Texas Watch Volunteer Water Quality Monitoring Program
2006 North Mesquite Creek Data Summary

North Mesquite Creek Descriptive Summary

In Mesquite, Texas, at Latitude 32˚49' N and Longitude 96˚37' W, North Mesquite Creek runs southeast of Dallas County, stretching 11 miles toward the East Folk of The Trinity River in Kaufman County (TSHC, 2001). Clayish soils surround the watercourse as it makes its way through a mixed land use area (TSHC, 2001), (USGS, 2000). North Mesquite Creek runs through the intersections of Highway 80 and Beltline Road in Mesquite, Texas and Interstate highways 30 and 635 in east Dallas County (TSHC, 2001), (NCTCG, 2001). This relative location makes the creek susceptible to point and non-point sources of pollution runoff. In November 1998, the USGS recorded 4,260,000 cu. ft. of runoff being produced by a 1.5 inch storm over a 13 hour period; the following month a 1.17 inch storm produced 5,590,000 cu. ft over a 20 hour period (USGS, 2001). All measurements were taken from the Beltline Road intersection. From November 1998 to June 2000, the mean runoff discharge at this site was 2,422,000 cu. ft. per 12 hour storm duration. This gives an idea of the volume of discharge typically flowing into North Mesquite Creek during a storm event and how easily water quality variables could be impaired if there were significant sources of pollution in this area. Being a mixed land use area, however, the creeks lends itself to possible contamination by residential, commercial, highway, and industrial land uses. The Trinity River Authority is the authority delegated to plan for this 2,500 acre drainage region within the East Folk Watershed (TRA, 2005). The creek itself has not been listed on the 303(d) listing of impaired waters; although the East Folk Trinity River which drains the North Mesquite Creek has been subject of concern for nutrient enrichment and high salinity levels (TRA, 2005). The creek has been designated for instream uses only, such as navigation and recreation (Kennedy, 2002). Any uses requiring water to be taken out of the creek are not recommended.

Historical Water Quality Data

A report to North Central Texas concluded the following information regarding surface water characteristics at North Mesquite Creek (Kennedy, 2002). Levels of pH for the creek from November 2000 to April 2001 were between 6.4 and 8.2, with 7.7 being the average for the nine samples collected from that period; this satisfies the requirements for aquatic life at the creek in accordance with the Texas Surface Water Quality Standards (Pinchback, 2002). The lowest pH value was collected in November, the highest in January. The average water temperature in degrees Celsius was at 13.4, ranging from 6.5 to 22 throughout the testing period. Fecal coliforms in colonies per 100 milliliters ranged between 1,000 and 70,000, values of over 10,000 occurring randomly throughout the five month sample period. The average volume of fecal coliforms present at North Mesquite Creek was 15,456 colonies/100 ml based on the nine samples taken. Total Dissolved Solids (TDS) present at the creek averaged 217 mg/L, the lowest at 30 mg/L occurring in November and the highest at 360 mg/L in February.

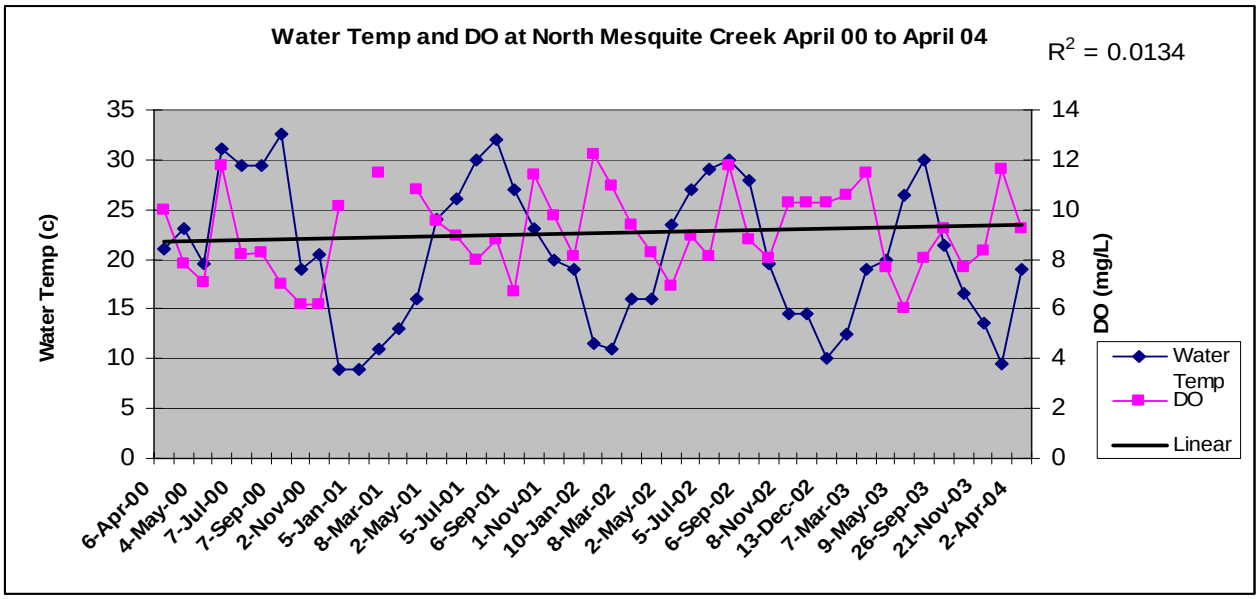
During this period, oil and grease levels were also screened for at North Mesquite Creek and measured in mg/L. These values ranged from <1 to 559. The high value was achieved in March 2001 and was the highest value collected out of the 22 different stream sites screened during the 2000 to 2001 study. The average oil and grease contamination for this site was 216 mg/L. These high values indicate that point source pollution could certainly be a factor influencing water

quality variables at North Mesquite Creek Motor vehicles running along Interstate highways 30 and 635 and those passing through the Highway 80 and Beltline Road intersection most likely account for this presence of oil and grease.

Recent Data

In assessing the water quality of North Mesquite Creek, four main variables are studied: water temperature, dissolved oxygen (DO), pH, and conductivity (TDS). Values from these factors determine the designated water uses of the creek and of other watercourses within Texas (Pinchback, 2002). All collections were made in accordance with The Texas Watch Volunteer Environmental Monitoring Manual (Pinchback, 2002). The data presented in this report falls within a four year time frame, beginning April 6, 2000 and ending April 2, 2004. The reported times for each collection vary no more than 4 hours and 20 minutes apart, making the entire data set a well represented idea of the water quality conditions at North Mesquite Creek.

Water Temperature and Dissolved Oxygen (DO)



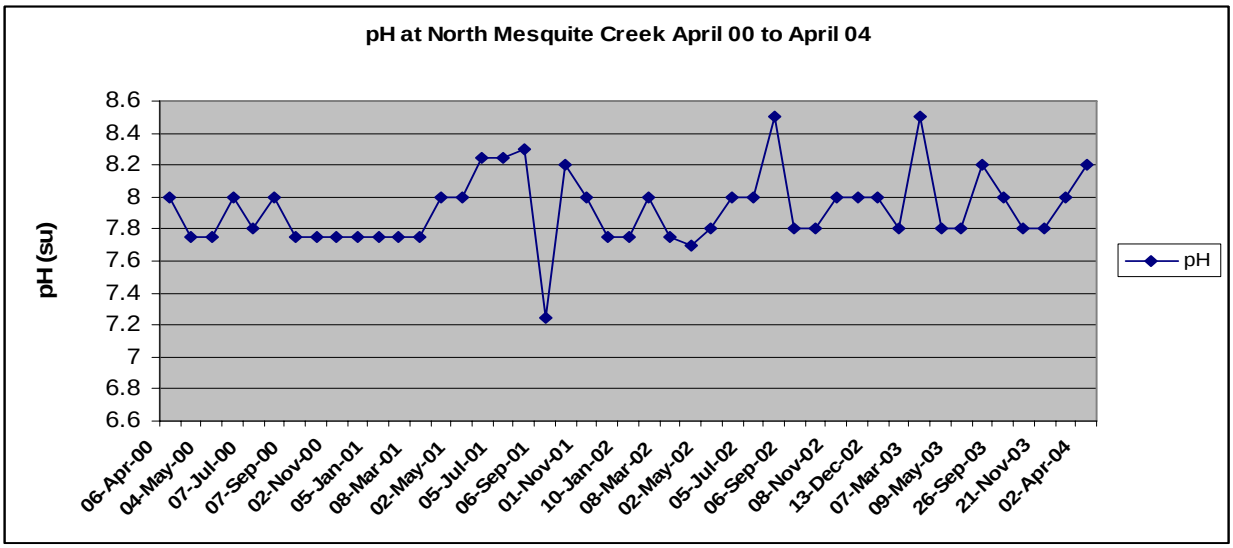
Water temperatures seemed to follow a naturally occurring pattern, elevating gradually during warm summer months and gradually decreasing in cooler months. In 2002, however, the graph shows brief impediments to that pattern. From September 2001 to October 2001 the temperature dramatically drops from a value of 32.5 to 19 degrees Celsius; after which, a sudden rise to 20 occurs in November when a decrease in temperature would have been expected. The temperature drops significantly between December and January before gradually increasing in the spring. From February 2002 to May 2002, we see another drastic change in temperature values, increasing from 11 to 16 and stabilizing the following April. After April, we again see another sharp rise in temperature from 16 to 23.5 degrees before gradually increasing for the remainder of the summer.

No D.O. exceedences were reported from April 2000 to April 2004, making the creek sustainable for aquatic species. The lowest D.O. level collected was 6.0 mg/L; this was in May 2003. The highest values occurred in both winter and summer months. In January 2002, the highest value at

12.2 occurred. The average D.O. level throughout the four year study was at 9.0 and the median at 8.9. D.O. levels seemed to correlate with the water temperature from December 2001 to February 2002. On the graph, water temperature and D.O. can be seen decreasing together during that time. There also seemed to be an adverse relationship between the two variables during June and July 2001. Relationships between these two variables are nowhere else present during the four year period.

Few significant changes in D.O. concentrations can be observed from the graph. The most significant occurred between May and June 2000 when D.O decreased from 7.1 to 11.8. This 4.7 difference occurred again between September and October 2001. In December 2000, we also see another drastic rise to 10.1 from 6.2 in November; a drastic changing in water temperature also occurs at this time, telling us that water temperature and D.O. may have been correlated. The site of where these samples were collected lies between Interstate 20 and Highway 80, where traffic is present. The drastic changes in DO and water temperature from November to December may have reflected an increase in traffic along these roads during the holiday season months. Most differences in D.O. levels between months occurred in moderate increments.

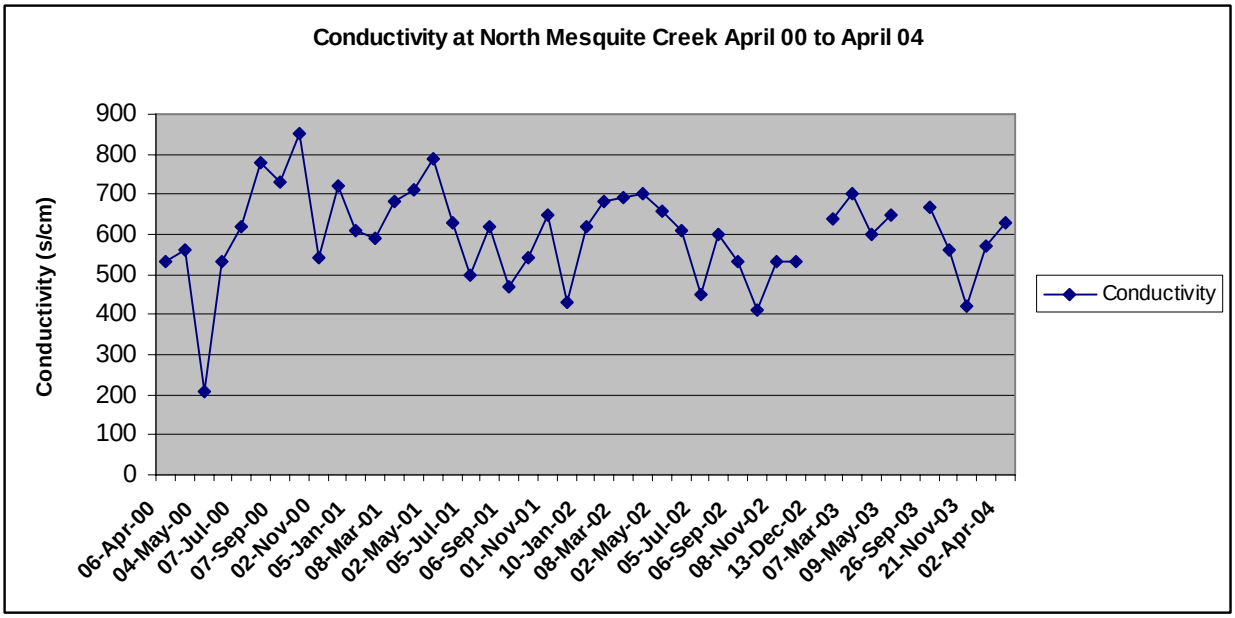
pH



From April 2000 to April 2004, pH values ranged from 7.3 to 8.5 s.u., providing, for the most part, suitable ranges for aquatic life; only three of these values fell out of the recommended range of between 6.5 and 8.2 (Pinchback, 2002). A pH of 8 was taken in April 2000; in April 2004 this pH had a slight increase of 8.2, suggesting stability in pH throughout the period; this stability, however, was at an extreme from September 2000 to March 2001 where pH values remained constant within these months. The graph shows no change in pH, the value holding constant at 7.75, while water temperature and D.O. values were sharply decreasing and increasing respectively. Being within the optimal range for aquatic life, this stability may indicate no detrimental outside factor influencing the pH of the creek. This constant figure, furthermore, agrees with the USGS's pH value of 7.7 during that period (Kennedy, 2002). A sharp drop in pH

level, however, is noticed in September 2001. This may have been a reaction to the sudden change to cooler weather conditions.

Conductivity (TDS)



Conductivity averaged 599 s/cm over the four year period. As seen in the graph, samples collected did not deviate to far from the mean. The standard deviation of all values collected was at 0.02. The value that deviated most significantly was the 210 value collected in May 2000. This value dropped significantly from the previous month and escalated back within normal range the proceeding month. This may have been from high volume traffic in the area during that period. The change in conductivity values between months was moderate for the April 2000 to 2004 period. Values decreased no more than four times before rising; rising values increased no more than four times before dropping. This reflects a high stability of creek conductivity during this time period.

Descriptive Statistics Table

NORTH MESQUITE CREEK (Site ID# 80111)	N	Complete	MIN	MEAN	MAX	MEDIAN	MODE
Sample Time (central)	36	80%	15:05	16:22	19:25	16:10	15:45
Sample Depth (meters)	36	80%	0.10	0.19	0.20	0.20	0.20
Specific Conductivity (S/cm)	43	96%	210.00	598.60	850.00	610.00	530.00
Air Temp (C)	45	100%	10.50	23.26	35.00	21.50	27.00
Water Temp (C)	45	100%	9.00	20.51	32.50	20.00	19.00
Dissolved Oxygen (mg/L)	43	96%	6.00	9.08	12.20	8.90	11.80
pH (s)	45	100%	7.25	7.92	8.50	7.80	8.00
DO Exceedences [< 6.0. mg/L]			0 of 43 = 0%				

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