ENVIRO

Linked by Migrating Waterfowl

Frederick R. Davis

Each fall, still-impressive numbers of migrant ducks and geese arrive in California, where their survival depends on crucial refuges scattered across landscapes that have been completely transformed by agriculture and urbanization. For example, Sonny Bono Salton Sea National Wildlife Refuge (NWR) lies along the shore of a lake formed in 1905 (when an attempt to divert water from the Colorado River went horribly awry) and maintained by the influx of irrigation drain water from surrounding fields. At the other end of the state, the U.S. Fish and Wildlife Service (FWS) manages refuges in the Klamath Basin for both waterfowl and commercial farmers.

In Seeking Refuge, Robert Wilson reveals the connections among waterfowl, places set aside for their use, and environments created by agriculture and other human activities. The Pacific flyway, followed by birds for eons, serves as one of the few constants in his short but wide-ranging account. Wilson (a geographer at Syracuse University) discusses how the landscapes, water flows, and land use patterns underwent extensive transformations depending on the prevailing concerns of the many interest groups that laid claim to areas along the path of the migrating birds.

U.S. Biological Survey ornithologist Frederick Lincoln developed the idea of flyways during the 1920s and 1930s to account for the migration patterns revealed by banded birds. The concept guided efforts to create a network of refuges across the region. It also helps Wilson link the complex and imbricated patterns of bird migration, land use patterns, and conservation policy (regional and federal). Wisely, the author opens with the physical geography of the region, which he aptly calls “The Wetland Archipelago.” By migrating along the flyway from Alaska (and even Siberia) to Southern California and back, waterfowl capitalized on the patterns of seasonal abundance across their range. During the 20th century, Wilson notes, water reclamation and diversion projects destroyed most of these wetlands. Ironically, the federal government directed reclamation projects that drained wetlands while simultaneously establishing wildlife refuges. More ironically still, the Klamath Basin served as a site for both activities.

Even as federal agencies pursued ambitious water-control projects, activists for bird protection and hunters lobbied for sanctuaries in the West. In response, Theodore Roosevelt established the Klamath Lake and Malheur Lake bird reservations in California and Oregon in 1908, the largest of more than 50 areas he set aside during his presidency. Though bird protection advocates celebrated such actions as victories, Wilson identifies loopholes in the legislation. (For example, it did not ensure water for wetlands and explicitly favored use of the land by the U.S. Reclamation Service.) Moreover, Roosevelt assigned the refuges to the inadequately funded and staffed Bureau of Biological Survey. At Lower Klamath Lake, the warden, appointed and supported by the National Association of Audubon Societies, faced insurmountable challenges monitoring thousands of acres in two states.

With the New Deal came brighter hopes for conservation and the refuges. The Biological Survey undertook a massive restoration of the Great Salt Lake in Utah, specifically at Bear River NWR, and that served as a model for similar projects across the Pacific flyway and North America. The Survey aimed to create a healthier environment for waterfowl, which massive die-offs had shown were susceptible to “western duck sickness” (attributed by Survey biologist Alexander Wetmore to alkali salts but later determined to be avian botulism). Restoration at Klamath, after decades of water diversion, required extensive engineering by both FWS and the Bureau of Reclamation. But as a result, waterfowl populations rebounded spectacularly.

Despite efforts to create “ideal habitat” for waterfowl, wildlife refuges came to exist within a complex system of drained and extensively irrigated landscapes. Wilson argues that the ability of birds to cross between refuges and privately owned farms created an “ecological commons.” The desire to control transgressions (plants and animals that moved freely between the two spaces) inspired coordinated efforts. Thus, FWS managers, like independent farmers, sprayed herbicides and pesticides, trapped muskrats, and injected ducks with antitoxin to fight botulism. As public spaces within a complex of private farms and hunting clubs, refuges also served as what Wilson calls “depredation control units,” where hunters who could not afford clubs could continue to pursue the sport. The 1973 passage of the Endangered Species Act conferred greater authority and responsibilities on FWS. Nonetheless, Native Americans, environmental groups, farmers, and Fish and Wildlife continue to debate water rights in the courts and political arenas. Meanwhile, salinity and toxin levels in the Salton Sea have climbed astronomically, threatening the thousands of birds that wintered there.

Seeking Refuge approaches the region at several scales simultaneously. As a result, Wilson provides a rich analysis of land and water use; waterfowl migration and conservation; biologists, wildlife agents, and hunters; and the transformation of multiple landscapes. His thoughtful study also enhances our appreciation of the remarkably resilient birds, whose semiannual migrations continue to lift our spirits.
Of Birds and Bureaucracy

Jared Farmer


To see wildlife in spectacular abundance, it’s not necessary to visit a wilderness preserve like Yellowstone National Park. Some of the greatest concentrations of birds in North America can be found within the agricultural grid, on tiny refuges sustained by irrigation wastewater from corporate farms. On the Pacific Flyway, one of North America’s four migratory bird corridors, 60 percent of migratory wildfowl winter in California’s Central Valley, one of the most intensively cultivated regions on Earth.

This coexistence of avian migration and industrial agriculture is the result of concerted efforts as well as incidental effects. In the early 20th century, irrigation projects disrupted the flyway by destroying wetlands used by migrating birds. These wetlands are “like links in a chain,” writes geographer Robert Wilson, and the flyway is “only as strong as its weakest link.” Wilson’s new book, Seeking Refuge, recounts the history of governmental efforts to repair or refashion particular links. The outcome can hardly be called natural. Today’s refuges, which bear only a passing resemblance to former habitats, were produced rather than preserved.

Migratory birds do not behave like spawning fish that insistently return to their home waters. As Wilson says, wildfowl know how and when to migrate, but not precisely where. The ducks and geese of western North America generally move southward, most likely to central or southern California. The Golden State used to offer a rich variety of aquatic habitats, including the Sacramento River delta, vernal pools, tidal marshes along San Francisco Bay, inland salt marshes at Owens Lake and Mono Lake, and what was once the largest body of water in the American West, Tulare Lake, covering as many as 800 square miles during wet cycles.

Not anymore. By the 1930s, 90 percent of California’s wetlands were gone. People turned Bay Area marshes into salt ponds; they converted large parts of the delta into fields and pastures; they drained Tulare Lake and made it a cotton plantation; and they siphoned away the inflow of Owens Lake, creating a dusty playa. Farther south, in Mexico, the delta of the Colorado River progressively dried up as farms and cities appropriated the flow.

The government generally facilitated this ecological regime change, but different agencies played contradictory roles. In the 19th century, the federal government gave “swamps” and “overflowed” lands to states. As states drained such property, they could sell it and use the proceeds to drain more land. In 1902, Congress created the U.S. Reclamation Service (which in 1923 was renamed the Bureau of Reclamation)—a whole agency devoted to the promotion of new refuges. “Zoned sanctuaries became mirrors of the very industrial processes and landscapes that had destroyed avian habitats.

Wilson begins with the example of the Klamath Basin. Early in the 20th century, the Reclamation Service spent a lot of money there transforming an incredibly productive wildlife habitat into a moderately productive agricultural district, despite low demand from homesteaders. It didn’t matter that President Theodore Roosevelt had established a wildlife refuge there in 1906, because the Klamath Lake Reservation, as it was called, lacked water rights. In 1917, carrying out a plan made years earlier, the Reclamation Service went ahead and cut off the water to Lower Klamath Lake, forcing it to evaporate. Visiting the area in 1935, Biological Survey ornithologist Frederick Lincoln lamented, “It doesn’t even support a good crop of weeds. . . . A jack-rabbit would starve on it.”

It was Lincoln who invented the term flyway, after analyzing data from a large-scale avian banding program. By 1930, he and his network of volunteers had banded 740,000 birds and had collected 10,000 bands from dead specimens. Comparing where a bird had been banded with where its body was found allowed ornithologists to hypothesize about the route the bird might have taken between those points. Lincoln named four flyways in North America: the Atlantic, the Mississippi, the Central and the Pacific. The four-region concept grew out of field research, but it also reflected bureaucratic thinking: Lincoln simplified and rationalized a complex natural phenomenon into something comprehensible and mappable. The Bureau of Biological Survey deployed the concept to promote its mission and, as Wilson says, to “compartmentalize space.” Not coincidentally, the Survey reorganized itself into four administrative zones that roughly matched the flyways.

Lincoln’s longitudinal study showed that migrating birds took a variety of flight paths within a general flyway. This knowledge encouraged the hope that displaced populations could be rerouted to new refuges. To compensate for the loss of marshes in Oregon, the Biological Survey enlarged wetlands in Utah. At Bear River National Wildlife Refuge, founded in 1928, the Survey borrowed techniques from its nemesis, the Bureau of Reclamation: It reengineered the mouth of the river and created a series of diked ponds that could be drained and filled according to schedule—an artificial disturbance regime. The refuge, which had been plagued by avian botulism, became a “super refuge”; the Survey touted its success in turning a “death trap” into a “supply depot.”

Building on this success, the agency redesigned the Pacific Flyway. Using revenue from Duck Stamps (hunting licenses also sold as collectibles), it purchased land in the Central Valley, including parcels that had not previously been wetlands. The key site was the Sacramento National Wildlife Refuge, established in 1937. Like a farm, the Sacramento refuge was subject to the water-use regulations of the irrigation district it was part of. Neighboring growers soon complained about “trespassing” waterfowl eating their crops. Because the refuge had junior water rights, the Biological Survey couldn’t afford to alienate the senior water users in the district. To solve the problem of “wayward birds,” the agency turned the Sacramento refuge into a real farm. It grew rice so that ducks and geese would be less tempted to feed elsewhere. When the migratory birds—trespassers by nature—continued to ignore boundary lines, wardens used surplus military aircraft for “aerial herding.” They even resorted to antiaircraft searchlights, mortars, grenades and other small explosives to keep birds in segregated spaces. To prevent “duck farms” from spreading insects and weeds to corporate farms, the agency applied herbicides and pesticides, including DDT. By the late 1940s, writes Wilson, “depredation control was becoming the primary purpose of new refuges.” Zoned sanctuaries became mirrors of the very industrial processes and landscapes that had destroyed avian habitats.