

# DECADE of CHANGE

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A tracking study shows how white-fronted geese responded to recent habitat changes in the Central Valley.

White-fronted geese have one of the broadest north-south ranges of any Arctic-nesting goose species in North America, and their population has had a similarly wide swing. The Pacific white-front population breeds primarily on the Yukon-Kuskokwim Delta (Y-K Delta) in Alaska and winters in the Sacramento Valley and Sacramento-San Joaquin River Delta in California. While most of these white-fronts used to stop in the Klamath Basin during the southern migration, many now bypass the basin and

migrate directly to the Central Valley. A small number (fewer than 20,000) breed in the Bristol Bay Lowlands in Alaska and winter in Mexico.

The Pacific population of white-fronted geese declined from historic peak estimates of 480,000 in the late 1960s to a low of 73,000 in 1979, mostly due to over-harvest. The Y-K Delta Goose Management Plan and restrictions on subsistence and sport harvest helped to restore the Pacific Flyway population to a recent peak in 2001 of 439,000.

In addition to these management efforts, changing agricultural practices and conservation programs in California's Central Valley have altered available habitat, and

A female white-fronted goose quickly adjusts to a radio transmitter attached to her neck collar.

Photo courtesy of John Takekawa



the geese have responded. Habitat changes include wetland restoration and the enhancement of agricultural lands as a result of the Central Valley Joint Venture beginning in 1990. Among the largest impacts were more frequent flooding of rice fields after harvest to speed straw decomposition (a result of air-quality legislation enacted in 1991 that restricted the burning of rice straw) and increased rice production acreage. In recent years, rice fields in the north Central Valley have averaged 600,000 acres annually. Approximately 75 percent of that is flooded, which provides habitat for the 375,000 white-fronts counted in 2004.

Although these habitat changes have presumably improved conditions for wintering waterfowl, no one had examined the white-fronts' actual response to these changes. To fill this gap, U.S. Geological Survey biologists from the Western Ecological Research Center (in cooperation with the California Department of Fish and Game, U.S. Fish and Wildlife Service, California Waterfowl Association, Ducks



Well-traveled white-fronted geese choose the Central Valley for wintering habitat.

Photo by Rich Gracie

Unlimited, and Central Valley Joint Venture) radio-marked and tracked more than 200 white-fronted geese during the winters of 1987 to 1990 (before the major habitat changes occurred) and during 1998 to 2000 (after a decade of habitat change in the Central Valley). Geese were followed from their breeding grounds on the Y-K Delta to their wintering areas in the Central Valley, where researchers recorded more than 4,500 goose locations.

This intensive tracking study showed that white-fronted geese have greatly altered their use of Central Valley habitats. During the 1980s, geese were mainly concentrated around the Sacramento and Delevan national wildlife refuges in the Colusa Basin, Gray Lodge and Upper Butte Creek wildlife areas in the Butte Basin, and the Sacramento-San Joaquin River Delta in

the Delta Basin. During the 1990s, geese continued to concentrate around the Sacramento and Delevan refuges but used the Butte Basin less frequently and the Delta Basin much less frequently. Instead, geese increased their use of the District 10 duck hunting clubs in the American Basin and, to a lesser extent, the vicinity of Sutter National Wildlife Refuge within the Sutter Basin. In general, the relative distribution of geese has shifted into areas with the greatest increases in rice production.

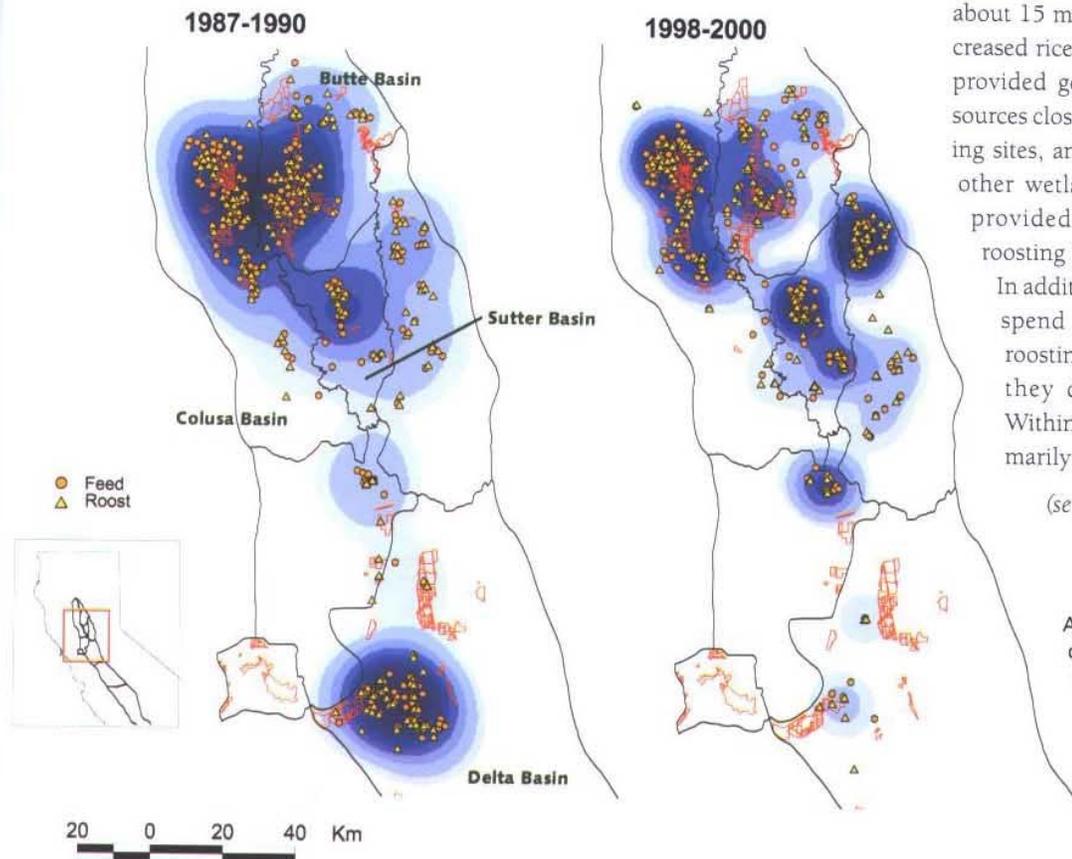
Increased feeding and roosting habitat in preferred areas has also allowed the geese to concentrate in particular areas: the range has shrunk from 3,200 square miles to less than 2,100. Similarly, the average distance traveled from roosting areas (sanctuaries) to feeding sites (rice fields) has declined by about five miles over the past decade. Now geese travel only about 15 miles on average to eat. Increased rice production has probably provided geese with more food resources closer to their preferred roosting sites, and more flooded rice and other wetland habitats have likely provided geese with additional roosting sites.

In addition, the white-fronts now spend more time feeding and roosting within rice fields than they did in the late 1980s. Within rice habitats, geese primarily used burned rice fields

(see *White-fronts* on page 58)

A multi-partner study determines changes in the feeding and roosting habits of Pacific white-fronted geese before and after major changes to their Central Valley habitat.

Graphic courtesy of the authors



# White-fronts (continued from page 17)



Management changes have boosted the numbers of these popular geese from a low of 73,000 to a 2004 count of 375,000.

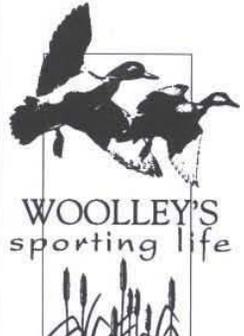
Photo by Bob McLandress

maintaining wintering goose populations. However, agricultural practices are constantly changing in the Central Valley, and managers should continue to plan for the amount of wetland habitat necessary to maintain the distribution and abundance of geese into the future.

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during the late 1980s, whereas they used flooded rice fields during the late 1990s. These phenomena highlight the importance of agricultural habitats, especially in

relation to rice and corn, for white-fronted geese. This dependence on agriculture might give the false impression that natural wetland habitats are not necessary for



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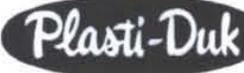
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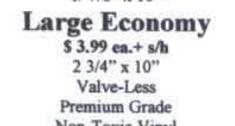
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