CHAPTER 3.0
OVERVIEW OF DATA USED FOR ANALYSIS

The conceptual model for organic carbon developed in this report is based largely on a database of organic carbon and other constituents compiled by the Drinking Water Policy Workgroup in 2004-2005. Data in the database originate from a variety of agricultural, urban, point source, and surface water monitoring programs throughout the watersheds of the Sacramento and San Joaquin rivers. Although it is possible that there are analytical differences between organic carbon measurements from these different sources, for the purpose of the large-scale evaluation that follows it is assumed that the measurements are comparable (i.e., DOC reported in different studies can be compared).

This chapter provides an overview of the organic carbon data contained in the Drinking Water Policy Database, notably the forms measured, the quantity and spatial distribution of the data, and the concentrations observed at various stations. Data from other sources were used to supplement this data where needed and are discussed below and in subsequent chapters. The plots in this chapter present an informative snapshot of the available data, and set the stage for loading analyses in the next two chapters. Figure 3-1 illustrates key locations in the Central Valley and Delta referred to in this and subsequent chapters.

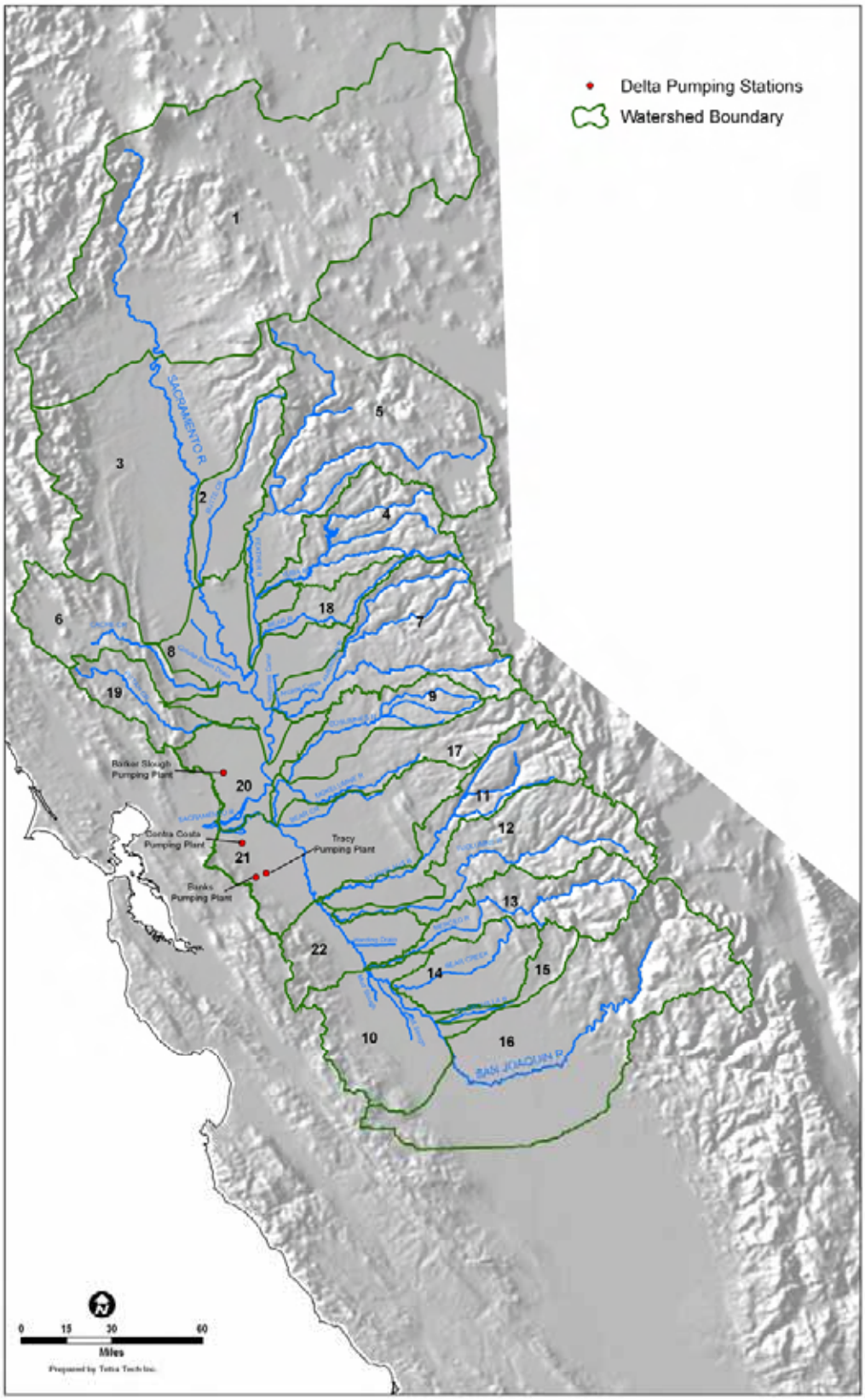

Figure 3-1. Stream reaches and other key locations in the Central Valley and Delta.

3.1 Overview of Concentration Data

Maps showing the distribution of data in the Central Valley are presented in Figures 3-2, 3-3, and 3-4 for total and dissolved organic carbon and UV absorbance at 254 nm, the only three organic carbon-related parameters in the database. Most of the data were collected along the main stems of the Sacramento and San Joaquin rivers and in the Delta. There were limited data for the tributaries to the Sacramento and San Joaquin rivers. Approximately half the stations in the database (representing about a third of the data) had no coordinate information and are not shown in these maps; and the data were not used in this analysis. Based on a spatial evaluation of the data, it appears that both DOC and TOC data are measured widely enough for watershed-wide analysis, although UVA254 is not.

A series of box plots was used to describe the range of organic carbon concentrations at various locations in the watershed. Figures 3-5 and 3-6 show the TOC and DOC concentrations by stations in alphabetic order, respectively. Data from wastewater effluent and from urban runoff were excluded from these plots. Agricultural drainage data are included in these plots, in part because it could often not be clearly distinguished from surface water flows, especially in the San Joaquin Valley. Both linear and log scales are presented because the concentrations in the Delta agricultural drains are an order of magnitude higher than at the other stations. Both plots clearly demonstrate that concentrations are substantially higher in the San Joaquin River Basin than in the Sacramento River Basin. Delta agricultural drainage contains the highest concentrations. This is notable due to the proximity of the Delta agricultural drains to major drinking water intakes.

Figures 3-7 and 3-8 show spatial views of the TOC data and DOC data, respectively. These figures also illustrate the higher concentrations in the San Joaquin River Basin, which is particularly evident for TOC (Figure 3-7).

Appendix A contains a listing of all stations with organic carbon data, including the number of data points for each parameter (DOC, TOC, and UVA254), the period over which sampling was conducted, and whether coordinate information is included. This listing can be used as a reference to identify the quantity of relevant data associated with specific stations in the database, particularly for future work to identify patterns at greater spatial detail than presented in this report. Review of Appendix A shows that stations with the largest number of data points are those on the main stem of the Sacramento and San Joaquin Rivers, especially at stations near the Delta. Many locations had measurements of either TOC or DOC, and data on all three parameters were available for a small number of stations. It was further noted that many stations appeared in the database under different, slightly varying names. In subsequent analysis, such stations were merged with a set of consistent names.

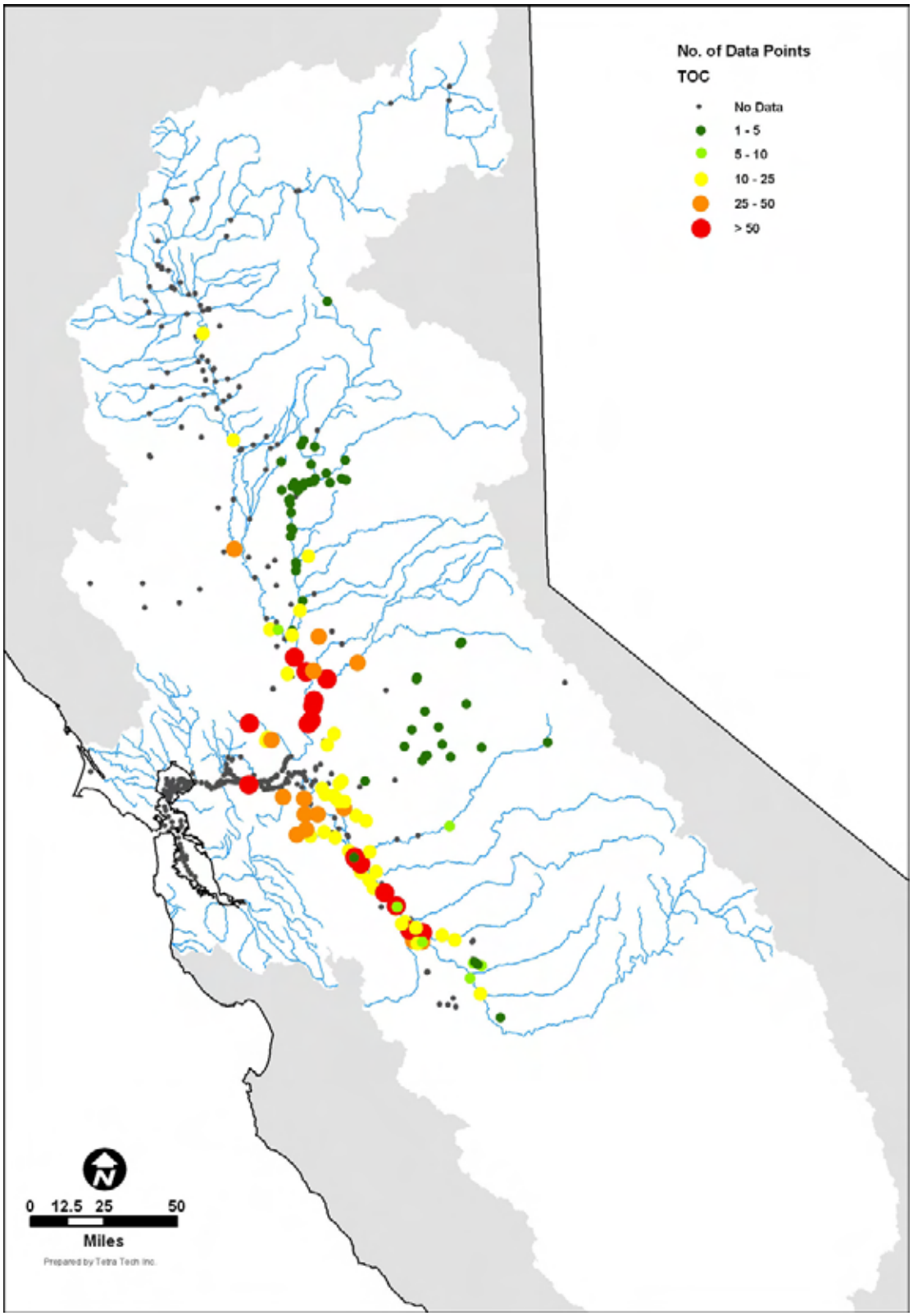

Figure 3-2. Number of TOC data points at each station in the Central Valley Drinking Water Policy Workgroup database.

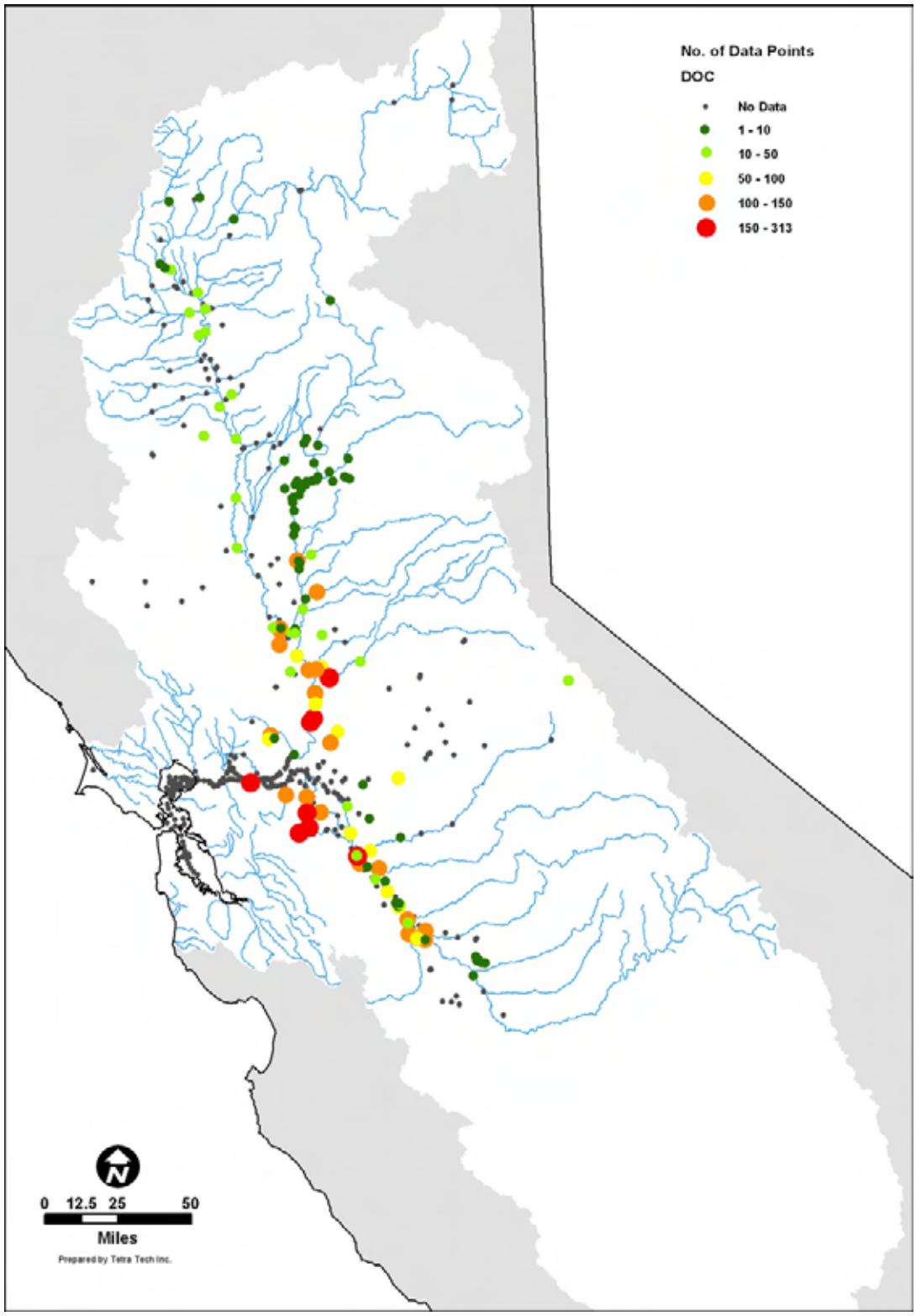

Figure 3-3. Number of DOC data points at each station in the Central Valley Drinking Water Policy Workgroup database.