Should Rice Be Grown in a Dry Climate?

Water is a precious resource, especially in California, where the average rainfall is low (38–51 cm/year, or 15–20 in./year), the population—33 million—is large and growing, and agricultural water use is high. (Farmers use 46% of the state's water to irrigate 3.5 million hectares, (8.6 million acres), more than in any other state.)[18, 19]

With cities and industries, not to mention fish and other wildlife, in need of water, growing crops that require a lot of water has come under heavy criticism, especially because much of the water that farmers receive is subsidized by the government. Some farmers have responded by reducing the acreage of water-intensive crops and switching to crops that require less water, such as fruits, vegetables, and nuts.

California produces 20% of the nation's rice, making it the second-largest rice-growing state in the United States. The rice produced has a market value of about $215 million and it uses enough water to supply one-fourth of the state's population. Although rice growers are not the biggest water users in the state, they have been particular targets of attack because the flooded fields required for rice are a visible reminder of the amount of water used by agriculture. In addition to high water use, rice growing has had other adverse environmental effects: Its high pesticide and herbicide use contaminates rivers and drinking supplies, and the burning of stubble left after harvesting contributes to air pollution in the valley.

Rice growers have responded to pressure to clean up their act in a number of ways. In the 1990s they decreased water use by 32% and pesticide use by 98%. They have switched to biodegradable pesticides; and they have decreased the burning of stubble by plowing it under, harvesting it, or flooding the fields in winter and allowing the organic matter to rot. Experts are also trying to find ways to protect young salmon, which run in the rivers of the Sacramento Valley, from being pumped into the channels leading to the rice fields. Although drawing water out of the rivers might have a negative impact on salmon, the release of water at the end of the winter, when the rivers are low, could help the spring run of salmon.

And the fields do provide a wetland habitat for many migrating birds and other species, so that winter flooding benefits an even wider diversity and greater number of species. Waterfowl are of particular interest because their numbers declined from 10–12 million in 1967 to 4–5 million in 1990, a period in which the state lost 90% of its wetlands to development and agriculture. About 79% of the yearly destruction of wetlands is attributed to agricultural practices. The drainage of wetlands adds to the loss by about 117,000 acres per year, so the net loss to agricultural lands is 2.38 million acres per year.[11]

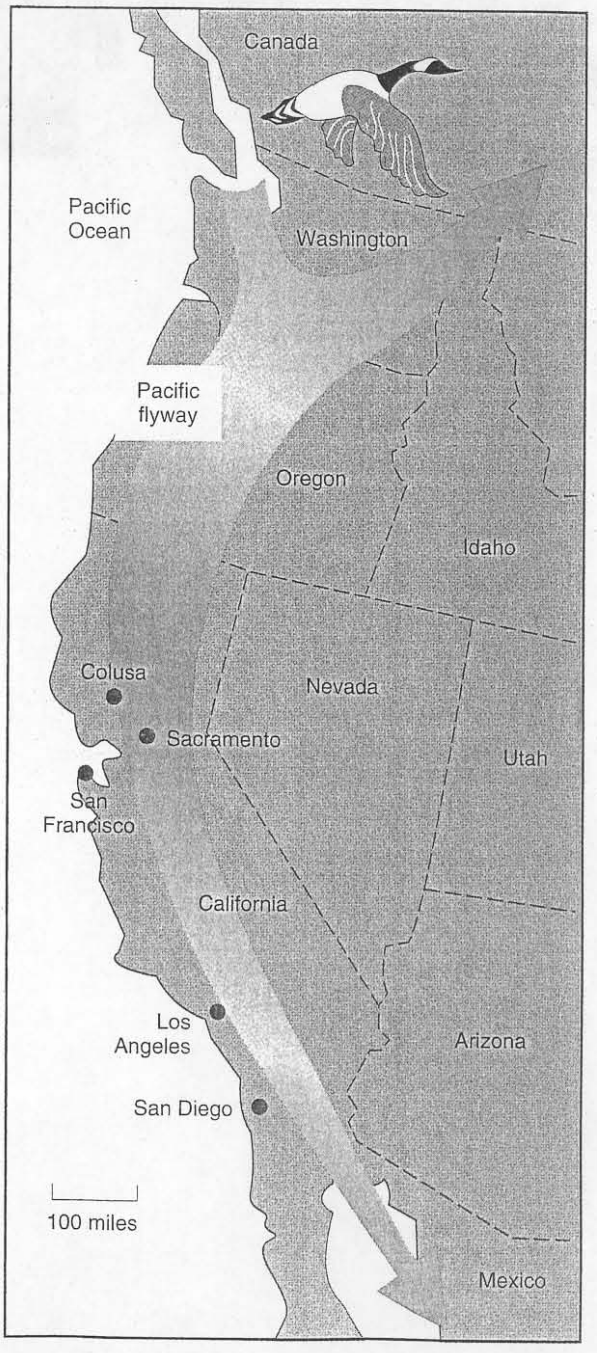

Figure 12.17 ■ The Pacific flyway, used by many birds that stop at agricultural wetlands in California. [*Source:* California Rice Commission 2003.

The Sacramento Valley lies along the Pacific flyway (Figures. 12.17 and 12.18), a major migration route for waterfowl. The valley is host to 20% of the ducks of the United States and 50% of all waterfowl in the flyway. Twenty-one wildlife species with special status (endangered, threatened, candidate species, or species of special concern) use the rice fields, attracted by the 114–136 kg (250–300 lb) of rice grains per acre left behind after harvesting and the 273–318 kg (600–700 lb) of invertebrates per acre that grow in the waters.

Excerpted from
Botkin and Keller. 2007. *Environmental Science: Earth as a living planet.* Wiley.