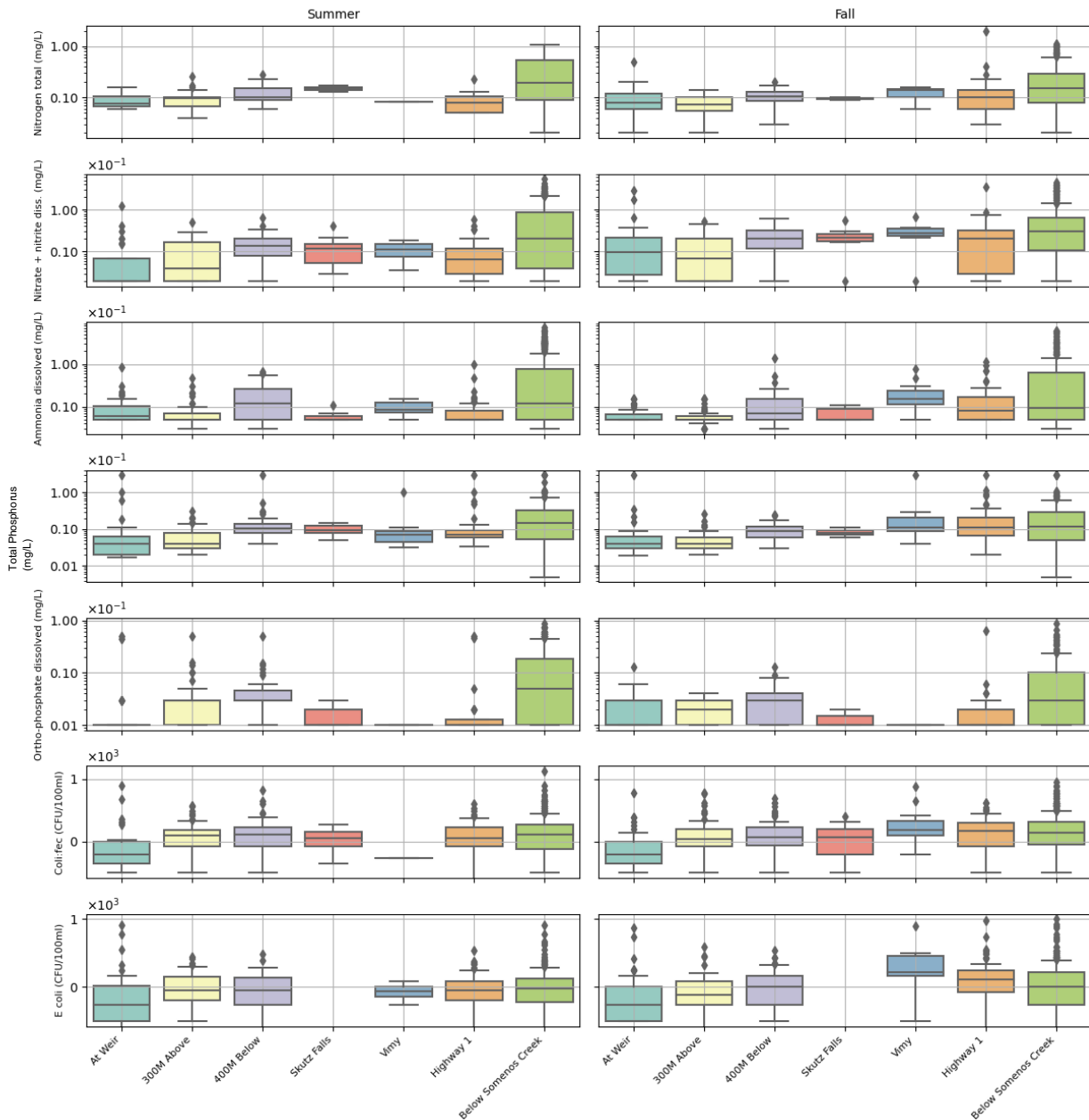


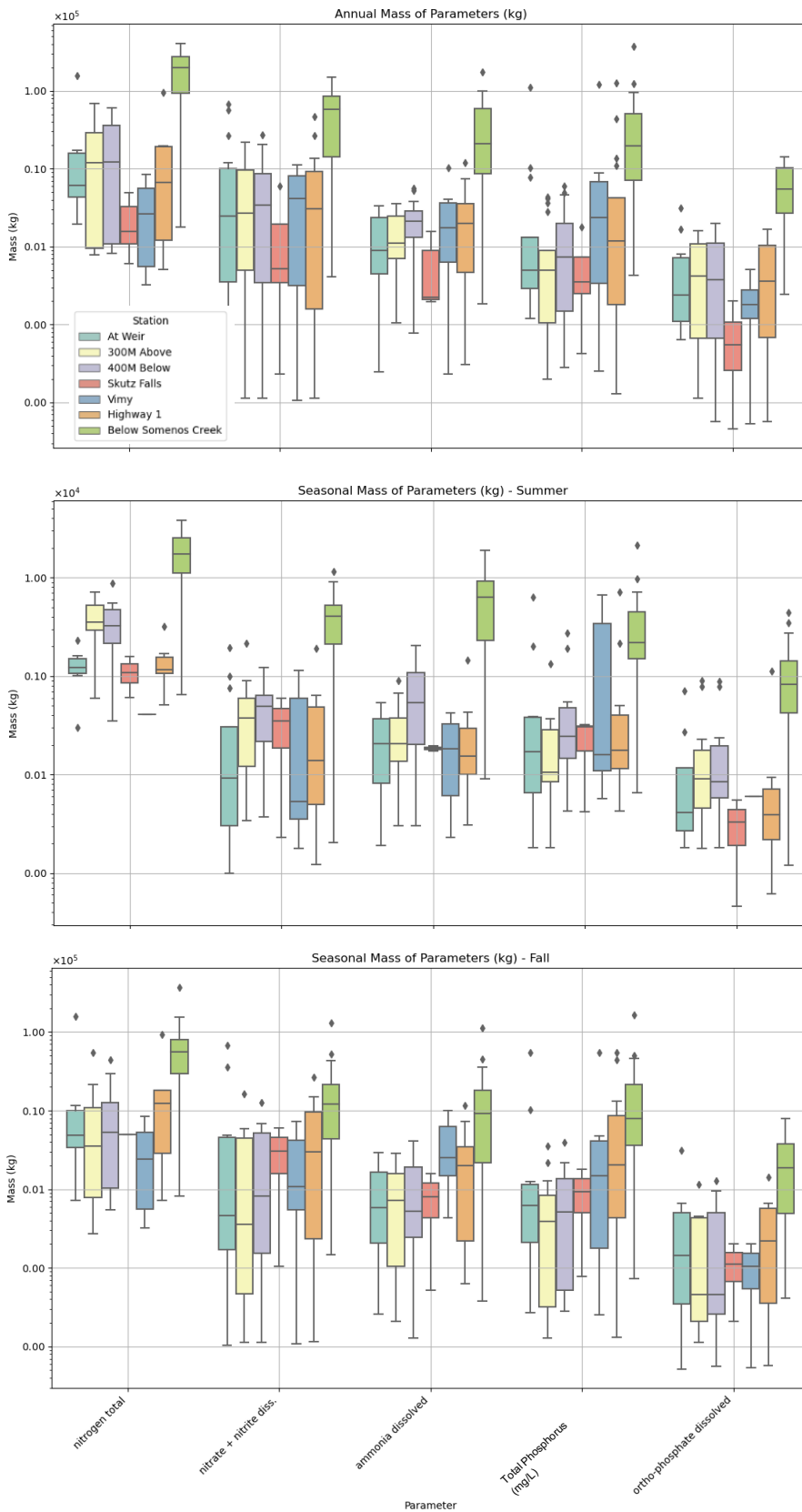
# Addendum

**Figure 1** shows concentration data in mg/l across all stations for six parameters, including data from a monitoring station named “below Somenos Creek” (7th station right side, green). This station is located about 500 m below the second sewage outfall, which serves the community of Duncan (Figure 1 of main text), and after the input of Somenos Creek. The middle line on the box plots shows the median value, and the boxes show the upper and lower quartiles. The whiskers show the upper and lower extremes, and any other points are statistical outliers / single data points. The figure incorporates data from 1990 to 2024, and is displayed for summer and fall months. Visually, the 7th station exhibits increased median values and variability for all forms of nitrogen and phosphorus. In addition to potentially receiving excess nutrients from the outfall, it also receives water from the Somenos sub-watershed, which contains enormous amounts of nutrient loading from farms and failing septic systems around Somenos Lake (H. Pritchard, personal communication, August 22 2024). Median values for E. Coli and Fecal Coliform do not appear to be significantly higher, however there does appear to be a large number of outlier data points on the higher end.

**Figure 1.**  
*Concentration box plots incl. below Somenos Creek*



**Figure 2.**  
Mass loading box plots

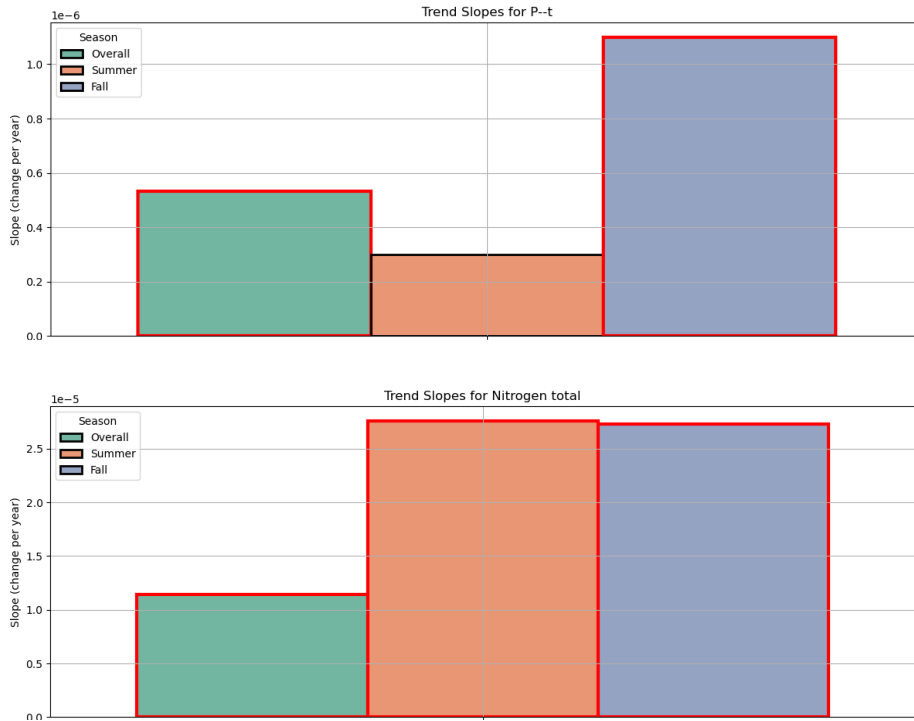


**Figure 2** shows mass loading calculations for each parameter (kg, typical year based on available data) on an overall basis (2a) as well as for summer and fall (2b, c respectively). Please refer to the main text for more information on how to read this figure. Interestingly, the masses at Somenos Creek are significantly higher in the summer versus the fall months, a result that is not apparent when looking at the concentration data alone. Across the board however, median mass values experience a significant increase below Somenos Creek, suggesting significant contributions of all parameters from the Somenos sub-watershed and/or the sewage outfall near the community of Duncan. These results further emphasize the need for continued monitoring efforts and attention to non-point source contributions.

**Figure 3** shows how total recorded phosphorus and nitrogen have trended since 1990 for the station below Somenos Creek. Here a positive bar indicates an increase in concentration over the study period, and a bar highlighted in red signifies that this change is statistically significant. Figure 4 shows how the variability (standard deviation) has changed over the study period. We find that phosphorus and nitrogen levels show a statistically significant increase, except for summer phosphorus levels (Figure 3). We also see a significant increase in the *variability* of nitrogen concentrations in both summer and fall, and the same for fall phosphorus levels.

**Figure 3.**

*Overall and seasonal trends in N and P levels since 1990, below Somenos Creek*



**Figure 4.**

*Trends in inter-annual variability since 1990, below Somenos Creek*



These results are in contrast to the other stations, where few statistically significant changes in concentration and variability were found with the available data. This may indicate that the Somenos sub-watershed is a source of nitrogen and phosphorus whose inputs and variability, particularly in the fall, have increased significantly since 1990. Further data collection and analysis will improve our understanding of the effects of the sewage outfall in Duncan and the contaminants found in Somenos Creek.