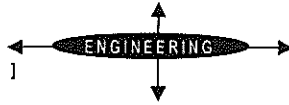


ID-3

Environmental Safety Health Geotechnical

O'Reilly, Talbot & Okun
[A S S O C I A T E S]



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File No. J022-22-01
June 22, 2009

Mr. Steve Ledoux, Town Manager
Town of Acton
472 Main Street
Acton, MA 01720

Re: Nitrate Trends in Groundwater
Acton, MA

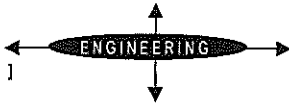
Dear Mr. Ledoux:

O'Reilly, Talbot & Okun Associates, Inc. (OTO) is pleased to present our evaluation of the trends in nitrate concentrations in certain groundwater monitoring wells in Acton. Our assessment was based on a spreadsheet provided by Mr. Doug Halley of the Acton Health Department. The spreadsheet summarizes nitrate and depth to water measurements for eleven monitoring wells over the period from August 1996 through May 2009. We understand these wells are located in the vicinity of septic systems. The purpose of our services was to provide an independent assessment of whether the data indicate a trend (either upward or downward) in nitrate concentrations.

We understand the nitrate measurements were made in the field by Health Department staff, and that the method of field analysis changed in August 1997. Prior to August 1997, nitrate was measured in the field using test strips which were dipped into the sample, then the resulting color was compared to a chart. The chart did not provide a continuous range of possible concentrations, therefore the data set from this period contains values at incremental steps (only values of 0, 5, 10, 25 and 50 mg/l nitrate were recorded during this period). In August 1997, the measurement method was changed to a more accurate method, the Hach field test kit, Model NI-11. In this method the sample is mixed with premeasured reagents, and the resulting color is compared to a color wheel. The color wheel has a continuous spectrum of possible colors and associated nitrate concentrations. The data generated since August 1997 are considered more reliable.

GRAPHICAL PRESENTATION

The nitrate and depth to water data were plotted against time to provide a visual assessment of trends. Note that we did not generate a plot for monitoring well FP-2-1, which was closed in 1996 and therefore did not have an adequate data set. For the remaining ten wells, two sets of graphs were generated: one using all of the data provided, and one using only the more reliable data generated since August 1997. The 20 plots are attached. On each plot, a trend line was added which shows the trend in nitrate concentration over time assuming a linear fit. The trend lines were electronically generated by the software used.



INTERPRETATION

In both sets of graphs (post-1996 and post-August 1997), five of the ten graphs showed an upward trend line, and five of the ten graphs showed a downward trend line. In most cases, the slope of the trend line was small, indicating little change over time. In the post-1996 data set, steeper downward trend lines were generated for two monitoring wells: FP-4-2 and FP-5-1. However, when considering only the post-August 1997 data, we cannot conclude a downward trend exists at either location. The FP-4-2 trend line decreases from an average of approximately 1.5 to 1 mg/l nitrate. The FP-5-1 trend line decreases from approximately 2.2 to 1.5 mg/l nitrate. Neither of these indicates a significant or reliable decrease given the overall scatter in the data.

Based on our assessment, there is not a significant trend either upward or downward in the nitrate data for these ten wells.

We appreciate the opportunity to be of service to the Town of Acton. If you have any questions or comments, please contact either of the undersigned.

Sincerely yours,
O'Reilly, Talbot & Okun Associates, Inc.

A handwritten signature in cursive script that reads "Valerie D. Tillinghast".

Valerie D. Tillinghast, LSP
Senior Project Manager

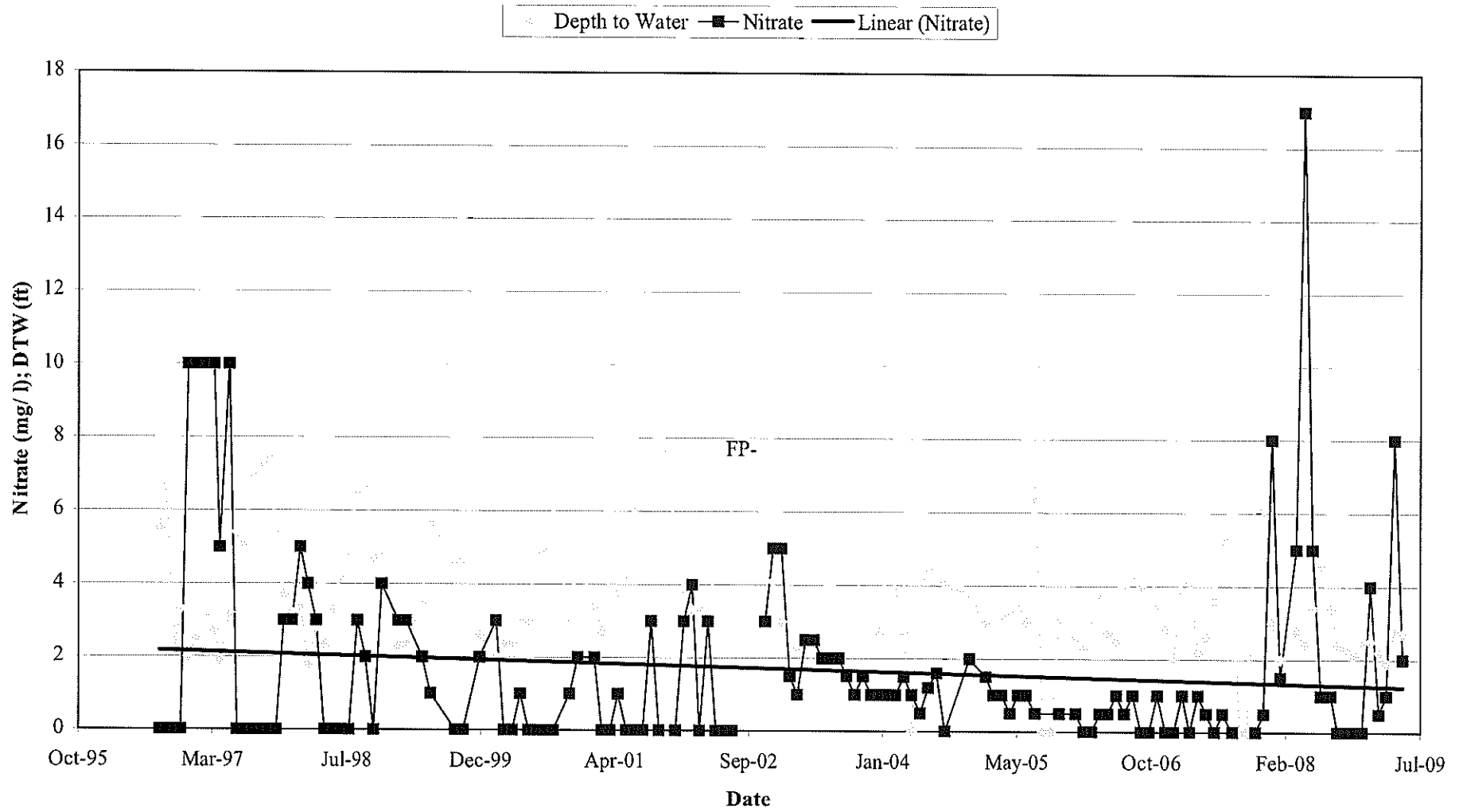
A handwritten signature in cursive script that reads "James D. Okun".

James D. Okun, LSP
Reviewer

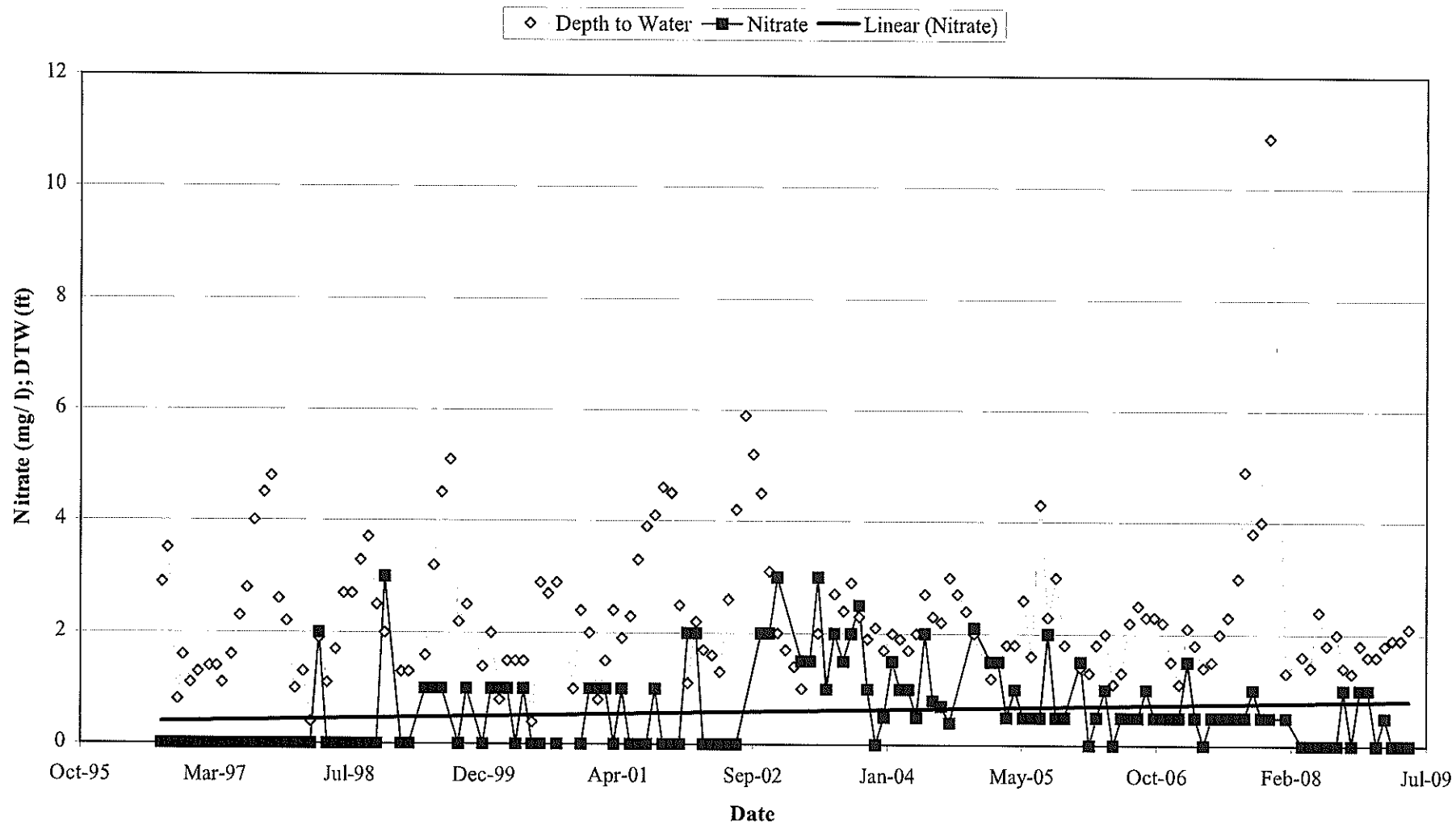
Attachments: Concentration vs. Time Plots (20)

c: Doug Halley/Board of Health

FP-1-1 (since 1996)

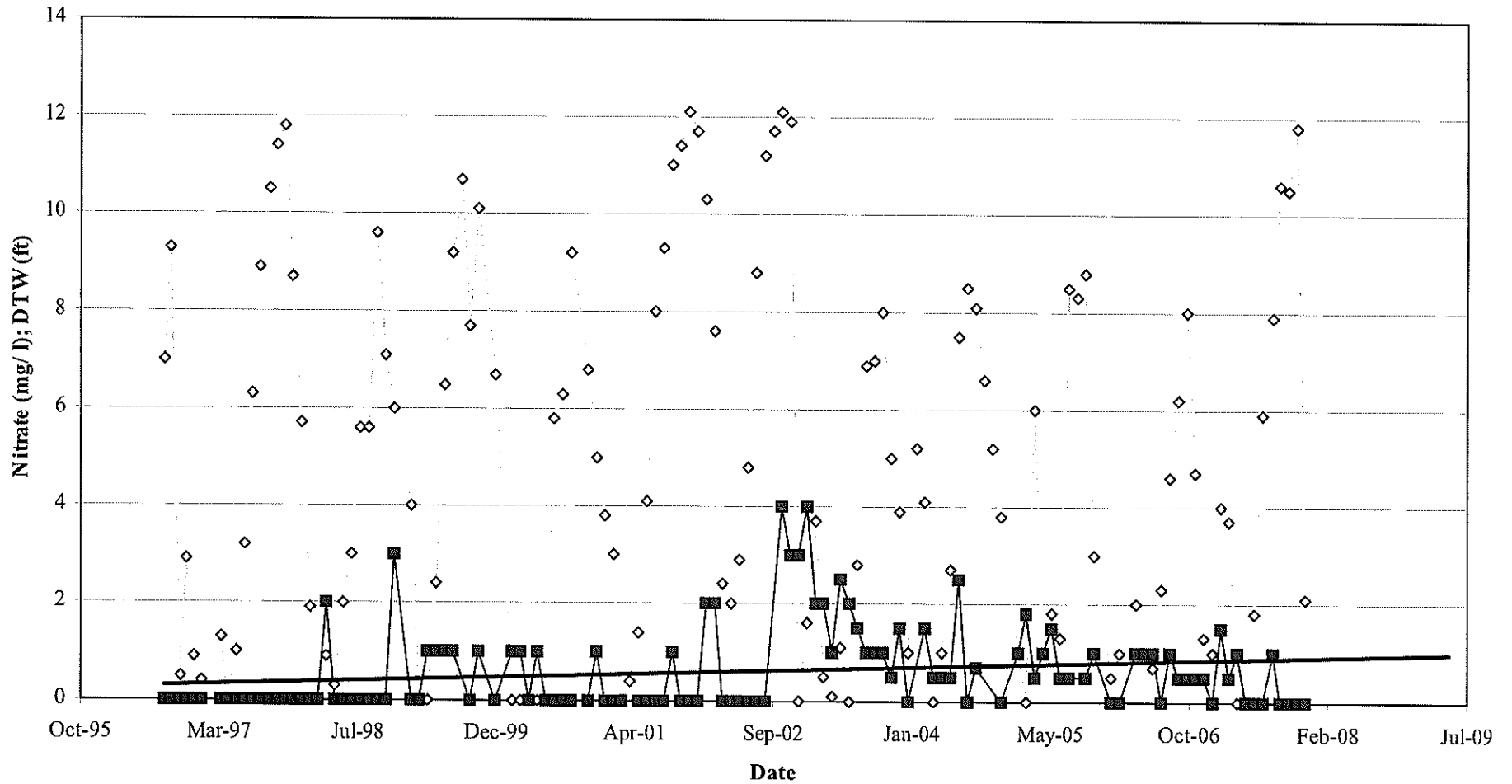


FP-1-3 (since 1996)



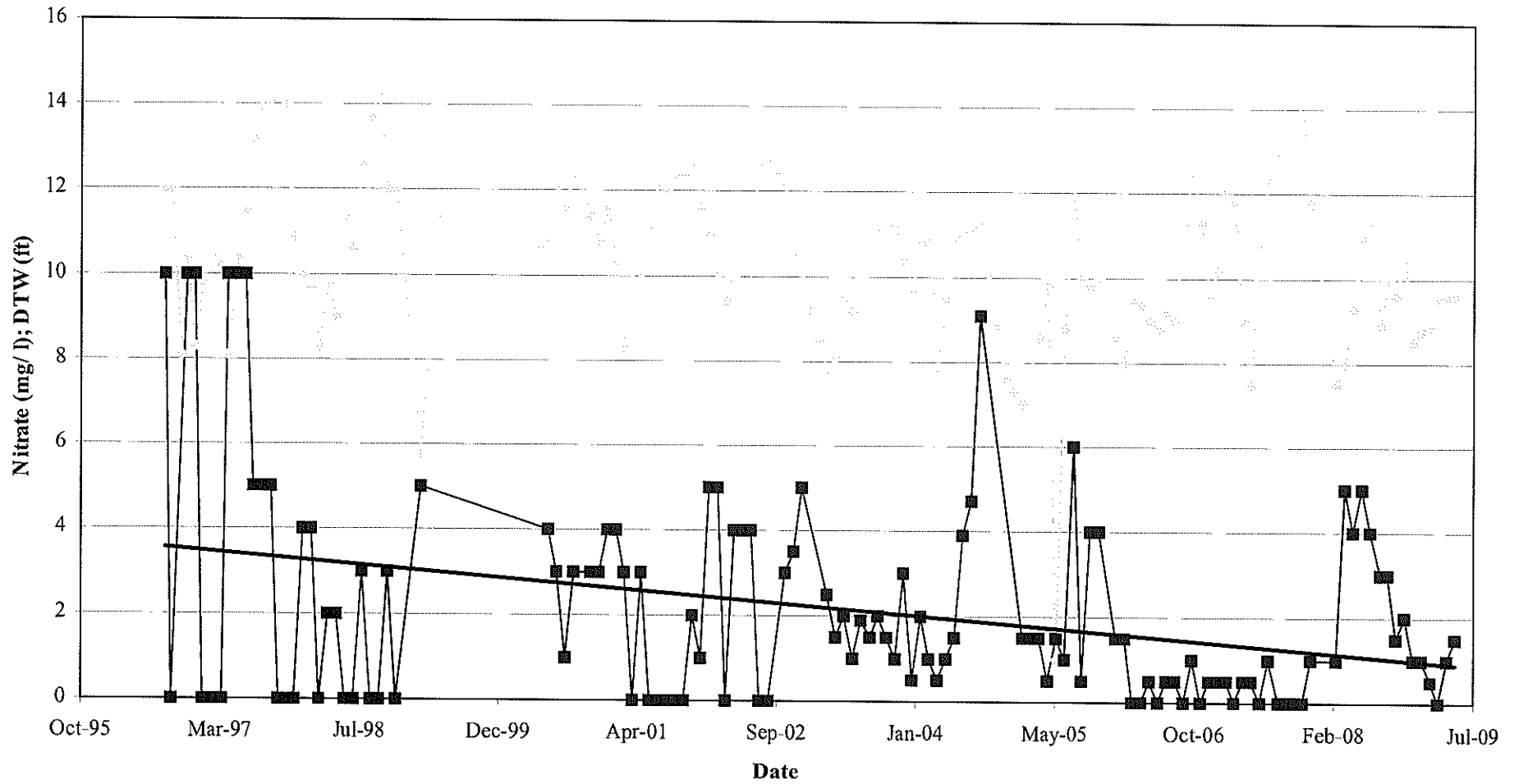
FP-4-1 (since 1996)

◇ Depth to Water —■ Nitrate — Linear (Nitrate)

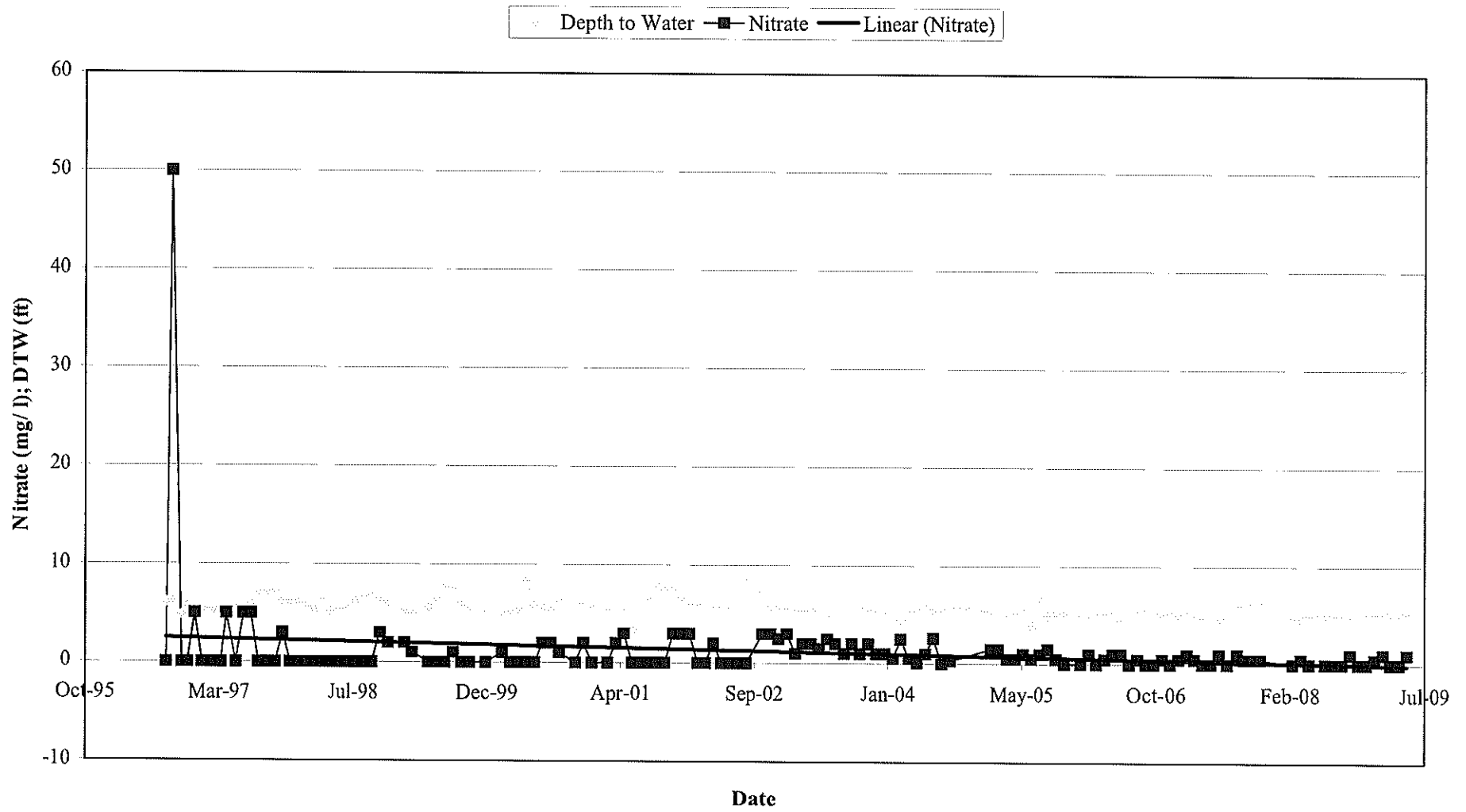


FP-5-1 (since 1996)

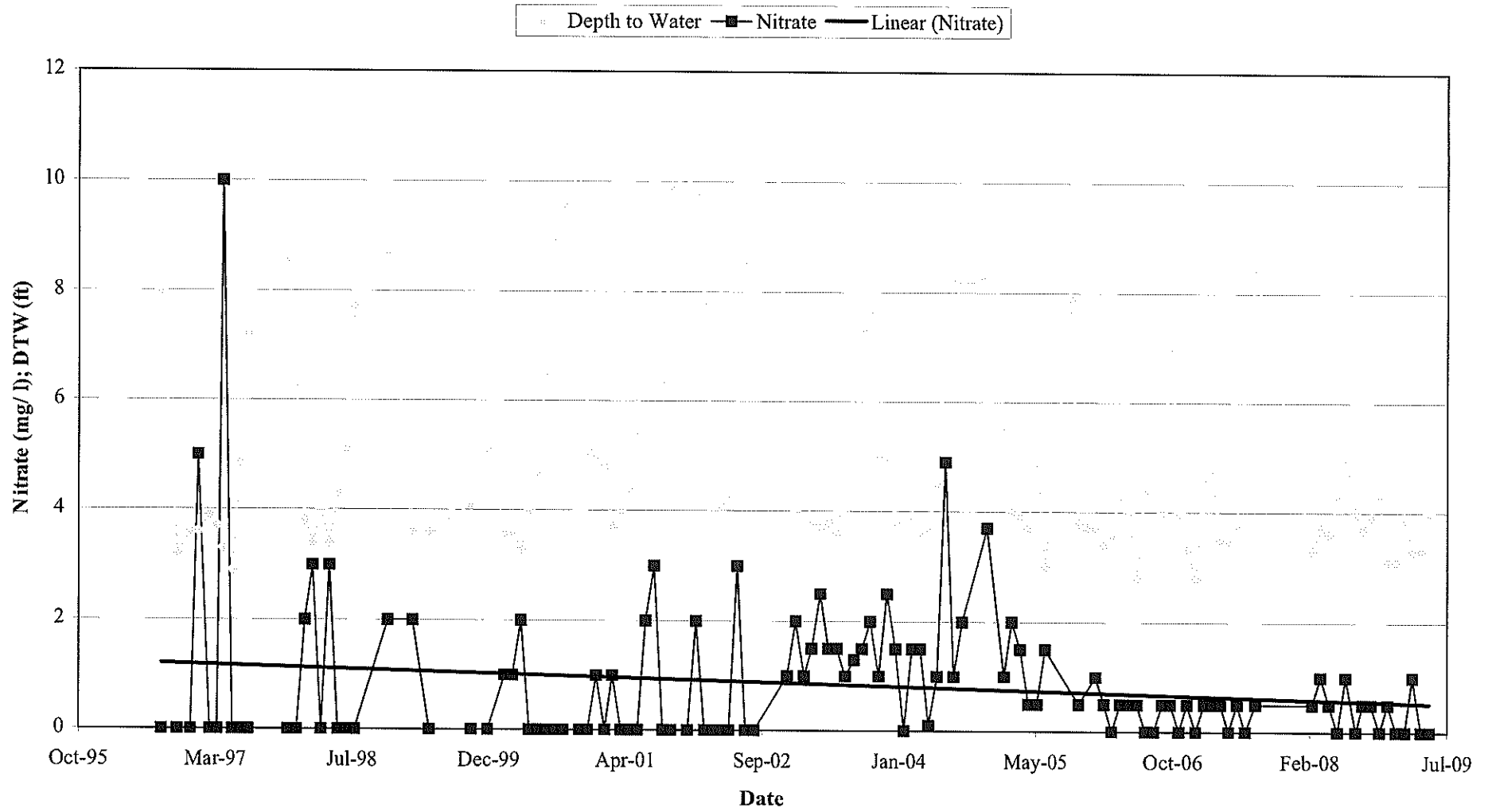
Depth to Water ■ Nitrate — Linear (Nitrate)



FP-6-1 (since 1996)

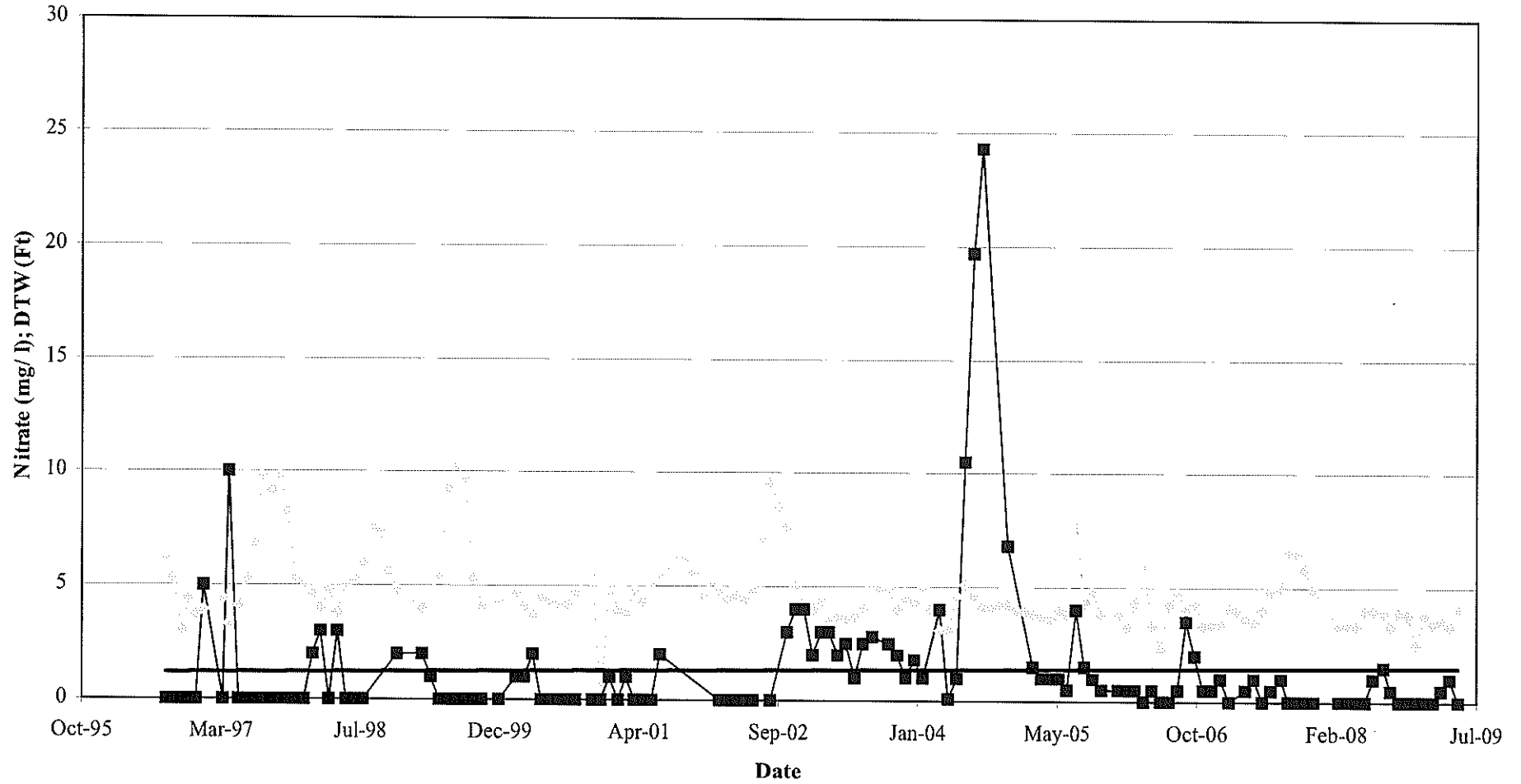


NB-2-1 (since 1996)



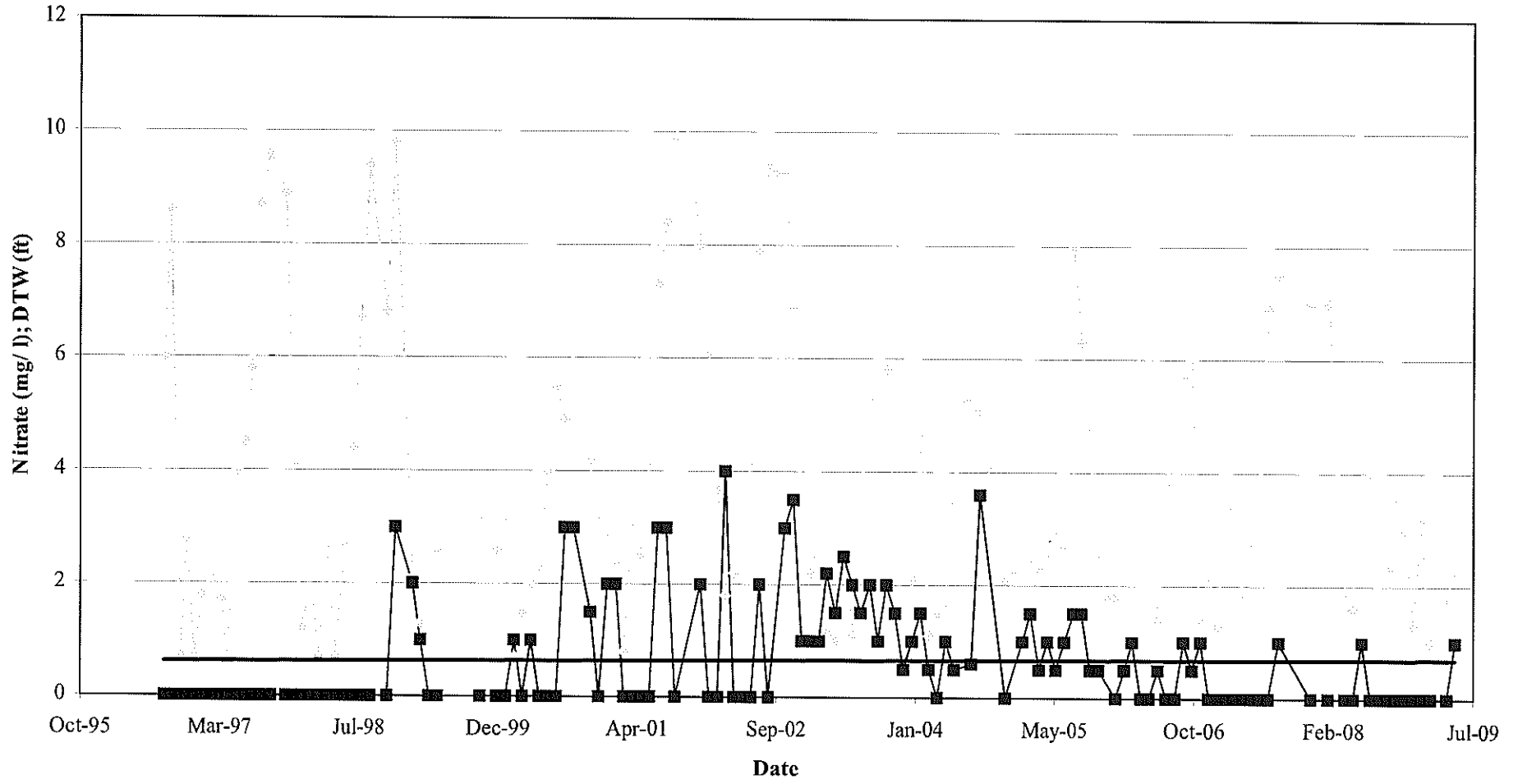
FP-7-3 (since 1996)

Depth to Water ■ Nitrate — Linear (Nitrate)



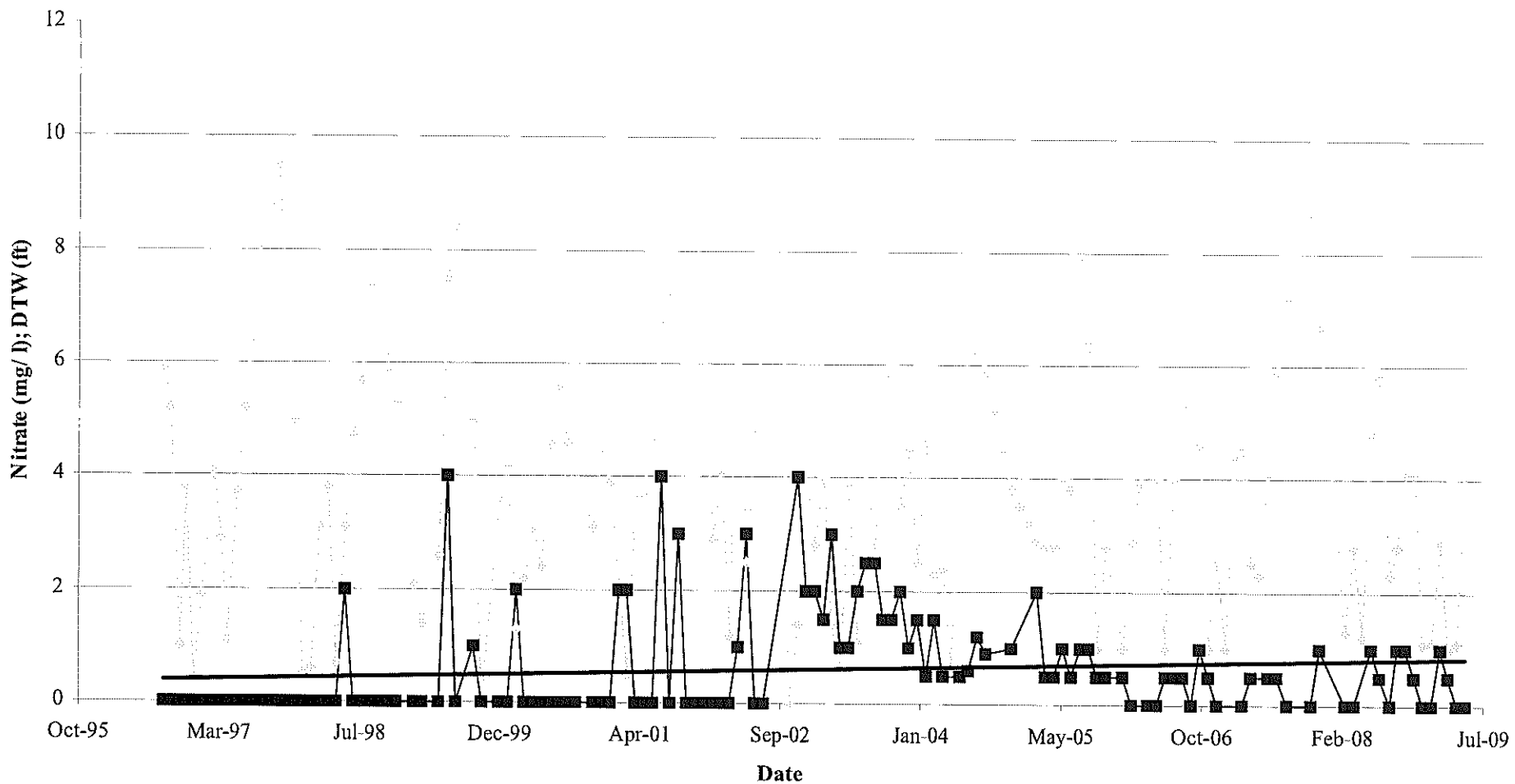
NB-3-1 (since 1996)

Depth to Water ■ Nitrate — Linear (Nitrate)



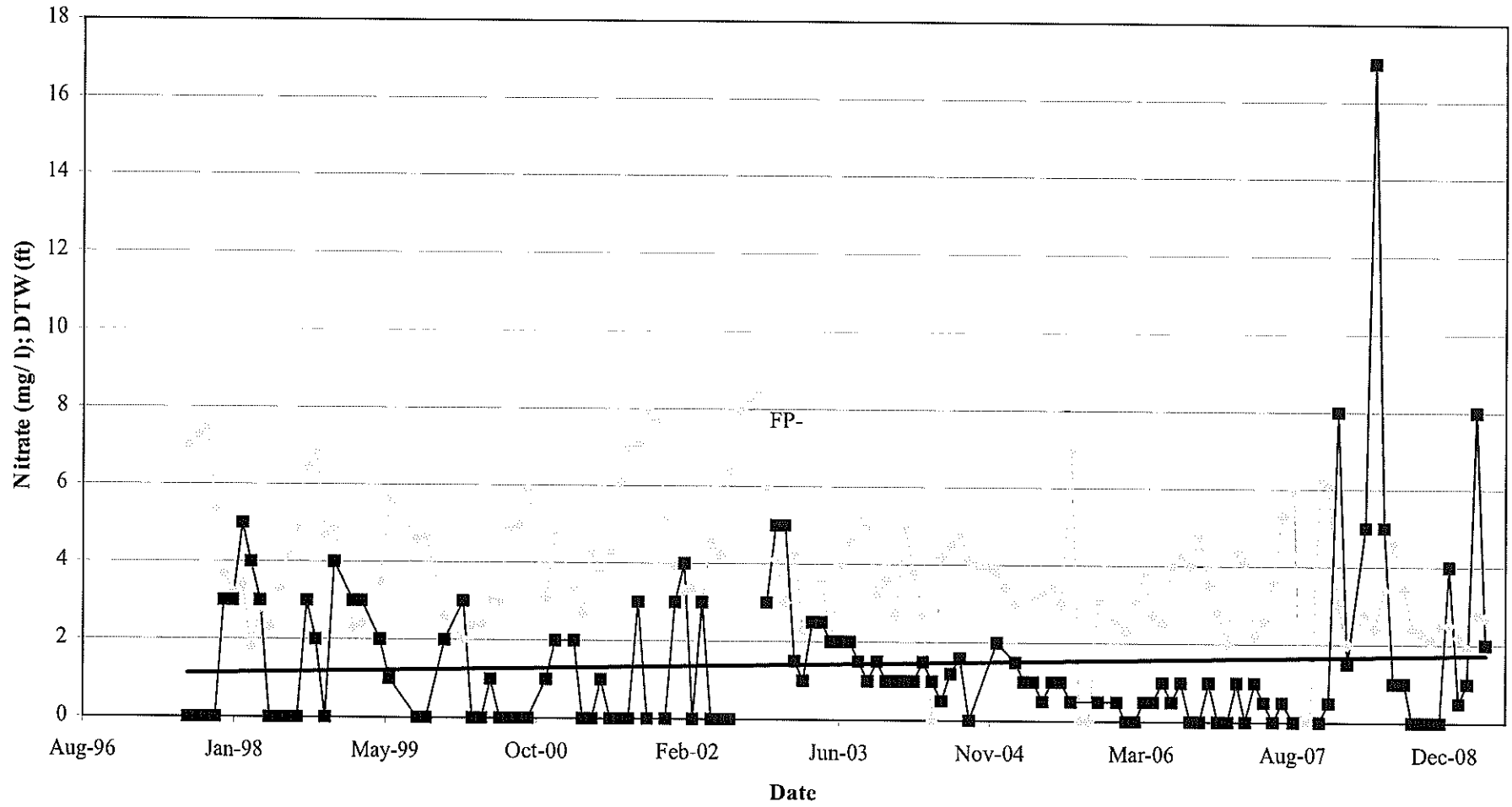
NB-4-6 (since 1996)

◆ Depth to Water ■ Nitrate — Linear (Nitrate)

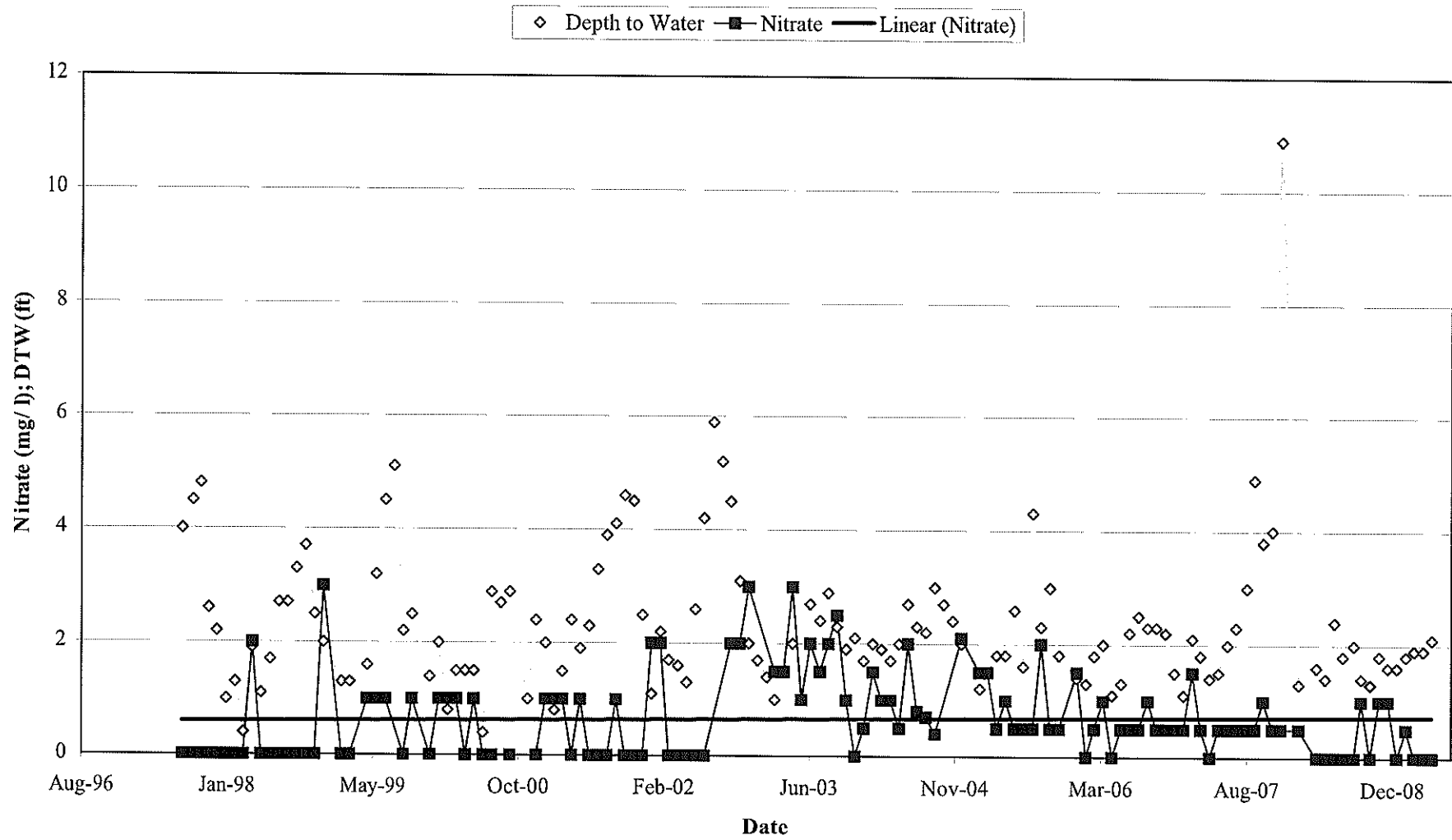


FP-1-1 (since 8/97)

Depth to Water ■ Nitrate — Linear (Nitrate)

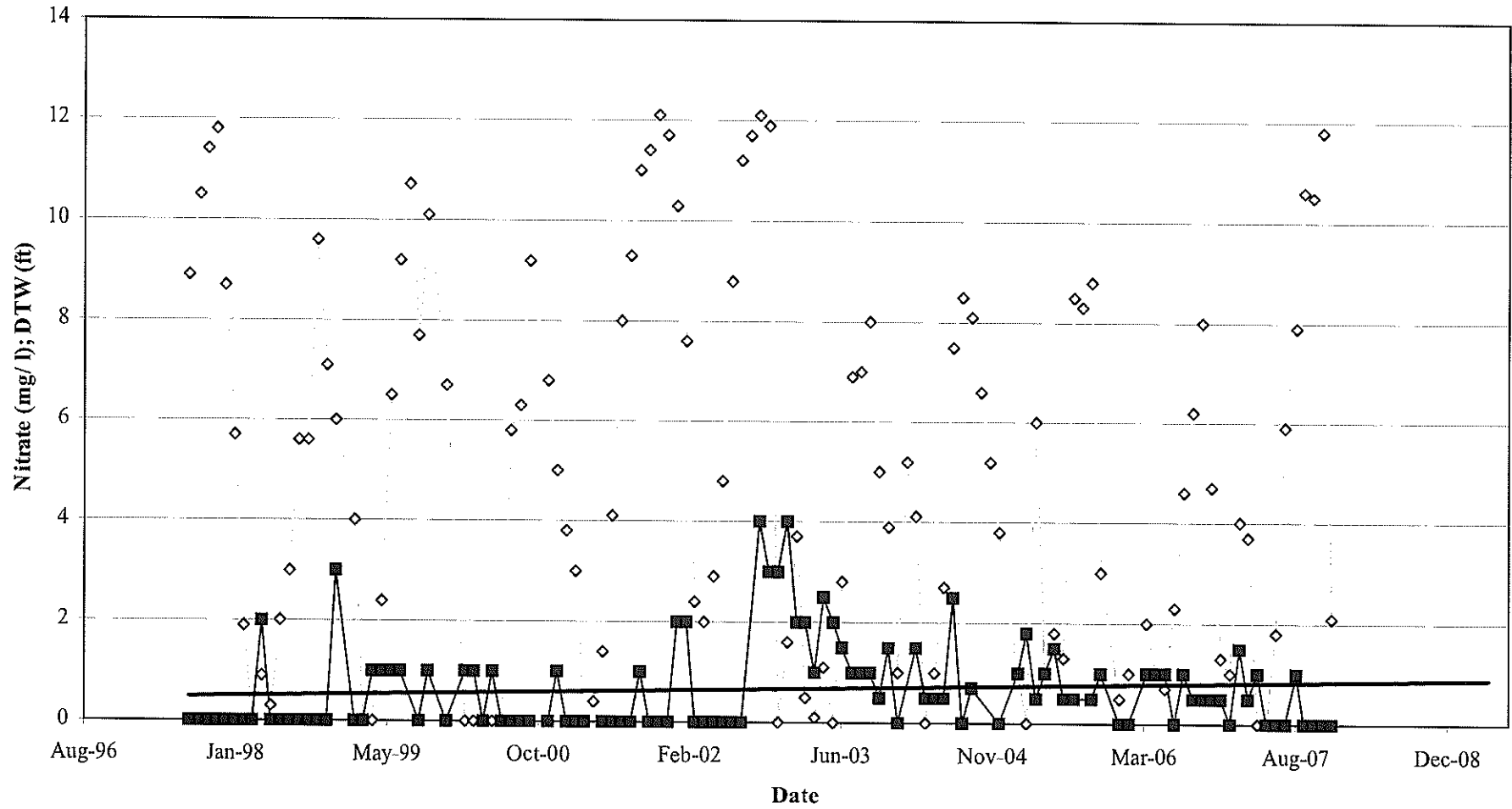


FP-1-3 (since 8/97)

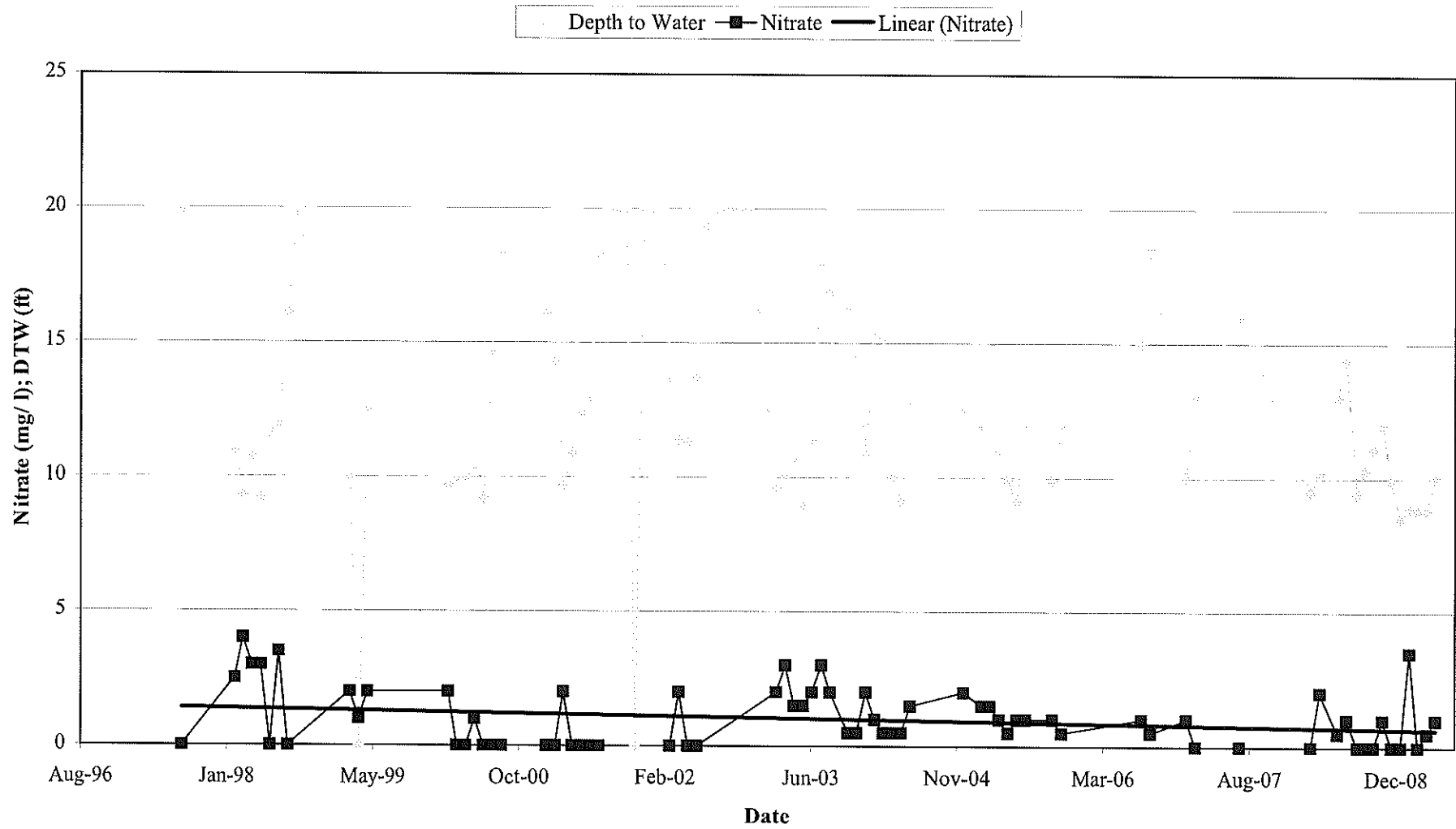


FP-4-1 (since 8/97)

◇ Depth to Water —■— Nitrate — Linear (Nitrate)

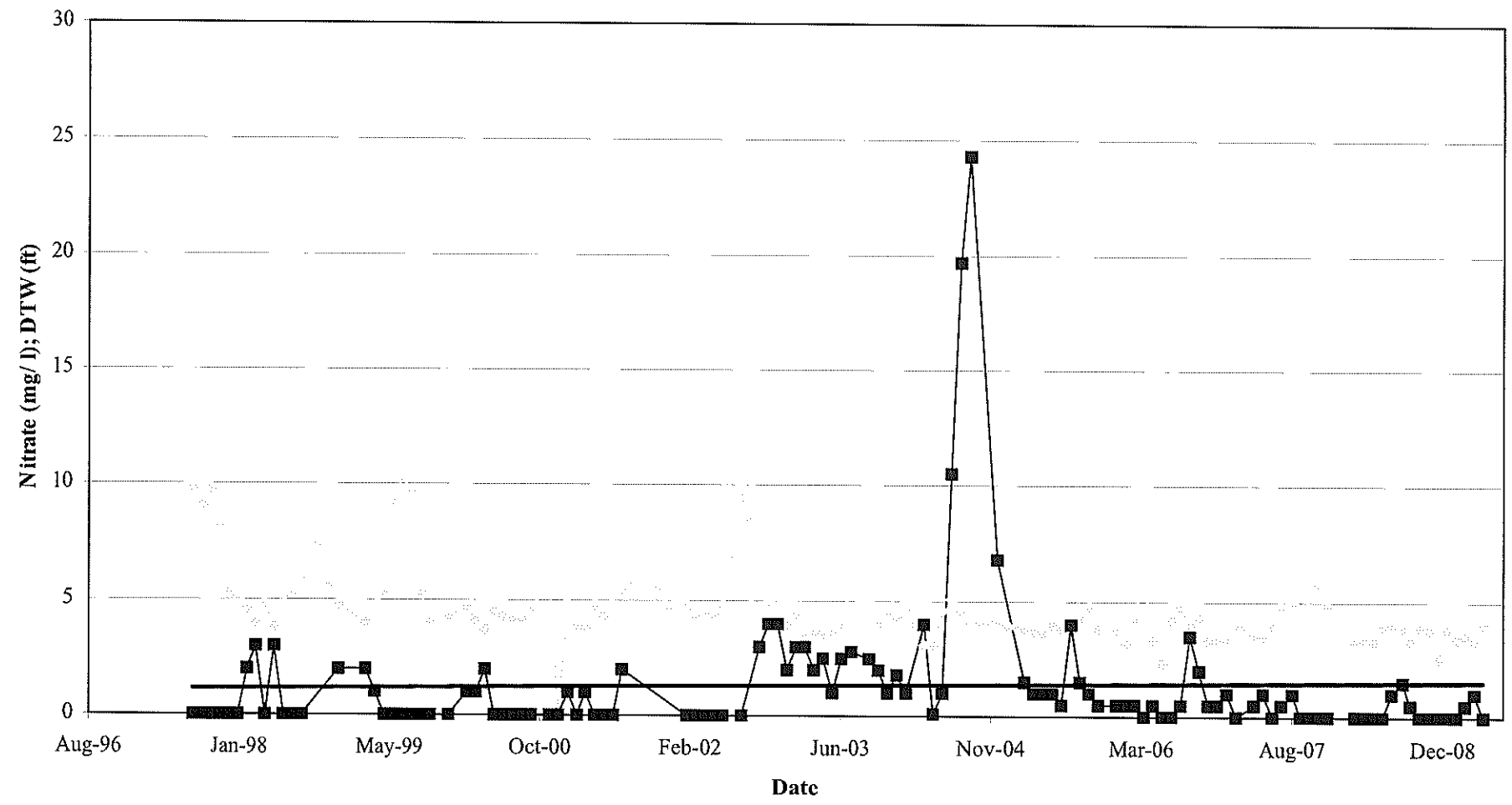


FP-4-2 (since 8/97)



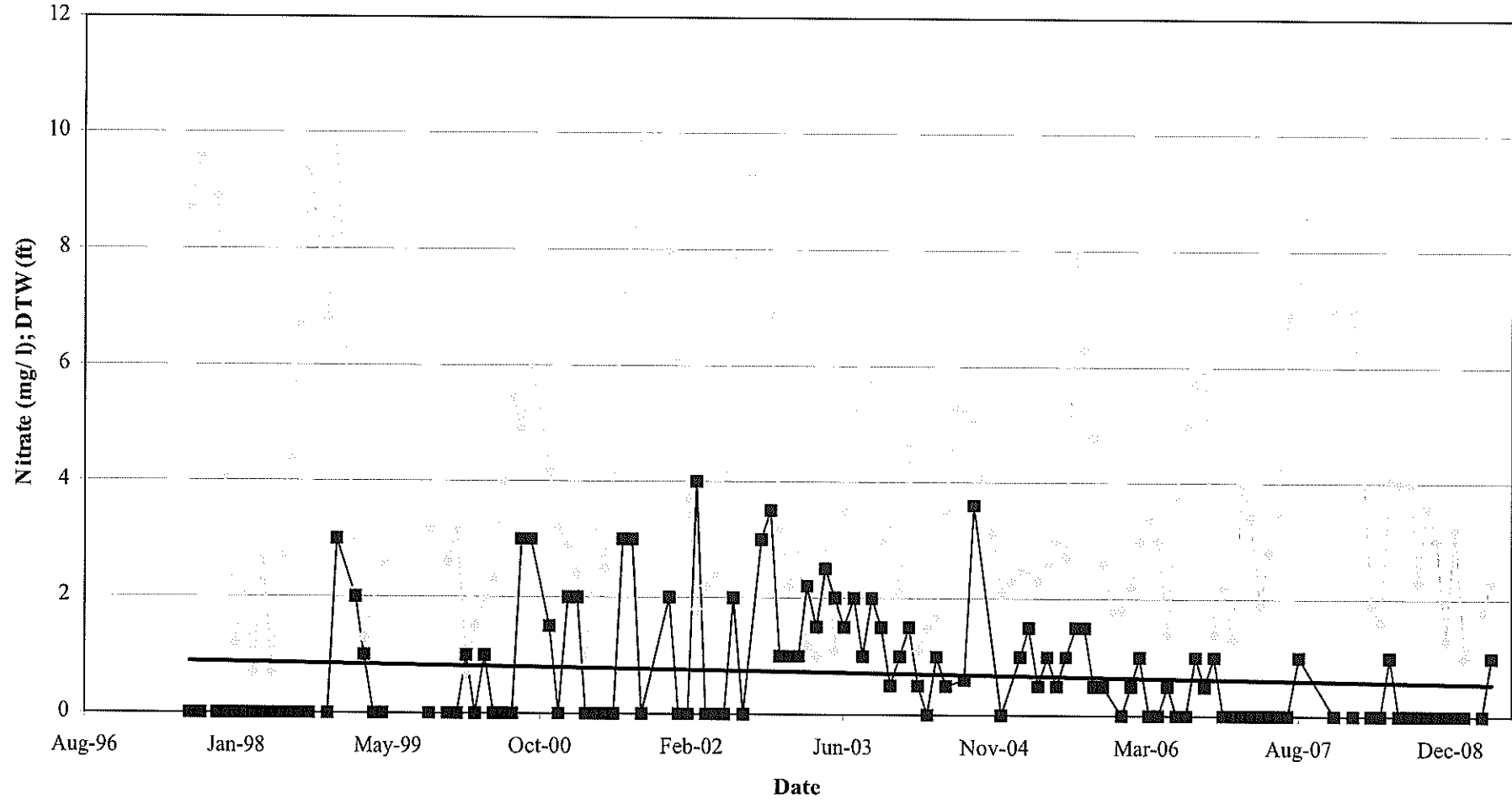
FP-7-3 (since 8/97)

○ Depth to Water ■ Nitrate — Linear (Nitrate)



NB-3-1 (since 8/97)

◆ Depth to Water ■ Nitrate — Linear (Nitrate)



NB-4-6 (since 8/97)

○ Depth to Water ■ Nitrate — Linear (Nitrate)

