# Baseline Water Quality For Lanana Creek within the Nacogdoches Area

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## Abstract

Lanana Creek is one of two springs that surround Nacogdoches, TX. Lanana Creek starts southwest of Lake Naconiche, conjoining with several other bodies of water along its path, and becomes part of the Angelina River. This body of water eventually ends in the Gulf of Mexico which may contribute to the dead zone. Contaminants in water may be of small concentration; however, prolonged exposure could produce many negative effects. To monitor future change in the creek, whether natural or human-induced, a baseline of targeted species for the creek waters must be established as a “snapshot” of the Nacogdoches Lanana Creek area. Events that could change the baseline include, but are not limited to, floods, fertilizers and pesticides used in rural farms, and urban runoff.

## Methods

The experiment consists of obtaining samples from eight different locations approximately twice a month along Lanana Creek and testing for different anion and metal concentrations in the creek. Samples from the eight sampling sites consist of NE Stallings Drive, Austin Street, East College Street, Starr Avenue, Martinsville Street, Park Street, Main Street, and Martin Luther King Jr. Blvd. Samples were filtered to remove residue as only the dissolved species in the water are analyzed. Anion analysis was conducted using an ion chromatography (IC), and metal analysis was conducted using an Inductively Coupled Plasma - Mass Spectrometer (ICP-MS).

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**Mean concentrations of anions in ppm over selected sampling sites for entire study of Lanana Creek**

| | NE Stallings | Austin | E College | Starr | Martinsville | Park | Main | Martin Luther King Jr | mean ± s.d. |
|---|---|---|---|---|---|---|---|---|---|
| Fluoride | 0.633 | 0.585 | 0.428 | 0.511 | 0.504 | 0.364 | 0.562 | 0.497 | 0.511±0.086 |
| Chloride | 53.590 | 69.509 | 51.549 | 54.418 | 61.605 | 48.396 | 52.015 | 44.289 | 54.422±7.865 |
| Nitrite | 0.473 | 0.362 | 0.284 | 0.259 | 0.255 | 0.310 | 0.311 | 0.266 | 0.315±0.074 |
| Bromide | 0.168 | 0.405 | 0.411 | 0.397 | 0.313 | 0.292 | 0.311 | 0.303 | 0.325±0.081 |
| Nitrate | 29.300 | 27.646 | 11.585 | 8.757 | 17.203 | 9.835 | 5.277 | 14.750 | 15.545±8.774 |
| Sulfate | 38.038 | 36.161 | 40.876 | 42.056 | 44.182 | 40.340 | 36.047 | 35.986 | 39.211±3.116 |
| Phosphate | 1.494 | 0.533 | 3.101 | 1.463 | 1.142 | 0.439 | 2.976 | 2.426 | 1.697±1.034 |

**Mean concentrations of metals in ppb over selected sampling sites for entire study of Lanana Creek**

| | NE Stallings | Austin | E College | Starr | Martinsville | Park | Main | Martin Luther King Jr | mean ± s.d. |
|---|---|---|---|---|---|---|---|---|---|
| Cd | 0.016 | 0.011 | 0.009 | 0.013 | 0.075 | 0.032 | 0.019 | 0.044 | 0.028±0.023 |
| Co | 0.659 | 0.142 | 0.281 | 0.398 | 0.342 | 0.267 | 0.499 | 0.327 | 0.365±0.158 |
| Cr | 0.601 | 0.348 | 1.028 | 0.658 | 0.706 | 0.639 | 0.894 | 1.313 | 0.774±0.297 |
| Cu | 3.923 | 3.333 | 2.683 | 2.432 | 2.783 | 1.857 | 1.664 | 4.436 | 2.889±0.963 |
| Li | 2.821 | 3.057 | 3.000 | 4.405 | 3.860 | 3.381 | 2.865 | 3.107 | 3.312±0.554 |
| Mn | 8.649 | 9.739 | 25.035 | 17.071 | 10.813 | 8.937 | 22.101 | 38.982 | 17.666±10.664 |
| Mo | 0.096 | 0.142 | 0.140 | 1.281 | 18.680 | 7.452 | 2.870 | 1.525 | 4.024±6.406 |
| Ni | 2.298 | 1.616 | 1.707 | 2.083 | 1.672 | 1.469 | 2.357 | 4.634 | 2.23±1.026 |
| Pb | 0.182 | 0.133 | 0.275 | 0.256 | 0.272 | 0.164 | 0.245 | 0.418 | 0.244±0.089 |
| Zn | 77.851 | 59.217 | 78.184 | 67.562 | 71.582 | 57.298 | 109.160 | 111.284 | 79.018±20.71 |

## Current status and future work

Data has been collected since August 2013 to the present approximately twice a month. Currently an initial baseline of targeted anions and metals has been established; however, further collection and analysis of the creek water will be needed before a valid baseline for the creek can be established for controlling/monitoring changes in the creek over time.