Figures

1.1 Study design 4
3.1 Urban growth forecasting process 15
3.2 Projected population among metropolitan California counties, 2020, 2050, 2100 26
3.3 California’s urban footprint, 1998 (population: 33 million) 33
3.4 California’s urban footprint, 2020 (population: 45.5 million) 34
3.5 California’s urban footprint, 2050 (population: 67 million) 35
3.6 California’s urban footprint, 2100 (population: 92 million) 36
4.1 Monthly average snow water content in the Sierra Nevada Mountains measured at Echo Summit, California, 1940–2000 51
5.1 Percent changes in the total cover of the vegetation classes under the Hadley and PCM scenarios 69
5.2 Simulated trends in (a) the annual percentage of the total area burned and (b) the smoothed percentage deviation from the 100-year historical mean for the future period (1994–2099) of the Hadley and PCM climate scenarios 75
5.3 Smoothed percentage changes in (2070–99) relative to (1961–90) for storage in different carbon pools (a–e) under the Hadley and PCM scenarios 78
6.1 Methodological approach 89
6.2 Study area 90
6.3 Landscape diversity as measured using the Shannon–Wiener index based on the estimated changes in community type extents under climate change scenarios by 2100 and 92 million estimated population 93
8.1 Location of the six study basins 124
8.2 Snow and rain mean annual depth for the lower and upper sub-basins for (1) each climate baseline, (2) 2010–25, (3) 2050–79, and (4) 2080–99 130
8.3 Ratio of climate change to baseline mean-monthly snow water equivalent for each basin for Hadley and PCM 132
8.4 Ratio of climate change to baseline mean-monthly snowmelt for each basin for Hadley and PCM 136
8.5 Streamflow monthly climatologies based on the Hadley and PCM scenarios 138
8.6 The cumulative daily streamflow for each basin for Hadley and PCM

8.7 Exceedence probabilities of the peak daily flow for each year for each climate change scenario for Hadley and PCM

10.1 Demand areas and major inflows and facilities represented in CALVIN

10.2 Data flow schematic for CALVIN

10.3 Schematic representation of lower American River flood control

10.4 Parameterization for mean and standard deviation of three-day floods into Folsom Reservoir for the stationary history scenario, the historical trend scenario, and Hadley scenario

10.5 Monthly mean rim inflows for the 12 climate scenarios and historical data

10.6 Average annual economic scarcity cost by sector

10.7 Agricultural water deliveries and scarcity by region and statewide

10.8 Climate change effects on levee setback and height decisions

10.9 Combined effects of Hadley climate change scenario and urbanization

11.1 California map with southern and northern SWAP regions

11.2 Parameters changed in the initial SWAP model

11.3 Decrease in agricultural land availability from 2020 to 2100 in the northern SWAP regions

11.4 Shift in crop demand in California in 2100

11.5 Average yield change for PCM and Hadley scenarios

11.6 Demand for water in Baseline, PCM, and Hadley scenarios

11.7 Percentage change in water, land, and income from PCM and Hadley scenarios

13.1 Sea level rise candidate sites in California

13.2 California’s economic cost of sea level rise

13.3 California’s transient costs for sea level rise without Los Angeles adjustment

13.4 California’s transient costs for sea level rise with Los Angeles adjustment