BIMONTHLY WATER QUALITY DATA: LAKE TUENDAE AND M. C. SPRING, 10/27/88 TO 10/10/89.

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INTRODUCTION

Lake Tuendae and M.C. Spring are two important habitats for the federally listed endangered fish, Mojave tui chub (*Gila bicolor mohavensis*). Inorder to effectively manage these habitats and better evaluate candidate refugia, the Bureau of Land Management and others interested in the protection and recovery of this species saw the need for baseline data on basic habitat parameters over one year.

On October 27, 1988, sampling was begun on Lake Tuendae and M. C. Spring measuring dissolved oxygen, water temperature, pH, conductivity, nitrate nitogen and turbidity. In addition to these data, ambient temperature, relative humidity, barometric pressure, cloud cover and wind observations were made. The level of the lake was recorded as well as the number of hours since water had been pumped into the lake. Following are the methods used and the resulting data.

METHODS

All observations were done during morning hours (except one @ M.C. Spring), as it was determined that this would yield the lowest (and most critical) dissolved oxygen readings. Ambient temperature and relative humidity were recorded from a Belfort Instruments hygrothermograph, and barometric pressure (necessary for calibration of dissolved oxygen meter) was recorded from a Weather Measure Corp. recording microbarograph. Lake level was recorded using a fiberglass meter tape to measure the distance

from the surface to a fixed point on a concrete pier at the east end of the lake. A zero point was determined for the water level that has been commonly used as the "full" mark when pumping into the lake. The lake level reported is therefore relative to the subjective determination of a "full lake". The number of hours (rounded to the nearest 1/2 hr), since significant water input via pumping were recorded. Generally, the lake is pumped up when it falls approximately 15 cm below "full", and is pumped to or above the full mark. M. C. Spring is self supporting as far as water influx, and remains about the same level year round; it's level was not measured. Tables 1 and 2 record conditions present at the time of the bimonthly observations, which are numbered 1-24.

Measurement of aquatic parameters in the lake took place at six established stations, all marked with submerged bouys except station #1, which was at the previously mentioned pier. Figure 1 gives the location and depth (@ lake level = 0.0 cm) of these stations.

Dissolved oxygen was measured using a Yellow Springs Instruments model 58 dissolvd oxygen meter. Calibration and replacement of the probe membrane took place before each observation period began. The same instrument was used to make temperature measurements, and both parameters were measured at mid-depth at stations 1, 2 and 3, and at 1, 2, 3 and 4 foot depths at stations 4, 5 and 6. Use of the above instrument allows quick determinations of dissolved oxygen, but may give erroneous readings in the presence of some interfering gases, including sulphur dioxide, hydrogen sulfide, and others

which may be present in Lake Tuendae, but were not assayed. Tables 3 & 4 and figure 2 contain dissoved oxygen data, and tables 5 & 6 and figure 3 contain water temperature data.

The amount of turbidity in the water was determined using an 8 inch diameter white Secchi disk. The disk was lowered until no longer visable, raised slowly until just visable, and then relowered until invisable again. Depth at this point was read from the attached cord (marked at decimeter intervals), with the centimeter portion measured with a fiberglass tape. If the disk was lost in the ditch grass or bottom muck the measurement was recorded as "bottom". Turbidity results are given in tables 13 & 14 and in figure 7.

Water samples were taken at mid-depth at each station using a La Motte water sampling kit, and were taken back to the lab. In the lab, each sample was measured for conductivity (corrected to 25 degrees centigrade) using a Fisher Scientific model 152 conductivity meter; results are given in tables 7 & 8, and figure 4.. Each sample would then have its pH measured using a Hach model 16400 portable pH meter calibrated to pH 4 and pH 10 buffers and corrected for solution temperatures. Results of pH readings are given in tables 9 & 10, and figure 5. Finally, the samples would be tested for nitrate nitrogen using a Hach model NI-12 test kit. This allowed measurements of 1.0 mg/l or greater, however, the levels measured in this project were at the low end of sensitivity for this kit (0-50 mg/l). Results for nitrate nitrogen are given in tables 11 & 12, and figure 6.

Table 1

OBSERVATION CONDITIONS

OBSERVATIONS 1-13

OBSERVATION NUMBER	DATE	TIME	Ta (°C)	% R.H.	B.P. mm Hg	LAKE LEVEL	LAST PUMPED	COMMENTS
1	10/27/88	0810	12.5	24	757	+8cm	16 hrs	Clear and calm.
2	11/09/88	0915	18.7	28	767	-9cm	85 hrs	Hazy, light breeze from SSW; sun behind clouds in east.
3	11/22/88	0840	10.5	27	769	-12cm	39 hrs	Overcast (cirrus); calm.
4	12/06/88	0830	7.3	30	770	+5cm	17 hrs	Overcast and calm. Cattails @ MCS prohibits secchi disk use
5	12/21/88	0940	11.6	20	767	-3cm	116 hrs	Clear, light breeze from north. Secchi use difficult (ripples).
6	1/10/89	0815	2.5	82	764	+8cm	40 hrs	MCS done @ 1600hr on 1/11; too dark for turbidity. Overcast/calm
7	1/26/89	0845	10.5	5	769	-4cm	89 hrs	Hazy and calm.
8	2/08/89	0800	3.4	48	773	+16cm	17 hrs	Overcast, wind to 38kph making Secchi use?? Max. Ta = 7 C/72hrs.
9	2/22/89	0905	12.1	22	770	-21cm	136 hrs	Cirrus = 1/2 sky, calm.
10	3/08/89	0825	18.8	40	762	+7cm	14.5hrs	Partly cloudy/calm. Ruppia grass showing fresh growth.
11	3/29/89	0730	19.1	27	764	+2cm	38 hrs	Cirrus = 2/3 sky. Chub active at station #1 (2-4"). Pupfish active
12	4/11/89	0740	21.5	12	757	+13cm	11 hrs	Scattered cirrus/wind SW to 24kph Many chub @ station #1.
13	4/26/89	0925	16.1	18	763	+2cm	14.5 hrs	Clear, wind SSW to 10kph.

Ta = ambient temperature
R.H. = relative humidity
B.P. = barometric pressure in millimeters of mercury

Table 2

OBSERVATION CONDITIONS

OBSERVATIONS 14-24

OBSERVATION NUMBER	DATE	TIME	Ta (°C)	% R.H.	B.P. mm Hg	LAKE LEVEL	LAST PUMPED	COMMENTS
14	5/09/89	0843	18.8	18	755	-15cm	135 hrs	Cumulo-nimbus (1/2 sky),wind S t 10kph.
15	5/25/89	0730	17.2	11	760	-11cm	118.5 hrs	Diesil contamination of well; no pumping taking place.
16	6/07/89	0650	23.5	25	758	-33cm	428 hrs	Clear and calm.
17	6/21/89	0745	28.3	8	759	0.0cm	61 hrs	Pumping again with BLM & USFWS permission. Clear and calm.
18	7/06/89	0705	26.4	8	760	-55cm	421 hrs	Pumps disconnected; waiting for new well. Bottom exposed @ W end.
19	7/19/89	0810	26.8	16	762	+6cm	16.5 hrs	Calm and clear. Pumped from new well for 40+ hours to refill lak
20	8/09/89	0745	30.1	37	760	-8cm	69 hrs	Nimbus clouds (3/4 sky). Wind SS to 25kph.
21	8/25/89	0730	22.1	22	768	-3cm	65 hrs	Clear and calm.
22	9/07/89	0810	21.3	8	758	-2cm	23 hrs	Clear; wind S to 15kph
23	9/27/89	0730	22.0	27	760	+5cm	0 hrs	Just pumped 15 hours. Overcast w/ breeze to 10kph.
24	10/09/89	0745	14.6	14	765	-4cm	46.0 hrs	Cirrus clouds (7/8 sky); calm.

Ta = ambient temperature
R.H. = relative humidity
B.P. = barometric pressure in millimeters of mercury

FIGURE 1
LAKE TUENDAE: MONITERING STATION LOCATIONS

SCALE: ~50'/INCH
= PALM
= BULRUSH & CATTAIL

	1	2	3	4	5	6
DEPTH @ STATION (LAKE LEVEL = 0.0cm)	0.77M	0.46M	1.68M	2.04M	2.19M	1.85m

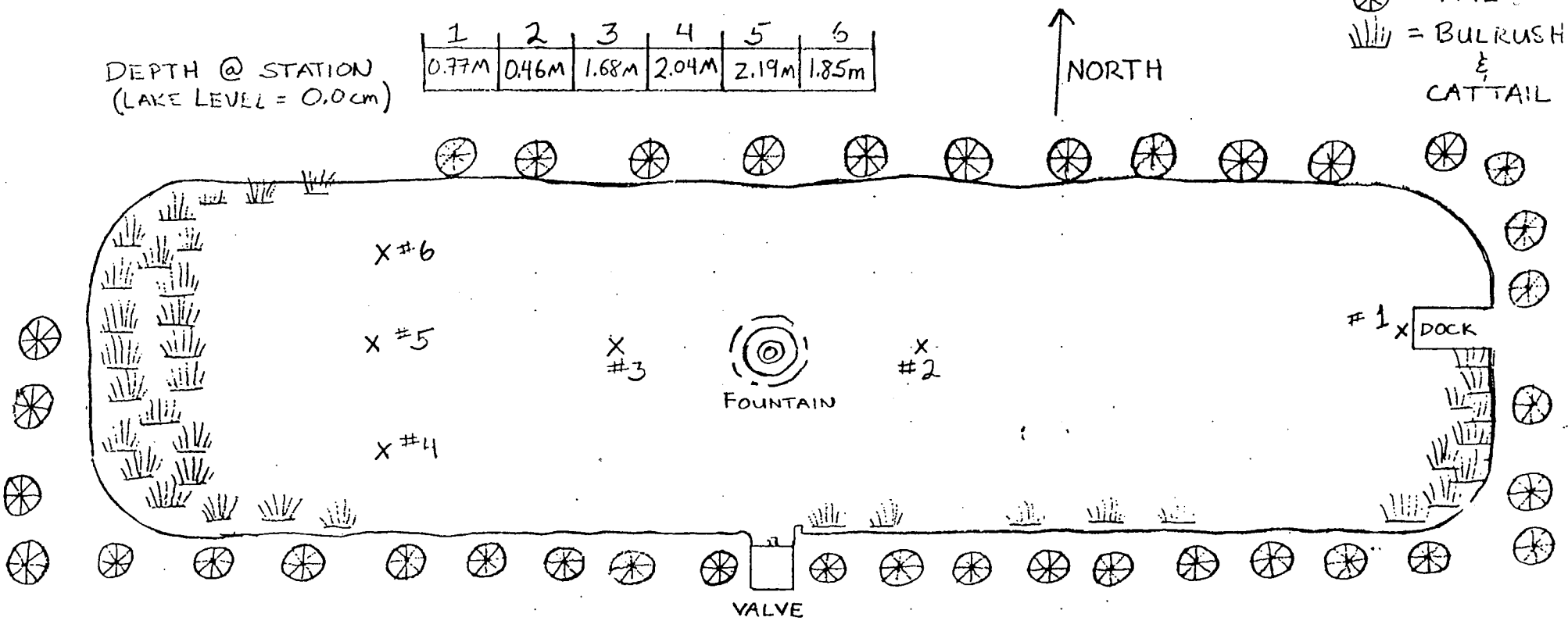

Table 3

DISSOLVED OXYGEN MEASUREMENTS (milligrams/liter)

OBSERVATIONS 1-13

	1988							1989					
	OCT.	NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL	
STATION	1	2	3	4	5	6	7	8	9	10	11	12	13
1	5.4	4.8	5.9	7.4	6.3	9.6	10.5	11.2	8.7	5.3	5.8	5.6	6.2
2	5.9	4.7	6.2	7.0	7.0	10.0	11.2	11.6	9.8	8.0	5.7	6.1	8.5
3	5.9	5.0	8.3	8.6	6.1	11.5	11.0	10.4	10.1	7.7	9.0	8.9	8.5
4 1'	6.8	7.1	7.7	8.9	7.1	11.0	10.3	11.0	10.4	8.9	8.6	9.1	8.8
4 2'	7.0	7.2	7.9	9.2	7.2	10.8	10.9	11.4	10.2	9.0	8.3	9.2	9.6
4 3'	7.1	7.5	8.0	9.4	7.3	10.9	11.6	11.9	10.8	9.0	8.4	9.1	9.0
4 4'	6.5	7.5	8.6	10.0	7.7	11.1	11.6	12.0	10.9	9.2	7.8	8.8	9.0
5 1'	6.7	6.8	8.0	7.9	7.0	10.7	10.4	10.9	10.0	8.4	8.2	9.0	9.2
5 2'	6.8	7.2	8.0	8.3	7.3	10.4	10.6	11.4	10.3	9.0	8.3	9.2	9.0
5 3'	7.4	7.3	8.3	9.9	7.4	11.0	11.0	11.6	10.9	9.2	8.3	9.4	8.7
5 4'	7.0	7.6	8.5	10.0	7.9	11.0	11.2	11.7	10.7	10.0	8.0	8.7	8.4
6 1'	7.0	7.0	7.5	7.5	7.2	10.9	10.7	11.2	10.2	8.7	8.6	9.0	9.3
6 2'	7.1	7.4	7.9	8.8	7.3	10.7	10.8	11.4	10.3	9.0	8.6	9.0	9.0
6 3'	7.4	7.5	8.3	9.0	7.3	10.9	11.0	12.1	10.6	9.0	8.4	9.1	8.7
6 4'	7.4	7.6	8.3	9.4	7.9	11.2	11.3	11.9	10.7	9.8	8.1	8.2	8.9
M.C.S.	5.1	6.4	6.3	6.0	5.1	7.4	9.0	10.6	9.2	5.9	5.2	5.0	6.2

Table 4

DISSOLVED OXYGEN MEASUREMENTS (milligrams/liter)

OBSERVATIONS 14-24

STATION	1989 MAY 14	MAY 15	JUNE 16	JUNE 17	JULY 18	JULY 19	AUGUST 20	AUGUST 21	SEPTEMBER 22	SEPTEMBER 23	OCT. 24
1	6.2	5.9	4.9	7.4	na	7.5	6.8	6.2	8.4	6.8	6.9
2	6.5	5.8	6.5	7.1	na	7.6	6.5	5.7	6.9	7.0	7.5
3	6.0	6.0	5.8	6.6	5.6	7.0	6.5	5.7	7.2	6.7	6.8
4 1'	6.4	6.2	6.1	8.0	5.2	7.7	7.1	6.0	7.4	7.2	6.7
4 2'	6.3	5.9	5.3	7.5	5.0	7.5	6.9	5.9	6.7	7.0	6.6
4 3'	6.0	6.0	5.0	6.3	4.6	6.3	5.9	5.2	5.8	7.0	6.6
4 4'	5.5	5.7	4.7	6.1	na	5.9	5.2	5.0	6.0	6.3	6.8
5 1'	6.7	7.0	6.6	7.7	5.6	7.5	6.9	6.4	7.4	7.1	7.0
5 2'	6.2	6.1	6.0	7.2	5.0	7.6	6.6	5.9	6.6	6.9	6.7
5 3'	5.9	5.9	5.2	6.4	5.0	6.3	6.0	5.7	6.0	7.0	6.9
5 4'	5.2	5.6	5.0	6.3	na	6.1	5.4	5.4	5.8	6.5	6.7
6 1'	7.0	6.4	6.2	8.1	5.3	7.7	7.2	6.5	7.2	7.3	7.1
6 2'	6.5	6.0	5.7	7.4	5.1	7.5	6.8	5.6	6.7	7.0	6.9
6 3'	6.2	5.9	5.2	6.4	4.8	6.7	5.8	5.6	6.0	6.8	7.0
6 4'	5.5	5.7	5.0	6.0	na	5.6	6.0	5.6	5.7	6.6	6.7
M.C.S.	6.1	5.0	5.3	4.8	5.9	5.1	5.4	6.0	6.1	5.8	5.8

FIGURE 2

DISSOLVED OXYGEN MEASUREMENTS (milligrams/LITER)

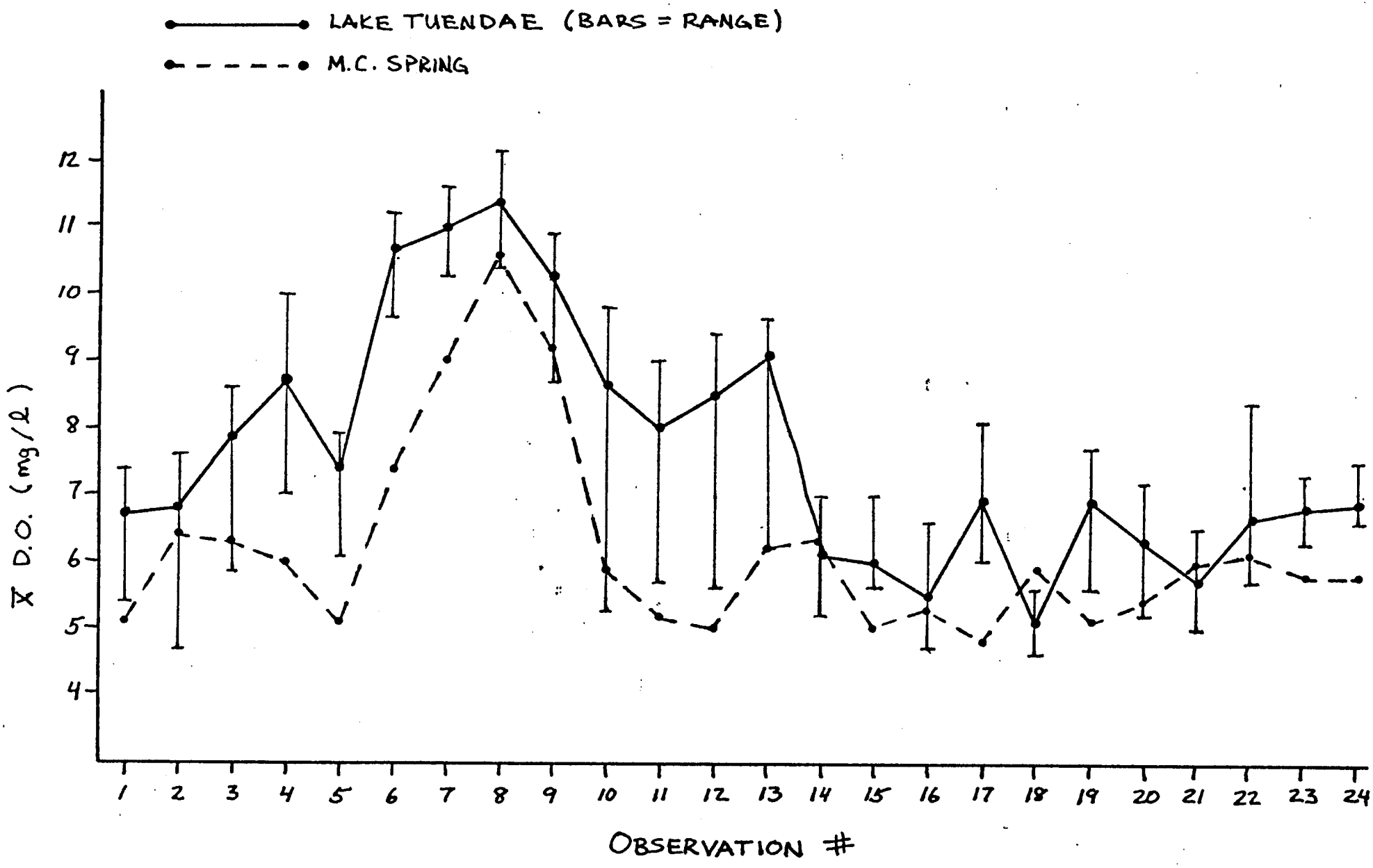

Table 5

WATER TEMPERATURES (degrees centigrade)

OBSERVATIONS 1-13

STATION		1988 OCT. 1	NOVEMBER 2	3	DECEMBER 4	5	1989 JANUARY 6	7	FEBRUARY 8	9	MARCH 10	11	APRIL 12	13
1		23.6	19.1	15.5	10.8	10.3	4.2	7.4	4.8	12.8	19.1	21.1	21.4	22.1
2		23.1	19.6	16.0	10.8	10.0	4.0	7.3	4.6	12.4	19.8	21.7	21.9	22.3
3		22.8	18.7	15.2	9.5	9.6	5.1	7.3	4.9	12.1	18.8	20.8	22.0	21.8
4	1'	23.1	20.2	15.7	10.1	10.1	5.3	7.5	5.0	1.28	18.9	21.0	22.5	22.5
	2'	22.7	19.7	15.0	9.6	9.7	5.0	7.4	5.3	12.5	18.8	20.6	22.0	22.4
	3'	22.4	19.5	15.0	8.9	9.1	5.9	6.9	5.2	10.9	18.1	20.4	22.0	21.2
	4'	22.0	18.9	14.5	8.6	9.4	5.8	7.0	5.0	10.3	17.9	20.0	21.6	19.8
5	1'	23.4	20.0	15.5	10.2	10.0	5.0	7.6	4.9	12.7	18.8	20.9	22.3	22.1
	2'	23.0	19.9	15.0	9.9	9.5	5.2	7.4	5.0	12.4	18.8	20.4	22.1	21.6
	3'	22.6	19.6	14.9	8.9	9.3	5.7	7.0	5.1	11.1	18.2	20.1	21.9	21.3
	4'	21.9	19.0	14.7	8.8	9.6	6.0	7.2	5.2	10.5	17.6	19.9	21.8	21.0
6	1'	23.0	20.3	15.9	10.0	10.2	4.9	7.4	5.1	12.7	19.0	20.9	22.3	19.6
	2'	22.8	20.0	15.7	9.6	9.8	5.0	7.6	5.1	12.4	18.8	20.6	22.4	21.7
	3'	22.3	19.3	14.7	9.0	9.5	5.2	7.2	5.3	11.0	18.1	20.0	22.2	21.0
	4'	22.0	19.2	14.7	8.5	9.3	5.2	7.2	5.2	10.3	17.3	19.8	22.0	19.6
M.C.S.		22.1	20.0	15.9	11.7	11.0	8.9	10.5	10.2	12.6	20.2	20.3	20.3	19.6

Table 6

WATER TEMPERATURES (degrees centigrade)

OBSERVATIONS 14-24

STATION		1989 MAY 14	MAY 15	JUNE 16	JUNE 17	JULY 18	JULY 19	AUGUST 20	AUGUST 21	SEPTEMBER 22	SEPTEMBER 23	OCT. 24
1		23.1	24.6	27.5	26.1	na	24.2	26.1	25.5	23.5	21.0	20.9
2		23.5	24.4	27.3	25.8	na	24.3	25.9	25.4	23.7	21.4	21.0
3		22.8	24.0	27.0	25.6	26.9	24.6	26.4	25.0	23.1	20.9	20.7
4	1'	23.2	24.8	27.1	26.3	27.4	24.7	27.0	25.9	23.6	21.2	21.2
	2'	23.0	23.9	26.5	25.9	27.0	24.5	26.6	25.6	23.4	21.0	21.0
	3'	22.7	23.1	26.0	25.0	26.0	24.0	25.5	25.1	22.2	20.1	20.3
	4'	21.9	22.6	25.7	24.3	na	23.9	25.0	25.0	21.7	20.0	20.0
5	1'	23.5	24.9	27.0	26.3	27.0	24.5	26.8	26.1	23.9	21.0	21.1
	2'	23.0	24.1	26.9	26.0	26.3	24.5	26.5	25.8	23.5	20.7	20.9
	3'	22.8	23.7	26.1	25.3	26.2	24.1	25.4	25.3	22.4	20.4	20.6
	4'	22.2	23.0	25.8	24.5	na	24.0	25.2	24.8	21.9	19.9	20.3
6	1'	23.5	24.6	27.0	26.5	27.1	24.5	26.9	25.9	23.9	21.0	21.1
	2'	22.9	24.0	26.6	25.8	26.4	24.4	26.7	25.7	23.4	20.9	21.0
	3'	22.5	23.4	26.0	24.9	26.0	24.0	25.4	25.0	22.4	20.2	20.7
	4'	22.0	22.9	25.6	24.6	na	24.0	24.9	24.8	22.0	19.9	20.2
M.C.S.		21.8	22.2	22.0	23.2	24.8	24.7	24.3	24.0	23.2	22.0	21.6

FIGURE 3

WATER TEMPERATURES (°C)

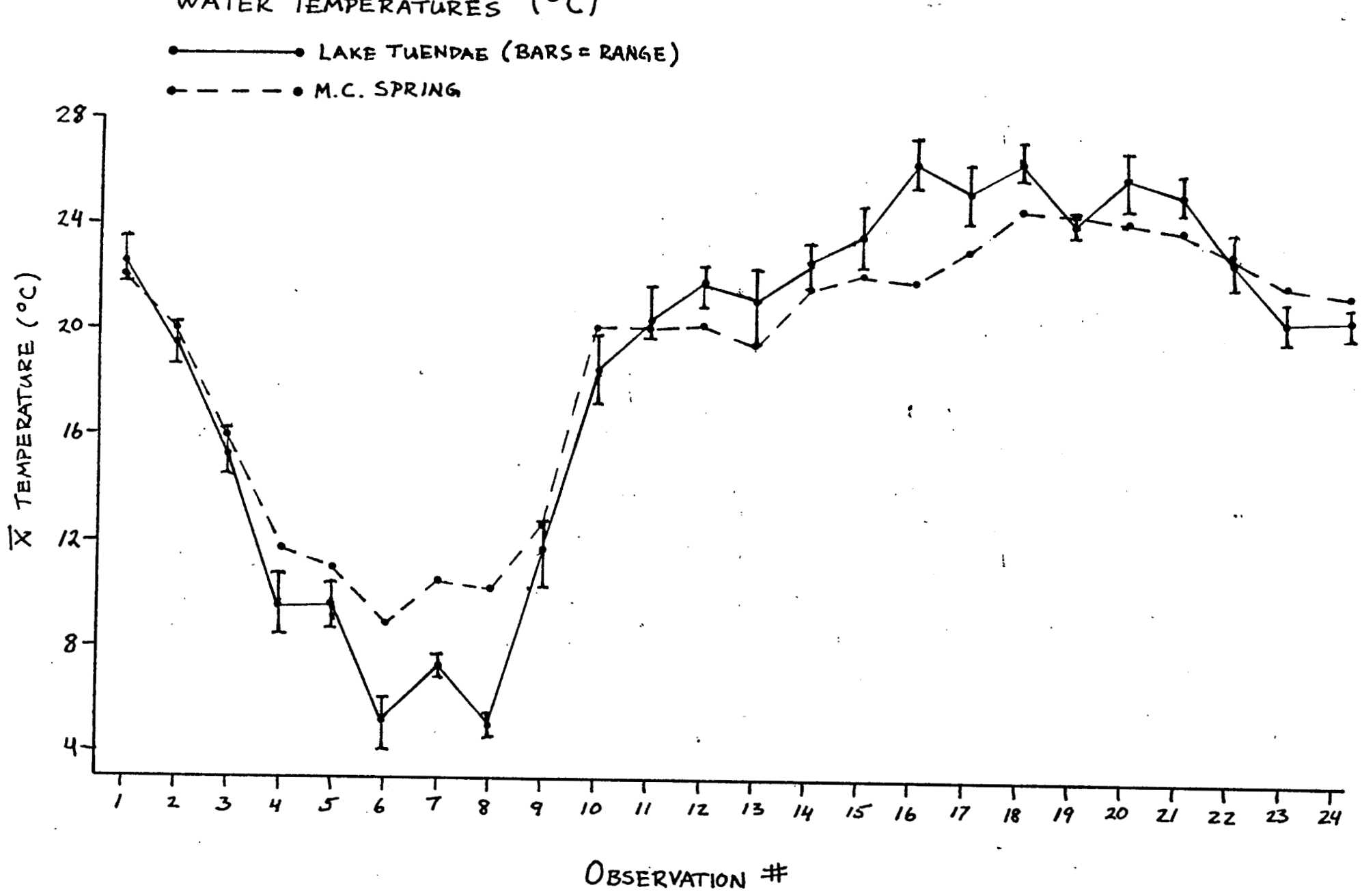

Table 7

CONDUCTIVITY (micromho/cm, corrected to 25°C)

OBSERVATIONS 1-13

	1988							1989					
	OCT.	NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL	
STATION	1	2	3	4	5	6	7	8	9	10	11	12	13
1	2100	2750	2600	1900	2350	2000	2800	2650	2850	2550	2450	2350	2450
2	2100	2800	2600	2100	2350	2050	3000	2600	3100	2700	2450	2000	2425
3	2150	2800	2700	1900	2600	2000	2850	2600	2750	2800	2600	2400	2450
4	2250	2800	2650	1950	2550	2150	2800	2600	2700	2800	2650	2400	2450
5	2100	2850	2700	2100	2450	1950	2800	2600	2700	2800	2650	2450	2400
6	2050	2850	2700	2100	2500	2000	2800	2600	2800	2750	2600	2500	2450
M.C.S.	1600	1450	1550	1450	1250	1500	1450	1550	1350	1150	1600	1650	1625

Table 8

CONDUCTIVITY (micromho/cm, corrected to 25°C)

OBSERVATIONS 14-24

	1989										
	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCT.
STATION	14	15	16	17	18	19	20	21	22	23	24
1	2700	2650	2800	2250	3150	2450	2525	2550	2400	2325	2450
2	2700	2600	2800	2250	3175	2450	2500	2600	2400	2325	2400
3	2700	2600	2775	2200	3000	2500	2500	2600	2375	2300	2457
4	2700	2600	2725	2250	3050	2450	2500	2575	2350	2350	2400
5	2700	2625	2700	2275	3100	2450	2525	2575	2300	2350	2450
6	2700	2625	2700	2250	3100	2425	2525	2575	2300	2350	2475
M.C.S.	1650	1575	1650	1550	1700	1600	1550	1750	1500	1500	1475

FIGURE 4

CONDUCTIVITY MEASUREMENTS (μmho/cm, CORRECTED TO 25°C)

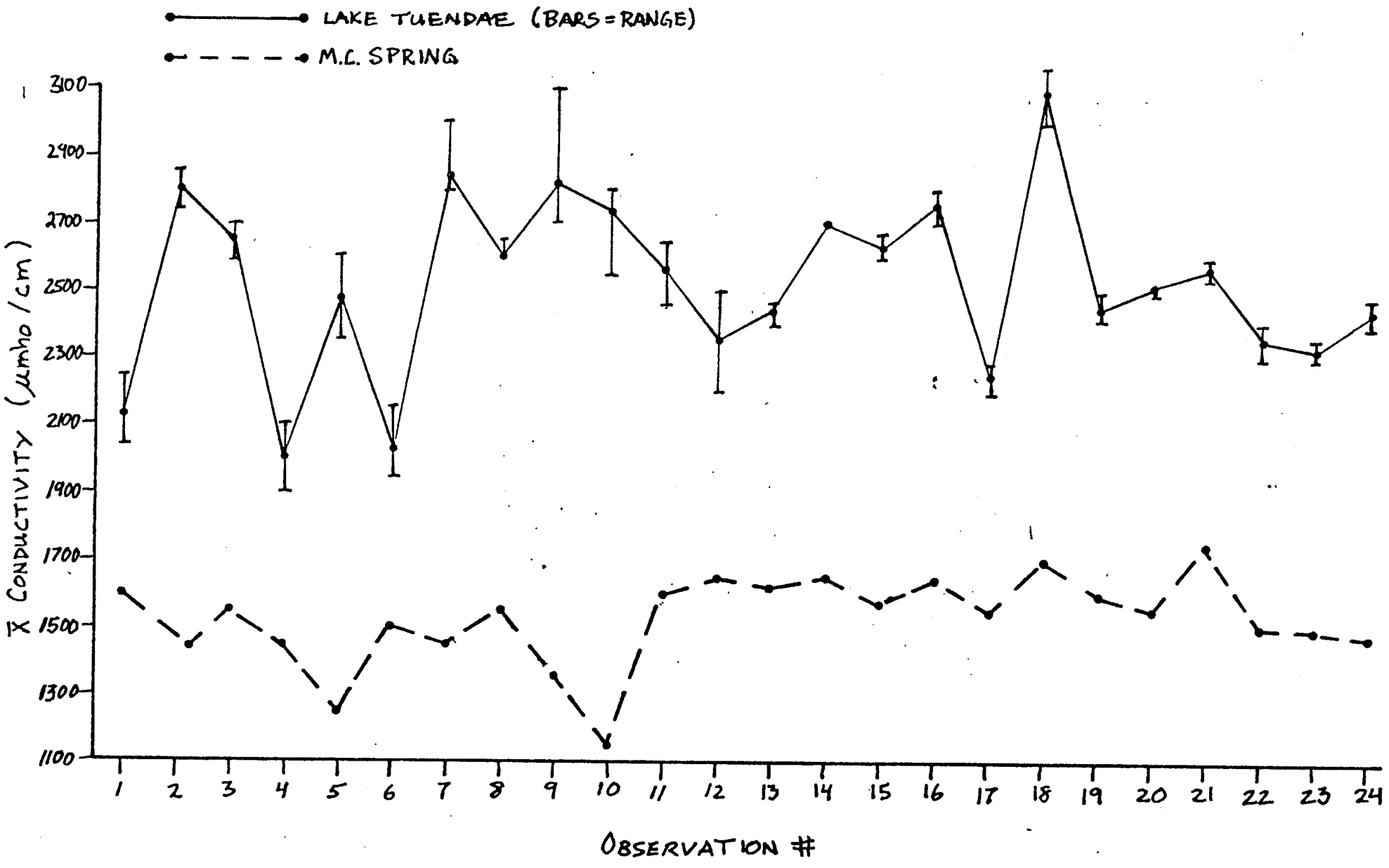

Table 9

pH MEASUREMENTS

OBSERVATIONS 1-13

	1988							1989					
	OCT.	NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL	
STATION	1	2	3	4	5	6	7	8	9	10	11	12	13
1	9.2	10.1	9.3	8.7	9.1	9.8	9.5	9.2	8.9	9.4	9.3	9.6	9.5
2	9.2	9.8	9.5	8.8	9.2	9.9	9.5	9.2	8.7	9.6	9.6	9.6	9.5
3	9.0	9.7	9.1	8.7	9.2	9.8	9.6	9.3	8.7	9.0	9.2	9.4	9.6
4	9.6	9.8	9.0	9.0	9.2	10.1	9.6	9.1	8.8	9.0	9.2	9.4	9.5
5	9.5	9.8	9.0	9.0	9.3	9.8	9.6	9.0	8.8	9.0	9.2	9.4	9.5
6	9.6	9.8	8.9	8.9	9.2	9.9	9.6	9.0	8.7	8.9	9.2	9.6	9.5
M.C.S.	7.3	7.8	7.5	7.7	7.8	7.3	7.0	7.8	7.6	7.4	7.2	7.6	7.8

Table 10

pH MEASUREMENTS

OBSERVATIONS 14-24

	1989										
	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCT.
STATION	14	15	16	17	18	19	20	21	22	23	24
1	9.7	9.5	9.8	10.0	10.2	9.9	9.6	9.5	9.5	9.2	9.5
2	9.7	9.5	9.7	9.9	10.1	9.8	9.6	9.7	9.5	9.4	9.4
3	9.7	9.5	9.8	9.9	10.1	9.9	9.8	9.7	9.3	9.2	9.4
4	9.8	9.6	9.8	9.9	10.0	9.7	9.8	9.7	9.3	9.2	9.6
5	9.8	9.5	9.6	10.0	10.0	9.8	9.8	9.7	9.3	9.2	9.6
6	9.7	9.6	9.8	10.0	10.0	9.8	9.8	9.7	9.4	9.2	9.5
M.C.S.	7.4	7.9	7.8	7.4	8.0	7.7	7.2	7.5	7.4	7.5	7.5

FIGURE 5

pH MEASUREMENTS

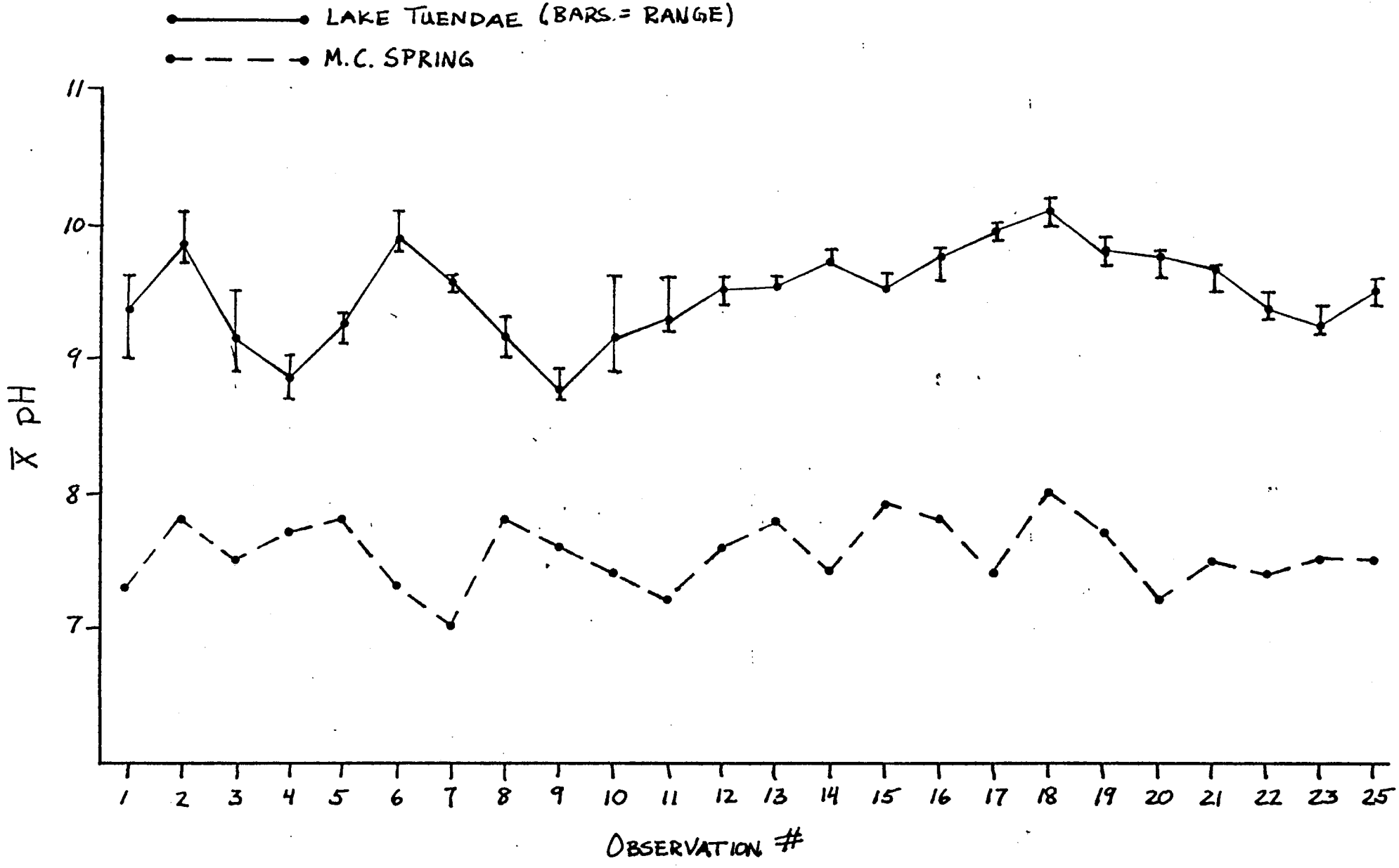

Table 11

NITRATE NITROGEN (milligrams/liter)

OBSERVATIONS 1-13

	1988							1989					
	OCT.	NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL	
STATION	1	2	3	4	5	6	7	8	9	10	11	12	13
1	3.0*	2.0	1.0	1.0	2.0	1.5	1.0	1.0	2.5	2.5	3.5	3.0	2.5
2	3.0*	2.0	1.0	1.0	2.0	1.0	1.5	1.0	2.0	3.0	4.0	3.5	2.5
3	4.0*	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.5	3.0	3.5	3.0	2.5
4	3.5*	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.0	3.5	3.0	3.0
5	3.0*	2.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.0	3.5	3.0	2.5
6	3.5*	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.0	4.0	3.0	2.5
M.C.S.	5.0*	3.0	1.0	1.5	1.0	1.5	2.0	1.0	2.0	2.0	2.0	2.5	2.0

* tests done w/ reagents of questionable reliability

Table 12

NITRATE NITROGEN (milligrams/liter)

OBSERVATIONS 14-24

	1989										
	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCT.
STATION	14	15	16	17	18	19	20	21	22	23	24
1	3.0	2.5	3.0	2.5	4.0	3.0	2.5	3.0	2.5	3.0	3.0
2	3.0	2.5	3.0	2.5	4.0	3.0	3.0	3.0	2.5	3.0	3.0
3	3.0	2.5	3.0	2.5	3.0	3.0	3.0	2.0	2.5	2.5	3.0
4	3.0	3.0	3.0	2.5	3.5	3.0	3.0	2.0	3.0	2.5	3.0
5	3.0	2.5	3.0	2.5	3.0	3.0	2.5	2.0	3.0	3.0	3.0
6	3.0	3.0	3.0	2.0	3.0	3.0	2.5	2.0	2.5	3.0	3.0
M.C.S.	2.5	2.0	2.5	2.0	2.5	2.5	1.5	2.0	2.0	1.5	2.5

FIGURE 6

NITRATE NITROGEN (milligrams / LITER)

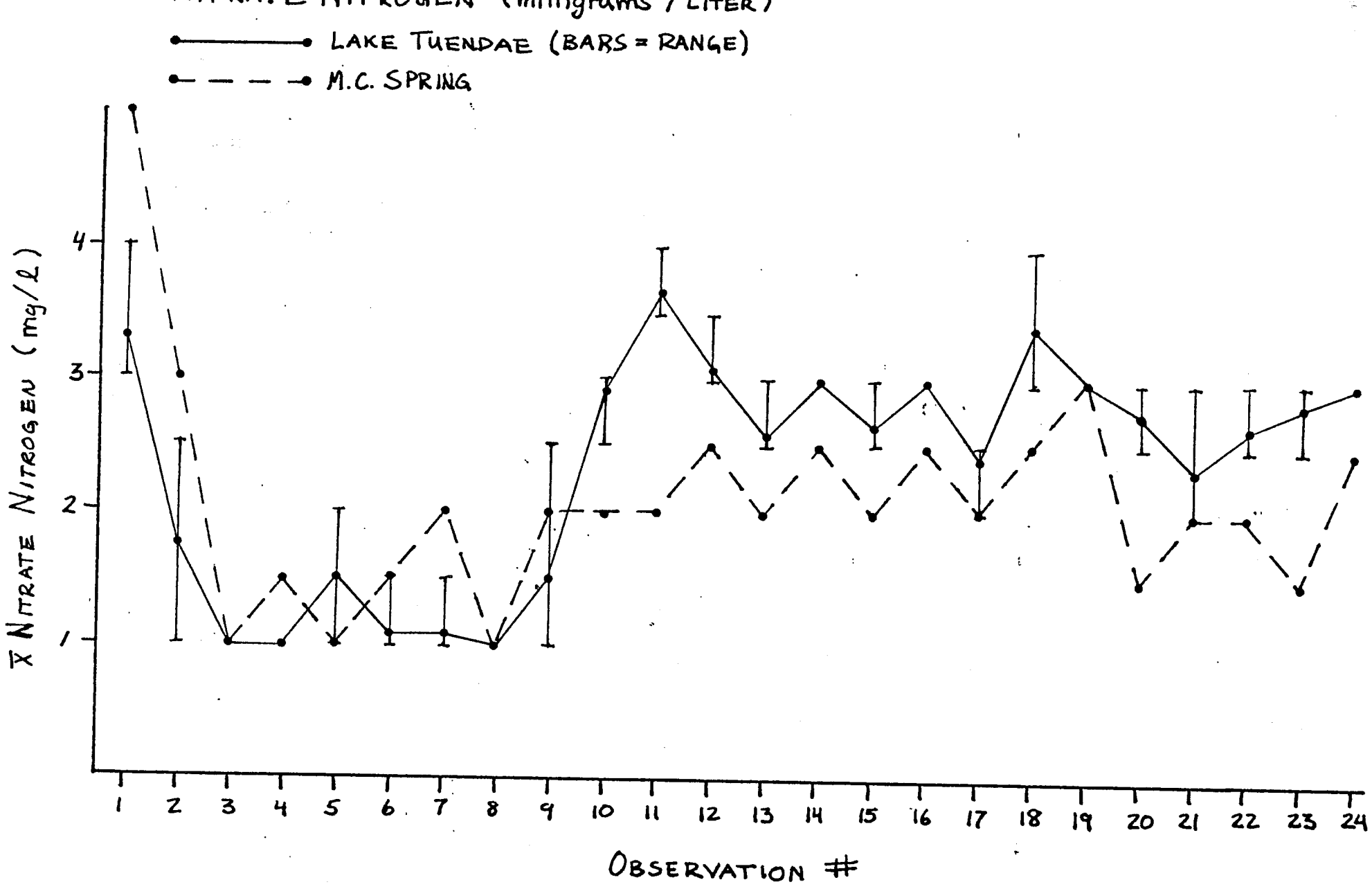

Table 13

TURBIDITY MEASUREMENTS (depth of Secchi disk in meters)

OBSERVATIONS 1-13

	1988							1989					
	OCT.	NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH		APRIL	
STATION	1	2	3	4	5	6	7	8	9	10	11	12	13
1	bttm*	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm
2	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm
3	1.21	1.30	1.46	1.54	1.48	1.38	1.28	1.30	1.02	1.26	0.85	0.60	0.55
4	1.15	1.31	1.40	1.49	1.40	1.46	1.40	1.21	1.15	1.15	0.87	0.68	0.52
5	1.18	1.33	1.38	1.50	1.52	1.44	1.27	1.00	1.30	1.21	0.92	0.66	0.53
6	1.27	1.28	1.47	1.56	1.50	1.50	1.39	1.25	1.26	1.24	0.86	0.61	0.53
M.C.S.	bttm	bttm	bttm	na	bttm	na	bttm	bttm	bttm	bttm	bttm	bttm	bttm

* bttm = bottom visible

Table 14

TURBIDITY MEASUREMENTS (depth of Secchi disk in meters)

OBSERVATIONS 14-24

	1989										
	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCT.
STATION	14	15	16	17	18	19	20	21	22	23	24
1	bttm*	0.51	bttm	0.66	dry	0.62	0.38	0.41	0.56	0.63	bttm
2	bttm	bttm	bttm	bttm	dry	bttm	bttm	bttm	bttm	bttm	bttm
3	0.70	0.60	0.46	0.58	0.42	0.60	0.46	0.50	0.61	0.85	1.11
4	0.66	0.63	0.40	0.62	0.39	0.58	0.41	0.52	0.57	0.81	1.02
5	0.68	0.64	0.44	0.65	0.36	0.55	0.47	0.52	0.56	0.89	1.13
6	0.70	0.64	0.48	0.70	0.38	0.59	0.50	0.50	0.59	0.86	1.09
M.C.S.	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm	bttm

*bttm = bottom visible

FIGURE 7

TURBIDITY MEASUREMENTS (DEPTH OF SECCHI DISK @ VISABLE EXTINCTION IN METERS)