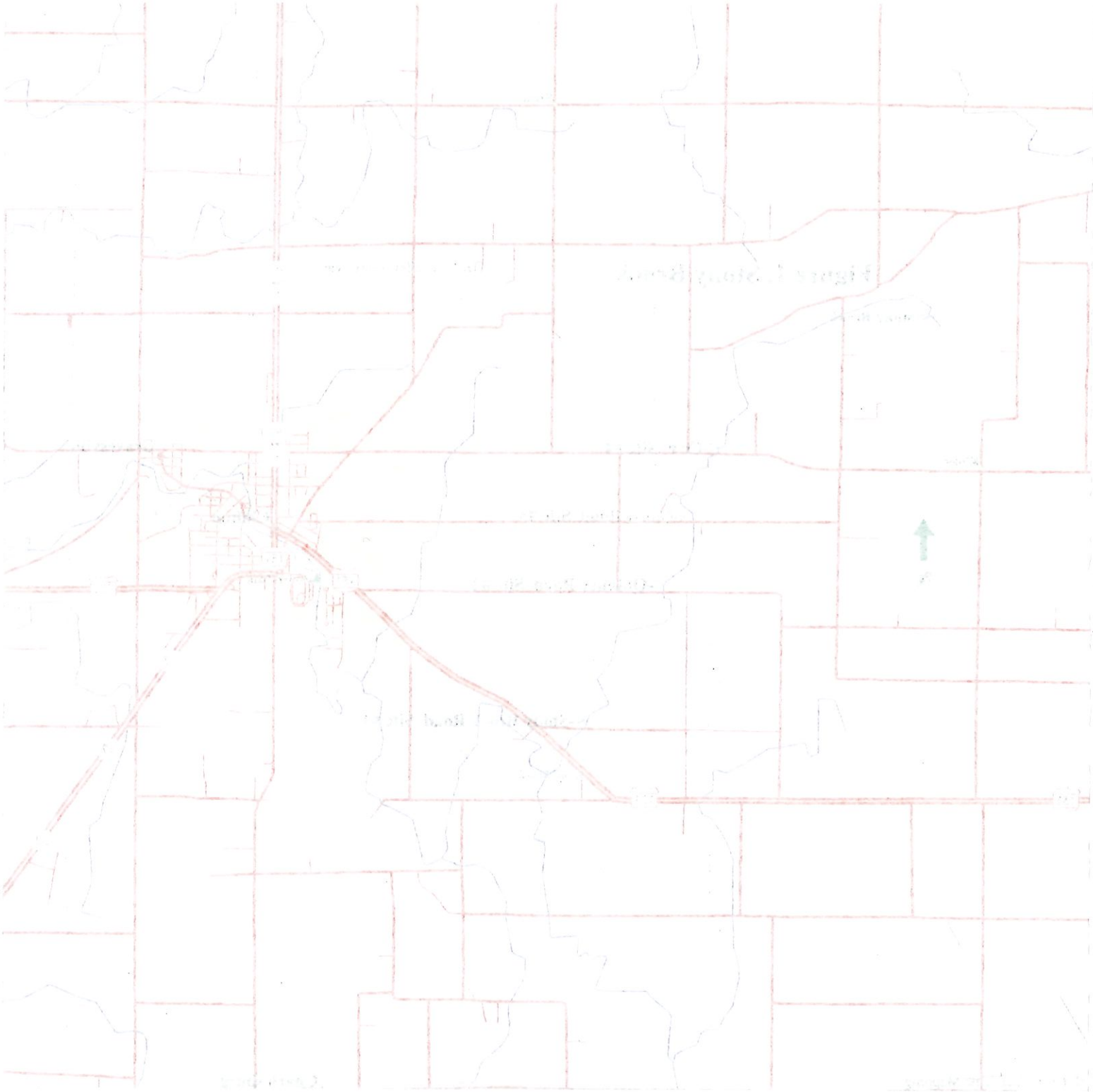
- State Route
- Geo Feature
- Town, Small City
- Park
- US Highway
- Population Center
- Street, Road
- Major Street/Road
- Street, Road
- State Route
- US Highway
- Railroad
- River
- Intermittent River

Scale 1:62,500 (at center)

1 Miles

2 KM

Mag 13.00
Fri Oct 17 10:06:31 1997



RESULTS: Many warm water **fish species** were found as well as one cool water species, the brook (five-spine) stickleback, (*Culaea inconstans*) (Table 1). Stony Brook contains minnows, darters, and crayfish that could support larger size brown trout. Diet studies indicate that brown trout feed on young trout sculpins, minnows, darters and lampreys (Becker 1983). The brown trout stocked in Stony Brook range from 7-13 inches in size (Attachment A). There were no trout observed during this survey. A local resident reported that youths in the area had caught five trout at the Court Road stream crossing in the summer of 1995. These may have been the trout which were stocked on April 21, 1994.

Many of the same species were recorded in Stony Brook during a fisheries survey conducted on July 30, 1946. Species recorded in 1946 included: northern pike, darters, suckers, dace, northern creek chubs, minnows and mud minnows (WDNR 1946). Additional studies conducted in 1961 and 1980 recorded similar species. These include: (1961) Johnny darter, white sucker, longnose dace, creek chub, central mud minnow, bluntnose minnow and (1980) brown trout, Johnny darter, blackside darter, white sucker, bluntnose minnow, fathead minnow, brook stickleback, and central mud minnow (WDNR 1986). Brown trout recorded during the 1980 study were thought to have been carried over from the 1979 stocking. This indicates that the stream contains sufficient forage diversity to sustain a brown trout fishery.

Table 1. Species Observed **X = Too Numerous to Count**

FISH SPECIES OBSERVED	STONY BR ROAD	QUINNEY ROAD	COURT ROAD	COUNTY HWY. F
Largemouth Bass (YOY) (*Micropterus salmoides*)		X		
Northern Pike (*Esox lucius*)	X			
Yellow Perch (*Perca flavescens*)	X			
Blackside Darter (*Percina maculata*)	X	X	X	
Johnny Darter (*Etheostoma nigrum*)	X	X	X	
White Sucker (*Catostomus commersoni*)	X	X	X	
Blacknose Dace (*Rhinichthys atratulus*)	X	X	X	
Bluntnose Minnow (*Pimephales notatus*)	X	X	X	X
Creek Chub (*Semotilus artomaculatus*)	X	X	X	X
Fathead Minnow (*Pimephales promelas*)	X		X	X
(Brook) Five-Spine Stickle Back (*Culaea inconstans*)	X	X	X	X
Central Mud Minnow (*Umbra limi*)	X	X	X	X

CRAYFISH OBSERVED				
Fantail (*Orconectes virilus*)	X	X		

Stream habitat evaluations ranged from good to excellent (Table 2). There were some notable nonpoint source pollution impacts to the stream at the Stony Brook Road site and the CTH F site. The site at Stony Brook Road had a feedlot located adjacent to the stream with a small canary grass buffer. The turbid water indicated that there may be some impact from the feedlot. Slight siltation occurred at the CTH F site where there was erodible cropland with little buffering. Just upstream of the cropped area, *Ludwigia palustris var. Americana* (false loosestrife) was very prolific. The plant can be found around ponds and lakes, in roadside ditches, in mud along streams, springfed streams, in sloughs, in swamps, and sometimes in shallow water (USGS 1997). It usually sprawls on wet ground or partly under water and it has a similar appearance when it grows out of the water (Hotchkiss 1970). It is unknown if this species is an indicator of good water quality. Muskrats are known to feed on the roots of this aquatic plant (USGS 1997). Overall, the four sites had sufficient bank cover and stable habitat.

Table 2. Stream Habitat Evaluations

Station	Stream Habitat	Comments
Stony Brook Road	73 = Good	water somewhat turbid, grassed banks, feedlot near the stream, good riffles and runs, flow, good substrate
Quinney Road	68 = Excellent	good bank cover, clear water, good riffles, runs and pools
Court Road	60 = Excellent	nice wooded area, good riffle and pools, slight siltation above bridge, great habitat, good substrate
County HWY. F	96 = Good	good bank cover, wood corridors with cropland with little buffers, slight siltation, large amounts of *Ludwigia palustris var americana* (false loosestrife)
Habitat Key: <70 = Excellent, 71-129 = Good, 130-200 = Fair, >200 = Poor		

The **biotic index values** ranged from very good to good, indicating possible slight to some organic pollution in Stony Brook (Table 3). Insects identified include: sowbugs (Amphipoda), scuds (Isopoda), flies (Diptera), beetles (Coleoptera), worms (Oligochaeta), mayflies (Ephemeraptera), caddisflies (Trichoptera), and stoneflies (Plecoptera). The species found in Stony Brook at both sites indicate good water quality as well as a good food source for trout. According to Becker, brown trout under 229 mm (9 inches) feed mainly on aquatic invertebrates during the cold months, whereas during the warm months a large part of their diet consists of terrestrial insects and worms. Brown trout feed mainly on aquatic invertebrates while they are small (229 mm) but as they grow in length they turn to a crayfish and fish diet. *Orconectes virilus* (fantail crayfish) were also observed at two sites: Stony Brook Road and Quinney Road.

In addition to suitable water quality and availability of spawning habitat, the size and density of available prey have been suggested as factors limiting abundance and growth rates of stream dwelling trout (Bannon and Ringler 1985). Species composition and size of available prey vary diurnally and seasonally (Elliot 1967, Bannon and Ringler 1986, Allan 1978); therefore, this studies macroinvertebrate results from a single sample date can only indicate the type of food source available to the fishery. However, several macroinvertebrate taxa collected from the two sample sites are known to be principal food items of various trout species.

Asellus (Isopoda) was the most dominant taxa collected from both sites. While not a preferred food, *Asellus* is known to be consumed by trout (Angradi and Griffith 1990, Mueller 1995). *Baetis* (Ephemeroptera), among the third most abundant taxa from both sample sites, is a preferred prey of brown trout (*S. Trutta*) (Bannon and Ringler 1986, Elliott 1967) and rainbow trout (*Oncorhynchus mykiss*) (Angradi and Griffith 1990). Pleycoptera, Trichoptera, Ephemeroptera, and Chironomidae are important brown trout foods (Elliott 1967). Angradi and Griffith (1990) found Trichoptera, Ephemeroptera and Diptera dominating stomach contents of rainbow trout collected from the Snake River, Idaho. The Court Road Bridge site contained 51% Ephemeroptera, Pleycoptera, Trichoptera and Diptera (EPTD) individuals while the Stony Brook Road site contained only 13% EPTD individuals, possibly due to the sites somewhat poorer habitat (Table 2).

Table 3. Biotic Index Values

Station	Biotic Index Values	% Substrate Sampled
Stony Brook Road	4.13 = Very Good	80 Rubble, 10 Gravel, 10 Silt
Court Road	4.60 = Good	10 Boulder, 50 Rubble, 10 Gravel, 10 Sand, 10 Silt

Biotic Index Value Key:

Value	Water Quality	Degree of Organic Pollution	Substrate Type
<3.50	= Excellent	No apparent organic pollution	Boulders >10.0"
3.51-4.50	= Very Good	Possible slight organic pollution	Rubble 2.5-10.0"
4.51-5.50	= Good	Some organic pollution	Gravel 0.1-2.5
5.51-6.50	= Fair	Fairly significant organic pollution	
6.51-7.50	= Fairly Poor	Significant organic pollution	
7.51-8.50	= Poor	Very significant organic pollution	
8.51-10.0	= Very Poor	Severe organic pollution	

The **stream flow** was very good for this time of year and the **water temperatures** were cold, ranging from 13.48-16.99 C (56.3-62.6 F) at Stony Brook Road and 14.02-18.88 C (57.20-65.98 F) at Court Road (Attachments B and C). Warmer temperatures recorded at Court Road may be accounted for by farm ponds which were developed near the headwaters of Stony Brook. Wetlands and springs located in the headwater areas would normally provide better flows and cooler temperatures to the stream. The temperatures recorded are indicative of streams which can support a brown trout fishery. **Air temperatures** recorded for the city Chilton ranged from 65-78 F during the day and 50-61 F during the night (National Weather Service 1996).

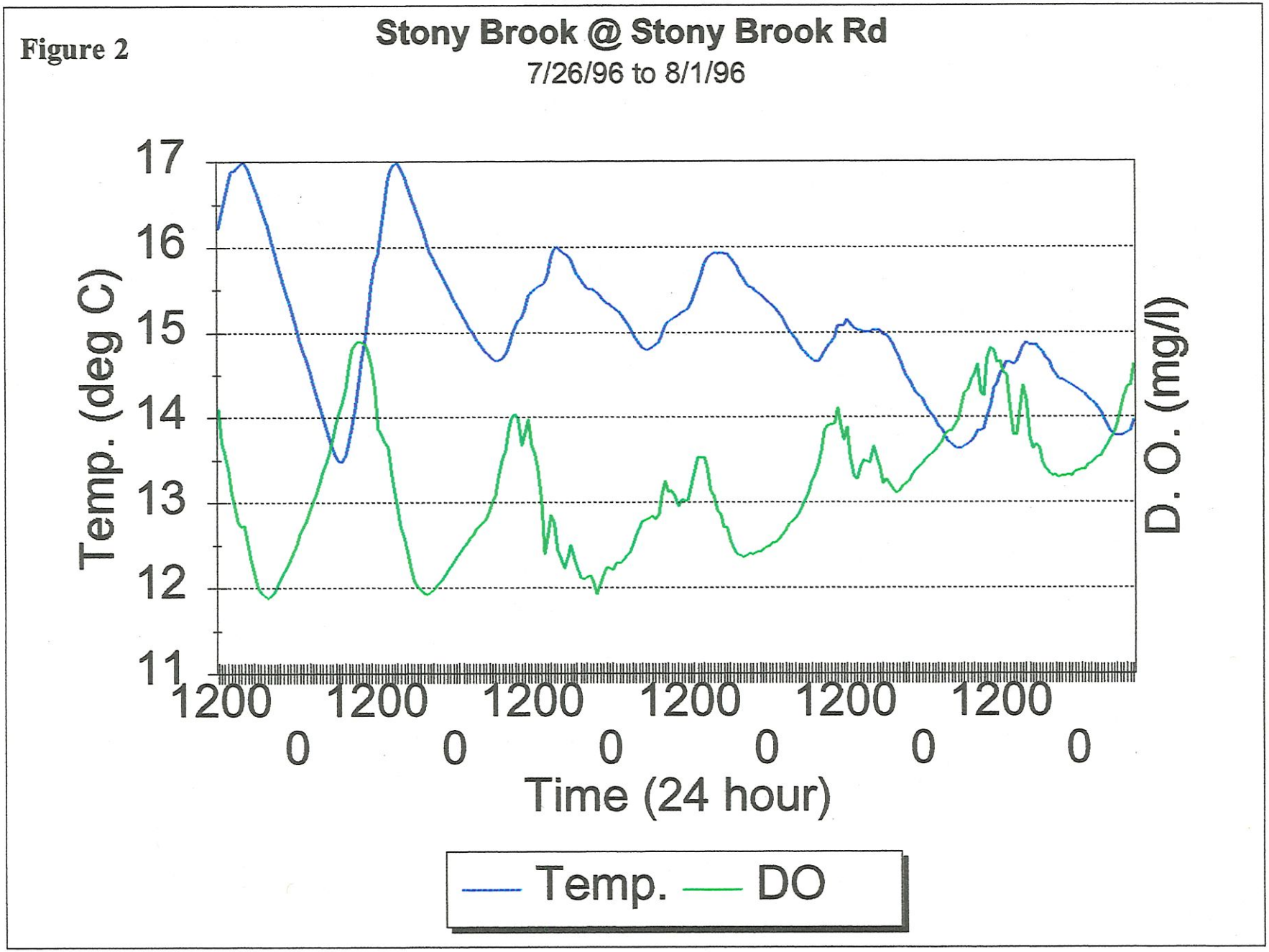
Dissolved oxygen (D.O.) levels were very good with the exception of one reading recorded at Court Road, 4.43 mg/l. This level fell below the state standard for fish and aquatic life under Wisconsin Administrative Code NR 102.04 (4) (e) (2) which states streams classified by the Department of Natural Resources (Wisconsin Trout Streams publication 6-3600 (80)) or as great lakes or cold water communities may not be altered from natural background temperature and dissolved oxygen levels to such an extent that trout populations are adversely affected. Dissolved oxygen in classified trout streams shall not be artificially lowered to less than 6.0 mg/l at any time, nor shall the dissolved oxygen be lowered to less 7.0 mg/l during the spawning season. Dissolved oxygen levels ranged from 11.90-14.95 mg/l at Stony Brook Road and 4.43-10.88 mg/l at Court Road (Figures 2 & 3). The continuous D.O. levels recorded are typical levels of streams which can support a brown trout fishery. However, D.O. levels may sag during spring runoff, causing the fish to move from Stony Brook into the South Branch of the Manitowoc River, and this maybe the reason why no trout were recorded during this survey.

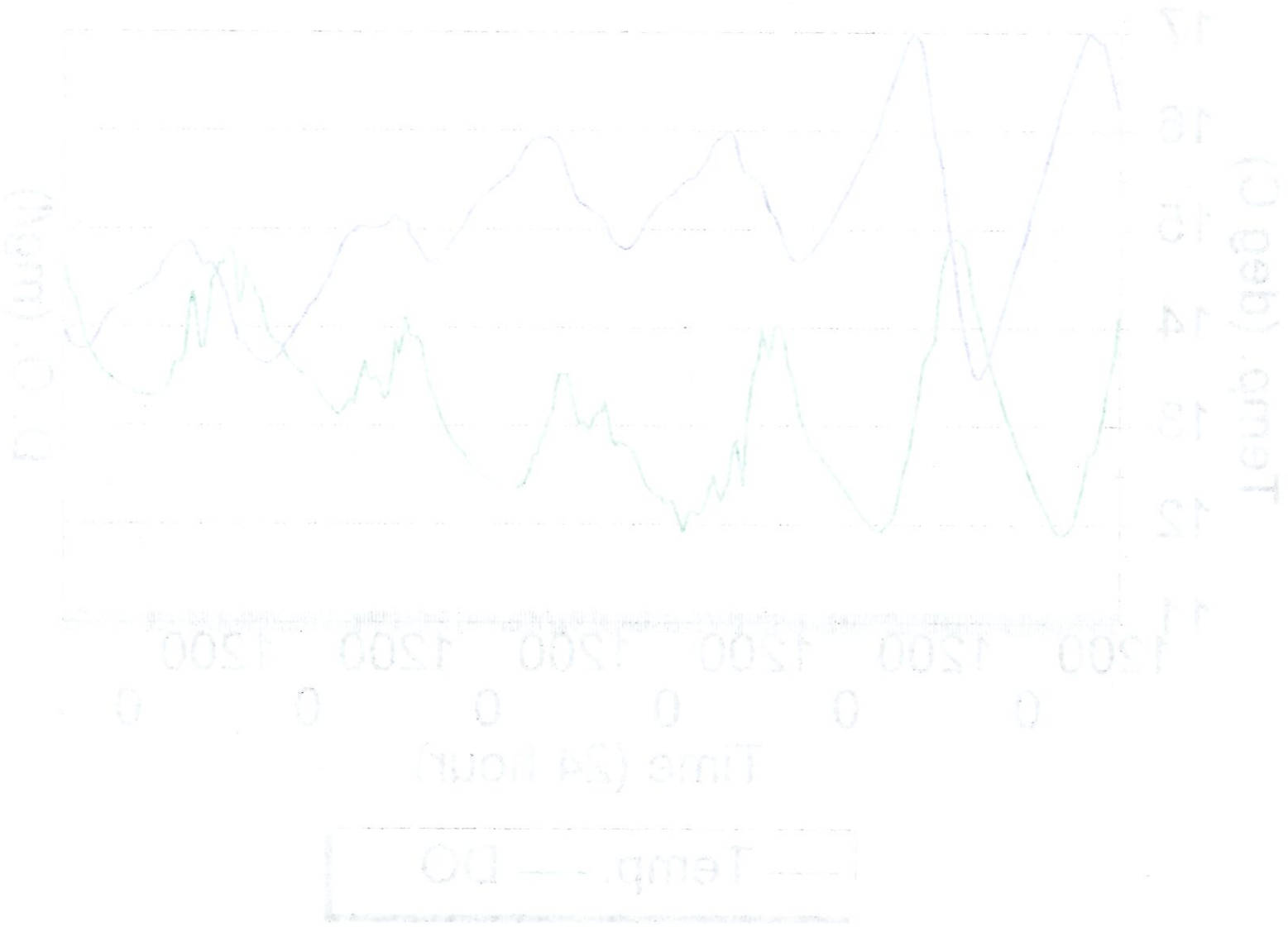
CONCLUSIONS: There were no trout reported during this survey. Stream flows, habitat, dissolved oxygen levels and water temperatures indicate that a trout fishery (Class III) could be managed in this stream. The in-stream habitat was good to excellent with good bank cover. There were some notable sources of nonpoint source pollution impacts to the stream. A nonpoint source watershed assessment was conducted in 1996 to determine a priority watershed ranking. The survey resulted in ranking the surface waters in this watershed "high" for selection under the Wisconsin Nonpoint Source Pollution Abatement Program (WDNR 1997). Since there were many rain events in June and July water levels were suspected to be higher than normal. Precipitation data from the National Weather Service showed 4.5" of rainfall for the month of July 1996, and 3.0" of rainfall for July 1997. Additional surveys should be conducted by the fisheries management staff, to determine the trout fishery potential in Stony Brook. If the stream is not capable of supporting a cold water fishery, the WDNR publication, *Wisconsin Trout Streams*, should be updated to reflect the correct classification.

This report fulfills the *Manitowoc River Basin Water Quality Management Plan* recommendations to monitor Stony Brook to determine the potential biological use and to determine if the stream is still capable of supporting a cold water fishery. Potential use indicates biological use and trout stream class that a stream or stream segment could achieve if it was well managed and pollution sources were controlled. Brook stickleback (C. Inconstans), a cold water species was found at all four stations monitored. Historically this stream has been managed as a class III trout stream and current water quality parameters indicate that it supports cold water species. The stream has a biological use of cold class III, the stream sustains no natural reproduction and requires annual stockings of legal-size fish for sport fishing. The potential biological use should be changed in the next update of the *Manitowoc River Basin Water Quality Management Plan*.

****Special thanks go to WT & FMHP staff**: Charmaine Robaidek, Brad Johnson, Scott Szymanski, Lee Meyers and Dave Bougie.

Figure 2


Stony Brook @ Stony Brook Rd
7/26/96 to 8/1/96
Temp. (deg C)
17
16
15
14
13
12
11
D. O. (mg/l)
1200
0
Time (24 hour)
Temp.
DO


Temp
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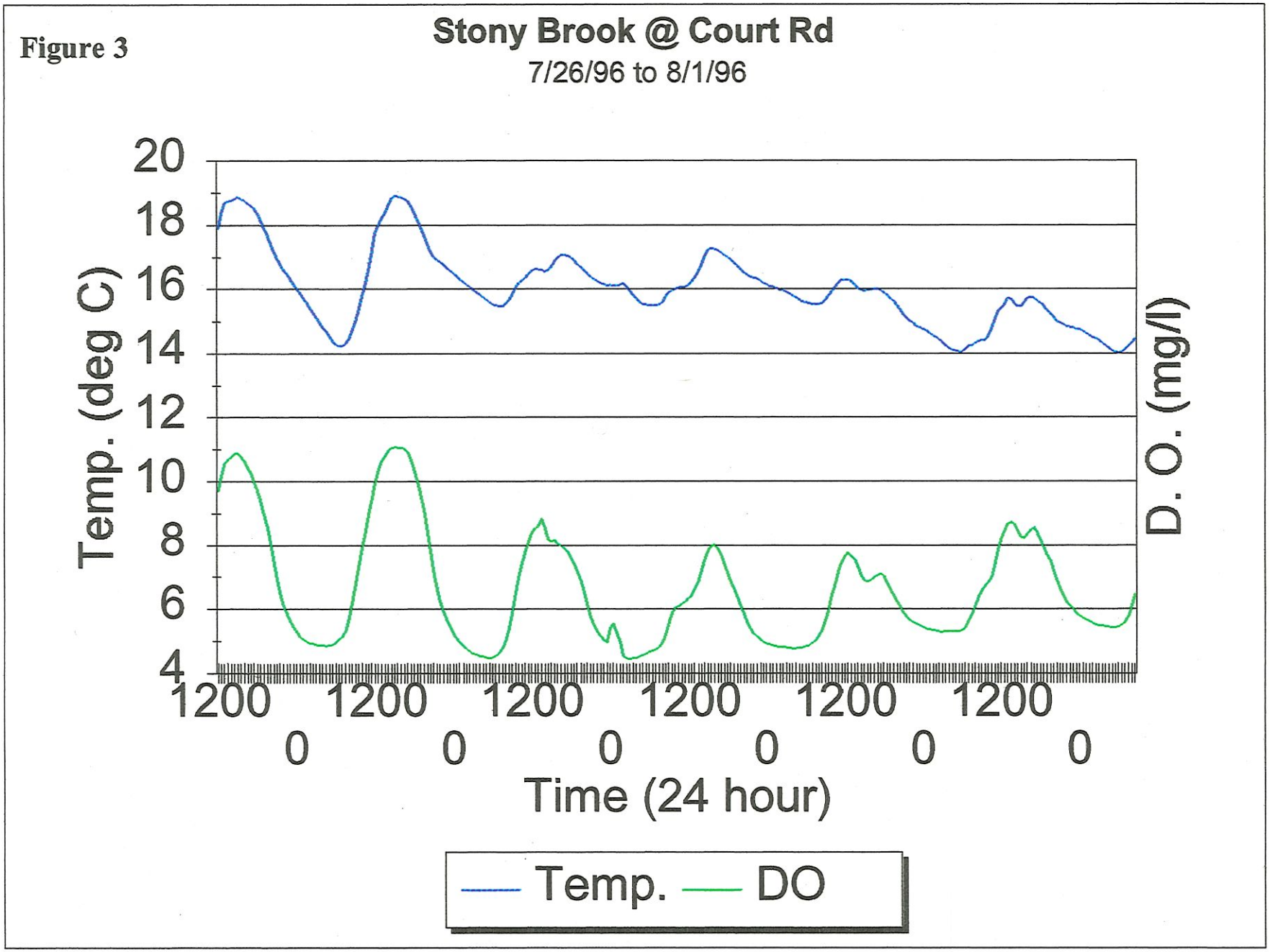
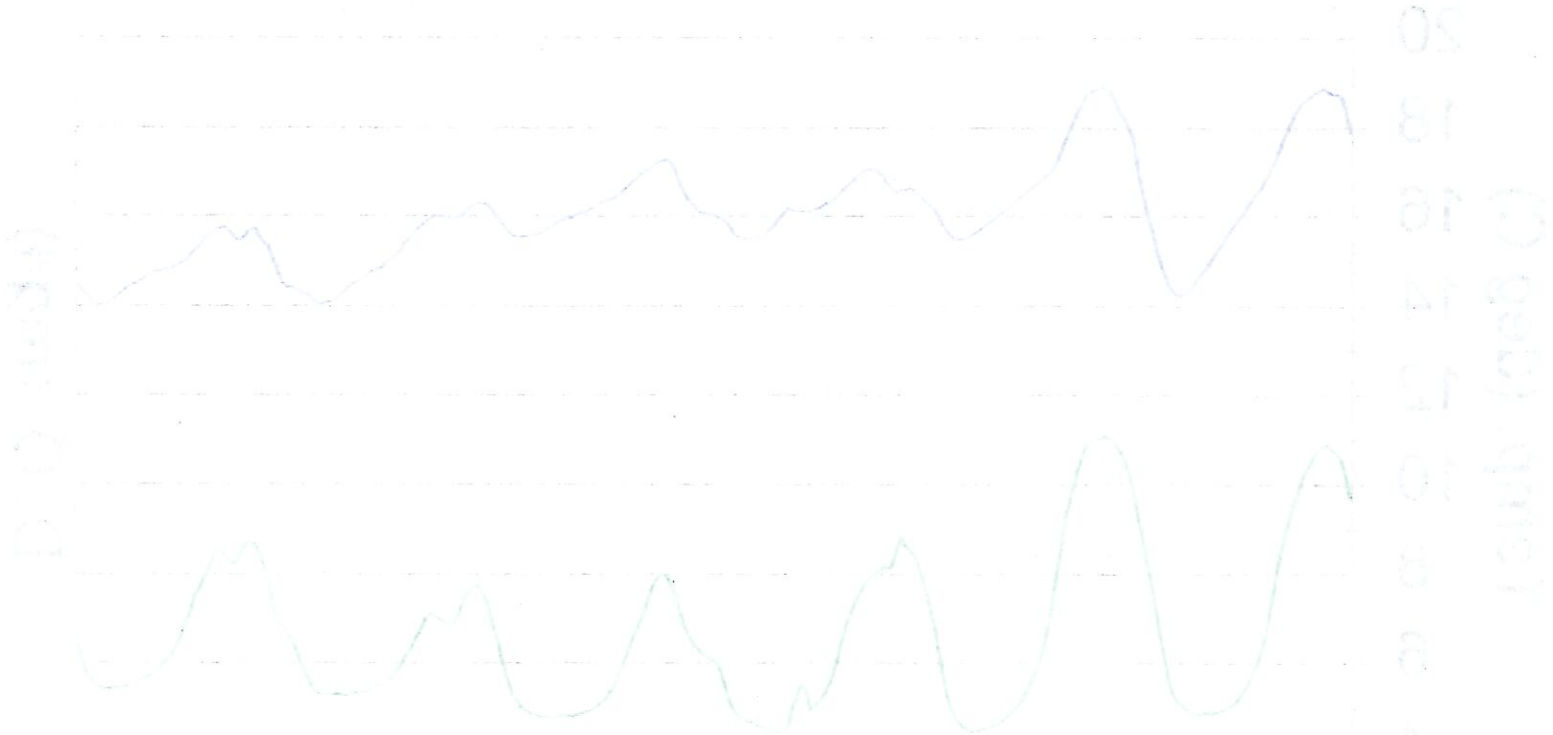
Time (24 hour)

Figure 3


Stony Brook @ Court Rd
7/26/96 to 8/1/96
Temp. (deg C)
D. O. (mg/l)
20
18
16
14
12
10
8
6
4
1200
0
Time (24 hour)
Temp.
DO



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Water Body History - Stoney Brook Creek - Calumet Co. - MWBC 815000

Attachment A

No.	CTY	FROM	TO	MWBC	DATE	SPEC	NUMBER	LBS	SIZE	COMMENTS	TEMP	DRIVER	STRAIN
1	08		Stoney Brook creek	81500	01/01/39	I21	2000		fgl				
2	08		Stoney Brook creek	81500	01/01/40	I21	2000		fgl				
3	08		Stoney Brook creek	81500	01/01/47	I22	600		ylg				
4	08	Green lake	Stoney Brook creek	81500	04/23/73	I21	200	67	9-13	excellent,via Wild Rose	55	M.Schrage	
5	08	Wild Rose hatch.	Stoney Brook creek	81500	04/16/74	I21	300	68	8	ylg	46	R.Tetzlaff	
6	08	Wild Rose hatch.	Stoney Brook creek	81500	04/17/75	I21	300	71	8	ylg	48	R.Tetzlaff	
7	08	Wild Rose hatch.	Stoney Brook creek	81500	04/21/76	I21	300	67	8	ylg	50	R.Tetzlaff	
8	08	Wild Rose hatch.	Stoney Brook creek	81500	04/14/77	I21	300	70	8		51	Richard Tetzloff	
9	08	Wild Rose hatch.	Stoney Brook creek	81500	04/20/78	I21	300	76	8	ylg	42	R.Tetzlaff	
10	08	Wild Rose hatch.	Stoney Brook creek	81500	04/30/79	I21	300	60	9	ylg	42	R.Tetzlaff	
11	08	Wild Rose hatch.	Stoney Brook creek	81500	04/24/80	I21	300	70	9	Excellent	45	Larry Carpenter	
12	08	Wild Rose hatch.	Stoney Brook creek	81500	04/28/81	I21	300	60	8	Excellent	48	Larry Carpenter	
13	08	Wild Rose hatch.	Stoney Brook creek	81500	04/21/82	I21	300	67	7	ylg,excellent	42	T.Carpenter	
14	08	Wild Rose hatch.	Stoney Brook creek	81500	05/04/83	I21	300	75	9	ylg,excellent	54	T.Carpenter	
15	08	Token creek	Stoney Brook creek	81500	04/23/84	I21	300	105	10	excellent ylg	40	Mike Schrage	
16	08	Wild Rose hatch.	Stoney Brook creek	81500	04/25/85	I21	300	120	9	ylg,excellent	56	T.Carpenter	
17	08	Wild Rose hatch.	Stoney Brook creek	81500	04/26/86	I21	300	100	9	excellent ylg	56	Terry Carpenter	
18	08	Wild Rose hatch.	Stoney Brook crrek	81500	04/28/86	I21	300	100	9	ylg,excellent	56	T.Carpenter	
19	08	Wild Rose hatch.	Stoney Brook creek	81500	04/23/87	I21	300	88	10	ylg,excellent	47	Gary Kubenik	
20	08	Wild Rose hatch.	Stoney Brook creek	81500	05/02/88	I21	300	83	10	ylg,excellent	55	Gary Kubenik	
21	08	Wild Rose hatch.	Stoney Brook creek	81500	04/26/89	I21	300	77	9	ylg,excellent		K.Yohm	
22	08	Wild Rose hatch.	Stoney Brook creek	81500	04/26/90	I21	300	80	9	ylg,excellent	64	K.Yohm	
23	08	Wild Rose hatch.	Stoney Brook creek	81500	04/22/91	I21	250	52	9	ylg BNWR(WR)90DWR very good	51	R.Adams	WR
24	08	Wild Rose hatch.	Stoney Brook creek	81500	04/20/92	I21	300	75	8.5	ylg,4/lb,BnWr(Wr)91DWr	56	Guy Willman	WR
25	08	Wild Rose hatch.	Stoney Brook creek	81500	04/27/93	I21	300	54	7.6	ylg,BnWr92DWr 5.6/lb	44	Randy Larson	WR
26	08	Wild Rose hatch.	Stoney Brook creek	81500	04/21/94	I21	300	48	7.3	Bn-Wr-93-D-Wr, 6.2/lb	44	Rich Klett	WR

Stony Brook @ Stony Brook Road

Attachment B

Date MMDDYY	Time HHMMSS	Temp. deg. C	pH units	Cond. ms/cm	DO % sat.	DO mg/l	Batt volts
72596	90000	14.62	8.16	747	147.5	14.95	12.6
	93000	14.85	8.16	747	146.2	14.75	12.6
	100000	15.08	8.17	747	146.4	14.69	12.6
	103000	15.35	8.17	748	146.2	14.59	12.5
	110000	15.62	8.18	748	145.9	14.48	12.5
	113000	15.92	8.19	747	145.3	14.33	12.5
	120000	16.22	8.19	748	143.9	14.1	12.5
	123000	16.39	8.19	748	140.4	13.71	12.5
	130000	16.55	8.19	748	139.5	13.57	12.5
	133000	16.74	8.2	748	138	13.38	12.5
	140000	16.89	8.2	747	135.7	13.11	12.5
	143000	16.89	8.19	748	134.1	12.95	12.5
	150000	16.94	8.19	747	132.3	12.77	12.5
	153000	16.97	8.19	747	131.8	12.72	12.5
	160000	16.99	8.2	747	132	12.73	12.4
	163000	16.92	8.19	748	129.3	12.49	12.4
	170000	16.81	8.18	749	127.1	12.3	12.4
	173000	16.71	8.17	748	125.3	12.16	12.4
	180000	16.62	8.17	749	123.6	12.01	12.4
	183000	16.49	8.16	749	122.5	11.94	12.4
	190000	16.37	8.15	749	121.9	11.91	12.4
	193000	16.25	8.15	749	121.3	11.88	12.3
	200000	16.1	8.14	749	121.2	11.9	12.4
	203000	15.97	8.14	749	121.2	11.94	12.4
	210000	15.83	8.14	748	121.7	12.02	12.3
	213000	15.7	8.14	748	122.1	12.1	12.4
	220000	15.57	8.13	748	122.4	12.17	12.3
	223000	15.43	8.14	748	122.9	12.25	12.3
	230000	15.32	8.13	748	123.5	12.33	12.3
	233000	15.18	8.13	747	123.9	12.42	12.4
72796	0	15.05	8.12	747	124.4	12.5	12.3
	3000	14.9	8.13	747	125.3	12.63	12.3
	10000	14.79	8.12	747	125.7	12.7	12.3
	13000	14.67	8.12	747	126.4	12.8	12.3
	20000	14.54	8.12	746	127	12.91	12.3
	23000	14.4	8.12	746	127.7	13.01	12.3
	30000	14.27	8.12	746	128.2	13.1	12.3
	33000	14.14	8.12	746	129	13.22	12.3
	40000	14.01	8.12	745	130	13.36	12.2
	43000	13.87	8.12	745	130.6	13.47	12.2
	50000	13.74	8.12	745	131.5	13.59	12.2
	53000	13.63	8.13	745	132.7	13.75	12.2
	60000	13.54	8.13	745	134.1	13.92	12.2
	63000	13.48	8.13	745	135.2	14.06	12.2
	70000	13.48	8.14	745	136.3	14.17	12.1
	73000	13.56	8.14	745	138.2	14.35	12.2
	80000	13.73	8.16	744	141.3	14.61	12.2
	83000	13.91	8.17	744	143.7	14.8	12.2
	90000	14.12	8.18	744	145.1	14.87	12.2
	93000	14.39	8.18	744	146.2	14.9	12.2
	100000	14.67	8.19	744	147	14.89	12.2
	103000	14.93	8.2	744	147.6	14.87	12.2
	110000	15.23	8.2	744	147.6	14.77	12.2
	113000	15.57	8.21	744	147.1	14.61	12.1
	120000	15.82	8.2	743	145.1	14.34	12.2
	123000	15.9	8.2	743	140.6	13.87	12.2
	130000	16.19	8.21	744	140.7	13.8	12.2
	133000	16.49	8.22	744	140.6	13.7	12.2
	140000	16.77	8.23	743	140.9	13.65	12.3
	143000	16.91	8.22	743	138.4	13.37	12.2
	150000	16.96	8.22	743	136.1	13.13	12.3

	153000	16.99	8.22	744	134.1	12.93	12.3
	160000	16.92	8.21	744	131.5	12.7	12.3
	163000	16.84	8.21	744	130	12.57	12.2
	170000	16.72	8.2	745	127.9	12.4	12.2
	173000	16.6	8.19	749	125.7	12.21	12.2
	180000	16.5	8.19	747	123.9	12.07	12.2
	183000	16.4	8.18	745	123.1	12.01	12.2
	190000	16.3	8.18	746	122.4	11.97	12.2
	193000	16.17	8.17	746	121.6	11.93	12.2
	200000	16.03	8.16	746	121.2	11.92	12.2
	203000	15.93	8.16	745	121.2	11.95	12.2
	210000	15.87	8.16	745	121.4	11.98	12.2
	213000	15.78	8.16	745	121.6	12.03	12.2
	220000	15.72	8.16	745	121.8	12.06	12.2
	223000	15.63	8.16	744	122.1	12.12	12.2
	230000	15.55	8.16	744	122.5	12.18	12.2
	233000	15.48	8.15	744	123	12.24	12.2
72896	0	15.4	8.15	744	123.2	12.29	12.2
	3000	15.33	8.15	744	123.7	12.35	12.2
	10000	15.27	8.15	743	124	12.4	12.2
	13000	15.18	8.15	743	124.5	12.47	12.1
	20000	15.12	8.15	743	124.7	12.51	12.1
	23000	15.05	8.15	743	125.2	12.57	12.1
	30000	15	8.15	742	125.4	12.61	12.1
	33000	14.93	8.15	742	125.9	12.68	12.1
	40000	14.88	8.15	742	126.1	12.71	12.1
	43000	14.82	8.14	742	126.4	12.76	12.1
	50000	14.77	8.14	742	126.7	12.8	12.1
	53000	14.74	8.14	742	127.4	12.89	12.1
	60000	14.69	8.15	741	128.4	13	11.9
	63000	14.67	8.15	740	129.1	13.08	12.2
	70000	14.67	8.16	740	131.4	13.31	12.1
	73000	14.69	8.16	740	133.4	13.51	12.1
	80000	14.74	8.17	740	134.5	13.6	12.1
	83000	14.82	8.18	740	137.2	13.85	12.1
	90000	14.95	8.19	739	139	14	12.1
	93000	15.05	8.2	739	139.7	14.04	12
	100000	15.13	8.2	739	139.4	13.98	12.1
	103000	15.17	8.19	739	136.4	13.67	12.1
	110000	15.27	8.2	739	138.1	13.81	12
	113000	15.42	8.21	738	140.3	13.98	12.1
	120000	15.47	8.21	738	137.4	13.68	12.1
	123000	15.5	8.21	738	136.5	13.58	12.1
	130000	15.53	8.2	738	134.8	13.41	12.1
	133000	15.55	8.2	724	131	13.02	12.1
	140000	15.58	8.17	720	124.7	12.39	12.1
	143000	15.67	8.17	719	127.2	12.61	12
	150000	15.87	8.18	710	130.1	12.85	12.1
	153000	15.97	8.17	705	129.5	12.76	12
	160000	16	8.15	696	126.2	12.43	11.9
	163000	15.95	8.13	712	125	12.32	12.1
	170000	15.92	8.11	705	123.9	12.22	12
	173000	15.9	8.12	709	125.1	12.34	12
	180000	15.87	8.12	705	126.5	12.49	12.1
	183000	15.77	8.12	712	124.9	12.35	12
	190000	15.68	8.1	707	123.4	12.23	12
	193000	15.63	8.08	706	122	12.11	12
	200000	15.57	8.07	701	121.7	12.1	12
	203000	15.52	8.07	703	121.8	12.12	12
	210000	15.5	8.07	704	122	12.14	12
	213000	15.5	8.06	707	121.2	12.06	12
	220000	15.47	8.05	708	119.7	11.92	12
	223000	15.43	8.06	708	120.9	12.05	12

	230000	15.38	8.06	711	121.8	12.15	12
	233000	15.35	8.08	713	122.6	12.24	12
72996	0	15.33	8.07	712	122.4	12.22	12
	3000	15.3	8.07	718	122.2	12.21	12
	10000	15.27	8.07	725	122.8	12.28	12
	13000	15.23	8.07	729	122.7	12.28	12.1
	20000	15.18	8.07	729	122.9	12.31	11.9
	23000	15.12	8.07	729	123.2	12.36	11.9
	30000	15.07	8.08	726	123.4	12.4	11.9
	33000	15	8.08	722	124.1	12.48	11.9
	40000	14.93	8.09	722	125	12.59	12
	43000	14.87	8.1	725	125.9	12.7	11.9
	50000	14.82	8.11	724	126.6	12.78	11.9
	53000	14.8	8.11	719	126.7	12.79	11.9
	60000	14.8	8.11	717	126.8	12.81	11.9
	63000	14.82	8.11	716	127.2	12.84	12.1
	70000	14.85	8.12	715	126.9	12.8	11.9
	73000	14.88	8.12	713	127.4	12.85	11.9
	80000	14.97	8.13	714	130.2	13.1	11.9
	83000	15.08	8.14	715	132	13.25	11.9
	90000	15.12	8.14	719	130.8	13.12	11.9
	93000	15.15	8.14	726	131	13.14	11.9
	100000	15.17	8.14	732	130.4	13.07	11.9
	103000	15.2	8.14	734	129.3	12.95	11.9
	110000	15.23	8.14	735	130.2	13.03	11.8
	113000	15.25	8.15	734	130.1	13.02	11.9
	120000	15.27	8.16	735	130.2	13.02	11.9
	123000	15.33	8.17	736	132	13.19	11.9
	130000	15.43	8.18	737	133.9	13.34	11.9
	133000	15.55	8.19	737	136.1	13.53	11.9
	140000	15.67	8.2	737	136.3	13.52	11.8
	143000	15.8	8.2	737	136.8	13.53	11.8
	150000	15.87	8.2	737	135.6	13.39	11.8
	153000	15.9	8.2	735	133.1	13.14	11.8
	160000	15.93	8.2	734	132.7	13.08	11.8
	163000	15.92	8.2	733	130.8	12.9	11.8
	170000	15.93	8.2	731	130.4	12.86	11.8
	173000	15.92	8.2	730	128.8	12.7	11.8
	180000	15.92	8.2	729	128.8	12.7	11.8
	183000	15.88	8.19	728	127.2	12.55	11.8
	190000	15.83	8.19	728	126.1	12.46	11.8
	193000	15.77	8.19	728	125.1	12.38	11.8
	200000	15.68	8.18	728	124.8	12.37	11.8
	203000	15.63	8.18	728	124.5	12.35	11.8
	210000	15.57	8.17	728	124.5	12.37	11.8
	213000	15.53	8.17	729	124.6	12.39	11.8
	220000	15.52	8.17	729	124.4	12.38	11.8
	223000	15.47	8.17	729	124.7	12.41	11.8
	230000	15.45	8.16	730	124.6	12.41	11.8
	233000	15.42	8.16	730	124.8	12.44	11.8
73096	0	15.38	8.16	730	125.1	12.47	11.8
	3000	15.35	8.16	730	125.1	12.48	11.7
	10000	15.32	8.16	730	125.4	12.52	11.7
	13000	15.27	8.16	730	125.3	12.53	11.7
	20000	15.22	8.15	730	125.6	12.57	11.7
	23000	15.17	8.16	729	125.9	12.62	11.7
	30000	15.1	8.16	729	126.3	12.67	11.7
	33000	15.03	8.16	729	126.7	12.74	11.7
	40000	14.98	8.16	729	127	12.77	11.7
	43000	14.93	8.16	729	127.2	12.81	11.7
	50000	14.87	8.16	729	127.5	12.86	11.7
	53000	14.8	8.17	729	128.2	12.94	11.7
	60000	14.77	8.17	729	128.9	13.03	11.7

	63000	14.72	8.17	729	129.5	13.1	11.6
	70000	14.69	8.17	729	130.7	13.23	11.6
	73000	14.65	8.18	729	131.5	13.32	11.6
	80000	14.65	8.18	729	132.5	13.43	11.6
	83000	14.7	8.19	729	134.4	13.6	11.6
	90000	14.77	8.2	729	137	13.85	11.6
	93000	14.83	8.2	730	137.7	13.9	11.6
	100000	14.88	8.21	730	137.9	13.91	11.6
	103000	14.93	8.21	730	138.2	13.92	11.6
	110000	15.07	8.22	731	140.5	14.11	11.6
	113000	15.08	8.22	731	138.3	13.89	11.6
	120000	15.08	8.22	732	136.7	13.73	11.6
	123000	15.15	8.23	732	138.4	13.88	11.6
	130000	15.1	8.22	733	134.7	13.52	11.6
	133000	15.05	8.21	733	132.4	13.31	11.6
	140000	15.03	8.21	734	132.1	13.27	11.6
	143000	15.02	8.22	734	133.3	13.41	11.6
	150000	15	8.22	734	134.2	13.49	11.6
	153000	15	8.22	735	134	13.48	11.6
	160000	15	8.22	736	133.9	13.46	11.5
	163000	15.03	8.23	736	135.9	13.66	11.5
	170000	15.03	8.22	737	134.6	13.53	11.5
	173000	15.02	8.22	737	133.3	13.41	11.6
	180000	14.97	8.21	738	131.4	13.22	11.5
	183000	14.97	8.21	738	131.8	13.27	11.5
	190000	14.93	8.21	739	131.2	13.22	11.5
	193000	14.85	8.2	739	130.3	13.15	11.5
	200000	14.77	8.2	740	129.7	13.11	11.5
	203000	14.69	8.2	740	129.6	13.13	11.5
	210000	14.59	8.19	740	130	13.19	11.5
	213000	14.49	8.19	741	130	13.22	11.5
	220000	14.44	8.19	741	130.1	13.25	11.5
	223000	14.35	8.19	742	130.7	13.33	11.4
	230000	14.29	8.19	743	131	13.38	11.4
	233000	14.25	8.19	743	131.3	13.42	11.4
73196	0	14.22	8.19	744	131.5	13.45	11.4
	3000	14.14	8.19	744	131.8	13.5	11.4
	10000	14.07	8.19	745	132	13.54	11.4
	13000	14.02	8.18	745	132.1	13.57	11.4
	20000	13.96	8.18	745	132.2	13.61	11.4
	23000	13.89	8.18	745	132.6	13.66	11.4
	30000	13.86	8.18	745	132.9	13.7	11.3
	33000	13.78	8.19	746	133.5	13.79	11.3
	40000	13.71	8.18	746	133.7	13.83	11.3
	43000	13.68	8.18	747	133.7	13.84	11.3
	50000	13.64	8.19	747	134.2	13.9	11.3
	53000	13.63	8.19	747	134.7	13.96	11.3
	60000	13.63	8.19	748	136.3	14.13	11.3
	63000	13.66	8.2	748	137.9	14.28	11.3
	70000	13.68	8.2	748	138.2	14.31	11.3
	73000	13.71	8.2	748	139.6	14.44	11.3
	80000	13.76	8.21	748	140.3	14.5	11.3
	83000	13.84	8.21	748	141.7	14.62	11.3
	90000	13.84	8.2	749	138.6	14.29	11.3
	93000	13.86	8.2	749	138.2	14.25	11.2
	100000	14.01	8.22	748	143	14.69	11.2
	103000	14.14	8.23	748	144.5	14.81	11.2
	110000	14.34	8.23	749	145	14.79	11.2
	113000	14.39	8.23	749	143.6	14.64	11.2
	120000	14.52	8.24	749	144.2	14.66	11.2
	123000	14.57	8.24	749	143.1	14.52	11.2
	130000	14.65	8.24	749	143.1	14.5	11.2
	133000	14.64	8.24	749	138.8	14.07	11.2

	140000	14.62	8.21	750	136	13.79	11.2
	143000	14.65	8.22	749	136.1	13.79	11.2
	150000	14.74	8.21	749	139.3	14.09	11.2
	153000	14.83	8.25	749	142.4	14.37	11.2
	160000	14.88	8.2	749	140.9	14.21	11.2
	163000	14.85	8.22	750	136.3	13.75	11.2
	170000	14.85	8.18	750	135.1	13.63	11.2
	173000	14.85	8.22	751	135.5	13.68	11.2
	180000	14.8	8.22	751	135	13.64	11.1
	183000	14.77	8.2	751	133.3	13.47	11.1
	190000	14.7	8.2	751	132.4	13.4	11.1
	193000	14.65	8.19	751	131.6	13.34	11.1
	200000	14.55	8.19	751	131	13.31	11.1
	203000	14.5	8.19	751	131	13.32	11.1
	210000	14.45	8.14	751	130.6	13.29	11.1
	213000	14.44	8.16	751	130.7	13.31	11.1
	220000	14.42	8.14	752	130.7	13.31	11
	223000	14.39	8.16	752	130.7	13.32	11
	230000	14.37	8.15	752	130.6	13.31	11
	233000	14.35	8.15	752	131	13.36	11
80196	0	14.32	8.15	752	131	13.37	11
	3000	14.3	8.14	753	131.1	13.38	11
	10000	14.27	8.13	753	130.9	13.38	11
	13000	14.22	8.13	752	131.4	13.44	11
	20000	14.19	8.13	752	131.5	13.46	10.9
	23000	14.16	8.13	752	131.7	13.49	10.9
	30000	14.11	8.13	752	131.9	13.53	10.9
	33000	14.06	8.13	752	131.9	13.54	10.9
	40000	13.97	8.13	752	132.3	13.61	10.9
	43000	13.89	8.12	752	132.7	13.68	10.9
	50000	13.82	8.12	752	133.2	13.75	10.9
	53000	13.79	8.12	753	133.9	13.82	10.9
	60000	13.78	8.12	753	134.9	13.93	10.7
	63000	13.78	8.12	753	136.5	14.09	10.8
	70000	13.79	8.13	752	137.9	14.24	10.8
	73000	13.82	8.14	752	139.2	14.36	10.8
	80000	13.84	8.14	752	139.4	14.37	10.8
	83000	13.96	8.15	752	142.2	14.62	10.8

Stony Brook @ Court Street

Attachment C

Date MMDDYY	Time HHMMSS	Temp. deg. C	pH units	Cond. ms/cm	DO % sat.	DO mg/l	Batt volts
72696	90000	15.18	7.44	811	68.6	6.87	15.4
	93000	15.51	7.46	811	73.9	7.35	15.4
	100000	15.92	7.47	811	79.2	7.81	15.3
	103000	16.31	7.48	812	84.9	8.3	15.3
	110000	16.78	7.5	812	90.4	8.75	15.3
	113000	17.3	7.52	813	96.5	9.24	15.3
	120000	17.88	7.54	812	102.5	9.7	15.2
	123000	18.35	7.56	813	108.2	10.14	15.2
	130000	18.68	7.59	813	113.2	10.54	15.2
	133000	18.73	7.6	812	114.9	10.69	15.2
	140000	18.76	7.61	812	116	10.78	15.2
	143000	18.8	7.62	812	117.2	10.88	15.1
	150000	18.87	7.63	811	117.3	10.88	15.1
	153000	18.8	7.65	811	115.8	10.76	15.1
	160000	18.76	7.65	811	114.6	10.65	15
	163000	18.68	7.64	810	111.9	10.41	15.1
	170000	18.59	7.64	811	109.9	10.25	15.1
	173000	18.52	7.62	811	106.8	9.97	15
	180000	18.35	7.6	810	103.7	9.71	15
	183000	18.15	7.6	811	99.7	9.38	15
	190000	17.91	7.6	811	95.2	9	14.9
	193000	17.66	7.57	811	90.1	8.56	15
	200000	17.39	7.55	812	84.1	8.04	14.9
	203000	17.15	7.52	813	77.6	7.45	14.9
	210000	16.95	7.5	813	71.7	6.91	14.9
	213000	16.76	7.49	813	66.6	6.45	14.9
	220000	16.59	7.47	813	62.8	6.11	14.8
	223000	16.46	7.47	813	59.8	5.82	14.9
	230000	16.31	7.46	812	57.3	5.61	14.8
	233000	16.16	7.46	812	55.4	5.43	14.8
72796	0	16.02	7.45	811	53.9	5.3	14.8
	3000	15.89	7.44	811	52.2	5.14	14.8
	10000	15.74	7.44	811	51.1	5.06	14.7
	13000	15.59	7.43	811	50.1	4.97	14.8
	20000	15.44	7.43	811	49.5	4.93	14.7
	23000	15.29	7.43	812	49.1	4.91	14.7
	30000	15.14	7.42	812	48.7	4.89	14.7
	33000	14.99	7.41	812	48.3	4.86	14.7
	40000	14.83	7.41	812	48.3	4.87	14.7
	43000	14.7	7.41	813	47.9	4.84	14.7
	50000	14.55	7.41	813	48	4.87	14.7
	53000	14.4	7.41	813	47.9	4.88	14.7
	60000	14.3	7.41	813	48.4	4.94	14.4
	63000	14.23	7.41	813	49.2	5.04	14.6
	70000	14.23	7.4	813	50.3	5.14	14.6
	73000	14.31	7.41	813	52.2	5.33	14.6
	80000	14.46	7.41	814	56.5	5.74	14.6
	83000	14.71	7.42	814	61.6	6.23	14.6
	90000	14.98	7.44	814	67.1	6.75	14.6
	93000	15.31	7.45	814	73.2	7.31	14.6
	100000	15.72	7.46	814	79.3	7.85	14.6
	103000	16.16	7.48	814	85.7	8.4	14.6
	110000	16.59	7.51	814	92.2	8.96	14.6
	113000	17.13	7.52	815	98.1	9.42	14.6
	120000	17.74	7.55	814	104.5	9.92	14.5
	123000	17.96	7.57	815	109.1	10.3	14.5
	130000	18.17	7.59	815	112.7	10.6	14.5
	133000	18.37	7.6	815	115.2	10.79	14.5
	140000	18.59	7.62	815	117.6	10.96	14.5
	143000	18.81	7.65	816	118.9	11.04	14.5
	150000	18.9	7.65	815	119.4	11.07	14.5

	153000	18.88	7.65	815	119.2	11.05	14.5
	160000	18.87	7.65	815	119.2	11.06	14.5
	163000	18.81	7.66	814	118.7	11.02	14.5
	170000	18.75	7.66	814	117.4	10.91	14.5
	173000	18.59	7.65	815	114.4	10.67	14.5
	180000	18.39	7.65	814	110.7	10.37	14.5
	183000	18.18	7.63	815	106.5	10.02	14.5
	190000	17.95	7.62	815	101.8	9.62	14.4
	193000	17.67	7.6	815	95.7	9.1	14.4
	200000	17.39	7.6	816	88.6	8.47	14.4
	203000	17.15	7.59	817	81.2	7.8	14.4
	210000	17	7.56	817	74.1	7.14	14.4
	213000	16.9	7.54	817	68.5	6.61	12.8
	220000	16.85	7.5	815	64	6.19	12.5
	223000	16.74	7.49	815	60.6	5.87	12.4
	230000	16.64	7.48	814	58.1	5.64	12.4
	233000	16.56	7.47	814	55.8	5.43	12.4
72896	0	16.49	7.46	814	53.7	5.23	12.1
	3000	16.41	7.45	814	52	5.07	12.1
	10000	16.32	7.45	814	50.5	4.94	12.1
	13000	16.22	7.44	814	49.4	4.84	14.3
	20000	16.14	7.43	813	48.4	4.75	14.3
	23000	16.06	7.43	813	47.6	4.68	14.4
	30000	15.99	7.42	814	46.9	4.61	14.2
	33000	15.91	7.42	812	46.5	4.59	14.3
	40000	15.84	7.41	812	45.8	4.53	14.3
	43000	15.76	7.41	813	45.6	4.51	14.3
	50000	15.69	7.41	813	45.2	4.48	14.3
	53000	15.61	7.4	814	44.9	4.46	14.3
	60000	15.54	7.4	814	45.2	4.49	14.2
	63000	15.51	7.4	812	45.6	4.53	14.2
	70000	15.47	7.4	812	46.3	4.61	14.2
	73000	15.46	7.4	812	47.8	4.76	14.2
	80000	15.56	7.4	813	50.3	5	14.2
	83000	15.66	7.41	814	53.9	5.35	14.2
	90000	15.79	7.42	814	59.3	5.86	14.2
	93000	15.99	7.44	815	65.1	6.41	14.2
	100000	16.17	7.45	815	71	6.96	14.2
	103000	16.27	7.47	815	76.1	7.44	14.3
	110000	16.34	7.48	815	79.8	7.79	14.2
	113000	16.46	7.49	815	83	8.09	14.2
	120000	16.56	7.5	814	86.2	8.38	14.2
	123000	16.61	7.51	814	87.8	8.53	14.2
	130000	16.61	7.51	814	88.3	8.58	14.2
	133000	16.59	7.55	781	90.9	8.83	14.2
	140000	16.54	7.55	724	87.8	8.55	14.2
	143000	16.58	7.51	756	84.4	8.2	14.1
	150000	16.68	7.5	785	83.4	8.09	14.2
	153000	16.85	7.5	791	84.3	8.15	14.1
	160000	16.98	7.49	793	83.4	8.04	14.1
	163000	17.05	7.49	794	82.8	7.97	14.2
	170000	17.05	7.48	791	82	7.89	13.9
	173000	17.03	7.47	790	80.8	7.78	14.1
	180000	16.98	7.47	789	78.9	7.6	14.1
	183000	16.9	7.46	789	76.7	7.41	14.1
	190000	16.78	7.45	792	74	7.17	14.1
	193000	16.68	7.44	794	70.8	6.87	14.1
	200000	16.59	7.43	795	67	6.51	14.1
	203000	16.49	7.42	796	62.7	6.11	14.1
	210000	16.39	7.41	798	58.9	5.75	14
	213000	16.31	7.41	799	56.2	5.5	14
	220000	16.26	7.4	801	54.2	5.31	14
	223000	16.19	7.4	801	52.5	5.15	14

	230000	16.16	7.4	800	51.3	5.03	14
	233000	16.11	7.39	799	50.3	4.94	14
72996	0	16.12	7.42	771	54.8	5.38	14
	3000	16.11	7.41	753	56.3	5.53	14
	10000	16.11	7.4	775	53.7	5.27	14.1
	13000	16.12	7.4	788	50.6	4.96	14
	20000	16.17	7.39	791	46.1	4.52	14
	23000	16.07	7.38	788	45.3	4.45	14.1
	30000	15.94	7.37	786	45	4.43	14
	33000	15.83	7.37	786	45.2	4.46	14
	40000	15.71	7.36	788	45.1	4.46	14
	43000	15.59	7.37	789	45.4	4.51	14
	50000	15.54	7.37	790	45.8	4.56	14
	53000	15.52	7.37	790	46.4	4.61	13.9
	60000	15.49	7.37	789	46.9	4.67	13.9
	63000	15.49	7.37	788	47.1	4.69	13.9
	70000	15.49	7.37	785	47.4	4.72	13.9
	73000	15.52	7.37	756	48.4	4.81	13.9
	80000	15.59	7.37	786	49.9	4.96	13.9
	83000	15.76	7.38	783	52.4	5.19	13.9
	90000	15.89	7.39	780	56.1	5.53	13.9
	93000	15.94	7.41	777	59.6	5.87	13.9
	100000	15.99	7.41	776	61.3	6.04	13.9
	103000	16.04	7.42	774	61.8	6.08	13.9
	110000	16.04	7.42	774	62.7	6.16	13.9
	113000	16.07	7.43	773	63.4	6.23	13.9
	120000	16.11	7.43	772	64.5	6.33	13.9
	123000	16.21	7.44	773	65.5	6.42	13.9
	130000	16.34	7.44	773	67.6	6.61	13.9
	133000	16.54	7.45	774	70.7	6.88	13.9
	140000	16.76	7.47	775	74.2	7.19	13.9
	143000	17.03	7.48	775	78.4	7.55	13.9
	150000	17.22	7.49	777	81.3	7.8	13.9
	153000	17.27	7.51	777	83.2	7.97	13.9
	160000	17.25	7.52	777	83.4	8	13.9
	163000	17.2	7.51	777	82	7.87	13.9
	170000	17.13	7.51	777	79.8	7.67	13.9
	173000	17.05	7.5	776	76.8	7.39	13.9
	180000	17	7.5	776	73.8	7.11	13.8
	183000	16.91	7.49	775	70.8	6.84	13.8
	190000	16.81	7.48	774	68.4	6.62	13.9
	193000	16.71	7.48	774	65.4	6.34	13.7
	200000	16.59	7.47	773	62.5	6.08	13.8
	203000	16.51	7.46	772	60	5.84	13.8
	210000	16.43	7.48	772	57.1	5.57	13.8
	213000	16.38	7.47	772	55.1	5.38	13.8
	220000	16.34	7.47	772	53.4	5.22	13.8
	223000	16.31	7.47	772	52.5	5.13	13.8
	230000	16.26	7.47	771	51.4	5.04	13.8
	233000	16.19	7.47	771	50.6	4.96	13.8
73096	0	16.14	7.46	772	50	4.91	13.8
	3000	16.07	7.46	773	49.7	4.88	13.8
	10000	16.06	7.46	772	49.4	4.85	13.8
	13000	16.02	7.46	774	49.1	4.83	13.8
	20000	15.97	7.46	774	48.9	4.81	13.7
	23000	15.96	7.46	774	48.7	4.8	13.6
	30000	15.91	7.46	775	48.7	4.8	13.7
	33000	15.86	7.45	777	48.4	4.78	13.8
	40000	15.79	7.45	777	48.2	4.77	13.7
	43000	15.74	7.46	777	48.1	4.77	13.7
	50000	15.67	7.45	778	48.3	4.78	13.7
	53000	15.61	7.45	779	48.4	4.8	13.7
	60000	15.59	7.45	780	48.6	4.82	13.7

	63000	15.56	7.45	780	48.8	4.85	13.7
	70000	15.53	7.45	781	49.5	4.93	13.7
	73000	15.54	7.45	782	50.3	5	13.7
	80000	15.53	7.46	783	52	5.17	13.7
	83000	15.56	7.46	784	53.6	5.33	13.8
	90000	15.66	7.46	784	56.6	5.61	13.7
	93000	15.79	7.47	785	60.3	5.96	13.7
	100000	15.91	7.49	786	64.9	6.4	13.7
	103000	16.06	7.5	787	69	6.78	13.7
	110000	16.19	7.51	789	73.2	7.18	13.7
	113000	16.29	7.52	790	76.2	7.45	13.7
	120000	16.29	7.54	790	78.1	7.64	13.7
	123000	16.29	7.54	792	79.3	7.75	13.7
	130000	16.24	7.55	793	78.1	7.65	13.7
	133000	16.12	7.54	793	76.8	7.54	13.6
	140000	16.01	7.54	794	74.2	7.3	13.6
	143000	15.96	7.53	794	71.4	7.03	13.6
	150000	15.94	7.52	795	70	6.89	13.6
	153000	15.96	7.52	796	69.6	6.85	13.6
	160000	15.96	7.52	797	69.9	6.89	13.6
	163000	15.99	7.52	798	71	6.99	13.7
	170000	16.01	7.53	798	71.6	7.04	13.8
	173000	15.96	7.53	799	72	7.1	13.6
	180000	15.87	7.53	800	71.1	7.02	13.6
	183000	15.81	7.53	800	68.8	6.8	13.6
	190000	15.71	7.52	801	66.6	6.6	13.6
	193000	15.62	7.52	802	64.5	6.4	13.4
	200000	15.49	7.51	802	62.5	6.21	13.6
	203000	15.36	7.51	802	60.8	6.06	13.6
	210000	15.22	7.5	803	58.9	5.89	13.7
	213000	15.12	7.49	803	57.4	5.76	13.6
	220000	15.02	7.49	803	56.3	5.65	13.5
	223000	14.94	7.49	805	55.2	5.56	11.2
	230000	14.85	7.48	805	54.8	5.53	11.2
	233000	14.81	7.48	806	54.2	5.47	11.5
73196	0	14.76	7.48	806	53.7	5.43	11.4
	3000	14.72	7.48	806	53.1	5.37	11.2
	10000	14.64	7.48	806	52.8	5.35	12
	13000	14.57	7.48	806	52.4	5.32	11.9
	20000	14.5	7.48	807	52.2	5.31	11.9
	23000	14.43	7.48	807	51.8	5.28	12.1
	30000	14.35	7.47	807	51.8	5.28	12.1
	33000	14.26	7.47	807	51.8	5.29	12
	40000	14.17	7.47	807	51.7	5.29	12
	43000	14.1	7.47	807	51.8	5.31	12
	50000	14.07	7.46	808	51.7	5.3	11.8
	53000	14.05	7.47	808	51.5	5.29	11.7
	60000	14.05	7.46	808	51.9	5.33	11.8
	63000	14.12	7.47	808	52.8	5.41	11.8
	70000	14.22	7.47	809	54.7	5.6	13.4
	73000	14.26	7.48	809	57.2	5.85	13.4
	80000	14.33	7.49	810	59.7	6.09	11.4
	83000	14.39	7.5	810	62.5	6.37	13.4
	90000	14.41	7.51	809	64.4	6.56	13.4
	93000	14.4	7.51	810	65.7	6.69	13.4
	100000	14.53	7.52	810	67.1	6.81	13.4
	103000	14.78	7.52	810	69.2	6.99	13.4
	110000	15.07	7.54	810	73.6	7.39	13.4
	113000	15.31	7.55	811	78.5	7.84	13.4
	120000	15.41	7.57	810	82.3	8.2	13.4
	123000	15.52	7.58	810	84.9	8.44	13.4
	130000	15.71	7.59	810	87.3	8.65	13.4
	133000	15.68	7.6	811	88.1	8.73	13.4

	140000	15.56	7.6	810	87	8.64	13.4
	143000	15.46	7.6	810	84.9	8.46	13.4
	150000	15.46	7.6	811	82.8	8.24	13.4
	153000	15.56	7.6	811	82.6	8.21	13.4
	160000	15.71	7.6	811	84.1	8.33	13.4
	163000	15.74	7.61	810	85.7	8.48	13.4
	170000	15.71	7.62	811	86.3	8.55	13.4
	173000	15.64	7.61	811	84.5	8.38	13.4
	180000	15.57	7.6	811	82.1	8.15	13.4
	183000	15.47	7.6	812	79.7	7.93	13.4
	190000	15.36	7.59	812	77	7.69	13.4
	193000	15.24	7.59	812	74.9	7.49	13.4
	200000	15.14	7.57	812	71.6	7.18	13.4
	203000	15.01	7.57	812	68.5	6.89	13.4
	210000	14.96	7.55	812	65.9	6.64	13.4
	213000	14.91	7.54	812	63.7	6.42	13.4
	220000	14.86	7.54	812	61.8	6.23	13.4
	223000	14.83	7.53	812	60.5	6.1	13.4
	230000	14.81	7.52	812	59.3	5.99	13.4
	233000	14.76	7.52	812	58	5.87	13.3
80196	0	14.76	7.51	813	57.2	5.78	13.3
	3000	14.71	7.51	812	56.6	5.73	13.3
	10000	14.63	7.51	812	55.9	5.67	13.4
	13000	14.57	7.51	812	55.2	5.6	13.3
	20000	14.51	7.5	812	54.6	5.55	13.3
	23000	14.48	7.5	812	54.2	5.51	13.3
	30000	14.41	7.5	812	53.8	5.48	13.3
	33000	14.33	7.49	812	53.6	5.47	13.3
	40000	14.26	7.49	812	53.2	5.44	13.3
	43000	14.17	7.49	812	53.1	5.43	13.3
	50000	14.08	7.48	812	52.9	5.42	13.3
	53000	14.03	7.49	812	52.8	5.42	13.3
	60000	14.02	7.49	812	53	5.45	13.3
	63000	14.04	7.49	812	53.7	5.51	13.3
	70000	14.12	7.5	812	54.6	5.59	13.3
	73000	14.23	7.5	812	56.6	5.79	13.3
	80000	14.33	7.51	812	59.7	6.09	13.3
	83000	14.46	7.54	812	63.4	6.45	13.3