3. UDM-The 2020 Cities/County Forecasting Model

The Urban Development Model (UDM) allocates the region wide forecast to produce the 2020 Cities/County Forecast. UDM is designed to forecast the location of residential and nonresidential activity within the region. In particular, UDM is based on the spatial interrelationships between economic factors, population and housing factors, land use patterns, and the transportation system.

Four major premises underlie UDM's forecast of residential activities.

a. Employment location is a primary determinant of the location of residential activities;
b. The longer the work trip, the less the likelihood that a person makes that trip;
c. The more land that is available for residential development, the greater the potential for residential growth; and
d. Residential growth occurs where local land use plans and policies identifies additional capacity for residential development.

UDM captures the link between work place location and residential location through commuting patterns and travel times within the region furnished by the transportation model. By using current and future trends in travel behavior, UDM can account for the other factors that determine where people might live within the region, such as land values, multiple worker households, income, and neighborhood preferences.

After UDM determines the residential location of employed residents, it uses several local factors to derive households (occupied units), housing stock (occupied units plus vacant units), and population. One factor, known as the employed residents per household rate, determines the number of households needed to accommodate the forecast of employed residents. For each area, this factor reflects the characteristics that determine the typical number of workers in each house, such as local unemployment rates, multiple-worker households, labor force participation rates, the age structure, and income. Local vacancy rates and household size (average persons per household) factors determine housing stock and the number of persons living in each household. Finally, UDM produces a forecast of group quarters population (e.g., nursing homes, military barracks, jails, and college dormitories) to complete the population forecast.

Not only does the spatial distribution of employment opportunities influence the location and demand for houses, but the reverse is true as well, especially for population-serving employment such as retail trade and services. UDM handles

this relationship by assuming a lag between residential development and the subsequent location of new jobs. Other factors that determine the future location of employment opportunities within the region are:

a. Transportation characteristics, including home-based shopping travel behavior;
b. The existing and previously forecasted locations of employment, reflecting the economies of scale businesses gain by locating near like-businesses; and
c. The capacity for additional employment growth based on existing land use plans or a specified alternative.

As noted, the availability of land and capacity for development influence the forecast of both residential and employment activities. The demand for these activities, in turn, influences future land supply and capacity. For example, an area adding residential activity consumes land and reduces the capacity for future residential development. Therefore, changes in land supply and capacity affect the allocation of activity in subsequent forecast years. UDM does not allow growth to exceed the capacity implied by the available land and densities.

Some of the forecast outputs that UDM generates are birth rates, death rates, domestic net migration, international net migration, household size, land use, housing structure type, local labor unemployment rate, jobs per housing unit, median household income, and civilian employment by jurisdictions and many other geography areas within the region, down to areas as small as blocks. Of the many outputs that the UDM model produces, the CWA uses a number of these outputs to forecast the water needs of individual member agencies as described in the next session of the report. They are the following: occupied single family housing, occupied multifamily housing, total employment and employment by major industry group, persons per household, housing density, and household income. These are the inputs that go into the CWA CWA-MAIN model.

B. San Diego County Water Authority

1. INTRODUCTION

The mission of the San Diego County Water Authority (CWA) is to provide a safe and reliable supply of water to its member agencies serving the San Diego region. The CWA provides wholesale water supplies to 22 member retail agencies and Pendleton Military Reservation. A mixture of dense urban areas and rural, predominantly agricultural areas characterizes the 1,420 square mile service area of the CWA. The expected rate of population and economic growth coupled with the geographic and climatic diversity of the service area presents a challenge for future water supply and conservation planning.

For ten years the CWA and SANDAG have been working together to link future water supply needs with the forecasted growth for the region. The voters in San Diego County in 1988 passed proposition C, which requires SANDAG to prepare a growth management strategy that includes a water supply element. In response, the CWA and SANDAG entered into a memorandum of agreement (MOA) whereby the CWA agrees to use SANDAG's most recent regional growth forecasts for water supply planning purposes. In addition, the MOA requires the CWA to provide recent information on the future supplies that will meet the growth forecasted for the region. SANDAG has recently established a formal process to measure the progress of future water supply development and its ability to meet the needs of an expanding community. The MOA ensures that the water demand projections for the San Diego region are linked with SANDAG's growth forecasts and that water supply is a component of the overall growth management strategy.

2. WATER PLANS AND REPORTS

To assist in meeting its mission, the CWA has developed the 2000 Urban Water Management Plan (2000 Plan). The 2000 Plan identifies the future water demands forecasted for the CWA's service area through 2020. Based on these forecasts a water supply reliability analysis is conducted that identifies the supplies necessary to meet future demands. The development of a water use forecasting model is the culmination of an extensive data collection endeavor. The process involves database development, water use modeling, calibration of models to historical records, verification of model accuracy, development of a baseline forecast, and the development of forecasts with water conservation. Water demand forecast data is used not only for water resources planning, but also for financial analysis and facility planning.

3. IWR/CWA-MAIN-Water Demand Forecasting Model