

# FEELING THE HEAT

The impacts of global warming on California's wildlife  
and what we can do now to help species adapt and survive



**G**lobal warming is one of the most serious threats to wildlife today. According to the Intergovernmental Panel on Climate Change (IPCC), if temperatures rise more than 2.7 degrees Fahrenheit (F) to 4.5 degrees F above current temperatures, 20 percent to 30 percent of species worldwide are likely to be at increased risk of extinction. In California, where temperatures are projected to rise 2.4 degrees F to 3.6 degrees F by 2050 and 4.1 degrees F to 10.4 degrees F by 2100, global warming will further tax already stressed plants and animals.

While California is addressing climate change with legislation to reduce greenhouse gas emissions to 1990 levels by 2020, it will take decades for these reductions to halt the rise in global temperatures. Meanwhile, rising temperatures, degrading air quality and drying soils are having devastating impacts on California wildlife and natural systems.

Here are some examples of species already feeling the heat and a list of actions we can take now to help these and other species cope.



### PIKA

Scientists predict that rising temperatures could affect as much as 70 percent of the snow pack in the Sierra Nevada by the end of this century. As a result, the pika, a relative of the rabbit that thrives on steep, rocky slopes, may be one of the first mammals in California to become extinct because of global warming.

Adapted to cold alpine conditions, pikas are intolerant of high temperatures. Rising temperatures from global warming threaten to shorten the period during which these “rock rabbits” can gather food, shrink their meadow foraging habitat, change the types of plants available for them to eat and reduce the snow pack that protects them in winter.

Climate change is also driving pikas farther and farther upslope, beyond the altitudes that offer the rock formations and plants they need to survive. Field surveys of Yosemite National Park conducted regularly over the past 100 years confirm that the range of the pika and other small alpine mammals has become increasingly restricted to higher altitudes, a change researchers attribute to global warming in the 20th century.



### DESERT TORTOISE

Drought and heat waves are two of the greatest concerns about global warming in California. With the arid Southwest projected to be one of the regions most severely impacted, sensitive wildlife such as the threatened desert tortoise must be carefully monitored. Hotter temperatures could alter vegetation and the foraging patterns of this reptile already living on the edge in a harsh environment.

Desert tortoises spend as much as 98 percent of their time in burrows to escape desert heat. Further research is needed to see how rising temperatures will affect this behavior. Wildlife managers must also look at potential shifts in habitat should tortoises migrate to cooler areas, and address any challenges lack of connectivity between protected areas may present.

### MARINE ECOSYSTEM

Since long before the beginning of the Industrial Age, oceans were effectively absorbing carbon dioxide (CO<sub>2</sub>). Recent studies show that in addition to rising sea levels and a 0.5 degree F increase in ocean surface temperature, excess CO<sub>2</sub> in the atmosphere is increasing ocean pH levels, a process known as ocean acidification. This change in chemistry appears to be affecting the ability of some mollusks and other marine organisms to build calciferous shells, and threatens to shift the ranges of marine organisms and alter entire food webs in ways not yet fully understood.



Several species of marine birds that depend on California habitats—including already endangered breeding populations of ash storm-petrels, Craveri's murrelets and black-vented shearwaters—are expected to experience declines as rising sea levels inundate the rocky areas where they breed on and near the coast. In addition, critical foraging for at least 70 bird species could be disrupted by the effects of rising sea temperatures on the food chain.

#### CENTRAL VALLEY CHINOOK SALMON

Global warming is now one of the greatest long-term threats facing Central Valley salmon. As many as 600,000 spring-run Chinook salmon once inhabited 6,000 river-miles in California's Central Valley. The San Joaquin River alone supported a population of 50,000 to 200,000 salmon. However, water diversions and dams eliminated spring-run Chinook in the San Joaquin River and by 1997, Central Valley populations had declined to less than 1 percent of historic levels with only 20 percent of historic habitat still accessible. Today, all Chinook runs are limited to less than 300 river-miles, mostly in the main stem of the Sacramento River.



Global warming will shorten the period when fall-run Chinook, particularly fish in the San Joaquin River, have access to sufficiently cool habitats. Winter- and spring-run salmon, already the most harmed by dams, are especially likely to be affected because they depend on rivers and streams for rearing their young in the warm summer months. If air temperatures rise 3.6 degrees F, the Tuolumne and Merced rivers and Butte Creek will become too warm for spring-run Chinook. Should these temperatures rise about 9 degrees F as expected with continued unabated warming, the Central Valley Chinook population will face extinction.

#### TRICOLORED BLACKBIRDS

More than 95 percent of the world's tricolored blackbirds live in California. They were once so common that observers described flights of more than 200,000 "darkening" our skies. However, as California's native wetlands have dwindled dramatically, so has the number of tricolored blackbirds.

Tricolored blackbirds now frequently nest in agricultural areas, particularly fields planted with feed and forage crops on dairy farms. Sadly, these crops are often harvested while eggs or young are still on the nests, making it difficult for these birds to survive. Public and private land managers are restoring and managing habitat to encourage tricolored blackbirds to nest in wetlands and other secure habitats rather than agricultural fields.

Recognizing that these fields, though less than ideal, are keeping the species from disappearing altogether, resource managers are also promoting irrigated agriculture. This allows farmers to delay the harvest of crops until tricolored blackbirds have fledged. As global warming further shrinks the size and distribution of our wetlands, policies that support irrigated agriculture and continued investment in habitat restoration are essential to the survival of this California species.



## HELPING WILDLIFE ADAPT AND SURVIVE: WHAT WE CAN DO NOW

The agencies responsible for managing our land and natural resources must act now to help wildlife cope with the unavoidable impacts of climate change. Our state legislature must provide adequate funding for implementing these plans and monitoring our wildlife's responses to global warming. Specifically, we must call for our agencies and government to:

- Generate dedicated revenue not just for protection, but also for climate change research, monitoring and planning and the development of a statewide adaptation strategy.
- Provide adequate funding to establish and support critical monitoring systems and networks, which will allow for early detection of impacts of climate change on wildlife and habitat. This is crucial given the scientific uncertainty about how species will react to a changing environment. Working with the California Energy Commission's Public Interest Energy Research (PIER) program, universities and other research organizations can help to best coordinate and conduct new research based on monitoring data as soon as it becomes available.

- Identify actions needed to help wildlife adapt to and survive climate change challenges.
- Urge wildlife-managing agencies to adjust their land-use permitting processes and resource management plans to incorporate actions to mitigate potential negative impacts of climate change.
- Conduct a complete fine-scale analysis of predicted changes in vegetation and other limiting factors and how these changes will affect wildlife, particularly threatened and endangered species.
- Establish partnerships that allow state agencies also to work on private and federal lands to ensure connectivity between core wildlife populations is maintained to cover any expected migration of species out of protected areas.

Taking these steps will strengthen California's position as a world leader in addressing climate change and help ensure that the wondrous wildlife we enjoy today is here for future Californians.



[www.defenders.org](http://www.defenders.org)



[www.ca.audubon.org](http://www.ca.audubon.org)



[www.nature.org](http://www.nature.org)

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