CHAPTER FOUR
THE GOOD, THE BAD, AND THE UGLY: NEW SPECIES, MISSING SPECIES, AND INVASIVES

It may come as a surprise to many that breeding species richness (total number of species exhibiting some breeding behaviors) and the number of species confirmed as breeders both increased in Atlas 2. Atlas 1 found 120 species showing breeding behaviors (possible, probable, or confirmed) with 107 of those confirmed as breeders. During Atlas 2 total breeding species richness was 133, and 119 of those were confirmed. Those numbers represent an increase of 11% in total breeding species richness and 9% in confirmed breeders. The appearance of several of these species as new breeders (and the disappearance of some others) can be linked to human activities, intentional or incidental. In this chapter we discuss these new or missing species and speculate about forces that may have influenced their appearance, or disappearance, in Sacramento County. We also cover some species that some readers may wish had never arrived (introduced species). Individual species accounts in Chapter Eight include comparison maps and more information about all the species discussed below. The page number for each species account is shown beside the species name.

THE GOOD: NEW NATIVE BREEDING SPECIES

Table 4-1 compares the status of 17 native species observed as probable or confirmed breeders in Atlas 2 that were not confirmed as breeders in Atlas 1. Of those, only two showed any breeding behaviors during Atlas 1.

Osprey, Bald Eagle, and Peregrine Falcon
106, 111, & 126

There is little doubt that the appearance of three of these species, the Osprey (*Pandion haliaetus*), Bald Eagle (*Haliaeetus leucocephalus*), and Peregrine Falcon (*Falco peregrinus*), can be attributed to the banning of the pesticide DDT in North America in the early 1970s, and to the extraordinary recovery efforts made on their behalf (Cade et al. 1988, Poole 1989, Jacobson and Hodges 1999, Bierregaard et al. 2020, Buehler 2020, White et al. 2020). Human intervention was a key factor in the form of pesticide regulation, prevention of persecution and harassment, releases of captive-raised birds (chiefly Peregrine Falcons; Cade et al. 1988), and construction of nest platforms (mainly for the Osprey; e.g., Airola and Shubert 1981, Ewins 1996, Henny and Kaiser 1996). This recovery was already underway by the beginning of Atlas 1, but these species had not yet recolonized the county at that time.

During Atlas 2, Ospreys were confirmed breeding along the upper Sacramento River, in the Delta, at Stone Lakes National Wildlife Refuge, and in the lower stretches of the American River. Bald Eagles bred along the upper American River below Folsom Dam, and in the upper and lower Cosumnes River watershed. Peregrines were confirmed nesting only on the U.C. Davis Medical Center building south of Highway 50. Peregrine Falcons nesting on urban structures has become a fairly common occurrence in recent years (Cade et al. 1996, Luniak 2004). There were a few other intriguing Peregrine Falcon observations during Atlas 2. We had two reports of birds carrying food in the eastern areas of the county (Mather Field and Meiss Road). Since there are no known breeding locations and little suitable nesting substrate in that area, we did not code these observations as confirmations. There were also several observations of a pair showing courtship and territorial behavior near Old Sacramento and the I Street and Tower bridges, where there are possible nesting spots. In addition, there are anecdotal historical reports of Peregrines breeding on the Antioch Bridge in the southwestern part of the county and on Sacramento downtown buildings and some more recent downtown observations outside of the breeding season (eBird).

Table 4-1. New Breeders (native species confirmed or probable in Atlas 2). Numbers shown are the number of atlas blocks in which the species was observed exhibiting breeding behaviors.

	Atlas 1			Atlas 2		
	Confirmed	Probable	Possible	Confirmed	Probable	Possible
Hooded Merganser	0	0	0	4	0	5
Black Rail	0	0	0	0	1	0
Least Tern	0	0	0	1	0	0
Least Bittern	0	0	0	1	1	2
Cattle Egret	0	0	0	5	0	0
Osprey	0	0	0	8	2	2
Bald Eagle	0	0	0	6	2	1
Peregrine Falcon	0	0	0	1	1	3
Say's Phoebe	0	0	0	3	0	2
Common Raven	0	0	0	15	17	11
Lawrence's Goldfinch	0	3	2	1	1	2
Grasshopper Sparrow	0	0	0	1	3	2
Chipping Sparrow	0	0	0	1	0	0
Dark-eyed Junco	0	0	0	2	0	2
Great-tailed Grackle	0	0	0	12	7	7
Yellow Warbler	0	1	9	1	2	2
Summer Tanager	0	0	0	0	2	0

Hooded Merganser **65**

We can also largely credit human activities for the expansion of the Hooded Merganser's (*Lophodytes cucullatus*) breeding range into Sacramento County, although this was certainly not intentional. During the 1960s and into the 1980s there were just four records of this species breeding in California. However, by the early 2000s Hooded Mergansers were well established as a breeder throughout much of the northern half of the state (Pandolfino et al. 2006). While increased effort to preserve and restore wetlands was a factor, this expansion was mostly driven by the rapidly growing availability of nest boxes (intended for use by Wood Ducks, *Aix sponsa*) installed by many individuals and organizations (Bellrose 1990, Nichols and Johnson 1990, Soulliere 1990, Pandolfino et al. 2006, Dugger et al. 2020). In 2011, the first Hooded Mergansers bred in Sacramento County at Cosumnes River Preserve, most likely using Wood Duck boxes (nest box use there was confirmed the following year; Conard et al. 2012). During Atlas 2 we found nesting Hooded Mergansers along the Cosumnes River at the Valensin portion of the Cosumnes River Preserve, on the American River just south of William B. Pond Recreation Area, and recently fledged young were observed along the American River upstream of the California State University, Sacramento campus. Those young birds on the American River could have been hatched elsewhere along the river or along one of the many tributary creeks. In addition, Hooded Merganser eggs were found in a nest box occupied by Wood Ducks just east of Elk Grove. Such egg-dumping is a fairly common practice among cavity-nesting ducks.

Great-tailed Grackle **186**

Staying on the theme of human-influenced range expansions, the Great-tailed Grackle (*Quiscalus mexicanus*) is yet another species whose expansion was aided, unintentionally, by human activities. As the specific epithet implies, this species' range in North America was historically limited to Mexico, with a slight intrusion into the very southern tip

of Texas. Starting early in the 20th century and continuing into the 21st, this species staged a remarkable expansion throughout most of the western U.S. (Dinsmore and Dinsmore 1993, Wehtje 2003). The first ones showed up in California in 1964 (McCaskie et al. 1966) in Imperial County at the southeastern corner of the state. Within 10 years they were relatively common there and beginning to spread westward and northward. The first Central Valley records came in 1979 (Laymon and Shuford 1980) and by the early 2000s there were records in nearly every California county (Pandolfino et al. 2009). The first Sacramento County record was from the Sacramento Regional Wastewater Treatment Plant Bufferlands (hereafter, Bufferlands) in Elk Grove in 1996 (Jones et al. 1998, Pandolfino et al. 2009). This species adapts well to human-altered landscapes, both agricultural and suburban (Wehjte 2003), and their expansion has tracked increases in both types of land use in the West (Selander and Giller 1961, Johnson and Peer 2020). In the Central Valley in particular, Great-tailed Grackles have taken advantage of new residential development close to small patches of wetlands (their primary breeding habitat) that were avoided during development to meet regulatory requirements (Pandolfino et al. 2009). During Atlas 2 we had breeding behavior observations in 26 of the 135 blocks (19%) with breeding confirmed in 12 blocks scattered throughout the county.

Black Rail **86**

At the time Atlas 1 was being conducted, the notion that Black Rails (*Laterallus jamaicensis*) might breed on the Central Valley floor beyond tidal estuaries would have been considered a very remote possibility at best. Prior to that, the only Central Valley floor record was of a dead bird found at Gray Lodge Wildlife Area in Butte County in 1962 (Crowell and Nehls 1969). In Northern California, the species' breeding range was believed restricted to tidal wetlands in Tomales Bay and Bolinas Lagoon (Marin County), Bodega Bay (Sonoma County), and some marshes of the San Francisco and San Pablo bays and the Sacramento–San Joaquin Delta (Manolis 1977, Manolis 1978, Winter and Manolis 1978, Laymon and Shuford 1979, Evens et al. 1991, Tsao et al. 2015). Our notion of what constitutes Black Rail habitat was turned on its head with the 1994 discovery of a population of the rails breeding in the Sierra foothills of Yuba County (Aigner et al. 1995). Since then, more foothill breeding locations were found in Butte, Nevada, and Placer counties (Richmond et al. 2008). Black Rails were reported in Sacramento County at Cosumnes River Preserve in 1998 and in 2004. During spring 2015 there were reports of vocalizing birds at three Sacramento County locations: Stone Lakes National Wildlife Refuge, Cosumnes River Preserve, and Twitchell Island in the Delta (Rottenborn et al. 2016). Rails, in general, are extraordinarily secretive and are very difficult to confirm as breeders. During Atlas 2 we were able to rate only one block (at Cosumnes River Preserve) as having probable breeders based on singing at a single location continuing for more than seven days, as well as counter-calling between two birds. While the sloughs at Cosumnes River Preserve have a strong tidal influence, the wetlands where these rails were detected are all cut off from that influence. Given that the Black Rail is on the list of Threatened species in California (State of California 2020) and has been since the initiation of that list in 1971, tracking the status and distribution of this species is vitally important.

Common Raven **139**

Grinnell and Miller (1944) described the mid-20th century status of the Common Raven (*Corvus corax*) in California as "*now scarce or absent in all settled parts of the state*." William Dawson (1923) concurs, noting that they were, at the time, "*almost disappearing from the more thickly settled regions*." And even more recently, Small (1994), characterized their occurrence in the Central Valley as "*notably absent from much of the Central Valley from Butte County south to Kings and western Tulare counties*." Things have most certainly changed.

California Breeding Bird Survey (BBS) data (Sauer et al. 2020) showed a strong rate of increase of ravens of nearly 5% per year from 1966 through 2017. In an assessment of population trends for wintering birds in the Central Valley (Pandolfino and Handel 2018), the rate of increase for Common Ravens between 1978 and 2014 was among the highest observed for any of the 112 species analyzed. This species is now a

common sight in all but the most densely urbanized parts of Sacramento County. This increase, as well as increases across North America, can be largely attributed to recent declines in persecution of the species by humans, allowing this highly intelligent and resourceful corvid to take full advantage of the opportunities that human activities create (Boarman and Heinrich 2020). The 15 blocks where breeding was confirmed or probable included nearly every part of the county except the Delta (where, we suspect, the lack of confirmation was due to relatively poor coverage). One pair even nested successfully near the American River College campus in the midst of dense suburban development.

Say's Phoebe **132**

With most grassland birds in widespread, long-term decline in North America (Peterjohn and Sauer 1999, Askins et al. 2007, Sauer et al. 2020), the Say's Phoebe (*Sayornis saya*) has been a notable exception, showing a positive trend as a breeder (Sauer et al. 2020) and, at least in the Central Valley, as a wintering species (Pandolfino and Handel 2018). Given the significant reduction of grassland in Sacramento County between the two atlases, the idea that Say's Phoebes might expand their breeding range into the county seemed a very remote possibility. As documented by Dunford et al. (2019), prior to 2014 there were only occasional sporadic reports of Say's Phoebes in the Central Valley in the breeding season, and even fewer with confirmed breeding. However, starting in 2014 and increasing dramatically during 2018, breeding was confirmed at many Central Valley locations (including Fresno, Sacramento, San Joaquin, Solano, Tulare, and Yolo counties; Dunford et al. 2019). And, in nearby Placer County, over-summering birds were observed in 2018 and 2019, and breeding was confirmed in 2020 (*fide* E. Pandolfino, hereafter EP). Once again, the role of humans is a factor, as nearly every Central Valley breeding record involved a nest built on a building or other such structure. During Atlas 2, Say's Phoebes were noted as at least possible breeders in five blocks, with confirmed breeding in three, one each in 2018, 2019, and 2020. All confirmations were in areas where large patches of open space are intermixed with suburban development.

Least Tern **93**

When a pair of federally Endangered California Least Terns (*Sternula antillarum browni*) showed up at the Sacramento Regional Wastewater Treatment Plant on 27 June 2008, they provided the first record for the county (Conard 2009). The pair nested, but their two eggs failed to hatch. At least one pair has nested every year through 2020, except for 2013 and 2014. This normally colonial species occurred as a single pair at the treatment plant until 2019 and 2020, when there were two pairs. Nests have been scrapes in gravel roads between sewage treatment ponds, and the terns have foraged in freshwater ponds on the adjacent Bufferlands surrounding the treatment plant (Conard 2018). The terns appeared to fledge young in seven of the 11 years they nested, but experienced significant predation (inferred from missing eggs and young) and often responded by renesting. Predation was not directly witnessed, but potential predators observed near nests included coyotes (*Canis latrans*), Northern Harriers (*Circus hudsonius*), Swainson's Hawks (*Buteo swainsoni*), Red-tailed Hawks (*Buteo jamaicensis*), Peregrine Falcons, and Common Ravens (C. Conard, hereafter CC, pers. obs., S. Scott pers. comm.). Breeding has been within block G-7, except one nest in 2019 that was just barely into block G-8 (the block boundary bisects the southernmost unit of treatment ponds). Arrival dates have ranged from 8 May to 5 July, with first incubation observed between 19 May and 12 July, averaging about a month later than breeding in the San Francisco Bay Area (Frost 2017).

This pioneering outpost appears to be part of a continuing wave of expansion. Least Terns were not confirmed breeding at the San Francisco Bay until the 1960s; the first Contra Costa County breeding was in West Pittsburg in 1982, just a few km from southwestern Sacramento County (Glover 2009). Breeding at the Montezuma Wetlands in Solano County, the nearest known nesting site at just over 50 km away from the Sacramento Regional Wastewater Treatment Plant, was first confirmed in 2006 (Berner 2015). With monitoring and protection, the population expanded statewide from fewer than 500 pairs in the early 1970s to approximately 7,000 pairs from 2003 to 2010, but decreased to around 4,000 pairs from 2012 to 2016 (Frost 2017). Most of the state's breeding terns are in coastal Southern

California, with approximately 6% in Northern California, and the majority of those in Alameda County (Marschalek 2011).

Least Terns can live for over 20 years (Thompson et al. 2020), so it seems likely that there is some continuity of individuals coming to this location so distant from other known nesting sites. The Bufferlands has a natural resources staff that has worked with plant operations to protect nest sites. A lack of awareness and consistent protection is a big obstacle to establishment at new locations. The nest sites used at the treatment plant have been in active roadways, requiring careful monitoring and roads to be closed once territorial behavior starts; further vigilance is required once the chicks begin to wander from the nest sites (Conard 2018). Common Ravens have become established nesters nearby since 2016 and regularly forage among nesting birds in the treatment ponds (CC pers. obs., S. Scott pers. comm.), threatening the long-term viability of this small breeding effort.

Least Bittern **98**

The easily overlooked Least Bittern (*Ixobrychus exilis*) was recorded in just four blocks during Atlas 2. With the exception of one block (K-5), it has been quite rare in the past 15 years. The first Sacramento County record was on 1 May 1996 at the constructed wetlands (block H-7) of the Bufferlands (Jones et al. 1998, Conard 2007). Breeding was suspected, but never confirmed, and records ceased after 2001. Similarly, the first record at Cosumnes River Preserve (block H-11) was on 13 June 1997. Records there were fairly consistent through 2006, but irregular since, with the most recent from 20 April 2015 (Cosumnes River Preserve unpublished database, J. Trochet pers. comm.). Prior to Atlas 2, there were two records from block J-10 and one from I-11 (eBird, J. Trochet pers. comm.). A single Least Bittern was seen and heard at Stone Lakes National Wildlife Refuge (block G-9) from 11 March to 11 April 2015. The most consistent location in recent years has been Mather Lake (block K-5). A bird with downy head plumes photographed on 21 July 2017 is the strongest evidence of breeding in the county. There have been reports from Mather Lake during the breeding season in most years since 2011. In June 2020, two Least Bitterns were found in block B-16, with singing for more than a week at a 240-ha restored marsh (Sherman Island Whale's Mouth Habitat Restoration Project) at the southwestern tip of Sherman Island in the Delta.

Least Bitterns are highly migratory, but sometimes found in the winter, including at Gray Lodge Wildlife Area, Butte County (Small 1994, Snowden 2013). December records from block H-7 in 1996 and 2001, and block H-11 in December 2004 and January 2006 (Rio Cosumnes Christmas Bird Count, Cosumnes River Preserve unpublished database, CC pers. obs.) suggest periods of year-round residency. Breeding season habitat at formerly occupied sites on the Bufferlands and the Cosumnes River Preserve have become less suitable in recent years for a variety of reasons, including changes to water delivery infrastructure and pressure to decrease summer water that might produce mosquitoes (CC pers. obs., S. Scott and J. Trochet pers. comm.)

Least Bitterns have been found much more widely and frequently in Yolo County than in other surrounding counties, especially in the past decade. There is at least one breeding record and annual detections at the Yolo Bypass Wildlife Area, as well as other sites just west of the Sacramento-Yolo County line (eBird, CC pers. obs., Hampton et al. 2019). There are only two, single-day breeding season records in San Joaquin County in recent decades (D. Yee pers. comm.). The species was not recorded as a possible breeder in Contra Costa County through 2009 (Glover 2009) or in Solano County (Berner 2015), but breeding season records from Contra Costa County beginning in 2013 are only 5 km from the B-16 site mentioned above (eBird). Our understanding of this species' true status is limited by its typically quiet and elusive nature, the difficulty in accessing extensive patches of dense marsh, and the many potential sites with restricted or no public access.

Cattle Egret **102**

Formerly confined to the Old World, Cattle Egrets (*Bubulcus ibis*) staged a successful invasion of the Americas, probably beginning in the late 1800s, resulting in their colonization of much of the

Western Hemisphere, including the southeastern United States by the 1950s (Crosby 1972). As their name suggests, Cattle Egrets do much of their foraging around large grazing animals, and their spread through the Americas was undoubtedly aided by the widespread increase of livestock, especially cattle (Telfair 2020). The species was first recorded in California in 1964 (McCaskie 1965) and was first found breeding in the state, at the Salton Sea, in 1970 (McCaskie 1970). The breeding population around the Salton Sea rapidly grew into the thousands, and despite fluctuations in population size in subsequent years, the area remains the stronghold for the species in the state (Molina and Sturm 2004, Shuford et al. 2020a). Although observed in the Sacramento area since the 1970s (including during Atlas 1) and first found breeding in 1985 near Woodland, Yolo County (see Engilis 2013 for source), breeding in Sacramento County was not observed until sometime in the 2000s (*fide* CC). Shuford et al. (2020a) reported Cattle Egrets breeding in two colonies in Sacramento County in the period 2011–2012, but both were apparently abandoned or destroyed before Atlas 2 began. Six breeding sites were found in four different blocks in the Atlas 2 period, of which three were still active at the end of Atlas 2 (CC pers. obs., C. Berger and J. Trochet pers. comm.).

At least five of the six colonies found in Atlas 2 and the two colonies cited in Shuford et al. (2020a) were in suburban residential areas or other artificial sites (Sleep Train Arena pond), in association with Black-crowned Night-Herons (*Nycticorax nycticorax*), Snowy Egrets (*Egretta thula*), and occasionally other species, and this has been the pattern observed throughout California (Shuford et al. 2020a). The only instance of breeding in the county away from suburban sprawl is of 1–3 pairs observed from 2017–2020 at the large heronry at Horseshoe Lake on the Valensin Unit of the Cosumnes River Preserve. This site has been used by Great Blue Herons (*Ardea herodias*) and Great Egrets (*Ardea alba*) since before Atlas 1, and Cattle Egrets only began using this colony after Black-crowned Night-Herons and Snowy Egrets did so (after 2014; J. Trochet pers. comm.).

The symbiotic breeding relationship that Cattle Egrets appear to form with other mid-sized ardeids (e.g., see Belzer and Lombardi 1989) and the predilection for these species to breed together in ornamental trees in suburban settings create inevitable conflicts with humans, who view the heronries as a nuisance because of noise, guano deposits, damage to planted trees, wandering fledglings, and other activities (Grant and Watson 1995, Telfair et al. 2000). Five of the seven suburban residential heronries documented in Sacramento County since 2011 have been abandoned because of human disruption or removal of nesting trees (G. Ewing pers. comm., C. Berger pers. comm., CC per. obs.). As colonies disappear from one location and then pop up in another, it becomes difficult to evaluate and monitor local breeding populations. Colonies may even come and go before they are discovered. Even partial stabilization of the situation and an uneasy truce between humans and heronries may be difficult to accomplish, but an attempt to entice and encourage the birds to use sites away from human habitations, such as the Sleep Train Arena pond, might be worth trying (C. Berger pers. comm., Sacramento Heron and Egret Rescue pers. comm.).

Lawrence's Goldfinch **166**

Changes in the distribution of Lawrence's Goldfinch (*Spinus lawrencei*) are difficult to evaluate because of the species' irregular occurrence and lack of breeding site fidelity (Watt et al. 2020). The species may benefit from landscape disturbance, including human-induced activities such as livestock grazing (Watt et al. 2020). Although breeding was not confirmed in Atlas 1, probable or possible breeding behaviors were observed in five blocks in the eastern portion of the county where oak woodland habitat occurs. Distribution was similar in Atlas 2, with breeding behaviors detected in four blocks, including a confirmation in the Deer Creek Hills Preserve within block N-5. The Deer Creek Hills Preserve has been grazed for over a century, and fortunately this large preserve will remain in open space in perpetuity.

Grasshopper Sparrow **168**

Given the significant loss of grassland between atlases (as discussed in Chapter Two), the reappearance of Grasshopper Sparrow (*Ammodramus savannarum*)

in the county comes as a bit of a surprise. Although the species has experienced significant population declines rangewide, BBS data show modest (but not statistically significant) increases statewide and in the Coastal California Bird Conservation Region, which includes Sacramento County (Ruth 2015). The species was known to breed in the Sacramento area historically but went unreported for decades prior to 1993. It returned to the area with several observations in 1994 (Manolis 1998), immediately following Atlas 1. Three of these observations were along Meiss Road, where the species was confirmed breeding in block N-7 in Atlas 2. This area represents the largest remaining unbroken grassland in the county and the only reliable place to find this species. However, singing birds in the breeding season were at Deer Creek Hills in 2006 (EP pers. obs.) and have been detected in the southeastern corner of the county (blocks N-9 and N-10) since 2014 (CC pers. obs.). These observations were made during surveys on sites not open to the public. Given the secretive nature of this species, its quiet song, and the inaccessibility of much of the appropriate grassland habitat, there are likely other breeding locations that go undetected.

Chipping Sparrow **170**

Until the last year of Atlas 2 when a pair of Chipping Sparrows (*Spizella passerina*) was detected at the Cosumnes River Preserve (block H-11), breeding in the county was not suspected. That pair ultimately fledged at least two young. This species is a rather uncommon migrant and rare but regular wintering bird in the county. It appears to be wintering in higher numbers in recent years (eBird, CC pers. obs.), which is consistent with trends elsewhere in its range (Wright 2019). In winter it is often in developed areas with lawns, as is typical of the species (Middleton 2020). Local wintering increases have been noted in other taxa and are likely tied to warmer winters (Hampton 2019), but the extent to which this may impact breeding distribution is unknown. There is a seasonal increase in numbers beginning in late March, tapering off to near zero after mid-May. Spring detections are more frequent in the eastern portion of the county, generally in the transition zone to the low foothills.

The confirmed breeding effort was detected on the flats of the valley at only 2 m elevation, in a valley oak savanna, with most trees under 10 m tall and ground cover a mix of grasses and forbs (Trochet 2020). This site is well away from regular wintering sites or areas with the highest number of detected migrants. It serves as the only published breeding record from the Central Valley in many decades. The nearest locations where the species is regularly detected in the breeding season are well to the east of the county line, with consistent reports mostly into the coniferous zone (eBird). The nearest breeding sites are not known, despite seemingly suitable habitat in and just beyond the eastern county line; they have been found nesting as low as 180 m elevation in blue oak savanna in Nevada County (Rose and Rose 2019). To the west, Chipping Sparrows are patchily distributed breeders in open oak woodland and savanna of the Coast Range in Contra Costa County (Glover 2009). Surprisingly, there is one previous breeding record: an egg set collected in 1886 from an unspecified location in Sacramento County (Western Foundation of Vertebrate Zoology *fide* Trochet 2020). The breeding effort in Atlas 2 was documented as a singing male on 28 April 2020, a female soliciting copulation on 13 May, juveniles out of the nest on 5 June, and a last detection on 21 June. It is very unlikely that the species had nested at this site in recent years because the area has been getting consistent survey coverage for over two decades.

Dark-eyed Junco **171**

The first confirmed Dark-eyed Junco (*Junco hyemalis*) breeding record in Sacramento County was a nest found at the Cosumnes River Preserve containing four young on 18 May 2000; this was also apparently the first breeding record for the Central Valley floor (Trochet 2001). Juncos have continued as a rare but regular breeding season presence on the lower portions of Cosumnes River Preserve (blocks H-11 and I-11) ever since. The birds persisted in the vicinity of the first breeding site through 2004. From 2003 through 2019, breeding activity has continued at a few locations in blocks H-11 and I-11 (J. Trochet pers. comm., Cosumnes River Preserve unpublished database, eBird, CC pers. obs.). Each of these sites is characterized by relatively open valley

oak woodland adjacent to the main forest blocks, in more open woodland consisting of younger trees, with ground cover less than a meter high, and patches of rather sparse cover.

Oddly, in 2020, the last year of our Atlas 2 effort, singing and other breeding activity were not detected in blocks H-11 or I-11. A juvenile found on 9 July 2020 north of the Tall Forest is hard to explain, given the lack of any breeding season detections nearby (J. Trochet pers. comm.). There was also a single breeding season detection at Grizzly Slough, just to the south in block H-12, on 16 June 2020. The most compelling additional breeding observation for the county is a juvenile photographed at Reichmuth Park (block F-6) on 16 June 2016; interestingly, a juvenile was also photographed on 13 June 2016, less than 5 km away, across the Sacramento River in Yolo County (eBird). Other breeding season reports in the county have been single day occurrences.

It appears that these records, few as they might be (averaging two to three known pairs per season), are consistent with a slow expansion in the region. Regular bird surveys began at Cosumnes River Preserve in 1988, and each of the sites where breeding was subsequently detected were regularly surveyed since no later than 1995. It is unlikely that breeding juncos were overlooked for long, though the source population is unknown. To the east, breeding season occurrence does not appear to have shifted much in the past 80 years, with the core of the breeding range well east of the county line and into the conifer zone (eBird, Grinnell and Miller 1944). From the west, the population has moved closer to Sacramento as part of a long-term trend. The species was not known to breed in the East Bay until 1917 and was first detected as a breeder in Contra Costa County near Clayton in 1936; it is now a regular breeder in that county in areas with suitable woodland (Glover 2009). Similarly, juncos were absent as breeders from Solano County through the first half of the 20th century, but were reported as a common nesting species by 1988 and have since been confirmed breeding in much of the western portion of the county (Berner 2015). They have also been confirmed breeding in western Yolo County, for example, near the Putah Creek canyon west of Winters (eBird). In the past two years, they have been confirmed much closer, as family groups with dependent young have been found at the University of California Davis Arboretum on 24 July 2019 and in southeastern Davis on 5 June 2020 (eBird). In addition to the noted range expansion, this species has shown considerable flexibility in response to human-driven habitat changes. Beginning in the early 1980s, juncos in coastal San Diego County, later followed by Los Angeles and Santa Barbara counties, began to breed in manicured habitats such as college campuses (Vance 2020). It remains to be seen if the species will become a more widespread breeder in Sacramento County.

Yellow Warbler **189**

One of the most common and widespread North American wood warblers (Lowther et al. 2020), the Yellow Warbler (*Setophaga petechia*) was considered a common to locally abundant breeder throughout most of California, including the Central Valley, by Grinnell and Miller (1944). Early estimates of breeding numbers in the Central Valley may have been exaggerated because of the problem, ongoing today, of distinguishing between singing migrants, floaters, and actual breeding birds (Heath 2008, TM pers. obs.). However, the species had certainly declined as a breeder in the Central Valley by the 1970s (Gaines 1974), with small numbers apparently continuing to breed in the northern Sacramento Valley, where the Sacramento River floodplain has been less subject to extreme channelization and subsequent reduction of large tracts of riparian forest (Heath 2008, TM pers. obs.). The near extirpation of the species as a breeding bird has been attributed to two major factors: loss and fragmentation of habitat (riparian woodland, particularly cottonwood-willow assemblages) and Brown-headed Cowbird (*Molothrus ater*) parasitism (Gaines 1974, Heath 2008, Trochet et al. 2017).

A single probable code was reported in Atlas 1, involving an apparent pair seen in mid-June 1989 in a seemingly unusual location, along a small creek in the rolling hills in the northeastern part of the county. A handful of additional possible codes, typically involving singing birds from late May through late June in scattered riparian locations, were reported. As noted above, however, discerning late migrants from possible breeders is problematic. The same concern applies to a probable record

along Morrison Creek (persistent territorial singing in late May 2014) and a handful of possible records reported in Atlas 2.

Recent breeding efforts were not detected in Sacramento County until 2006 at the Cosumnes River Preserve (Trochet et al. 2017). An extensive tract of diverse riparian habitats in the preserve spanning atlas blocks H-11 and I-11 has been the site of additional apparent nesting attempts in subsequent years, culminating in the first documentation of successful nesting in 2011 and subsequent breeding activity documented during the second atlas period, including at least 10 singing males in the summer of 2020. In that year there were at minimum two successful nests, one producing at least two Yellow Warbler fledglings and the other producing at least one cowbird (J. Trochet pers. comm).

Several factors appear to have encouraged Yellow Warblers to breed at the Cosumnes River Preserve since 2006. The extent of the riparian forest and efforts to restore and maintain a variety of successional stages have certainly been important. Broadcasting songs as a conspecific attraction technique (Ahlering and Faaborg 2006, Ahlering et al. 2010), which has been shown to have some effect with Yellow Warblers elsewhere (Kelly and Ward 2017), was tried at the preserve in 2006 and some subsequent years and may have helped attract colonizers (J. Trochet pers. comm.).

Summer Tanager **190**

We did not expect to find a Summer Tanager (*Piranga rubra*) breeding in Sacramento County. In fact, we are fairly sure it did not breed successfully, but a male singing for one to four months at Cosumnes River Preserve for five consecutive breeding seasons qualified as a probable breeder by atlasing definitions. On 21 June 2014, two counter-singing males were found along Wood Duck Slough in the Tall Forest, block H-11 (J. Trochet pers. comm.). Both males continued the following day, but all subsequent

Brown-headed Cowbird Parasitism

Although there was no requirement to enter eBird comments during Atlas 2, a number of participants did so. While not a comprehensive list, the following species were identified as being at least potentially parasitized by cowbirds in our dataset:

	Atlas 1	Atlas 2
	# of host IDs	Activity noted in comments*
Ash-throated Flycatcher	1	none
Western Kingbird		cowbird attempted to lay eggs; chased off
Loggerhead Shrike		cowbird egg in nest
Lesser Goldfinch		female carrying nesting material chased cowbird
Song Sparrow		adult feeding young cowbird (2)
California Towhee		adult feeding young cowbird (3)
Spotted Towhee	1	adult feeding young cowbird (2)
Hooded Oriole		adult feeding young cowbird
Brewer's Blackbird	13	young cowbirds following blackbirds
Red-winged Blackbird	3	cowbird eggs in nest; adult feeding young cowbird (2)
Common Yellowthroat	1	adult feeding young cowbird (2)
Yellow Warbler		cowbird fledged from warbler nest
Blue Grosbeak	1	adult feeding young cowbird (3)

*The number in parentheses represents the number of comments mentioning each activity, if greater than one.

detections were of a single male, last found on 6 August. The following year, a single singing male persisted from 16 June to 18 July 2015. In 2016, the species did not return to block H-11 but was found within 1.5 km to the east in block I-11, from 22 May to 25 June, and in the same general area in 2017 and 2018, last detected on 26 August 2018 (eBird, CC pers. obs.). Each year the single male moved around a lot, singing continuously for long periods, indicating it was not likely paired or nesting, but attempting to attract a mate. We can only speculate as to whether it was the same bird each year.

In the southwestern U.S., including breeding sites in southeastern California, Summer Tanagers (*P. r. cooperi*) tend to breed in cottonwood and willow riparian as well as (farther southeast) Arizona sycamore (*Platanus wrightii*) and other riparian trees (Gallion 1994, Robinson 2020). During the five seasons of summer residence at the Cosumnes River Preserve the bird favored valley oaks, quite far from water in 2017 and 2018, even though portions of forest dominated by cottonwoods and willows occur nearby (CC pers. obs.). During the first half of the 20th century, the species was not thought to breed in the state away from the lower Colorado River (where much habitat was subsequently destroyed), but was established at the Kern River Preserve, east of Bakersfield, by the early 1980s (Grinnell and Miller 1944, Small 1994, Robinson 2020). This represents a shift to the northwest, but regular breeding is still nearly 400 km away from Sacramento County. Summer Tanagers found in Northern California are typically considered vagrants. However, a singing male (thought to have been of the nominate eastern subspecies) was near Colfax, Placer County, from early May to 16 July 2006 (Rogers et al. 2006), less than 50 km from Sacramento County. Apparently that same bird returned the following year to the same location and paired with a female Western Tanager (*Piranga ludoviciana*). The pair successfully fledged two young, though observers we unable to determine with certainty that the young were Western × Summer Tanager hybrids (Pandolfino et al. 2010).

Brewer's Blackbirds chase off a female Brown-headed Cowbird by Tim Manolis

Table 4-2. Species confirmed or probable in Atlas 1, but largely, or completely missing from Atlas 2. Numbers shown are the number of atlas blocks in which the species was observed exhibiting breeding behaviors.

	Atlas 1			Atlas 2		
	Confirmed	Probable	Possible	Confirmed	Probable	Possible
Northern Pintail	4	2	1	0	0	3
Lesser Nighthawk	1	3	6	0	1	4
Allen's Hummingbird	0	1	1	0	0	1
Wilson's Phalarope	0	2	0	0	0	0
Black Tern	0	3	1	0	0	0
Bank Swallow	4	2	1	0	0	0

THE BAD: MISSING BREEDING SPECIES

This section covers six species which were confirmed, or at least deemed probable, breeders in Atlas 1, but were missing, or nearly so, during Atlas 2 (Table 4-2). All but one, Allen's Hummingbird, show regional or even rangewide population declines in recent decades. Therefore, their disappearance from Atlas 2 should not be a complete surprise.

Lesser Nighthawk **75**

The Lesser Nighthawk (*Cordeiles acutipennis*) was characterized by Grinnell and Miller (1944) as common in the Central Valley from the San Joaquin Valley northward through the Sacramento Valley to Red Bluff (Tehama County). The primary breeding habitat, well described by these authors, is "*broad, pebbly wash-bottoms, with sparse shrubby vegetation.*" In the Central Valley, this sort of habitat exists almost exclusively as gravel bars with patches of low shrubs along streams and rivers. Populations were, and are still (Garrett and Dunn 1981, Latta and Baltz 2020), highest in the lower elevation deserts of inland Southern California. Even by the start of Atlas 1, the Central Valley population was in decline, largely due to stream channelization, flood control projects, and gravel mining (McCaskie et al. 1979). By the late 20th century, breeding Lesser Nighthawks were very sparsely distributed in the vicinity of Sacramento County, including the western edge of Yolo County (Hampton et al. 2019), the easternmost parts of Contra Costa County (Glover 2009), eastern San Joaquin County (San Joaquin Audubon Society 2002), and western Colusa County (Williams 1999). During Atlas 1 breeding was confirmed in block N-7 in the southeastern corner of the county, with probables in three nearby blocks. The nest site(s) were in a scrape on the ground on a pebbly surface in an area of mostly grassland, with a few scattered oaks not far away (*fide* G. Ewing). Between the atlases, a Lesser Nighthawk was flushed from a nest with eggs around the year 2000, in block O-9, in the southeastern county (J. Trochet pers. comm.). During Atlas 2 we had five potential breeding observations, all in that same southeastern corner (including one possible in block N-7). The only probable breeding observations during Atlas 2 were in the block M-7, just west of N-7. Both those observations were of multiple birds in the air together with vocalizations and behavior suggestive of courtship (both in early May, one in 2018 and the other in 2020).

Given the difference in coverage between the two Atlases, it is possible that the breeding status of the Lesser Nighthawk has not changed in the county. However, that portion of southeastern Sacramento County has been the site of intensive gravel-mining operations in the past two decades and much of the potential breeding habitat has, no doubt, been destroyed.

Bank Swallow **141**

Another species impacted by flood and erosion control projects is the Bank Swallow (*Riparia riparia*). This colonial-breeding swallow nests in steep-sided banks composed of loose, friable soils where they can excavate burrows (Garrison and Turner 2020). Historically, such banks were relatively plentiful along rivers and streams of the Central Valley. And

periodic flood events would scour away existing bank faces, creating the fresh, new banks that this species prefers (Garrison and Turner 2020). For at least the past century, humans have systemically modified natural stream and riverine systems with dams and bank stabilization techniques (chiefly riprap and shoring up the banks with rock and wire structures). Now, the types of stream/river-banks preferred by Bank Swallows are much less plentiful and are rarely renewed by flooding. During Atlas 1, Bank Swallows were confirmed breeding at a few different locations along the American River, and at least one on the Cosumnes River. We had no breeding behavior observations at all during Atlas 2. Indeed, Bank Swallows are now rarely seen in Sacramento County, and only in migration (*fide* CC).

Wilson's Phalarope **92**

Although nearly half of the prairie pothole and wet meadow habitats used by Wilson's Phalaropes (*Phalaropus tricolor*) has been converted to agriculture or development (Wells 2007, Butler et al. 2014), their breeding range has expanded in recent decades northward, eastward, and southward (Colwell and Jehl 2020). Their current core breeding range (Great Plains and northern Great Basin) reaches its southwestern edge on the east side of the Sierra Nevada Mountains in California (Beedy and Pandolfino 2013). However, this species has bred in the Central Valley on occasion. Historically those breeding attempts were limited largely to the central San Joaquin Valley in Merced and Fresno counties (Grinnell and Miller 1944). Indeed, prior to 1975 there were no confirmed breeding reports in the Sacramento Valley (Manolis and Tangren 1975). In 1977 a nest was found in the Sutter Bypass in Sutter County, and a likely breeding pair was observed near Woodland in Yolo County (see Engilis 2013 for source). Since then, the species has been confirmed breeding in the Yolo Bypass Wildlife Area twice (Hampton 2015), just west of Sacramento County. The only confirmed breeding in Sacramento County is from Stone Lakes National Wildlife Refuge between the two atlases in 2001, with two nests found, and at least one produced chicks (M. Brady pers. comm., *fide* CC). Because Wilson's Phalaropes occur as migrants throughout the summer in our area, one must be cautious about reporting presumed breeding behaviors. During Atlas 1, we found probable nesting in two locations, at Cosumnes River Preserve (block H-11) and a rice field in block L-11. In both cases, pairs were observed in the same location for more than a month. Potential breeding habitat is still present at Cosumnes River Preserve, but the rice fields in L-11 are long gone. We had no records during Atlas 2 that could be confidently rated as breeding behaviors.

Black Tern **94**

The Black Tern (*Childonias niger*) formerly bred in the Sacramento Valley and parts of the San Joaquin Valley (Grinnell and Miller 1944, Shuford 2008), but is believed to have declined because of the historic loss of wetlands and alteration of hydrologic regimes (Shuford et al. 2001). In the Sacramento Valley, this habitat loss has been offset by the expansion of ricelands, which provide potential breeding habitat (Cogswell 1977). During Atlas 1, probable breeding behaviors were observed in the Natomas Basin, the county's rice-growing region, and block H-11, containing the Cosumnes River Preserve and its rice fields and managed wetland habitat. Statewide surveys conducted in 1997–1998, during above average precipitation due to an El Niño event, found 90% of the breeding population in the Central Valley within Sacramento Valley rice fields (Shuford et al. 2001). Subsequently, the survey effort was repeated in 2009–2012, under drought conditions, detecting only 49% of the total number of terns found in the previous effort (Shuford et al. 2016). No breeding behaviors of Black Tern were observed during Atlas 2, with only a handful of passing observations reported during migration. With the continued loss of rice acreage in the Natomas Basin (as discussed in Chapter Two) and the "*precipitation whiplash*" of extreme dry-to-wet annual variation projected for California (Swain et al. 2018), this species may never again breed in Sacramento County.

Northern Pintail **64**

During Atlas 1 Northern Pintail (*Anas acuta*) was confirmed breeding (fledged young seen) in two blocks within the Cosumnes River Preserve complex and considered probable (pairs seen) in a block east of Galt, with a scattering of possible

reports from five other blocks, primarily in the southeastern quarter of the county. During Atlas 2, pairs of Northern Pintails were reported on Sherman Island in the Delta, at the Bufferlands, and at Stone Lakes National Wildlife Refuge, but breeding was never confirmed. Although they are found here in abundance in winter, the Sacramento Valley has probably never been an important part of the Northern Pintail's breeding range, which is primarily in the northern Great Plains and points north (Clark et al. 2020), and Sacramento County has probably never been a major breeding area. Pintails were occasionally reported nesting in Yolo County, but not in Sacramento County, from 1950 to 1990 (see Engilis 2013 for source) and were found breeding in small numbers during the Solano County atlas (2004–2010), mostly in the Suisun Marshes, and including one block adjacent to Sacramento County (Berner 2015). The North American population declined dramatically in the decades preceding Atlas 1, remaining relatively stable with annual fluctuations since then (Clark et al. 2020). In the Central Valley, a detailed analysis of wintering waterfowl populations between 1973 and 2000 (Fleskes et al. 2018) showed that the Northern Pintail was the only species in decline. Attempts to increase the North American population to previous high levels appear hampered by climate change and ongoing land use practices (Buderman et al. 2020). Potential breeding habitat in Sacramento County (rural pastureland and open grasslands with scattered small ponds) has decreased to some extent since Atlas 1, replaced in part by suburban development, vineyards, and orchards. In summary, potential for breeding in Sacramento County even prior to and during the first atlas was limited and is unlikely to improve substantially.

Allen's Hummingbird **81**

Although little in the way of reliable data on population status and trends exists, particularly for the migratory subspecies of Allen's Hummingbird (*Selasphorus sasin sasin*) that occurs in Northern California, it seems likely that population size is at least stable and that the species has expanded its range. This expansion is, at least in part, a result of human landscape alterations (e.g., ornamental vegetation and hummingbird feeders; Clark and Mitchell 2020). Grinnell and Miller (1944) marked the eastern boundary of the species' range in the San Francisco Bay region as passing through the Carquinez Strait, but breeding in the Delta region east of there has been documented in recent years. From the 1960s through the 1980s, Allen's Hummingbirds were seen in Courtland through the summer and suspected of breeding in the area (Lynch and Ames 1970; and see Engilis 2013 for source). During Atlas 1 a pair and courtship behavior observed near Ryde (about seven miles south of Courtland) in 1990 qualified for probable status. Coumoutso and Trochet (2002) documented the first breeding record for the Central Valley at the Cosumnes River Preserve and additional breeding activity by *Selasphorus* hummingbirds, likely Allen's Hummingbird, was observed there in 2004 and 2005 (J. Trochet pers comm.), but not since. The Solano County BBA, conducted in 2004–2010, documented confirmed or probable breeding in and around the Suisun Marshes, including three blocks just north of the southernmost tip of Sacramento County (Berner 2015). Finally, breeding of a *Selasphorus* sp. female, most likely an Allen's, was confirmed (gathering nest material) on the University of California Davis campus in Yolo County in 2012 (Trochet et al. 2017). Although Allen's Hummingbird was recorded as possible in only one block during Atlas 2, occasional, perhaps even regular, breeding in southwestern Sacramento County may yet occur, but difficulties of access and distinguishing Allen's from Rufous Hummingbird (*Selasphorus rufus*) hinder confirmation. One possible record during Atlas 1 was of a male on Montezuma Island, which is accessible only by boat, within 200 m of the Solano County shoreline, and within the same block of the Solano County BBA in which Allen's Hummingbird is coded as probable (Berner 2015).

Table 4-3. Introduced breeding species. Numbers shown are the number of atlas blocks in which the species was observed exhibiting breeding behaviors.

	Atlas 1			Atlas 2		
	Confirmed	Probable	Possible	Confirmed	Probable	Possible
Canada Goose	2	0	2	45	19	7
Mute Swan	0	0	0	6	4	1
Ring-necked Pheasant	36	29	30	4	8	17
Wild Turkey	5	4	7	39	14	10
Rock Pigeon	40	22	0	9	15	56
Eurasian Collared-Dove	0	0	0	14	38	48
European Starling	114	2	11	92	1	19
House Sparrow	106	12	2	59	19	24

THE UGLY: INTRODUCED SPECIES

In fairness to these species, they are most certainly NOT ugly, though, perhaps unwanted. In fact, some of us think starlings are quite attractive. Such nonnative species, or native species introduced unnaturally into an area, can often wreak havoc with native species through competition for scarce resources. This section deals with such species and compares their breeding distributions between the two atlases (Table 4-3).

Eurasian Collared-Dove **73**

The latest arrival to our area is the Eurasian Collared-Dove (*Streptopelia decaocto*), a species that has staged expansion across North America at a rate likely unprecedented for any other introduced species (Romagosa and Labisky 2000, Romagosa and McEneaney 2000, Ingenloff et al. 2017, Romagosa 2020). These doves began their expansion into the Central Valley in 2003 (Hampton 2006) and then rapidly spread throughout the valley (Hampton 2006, Pandolfino 2010, 2011). As an illustration of just how rapidly this bird can occupy a range of habitats, Eurasian Collared-Doves (entirely absent from the county during Atlas 1) were observed showing breeding behaviors in 100 of the 136 blocks (74%) during Atlas 2. They were confirmed in 14 blocks and deemed probable in another 38. Their current breeding range in the county includes nearly all but the most densely urbanized areas and the open grasslands in the southeastern parts of the county.

While one might suspect that Eurasian Collared-Doves would have a negative impact on native species such as the Mourning Dove (*Zenaida macroura*), nearly all studies show little to any evidence of this to date (Duncan 2004, Bonter et al. 2010, Pandolfino 2017). It now appears that their rapid spread and increasing numbers may have peaked, or even be in decline (Hess 2020, Lehman 2020, Leukering 2020, Pandolfino 2020a).

In another example of prescience, TM predicted in the July 1985 *Sacramento County BBA Newsletter* that Collared-Doves "*may eventually make it to our neck of the woods.*"

Mute Swan **57**

The other introduced species absent from Atlas 1, but now confirmed as a breeder in Sacramento County is the Mute Swan (*Cygnus olor*). Although the California Bird Records Committee has not yet determined that Mute Swans are sufficiently established in the state to be added to the official list, that seems just a matter of time. We had nesting confirmed in three areas: on Sherman Island in the Delta, on the quarry pond just west of Ione Road at the eastern edge of the county, and in the former Mather Air Force Base area (Mather Regional Park/Mather Lake). Fledglings were seen with adults on the American River near Rossmoor Bar, but it is unclear where they originated. This aggressive species has become a threat to native waterfowl in several eastern and midwestern states, and some state resource agencies

have begun control efforts (Ciaranca et al. 2020). Although the California Department of Fish and Wildlife is soliciting reports of observations (www.wildlife.ca.gov/Conservation/Invasives/Species/Mute-Swan), we are unaware of any concerted efforts at control currently in place in our state.

Canada Goose and Wild Turkey **56 & 69**

The next two species, Canada Goose (*Branta canadensis*) and Wild Turkey (*Meleagris gallopavo*), were both just becoming established as breeders in Sacramento County during Atlas 1 but are now common and widespread in the county. It may seem odd to some to include the Canada Goose in this group, as it is certainly native to our area, albeit not as a breeder and year-round resident. Historically, the only California breeding population was in the northeastern corner of the state, and this species was strictly a winter visitor to the Central Valley (Grinnell and Miller 1944). The multitude of Canada Geese now resident and breeding in our area, and most other parts of the U.S., are thought to have descended from captive birds released intentionally and/or accidentally (Nelson and Oetting 1998, Orr et al. 1998). Indeed, numbers of these geese have increased so dramatically that many states have begun aggressive control efforts (Mowbray et al. 2020 and citations therein).

During Atlas 1, Canada Geese were confirmed breeding in only two blocks, while in Atlas 2 they were confirmed in 45 (approximately one-third) of all blocks and are now common breeders throughout most of the northern two-thirds of the county.

Wild Turkeys, native to much of the eastern U.S., are not native to California (notwithstanding some scant fossil evidence to the contrary). For much of the 20th century, the California Department of Fish and Game (now the California Department of Fish and Wildlife) tried to introduce this species into the state as an additional game species. None of the early introductions using captive-raised birds were successful. However, in the mid-1980s wild-caught birds from Texas were released (Madan 2015), and the species' numbers in the Central Valley have increased at a nearly exponential rate ever since (Pandolfino and Handel 2018). It is unclear if this population explosion is having a negative effect on other wildlife species. During Atlas 1 turkeys were confirmed in only five blocks and their distribution was largely limited to the northeastern corner of the county. Atlas 2 confirmed the species as breeding in 39 blocks, and they are now found in all but the southwestern Delta areas.

Ring-necked Pheasant **70**

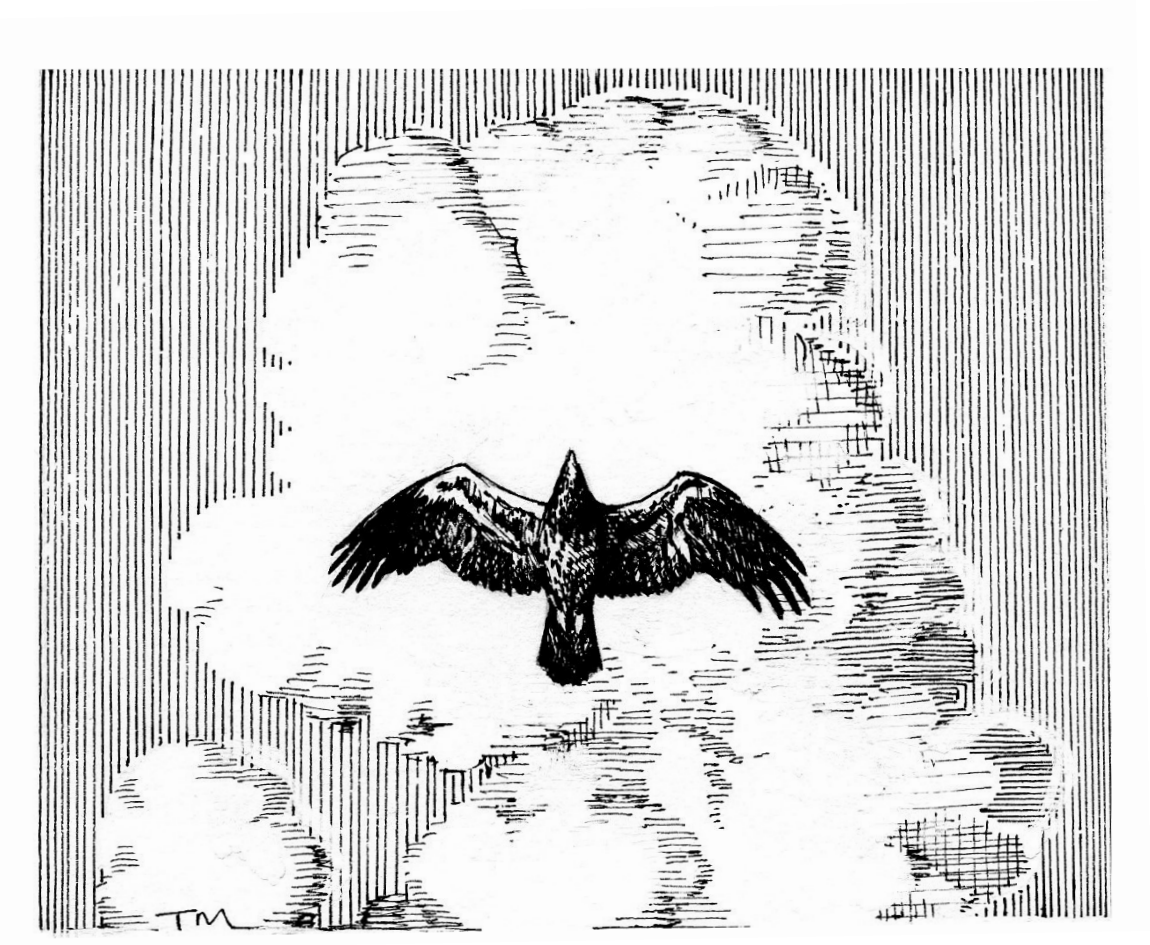
Following introduction to the western U.S. from Asia in the late 1800s, the Ring-necked Pheasant (*Phasianus colchicus*) established sizeable populations in portions of northern and central California by the early 1900s (Lever 1987). However, populations have declined substantially statewide over the past 30 years, primarily due to widespread changes in agricultural practices (Coates et al. 2016). Agriculture has been concentrated into the Central Valley, with the subsequent loss in other portions of the state to urbanization. In the Central Valley, changes in crop types and agricultural practices that eliminate weedy/shrubby areas at the edges of fields (clean farming) have further contributed to loss of habitat for this species. Other factors likely contributing to this decline include pesticide use, predation by Common Ravens, and competition with Wild Turkeys (Coates et al. 2016). While BBS data revealed that the Ring-necked Pheasant has declined rangewide in North America in recent decades at a small but significant rate (0.6%/year; Sauer et al. 2020), the rate of decline in California has been approximately six times greater (6.3%/year; Sauer et al. 2020).

Some of these changes are shown in Sacramento County between the two atlases, including increased urbanization, decreases in the planting of barley and sugar beets, winter flooding of ricelands, the significant increase in orchards and vineyards, and increased populations of ravens and turkeys. Widespread in the county during Atlas 1, breeding behaviors for the pheasant were observed in 95 of the 136 blocks (70%). During Atlas 2, breeding behaviors were observed in only 29 of the blocks (21%), primarily in the rural northern portion of the county, surrounding the city of Elk Grove, including the Bufferlands, and in the Delta.

Rock Pigeon, House Sparrow, and European Starling
72, 163, & 161

The last three species in this group constitute the old guard among introduced birds. The Rock Pigeon (*Columba livia*) was already well ensconced through most urban centers in California by the early 20th century (Grinnell and Miller 1944). House Sparrows (*Passer domesticus*) first appeared in San Francisco in the 1870s and were common in the Central Valley by 1940 (Grinnell and Miller 1944). A relative latecomer, the European Starling (*Sturnus vulgaris*) was first documented in the state in 1942 (Jewett 1942) and had become a common and widespread breeder throughout the state by the 1960s (Small 1994).

All three of these species, after decades of increasing abundance and expansions in range, appear to have begun to decline in the past 50 years. BBS data for each showed significant declines throughout their North American ranges since the mid-1960s (Sauer et al. 2020). California BBS data also showed significant declines for the starling and the House Sparrow (Sauer et al. 2020). Rock Pigeons showed a slight, but non-significant, increase for that time period (Sauer et al. 2020) in California. Comparing our results from the two Sacramento atlases, the total number of blocks in which each species was recorded was similar, while many more included confirmatory observations in Atlas 1. This is almost certainly due to the different sort of effort applied in Atlas 1. Observers then were likely more concentrated on getting breeding confirmations for all species in their block(s), whereas many birders tend to nearly overlook our common introduced birds in the course of a day of birding, perhaps a good example of the difference between birding and atlasing. The fact that the total number of blocks with breeding observations were similar between the two atlases supports the presumption that numbers are relatively stable for all three birds.



Sub-adult Bald Eagle by Tim Manolis