CHAPTER II

METHODOLOGY

INTRODUCTION

This Groundwater Assessment Study has been prepared with existing data from each of the groundwater basins within the Metropolitan service area. No new studies or technical analyses were conducted. This chapter outlines the process for compiling and displaying the available data that are used herein.

DATA COLLECTION AND REVIEW PROCESS

The following section describes the data collection and review process for the preparation of this document.

Scope of Study and Analysis Period

In its direction to staff in October 2005, the Board defined the scope of the study to include a description of the following items:

- Status and trends in groundwater management and use
- Investments in capital infrastructure
- Current conditions within the basins

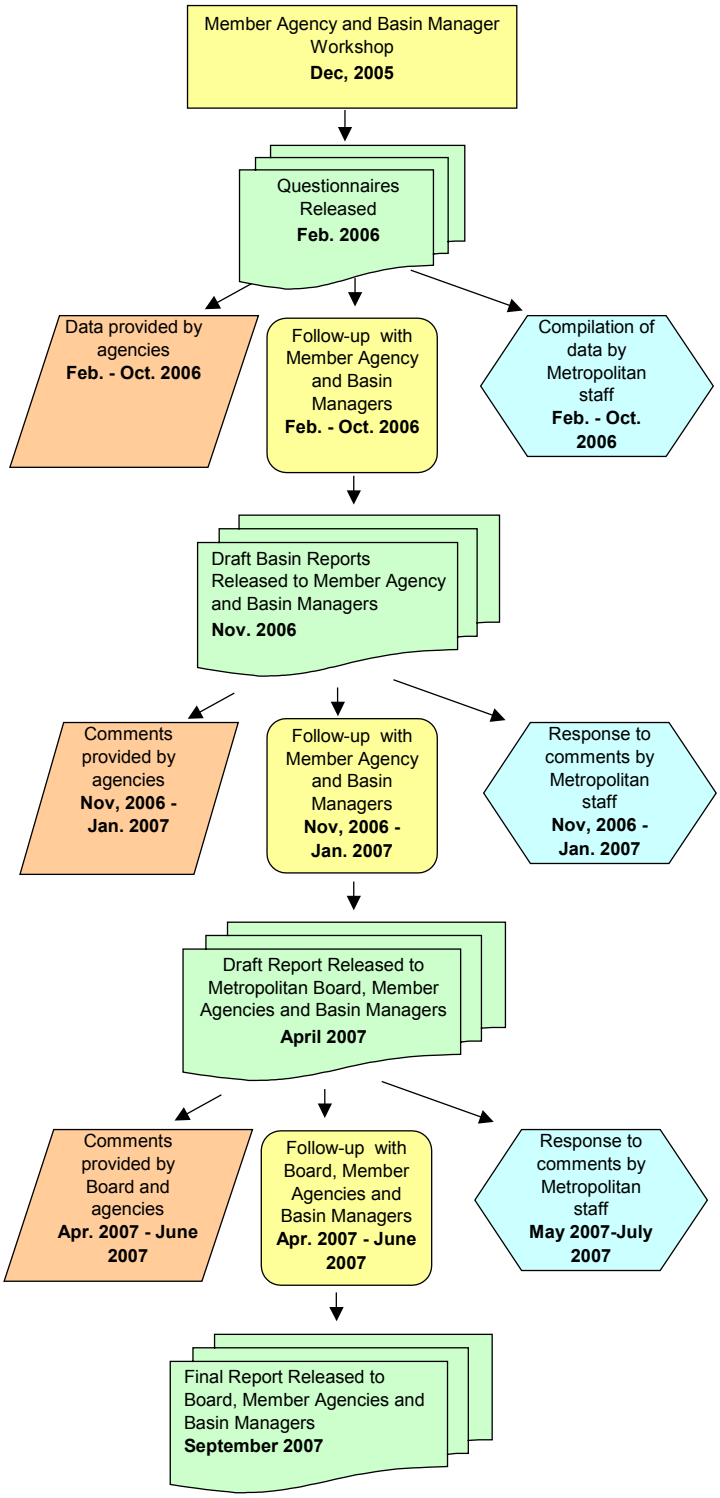
The analysis period for this study is the 20-year period from fiscal years 1985/86 to 2004/05. In some cases (e.g. San Fernando Basin), the basin is managed on a calendar year or water year basis. In these cases, the analysis period is modified to match the data available. This time period was selected to characterize the long-term trends and be as consistent with the most recent urban water management plans, which were adopted in 2005.

Member Agency and Basin Manager Input

The layout and data presented herein was developed based upon extensive input from the overlying Metropolitan member agencies and the groundwater basin managers. The process to prepare this document is shown as a flowchart in **Figure II-1.** Following the Board directive to prepare the Groundwater Assessment Study, Metropolitan invited its member agencies and groundwater basin managers throughout its service area to a workshop to discuss the Groundwater Assessment Study and the desire to establish a collaborative process for gathering and presenting information. At this December 2005 workshop, it was determined that a questionnaire should be developed and distributed to the member agencies and basin managers as the basis for providing input.

In February 2006, the questionnaire was sent out to each member agency and basin manager. The questionnaire requested input regarding the physical description of each basin, groundwater production and recharge, groundwater levels, facilities descriptions, water quality and basin management. Basin data, maps, reports, and questionnaire responses were subsequently.

Figure II-1
Review Process and Report Preparation Timeline



provided by the member agencies or basin managers for many basins within the Metropolitan service area.

In November 2006, the each draft chapter was provided to the overlying member agencies and respective basin managers for review and comment. Draft reports of each basin or group of basins were prepared using a standardized outline. Member agencies and basin managers received copies of their respective groundwater basin reports for review. A regional overview (Chapter III, presented herein) was subsequently prepared using the compiled information from the basin chapters. Metropolitan staff incorporated comments from the member agencies and basin managers.

In April 2007, a draft of the Groundwater Assessment Study report was completed and submitted to the Metropolitan Board of Directors, member agencies and basin managers for review and comment. Comments revised on the draft report were incorporated into this final report. In addition, an executive summary was prepared to accompany the final report.

Literature Review

Metropolitan staff and consultants reviewed the provided information and supplemented it with extensive literature review and discussions with basin parties. Documents reviewed, many of which could be accessed online, included items such as:

- Urban water management plans for water purveyors
- Water management plans
- Engineering reports
- Hydrogeologic reports
- Modeling reports

In addition, water quality data were augmented by data compiled from the Regional Water Quality Control Boards (Regional Boards) through their online Geotracker database. These data can be accessed at: http://www.geotracker.swrcb.ca.gov/.

MAPPING AND DATA PRESENTATION

Data for this study are organized in a Geographic Information System (GIS) format. A GIS is a combination of a database program and a graphical interface that displays data on maps. By compiling the information in a GIS, information can be accessed more easily and can be presented spatially to obtain a better understanding of the groundwater basins. Maps were developed using Environmental System Research Institute (ESRI) ArcGIS 9.1. The groundwater GIS is created in NAD83, California State Plane, Zone VI coordinate system.

Base Map Information

Base map information including freeways, water bodies, aerial photography, and Metropolitan facilities were compiled from Metropolitan files.

Groundwater Basin Boundaries

The groundwater basin boundaries of the California Department of Water Resources Bulletin 118 2004 Update were used initially for this study. This DWR base map was revised for this report based on information and GIS data supplied by the member agencies, the groundwater basin managers, and the Santa Ana Watershed Project Authority (SAWPA). These changes to the DWR mapping provided additional detail or revisions based on current technical studies and/or to reflect basin management and data reporting.

Specific changes to the DWR mapping are described in **Appendix A** and key changes are summarized below.

Ventura County Basins: These basins are within the management jurisdiction of the Fox Canyon Groundwater Management Agency (GMA), and are limited to those within the Metropolitan service area. Based on recent work performed by the U.S. Geological Survey for the GMA, the basin boundaries have been revised by the GMA and used in its groundwater management plan. Specifically, the U.S. Geological Survey divided DWR's Las Posas Valley basin into the West, East and South Las Posas basins. In addition, the Oxnard Forebay has been distinguished from the Oxnard Plain basin. The revised basin boundaries used by the GMA are used in this report.

San Gabriel Valley: This large DWR basin was divided to reflect groundwater basin adjudications and associated management and use: Main San Gabriel Basin, Puente Basin, Six Basins and Spadra Basin.

Upper Santa Ana Valley: DWR's Upper Santa Ana Valley is broken into the following six subbasins: Temescal, San Timoteo, Riverside-Arlington, Chino Cucamonga, and Rialto-Colton. The Rialto-Colton area is outside the Metropolitan service area and has not been covered in this report. With respect to the remaining basins, the mapping utilized by the Santa Ana Watershed Project Authority (SAWPA) has been used. There are slight variations in the basin boundaries, and divisions of basins to reflect management. The mapping of the common boundary between the Chino and Cucamonga basins has been adjusted to reflect hydrogeology as reflected in mapping rather than the adjudicated boundary presented in DWR Bulletin 118. Riverside Basin has been separated from Arlington Basin. The mapping of Temescal Basin is also somewhat modified from Bulletin 118 as relates to the boundary with Elsinore Basin.

Coastal Plain of Orange County: This basin was modified using the boundaries identified by SAWPA. In addition, the La Habra basin, which was included in the DWR basin, was separated from the Orange County Basin in this report.

Elsinore and Temescal Basins: DWR's mapping of Elsinore and Temescal basins has been broken down into subcomponents for purposes of this report, again using SAWPA's mapping. For purposes of this report, the Bedford, Coldwater and Lee Lake basins have been distinguished from the Elsinore Basin and addressed in one groundwater basin report titled Temescal Valley Basins along with the Temescal Basin. The remainder of Lake Elsinore Basin is addressed in its own groundwater basin report.

San Jacinto Basin: The San Jacinto Basin of Bulletin 118 has been divided into the Hemet-San Jacinto Basins (Hemet North, Hemet South, San Jacinto Upper Pressure, and San Jacinto Canyon) and the West San Jacinto Basins (Perris North, Perris South, Lakeview, Menifee, and San Jacinto Lower Pressure). These more detailed mapping units are reflected in groundwater management plans for this area. Overall boundaries are quite similar to those of Bulletin 118, but have been somewhat refined to better reflect geology.

Temecula Valley: This report addresses only a portion of the area mapped by DWR as the Temecula Valley Basin. Herein the covered portion is called Temecula-Murrieta Basin and is comprised of the Pauba and Temecula aquifers as mapped in the Santa Margarita River Watershed Management Plan and consistent with input received from the Santa Margarita River Watermaster and the Rancho California Water District. We have not used local surface water hydrology designations to further delineate these aquifers as sometimes done in the local documents.

San Diego County Basins: This report's mapping and inclusion of groundwater basins in coastal San Diego County reflects input from Metropolitan's member agency, the San Diego County Water Authority. Basins not used to meet municipal water supply are not included. The Las Flores Basin and San Diego Formation aquifer have been added. Sub-basins have been distinguished for the San Luis Rey Valley Basin.

Basin Management Facilities

The geographic distribution of groundwater management facilities is important to understanding the groundwater basin. Data included in the GIS coverage for each basin are:

- Key wells
- Spreading basins
- Seawater intrusion barriers
- ASR wells
- Desalters
- Other regionally significant facilities

These data were provided by the member agencies or basin managers, or from the literature review as applicable. Each facility is highlighted in a map for each basin that is included in Chapter IV – Groundwater Basin Reports of this document.

Other Data

Production and water level data for each basin are compiled for the period between fiscal years 1985/86 to 2004/05 where available. Primary data sources included electronic data directly from member agencies, basin managers, and water purveyors. When these data were not available, additional sources as part of the literature review were cited to obtain additional production and water level data. Often times, data for all producers in a basin, particularly those who are non-member agencies are not available. For example, production from private wells are often

unquantified and could be significant in some groundwater basins. A complete list of references is provided in each basin report in Chapter IV, Groundwater Basin Reports.

Precipitation data were obtained from representative stations in each basin. Sources included: the California Irrigation Management Information System (CIMIS), University of California Integrated Pest Management (UC IPM) and applicable watermaster reports. CIMIS data can be accessed via the Internet at: http://wwwcimis.water.ca.gov/cimis/data.jsp. UC IPM data can be accessed via the Internet at: http://www.ipm.ucdavis.edu/WEATHER/wxretrieve.html. A complete list of references is provided in each basin report in Chapter IV, Groundwater Basin Reports.

Groundwater recharge data including direct groundwater recharge via spreading basins and injection wells were generally obtained via electronic data directly from the member agencies, basin managers and water purveyors. For some basins in Los Angeles County, runoff recharge data are compiled from Los Angeles County Department of Public Works data. These data are available via the Internet at: http://ladpw.org/wrd/report/

Groundwater data compiled as part of this study have been used to assess the state of the groundwater within the Metropolitan service area. The remaining chapters of this report summarize the data for the entire region (Chapter III, Regional Overview) and for individual groundwater basins (Chapter IV, Groundwater Basin Reports).

DISCLAIMER

This report has been prepared using a wide variety of data and sources. Metropolitan makes no warranties, either expressed or implied, with respect to the data within this report, its accuracy, its quality, or fitness for a particular purpose or use. In no event will Metropolitan be liable for direct, indirect, consequential or incidental damages resulting from any inaccuracies in the data. The readers should review and evaluate the data to determine its suitability of use for their activities.