

List of Figures

Figure I.1. California bioregions as defined by the Interagency Natural Areas Coordinating Committee	37
Figure I.2. Watershed boundaries	37
Figure I.3. California counties	37
Figure I.4. Communities in El Dorado County.	38
Figure I.5. Forests and rangelands of California.	39
Figure I.6. Percentage area of land cover classes, statewide.	40
Figure I.7. Major ownership of forests and rangelands in California.	41
Figure 1.1.1. Growth of development in two density categories shown by decade from 1950 through 2000. Converted and parcelized acres correspond to housing density categories urban/exurban and low density rural, respectively. These density categories were also used in the risk analysis for this chapter.	48
Figure 1.1.2. U.S. Forest Service and CAL FIRE tree seed zones, with the shading and labels indicating the number of natural vegetation WHR types found within each zone.	52
Figure 1.1.3. Localized development threat.	53
Figure 1.1.4. Population growth and development impacts priority landscape.	54
Figure 1.1.5. Priority Landscapes of WHR types at risk from projected future development in the South Coast bioregion, due mainly from suburban sprawl.	57
Figure 1.1.6. Priority landscape in the northern Sierra bioregion, of predominantly working forest and rangeland use.	58
Figure 1.2.1. Results from U.S. Forest Service analysis of projected carbon stocks on national forests in California.	69
Figure 1.2.2. Gross tree biomass by stand age class and ownership group.	73
Figure 1.2.3. Volume and value trends for California timber products.	74
Figure 1.2.4. Annual timber volume from private and public lands.	75
Figure 1.2.5. Jobs associated with the forest products industry in California.	77
Figure 1.2.6. Estimated average forage productivity.	78
Figure 1.2.7. Inventory of breeding beef cows, dairy cows and ewes over time.	81
Figure 1.2.8. Priority landscape for risk reduction on forestlands.	83
Figure 1.2.9. Priority landscape for risk reduction on rangelands.	84
Figure 1.2.10. Priority landscape for restoring impacted timberlands.	85

Figure 2.1.1. Fire frequency (number of times burned) over the period 1950–2008.	98
Figure 2.1.2. Annual acres burned by decade and by life form, 1950s to 2000s.	99
Figure 2.1.3. Log-linear trend model for annual acres burned as a function of time, 1990–2008.	99
Figure 2.1.4. Land cover and tree seed zones in California, 2008.	100
Figure 2.1.5. Priority landscape for preventing wildfire threats to maintain ecosystem health.	104
Figure 2.1.6. Percent of watershed Hydrologic Unit Class 8 (sub-basins) in high priority for preventing wildfire threats to maintain ecosystem health.	105
Figure 2.1.7. Priority landscape for restoring wildfire impacted areas to maintain ecosystem health.	107
Figure 2.1.9. Sample priority landscape for preventing wildfire threats for community safety, Lake Tahoe region.	110
Figure 2.1.10. Number of communities meeting HMPL thresholds for preventing wildfire threats for community safety.	112
Figure 2.2.1. Native and exotic pest occurrence in California 1955–2008.	116
Figure 2.2.2. State declared zones of infestation.	118
Figure 2.2.3. Land cover and tree seed zones in California.	120
Figure 2.2.4. Priority landscape for restoring forest pest impacted areas to maintain ecosystem health.	121
Figure 2.2.5. Priority landscape (Lake Arrowhead area) for restoring forest pest impacted communities.	123
Figure 2.2.6. Priority landscape for preventing forest pest outbreaks to maintain ecosystem health.	126
Figure 2.2.7. Priority landscape for preventing forest pest outbreaks for community safety (Foresthill).	128
Figure 3.1.1. Precipitation supporting California's water supply has high inter-annual variability, but the trend line has remained mostly flat over last 100 years.	139
Figure 3.1.2. Water demand: the relationship between water demand and population growth.	141
Figure 3.1.3. Ranking of water supply watersheds. The ranking is based on reservoir storage capacity.	143
Figure 3.1.4. Watershed ranking of groundwater basins.	143
Figure 3.1.5. Watershed ranking of the density of forest meadows.	144
Figure 3.1.6. Expected changes in April 1 snowpack from 2010 through 2100.	147
Figure 3.1.7. Priority landscape for water supply.	149
Figure 3.1.8. Watersheds supporting salmonids where current range is the Evolutionary Significant Unit (ESU) and potential range from an Intrinsic Potential (IP) model.	153
Figure 3.1.9. Percentage of riparian cover by HUC8 watersheds.	153

Figure 3.1.10. Impaired waterbodies by HUC8 watershed units. Watersheds are shown ranked by the number of stressors that occur in a watershed.	154
Figure 3.1.11. Post-fire erosion threat. Soil erosion following wildfires can accelerate sediment delivery to stream courses and through siltation can impact to water storage facilities.	155
Figure 3.1.12. Priority landscape for water quality.	159
Figure 3.2.1. California urban areas by annual average days over 90 °F.	165
Figure 3.2.2. Urban forestry planting priority landscape.	169
Figure 3.2.3. Urban forestry maintenance priority landscape.	172
Figure 3.2.4. Past urban forestry projects by tree planting priority landscape (Tree City USA 2006–2008 and CAL FIRE Urban Forestry Program 2002–2008).	176
Figure 3.3.1. Communities at risk (2001) by bioregion.	182
Figure 3.3.2. Firewise Communities in a) Northern and b) Southern California.	185
Figure 3.3.3. Local and county Fire Safe Councils.	188
Figure 3.3.4. Priority communities with CWPP coverage.	191
Figure 3.4.1. California energy sources for electricity, 2007.	197
Figure 3.4.2. Application areas for wind and solar energy development on BLM lands, for two of the more active regions of the state.	199
Figure 3.4.3. Hydroelectric power plants in California.	201
Figure 3.4.4. Operational biomass facilities in California.	203
Figure 3.4.5. Priority landscapes for ecosystem health with potential for new biomass facilities.	205
Figure 3.4.6. Priority landscapes for ecosystem health that are not within 25 miles of operational, proposed, or idle biomass facilities.	207
Figure 3.5.1. Recent trends of listed species by taxa.	220
Figure 3.5.2. Summer bird species richness.	221
Figure 3.5.3. Winter bird species richness.	221
Figure 3.5.4. Amphibian species richness.	222
Figure 3.5.5. Mammal species richness.	222
Figure 3.5.6. Reptile species richness.	223
Figure 3.5.7. Freshwater fish species richness.	223
Figure 3.5.8. Plant species richness.	224

Figure 3.5.9. Protected and wildlife corridor areas asset.	230
Figure 3.5.10. Priority landscape of wildfire threat to areas important for wildlife habitat.	232
Figure 3.6.1. Visitation at state vehicular recreation areas (SVRA), 1997–2008.	238
Figure 3.6.2. California green infrastructure and protection status.	240
Figure 3.6.3. County green infrastructure prevalence and protection	241
Figure 3.6.4. Entities protecting green infrastructure by county.	242
Figure 3.6.5. Asset ranks for green infrastructure, and green infrastructure (unprotected), Orange County.	244
Figure 3.6.6. Example of priority landscape for conserving green infrastructure, Orange County.	245
Figure 3.6.7. Counties ranked based on acres of high priority landscapes and high plus medium priority landscapes.	246
Figure 3.6.8. Example of priority landscape ranks for managing green infrastructure, Santa Monica Mountains.	249
Figure 3.7.1. Ecological sections.	257
Figure 3.7.2. Composite forest carbon assets (A2 scenario).	262
Figure 3.7.3. Priority landscape forest carbon and ecosystem threat (A2).	264
Figure 3.7.4. Threat to aboveground carbon from projected development.	267
Figure 3.7.5. Priority landscape for forest carbon (A2) and development.	269
Figure 3.7.6. Predicted shift in species range for sugar pine.	272

List of Tables

Table I.1. Chapter topics/issues and priority landscapes	35
Table I.2. Example of ranking methodology used in the preventing wildfire threats for community safety analysis in Chapter 2.1	35
Table I.3. Area of land cover type by owner group (acres in thousands)	40
Table I.4. Forestland area by owner and bioregion (acres in thousands)*	42
Table I.5. Forest and rangeland ownership by bioregion (acres in thousands)*	42
Table 1.1.1. High priority landscape – acres potentially at risk (high or medium) from development – WHR types by bioregion (acres rounded to nearest hundred)	55
Table 1.1.2. Top 10 counties with the highest number of acres at risk, and their most impacted WHR types (acres rounded to nearest hundred)	56
Table 1.1.3. Eighteen top state counties of population growth, 2000–2008 (Population in thousands)	57
Table 1.2.1. Trends in pesticide use from 2005 to 2008	67
Table 1.2.2. Pesticide use on private lands summarized by bioregion based on county data	67
Table 1.2.3. Estimated area of forestland, by owner class and forestland status, 2001–2007 (acres in thousands)	68
Table 1.2.4. Net tree volume (in millions of cubic feet) on forestland by ownership and reserve status	69
Table 1.2.5. Carbon sequestration analysis results for all forestlands (32,114,317 acres)	70
Table 1.2.6. Carbon sequestration analysis results for public forestlands (19,467,566 acres)	70
Table 1.2.7. Carbon sequestration analysis results for private forestlands (12,646,761 acres)	70
Table 1.2.8. Carbon sequestration analysis results for private timberlands (7,647,009 acres)	70
Table 1.2.9 Total live tree stocks and estimated annual change from tree growth and mortality	71
Table 1.2.10. Per acre live tree stocks and estimated annual change from tree growth and mortality	71
Table 1.2.11. Acres and percent of silvicultural type by county for private timberland harvest averaged over 10 years (2000–2009).	72
Table 1.2.12. Snag density (trees per acre) by tree diameter class and ownership group	74
Table 1.2.13. Volume (million board feet) and value from timber production in California	74
Table 1.2.14. Acres of standard silvicultural prescriptions on private timberlands in THPs by year	76
Table 1.2.15. Number of cattle imported and exported between California and top six trading states, 2001	82
Table 1.2.16 Acres of reforestation opportunities on non-reserved public forestlands (78 plots)	86

Table 1.2.17. Acres of reforestation opportunities on private forestlands (57 plots)	86
Table 1.2.18. Understocked stands with regeneration opportunities on non-reserved public (371 plots) and private (167 plots) forestlands	87
Table 1.2.19. Overstocked stands with thinning opportunities on non-reserved public (144 plots) and private (83 plots) forestlands	87
Table 2.1.1. Distribution of priority landscape ranks by bioregion, for preventing wildfire threats to maintain ecosystem health (acres in thousands)	103
Table 2.1.2. Top five ecosystem types for area of high priority landscapes, for preventing wildfire threats to maintain ecosystem health	106
Table 2.1.3. Priority landscape ranks for restoring wildfire impacted areas to maintain ecosystem health, by bioregion (acres in thousands)	108
Table 2.1.4. Top five counties, based on acres in high priority landscape for preventing wildfire threats for community safety (acres in thousands)	111
Table 2.1.5. Top five counties, based on population in high priority landscape for preventing wildfire threats for community safety (population in thousands)	111
Table 2.1.6. Top five communities, based on acres of high priority landscape*, for preventing wildfire threats for community safety (acres in thousands)	111
Table 2.1.7. Top five communities, based on population in high priority landscape*, for preventing wildfire threats for community safety (population in thousands)	111
Table 2.2.1. High priority communities for restoring forest pest impacts for public safety (acres rounded to nearest hundred)	124
Table 2.2.2. Priority landscape by county for restoring forest pest impacted communities for public safety	124
Table 2.2.3. Top five Size Class 4 communities in terms of total priority landscape acres (acres rounded to nearest hundred)	128
Table 2.2.4. Top 20 Size Class 5 cities by HMPL total acres (acres rounded to nearest hundred)	129
Table 2.2.5. Top 17 counties by percent of statewide HPL and HMPL and total PL community acres for protection from future forest pest outbreaks (acres rounded to nearest hundred)	129
Table 2.2.6. Major invasive plant species in California forests and rangelands	131
Table 2.2.7. Air pollutants and their effects and trends	132
Table 3.1.1. Summary of climate change impacts on water resources	140
Table 3.1.2. Current high priority water management issues	142
Table 3.1.3. Watersheds with the highest composite assets to water supply	145
Table 3.1.4. Watersheds with highest composite threats to water supply	148

Table 3.1.5. Summary of the priority landscape for water supply	150
Table 3.1.6. Summary of water quality stressors in forested watersheds	151
Table 3.1.7. Summary of water quality conditions based on biotic indicators for perennial streams in California	151
Table 3.1.8. Summary of water quality impairments from 2006 303d list	152
Table 3.1.9. Impaired miles of streams	152
Table 3.1.10. Potential hydrologic response from changes in forest structure, changes in water flow paths and application of chemicals	155
Table 3.1.11 Threats to water quality – top watersheds per hydrologic regions	156
Table 3.1.12. Summary of water quality priorities – the priority landscape from the water quality analysis was summarized for each of the hydrologic regions across California	158
Table 3.2.1. Urban and rural areas by county (acres and population in thousands)	164
Table 3.2.2. Top five communities by size class: population in planting high priority landscape (acres and population in thousands)	170
Table 3.2.3. Top 50 communities by population in planting high priority landscape (acres and population in thousands)	171
Table 3.2.4. Top five communities by size class: population in maintenance high priority landscape (acres and population in thousands)	173
Table 3.2.5. Top 50 communities in urban forest maintenance high priority landscape by percent of population (acres and population in thousands)	174
Table 3.2.6. Priority landscapes by percent of county population (population in thousands)	175
Table 3.3.1. Communities at risk by bioregion	183
Table 3.3.2. Firewise Communities in California	184
Table 3.3.3 Priority communities for wildfire risk by bioregion (acres and population in thousands)	192
Table 3.3.4. Priority communities with CWPP coverage by bioregion (Acres and population in thousands)	192
Table 3.4.1. Current and potential future ¹ renewable energy infrastructure by bioregion	198
Table 3.4.3. High plus medium priority landscape (HMPL) acres (rounded to the nearest hundred) for ecosystem health by county that are potentially economically available as a result of making 12 proposed or idle biomass facilities operational	206
Table 3.4.4. Priority communities for protection or restoration for forest pests and wildfire, that are potentially serviced by an operational biomass facility, or idle/proposed facility	206
Table 3.5.1. Threats to wildlife and habitat by region, identified by DFG's CWAP	226

Table 3.5.2. Priority landscape for wildfire threat to areas protected for habitat by bioregion (acres in thousands)	233
Table 3.5.3. High plus medium priority landscapes for wildfire threat to areas protected for habitat by ownership and bioregion (acres in thousands)	233
Table 3.6.1. Acreage ¹ held by non-profit organizations by bioregion (includes fee title and easements)	243
Table 3.6.2. Acres of high priority landscapes by county, for managing green infrastructure	249
Table 3.6.3. Acres of high and medium priority landscapes by county, for managing green infrastructure	249
Table 3.7.1. Climate change impacts in the forest sector	253
Table 3.7.2. Climate threat index – expected changes in temperature (Celsius) and precipitation (mm) by ecological units.	258
Table 3.7.3. Bioregional estimate of aboveground forest carbon in teragrams (Tg) and the percent change from base year.	261
Table 3.7.4. Summary of acres of medium and high priority landscape (ecosystem threats) by bioregion (acres in thousands).	265
Table 3.7.5. Summary of high priority landscape (forest carbon and development) by bioregion (acres in thousands).	268
Table 3.7.6. Summary of percent change in species range	271
Table A.1. Framework datasets used for multiple purposes in this assessment	307