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In California, climate change will transform the land, lifestyles

By THE ASSOCIATED PRESS
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LOS ANGELES — Where celebrities, surfers and wannabes once mingled on the sands of Malibu's world-famous beaches, there are now only sea walls defending fading mansions from the ever-encroaching Pacific.

Abandoned ski lifts from Lake Tahoe to the fire-ravaged mountains of Southern California dangle above lonely trails that are now more suitable for mountain biking during much of the winter. The Joshua trees that once extended their tangled arms into the desert sky by the thousands have all but disappeared.

And in Northern California, tourists must drive farther north or to the cool edge of the Pacific to find what is left of the region's signature wine country.

Such is a possible peek into the Golden State's future under scenarios put forth by scientists trying to gauge what the nation 's most geographically diverse state might look like by the end of the century, if not sooner.

As the global climate warms, California's one-of-kind geography and the lifestyle it has made famous will not escape the consequences. From the misty redwood forests of the North Coast to the snow-fed waterfalls of the Sierra Nevada, from Southern California's sunbather-jammed beaches to the temperamental wildflowers of the inland deserts, the changes could be profound.

Many of the scientific predictions are gloomy. Some already are coming true.
Among the earliest and most noticeable casualties is expected to be California's ski season.

The snow is likely to continue but is expected to fall for a shorter period of time and melt more quickly. That could shorten the ski season by a month even in wetter areas and perhaps end it in others.

In Southern California, where skiing in a region parched by sun and cursed with the hot, dry Santa Ana winds might seem an oxymoron to outsiders, the region is ringed by mountain ranges that cradle several winter resorts.

The ski season here has begun to shrivel, whether from short-term drought or long-term changes.

"There's always plenty of snow, but you may just have to go out of state for it," said Rinda Wohlwend, 62, who belongs to two ski clubs in Southern California. "I'm a very avid tennis player, so I'd probably play more tennis."

Throughout California, residents will have to adapt in similar ways to warmer temperatures.

Because California is a coastal state with myriad microclimates, predicting exactly what will happen across a land mass a third larger than that of Italy by the end of the century is a challenge.

But through a series of interviews with scientists who are studying the phenomenon, a general description of the state's future emerges.

By the end of the century, temperatures are predicted to increase from 3 degrees to as much as 10 degrees Fahrenheit statewide. That could translate into even less rainfall across the southern half of the state, which already is under pressure from the increased frequency of wildfires and relentless population growth.

The deserts east of Los Angeles are home to small mammals, lizards and colonies of wildflowers that are accustomed to periodic three-year dry spells. But their populations may not be able to withstand the 10-year drought cycles that could

become commonplace as the planet warms.

Scientists already are considering relocating Joshua Tree seedlings to areas where the trees, a hallmark of the high desert and namesake of a national park, might survive climate change.

“They could be wiped out of California depending on how quickly the change happens,” said Cameron Barrows, who studies the effects of climate change for the Center for Conservation Biology in Riverside.

Farther north, where wet, cold winters are crucial for the entire state, warmer temperatures will lead to more rain than snow in the Sierra Nevada and faster melting in the spring.

Because 35 percent of the state’s water supply is stored annually in the Sierra snowpack, changes to that hydrologic system will lead to far-reaching consequences for California and its ever-growing population.

Some transformations already are apparent, stretching from the Sierra high country to the great valleys that have made California the nation’s top agricultural state.

The snowline, as it is in many other alpine regions around the world, is receding. Throughout the 400-mile-long Sierra, trees are under stress, leading scientists to speculate that the mix of flora could change significantly as the century grows hotter.
The death rate of fir and pine trees has accelerated over the past two decades.
In the central and southern Sierra, the giant sequoias that are among the most massive living things on earth might be imperiled.

“I suspect as things get warmer, we’ll start seeing sequoias just die on their feet where their foliage turns brown,” said Nate Stephenson, a U.S. Geological Survey ecologist who is studying the effects of climate change in the Sierra Nevada. “Even if they don’t die of drought stress, just think of the wildfires. If you dry out that vegetation, they’re going to be so much more flammable.”

Because the Sierra snowpack accounts for so much of California’s water supply, the changes could lead to expensive water disputes between cities and farmers. Without consistent water from rivers draining the snowmelt, farmers in the Central and Salinas valleys could lose as much as a quarter of their water supply.

Some farmers could demand even more water while others will be forced to change the type of crops they grow.

Any such changes to the state’s $30 billion agriculture industry would have national implications, since California’s fertile valleys provide half the country’s fresh fruits, nuts and vegetables, according to the Union of Concerned Scientists’ study.

“Obviously, it’s going to mean that choices are going to be made about who’s going to get the water,” said Brian Nowicki, a biologist with the Center for Biological Diversity in Tucson, Ariz.

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What will happen along California’s famed coastline will affect the rest of the state, yet is among the biggest unknowns.

Will the rising seas swamp the ports of Long Beach and Los Angeles, the nation’s busiest port complex, turning them into a series of saltwater lakes? Will funky Ocean Beach, an island of liberalism in conservative San Diego County, become, literally, its own island?

Among the more sobering projections is what is in store for the marine life that hugs the state’s shoreline.

The upwelling season, a time when nutrient-rich waters are brought from the ocean’s depths to the surface, creates a food chain that sustains one of the world’s richest marine environments along the California coast.

That period, which spans from late spring until early fall, is expected to become weaker earlier in the season and more intense later. Upwelling in Southern California will become weaker overall.

As a result, sea lions, blue whales and other marine mammals that follow these systems up and down the coast are expected to decline.

Changing seas will present trouble for much of the state’s land-dwelling population, too.

A sea level rise of three to six feet will be enough to inundate the airports in San Francisco and Oakland. Many of the state ’s beaches are expected to shrink as sea levels rise and winter storms carry away sand.

“If you raise sea level by a foot, you push a cliff back 100 feet,” said Jeff Severinghaus, professor of geosciences at the Scripps Institution of Oceanography in San Diego. “There will be a lot of houses that will fall into the ocean.”