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SCIENCE

Paying Farmers to Welcome Birds

By JIM ROBBINS APRIL 14, 2014

WHEATLAND, Calif. — The Central Valley was once one of North America's most productive wildlife habitats, a 450-mile-long expanse marbled with meandering streams and lush wetlands that provided an ideal stop for migratory shorebirds on their annual journeys from South America and Mexico to the Arctic and back.

Farmers and engineers have long since tamed the valley. Of the wetlands that existed before the valley was settled, about 95 percent are gone, and the number of migratory birds has declined drastically. But now an unusual alliance of conservationists, bird watchers and farmers have joined in an innovative plan to restore essential habitat for the migrating birds.

The program, called BirdReturns, starts with data from eBird, the pioneering citizen science project that asks birders to record sightings on a smartphone app and send the information to the Cornell Lab of Ornithology in upstate New York.

By crunching data from the Central Valley, eBird can generate maps showing where virtually every species congregates in the remaining wetlands. Then, by overlaying those maps on aerial views of existing surface water, it can determine where the birds' need for habitat is greatest.

The BirdReturns program, financed by the Nature Conservancy, then pays rice farmers in the birds' flight path to keep their fields flooded with irrigation water from the Sacramento River as migrating flocks arrive. The prices are determined by reverse auction, in which farmers bid for leases and the lowest bidder wins.

Because the program pays for only several weeks of water instead of buying the habitat, the sums are modest; the conservancy does not disclose bids because that might affect future auctions, but it says the figures were both above and below the

$45 per acre that the federal government pays for bird-friendly practices.

The project's first season ended last month, as birds headed north from newly flooded fields. Researchers said all of the birds whose numbers they hoped to improve were seen on "pop up" wetlands — a temporary steppingstone for the birds' journey north. This happened when the field would have ordinarily been drained, an indication that the approach was working. More analysis will be done this month. The fields will be flooded again in the fall for the birds' return journey. Eventually, using this and other approaches, the conservationists at BirdReturns hope to increase the number of shorebirds that stop in the Central Valley to 400,000, from current levels of 170,000.

BirdReturns is an example of the growing movement called reconciliation ecology, in which ecosystems dominated by humans are managed to increase biodiversity.

"It's a new 'Moneyball,' " said Eric Hallstein, an economist with the Nature Conservancy and a designer of the auctions, referring to the book and movie about the Oakland Athletics' data-driven approach to baseball. "We're disrupting the conservation industry by taking a new kind of data, crunching it differently and contracting differently."

It could also be an exportable solution. Agriculture creates some of the world's most serious ecological problems. If BirdReturns proves itself, it could be an inexpensive model for adjusting agricultural landscapes to mesh with the needs of wildlife.

Migration takes a great deal of energy and is the riskiest thing birds do. Each January, about 20 species of shorebirds and several dozen species of wading birds and waterfowl start dropping into the Central Valley on their arduous journey north. Many are officially designated "of concern," a category just below "threatened."

The shorebirds — among them dunlins, sandpipers, snipes, whimbrels and black-necked stilts — zoom into wetlands, and wade on stiltlike legs through a few inches of water or across glistening mud flats to ferret out worms, insects, crayfish and snails with their long bills.

The Central Valley is the most developed of the landscapes they cross. Until now, one of the biggest problems has been that in February, at the peak of migration, rice farmers are letting their fields dry out in preparation for planting. "When they need it most, there's less and less habitat," said Mark Reynolds, a Nature

Conservancy scientist who helped design the program.

In 2012 Dr. Reynolds and Brian Sullivan, the eBird project leader for the Cornell Lab of Ornithology, got the idea of using the sighting data to find out where the shorebirds go. They overlaid those data on maps of water availability in the Central Valley to determine where the needs for wetlands were greatest.

“We had a little bit of data in a few places, and on some species, but with eBird we can go wall to wall,” Dr. Reynolds said. “It’s a whole new window on migration we didn’t have before.”

The ideal depth for shorebirds is two to four inches of water; any more and it is too deep for foraging. When eBird data show that a migration is underway, rice growers who have entered low bids open their irrigation ditches to provide just the right amount of flooding. That results in the pop-up wetlands.

In this first year, 10,000 acres (out of 500,000 devoted to rice farming in the Central Valley) owned by 40 farmers were flooded for four, six or eight weeks, at an average of 200 to 250 acres each. (Many farmers did not participate because of California’s drought.) Even for farmers who have enough water, the program can require some careful calibration. “If we put our water on late, the fields might not dry out” in time for planting, said Doug Thomas, who grows sushi rice for Rue & Forsman Ranch near here and who took part in the program this year.

But he added that the compensation was better than adequate and that he liked the private-sector nature of the initiative.

Dr. Hallstein, of the Nature Conservancy, said that at first it was a difficult to get farmers to make the shift, but that it helped when they thought of shorebird protection as just another crop, like rice.

Biologists hope the approach is a solution for one of conservation’s most pressing problems. “Migratory birds are a daunting challenge,” Dr. Reynolds said. “It’s a hemispherical scale, and it’s seasonal, and every species has a different life history.” But he added that if BirdReturns’ encouraging early results in the Central Valley prove out, “you could create habitat all along the flyway.”

Chris Elphick is an ornithologist and conservation biologist at the University of Connecticut who is familiar with the program but not involved with it. He called it “a great project,” though he cautioned that it was too soon to tell how well it would work in the long term.

A third of United States land is given over to agriculture, he said, so “it’s the

kind of thing we should be doing more of, thinking outside the box."

"There's a way to tweak farming," he went on, "that enables to use all of this in a way to benefit wildlife or whatever your conservation goals are."

The sponsors are optimistic. On a recent rainy day here, thousands of soaring dunlins wheeled across the gunmetal sky in the cohesive flock choreography known as a murmuration before they set down in a soggy rice field.

"It's pretty exciting," Dr. Reynolds said. "This program allows us to be strategic with scarce conservation dollars. That gives us a lot of hope."

Correction: April 14, 2014

An earlier version of a picture caption with this article misidentified the birds massing in a field in the Sacramento Valley. They are snow geese, not dunlins.

A version of this article appears in print on April 15, 2014, on page D1 of the New York edition with the headline: Paying Farmers to Welcome Birds.
