CHAPTER SIX
SPECIES SHOWING SUBSTANTIAL DECREASES IN BREEDING RANGE

In this chapter we cover eight species, not already discussed in Chapter Four, that showed substantial decreases in Sacramento County breeding range between Atlas 1 and Atlas 2 (Table 6-1). California BBS data from the past three decades showed large decreases in abundance (–2 to –5%/year) for all eight species, with those decreases considered statistically significant for four of the eight (Sauer et al. 2020). The page number for each species account in Chapter Eight is shown beside the species name.

Yellow-billed Magpie **137**

The decline of the California-endemic Yellow-billed Magpie (*Pica nuttalli*) has been well documented (Airola et al. 2007, Koenig et al. 2007, Pandolfino 2007, Crosbie et al. 2008, Smallwood and Nakamoto 2009, Wheeler et al. 2009) and is largely attributed to susceptibility of this species to the West Nile virus. The initial virus outbreaks of 2004–2005 reduced magpie numbers to approximately half of their pre-virus levels, and subsequent outbreaks have continued to negatively impact this species (Pandolfino 2010, 2013, 2020b). At the time of Atlas 1 Yellow-billed Magpies were widespread in the county, confirmed as breeding in 82 (60%) of all blocks. During Atlas 2 we were able to confirm breeding in only 33 (24%) of the atlas blocks. The long-term prospects for this species recovering to historical numbers is uncertain, given the apparent inability of Yellow-billed Magpies to mount an effective immune response to this virus (Ernest et al. 2010, Pandolfino 2020b).

Loggerhead Shrike **133**

Another species apparently seriously impacted by West Nile virus (Pandolfino 2008), the Loggerhead Shrike (*Lanius ludovicianus*), was already in long-term, widespread decline well before the arrival of this virus in North America (Morrison 1981, Cade and Woods 1997, Peterjohn and Sauer 1999). BBS data for California showed highly significant declines of more than 3%/year in this shrike's numbers between 1993 and 2019 (Sauer et al. 2020) and wintering numbers in the Central Valley have shown similar declines (–2.6%/year) from 1978 to 2014 (Pandolfino and Handel 2018). This species was hit with additional impacts by the first outbreaks of West Nile virus (Pandolfino 2008) and subsequent outbreaks have continued to affect these shrikes (Pandolfino 2020b). Statewide population trends and threats to Loggerhead Shrike habitats led

	Atlas 1			Atlas 2		
	Confirmed	Probable	Possible	Confirmed	Probable	Possible
Cinnamon Teal	19	43	2	7	9	4
Pied-billed Grebe	49	9	12	20	6	8
Common Gallinule	24	8	10	7	3	8
American Coot	32	22	9	6	6	11
Northern Harrier	13	23	32	3	10	12
Loggerhead Shrike	45	15	20	6	8	4
Yellow-billed Magpie	82	4	5	33	7	6
Horned Lark	17	16	7	6	7	5

Table 6-1. Eight species showing large decreases in breeding range between Atlas 1 and Atlas 2. The criteria for inclusion included: ≥50% decrease in total blocks with breeding behaviors; >50% decrease in blocks with confirmed breeding; and a net decrease of at least 10 blocks with breeding confirmations. Numbers shown are the number of atlas blocks in which the species was observed exhibiting breeding behaviors.

to the species being designated as a California Bird Species of Special Concern (Humple 2008).

Comparing the distributions of the Loggerhead Shrike between our two atlases is disheartening, to say the least. This fierce little "*honorary raptor,*" found in 80 blocks and confirmed breeding in 45 in Atlas 1, was present in only 18 in Atlas 2 and confirmed in only six. Given the likely persistence of West Nile virus in the Central Valley and the continuing loss of the grassland/open country habitats this bird needs, local extirpation is a distinct possibility.

Losers and Winners

The past 30 years have seen dramatic development in the northwestern portion of the county (Natomas), the Folsom area, and around Elk Grove, among other locations. Habitat loss and fragmentation are surely two of the subplots to the story of the two atlases, but adaptation and resilience are also apparent. To take but one example, Folsom has seen dramatic growth since the late 1980s, where grasslands have been lost, along with the birds that depend on them. Small creeks like Humbug and Willow were confined by surrounding development and greatly altered in places. In some areas these alterations came on top of impacts from mining in decades past. What had been grasslands and savanna cut by a few streams, with their associated riparian strip of trees and thickets, are now vastly different. What remains is far from pristine, but it still provides habitat for a lot of birds. The little patches of wetlands with cattails and other emergent species host rails, Common Gallinules, and Common Yellowthroats, to mention a few. These are species you would not expect to find consistently if the habitat were closer to its natural, seasonally dry, state. This does not compensate for the losses, but it does show that if a living is to be had from a patch of habitat, birds will probably find it.

Horned Lark **140**

Another grassland specialist that experienced a dramatic breeding range reduction between the two atlases is the Horned Lark (*Eremophila alpestris*). Like so many other grassland birds, this lark has been in decades-long decline throughout its range. BBS data for the past 30 years showed significant declines of 2.3%/year in North America and 2.9%/year in California (Sauer et al. 2020). During Atlas 1 Horned Larks were confirmed in 17 blocks and considered probable in another 16. We were able to confirm breeding in only six blocks in Atlas 2 with seven rated probable. A deeper dive into 12 blocks which included confirmations in Atlas 1, but no breeding observations at all in Atlas 2, tells a clear story of grassland loss. Discounting three of these blocks where we had little or no access during Atlas 2 (M-5, M-8, and N-8), the remaining nine blocks on average lost nearly 300 ha of grassland, an average loss of 34% (range 9–100% loss). Specific examples include block E-2 where development adjacent to the Sacramento International Airport converted more than 60% of the grassland, block M-2 where suburban expansion of Folsom consumed 66%, L-7 and L-8 where ranchette development removed approximately 15–16% of the grassland and badly fragmented what was left, and L-6 where more intensive agriculture consumed about 15% of the existing grassland. One can also see the impacts of new vineyards in the southeastern parts of the county where blocks M-9 and M-10 (with grassland to agriculture conversions of 759 and 317 ha, respectively) had probable breeding observations in Atlas 1 and no breeding observations in Atlas 2.

Cinnamon Teal **60**

The Cinnamon Teal (*Spatula cyanoptera*) was historically described as the most common breeding duck in the Central Valley (Grinnell et al. 1918). Today, numbers are greatly reduced, primarily due to the significant loss of wetland habitat. While wetland preservation and restoration have taken place in recent decades, almost all the focus has been on wintering waterfowl (CVJV 2020). Breeding waterfowl have additional habitat requirements, including adjacent grassland habitat where they often nest, and negative populations trends indicate

that these needs are not being met in order to maintain population numbers. The 2019 population estimate for Cinnamon Teal in the Central Valley was 42% below the long-term (1992–2019) average (CVJV 2020).

Therefore, it is unsurprising that the Cinnamon Teal demonstrated a large decrease between the two Sacramento County atlases. During Atlas 1, breeding behaviors were observed in 64 of the 136 blocks (47%) throughout most of the county except the urban core. During Atlas 2, breeding behaviors were observed in only 20 of the 136 blocks (15%), scattered where suitable habitat remains. Locations with multiple observations include the Cosumnes River Preserve, the Bufferlands, permanent water in the vicinity of the former Mather Air Force Base, and Sherman Island in the Delta. Only a single record was entered for the Natomas Basin in Atlas 2, where the species had been documented with breeding behaviors in all blocks in Atlas 1.

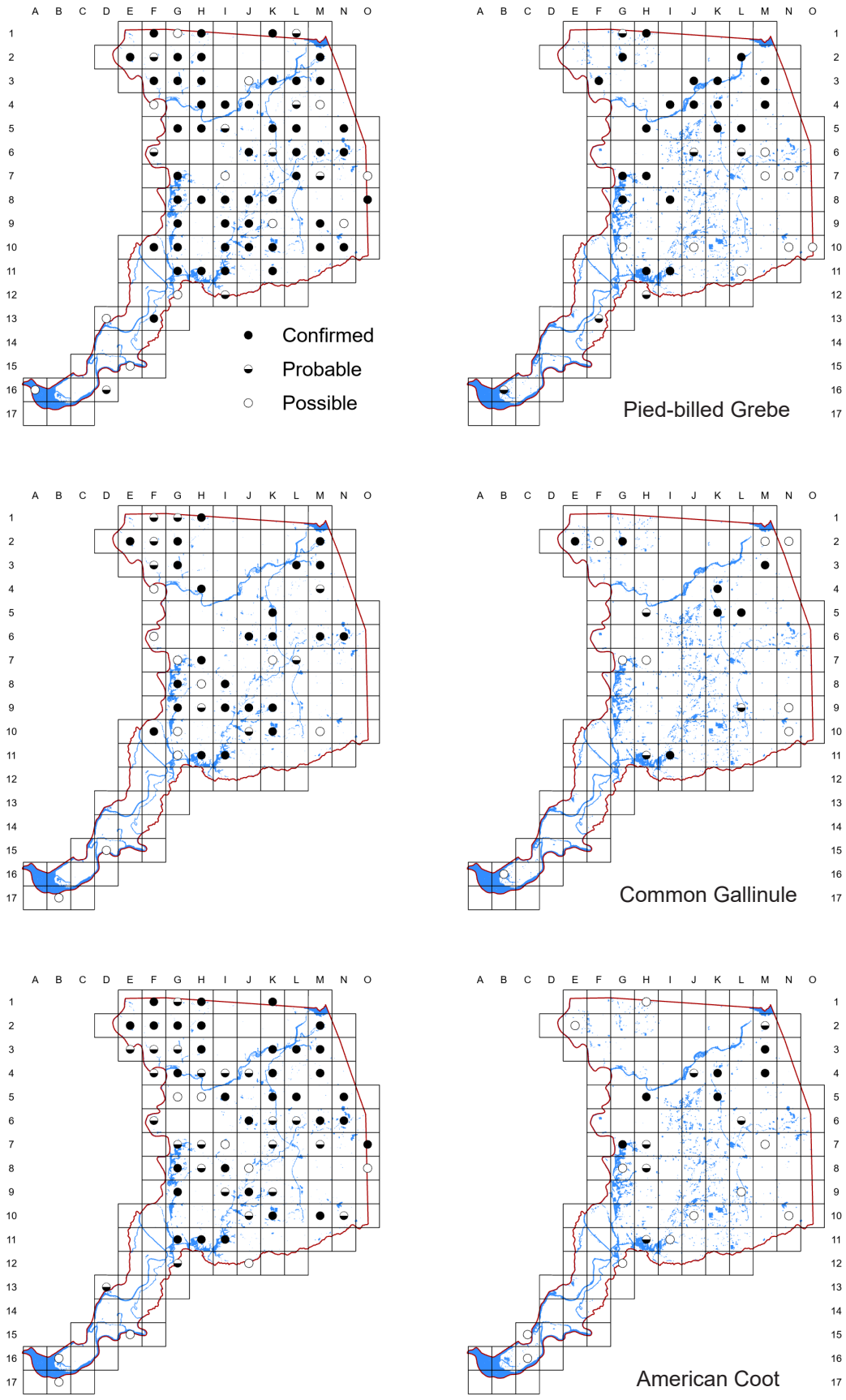
Pied-billed Grebe, Common Gallinule, and American Coot **71, 84, & 85**

We will treat these three species together because they share similar breeding habitat requirements and showed similar geographic patterns of breeding range reduction between the two atlases. The Pied-billed Grebe (*Podilymbus podiceps*), Common Gallinule (*Gallinula galeata*), and American Coot (*Fulica americana*) all require wetlands with a substantial amount of emergent vegetation (chiefly cattail, *Typha* spp.; or bullrush, *Scirpus* spp.) that remain well flooded throughout the breeding season (Bannor and Kiviat 2020, Brisbin and Mowbray 2020, Muller and Storer 2020). BBS data for California for these species suggest they may all be in decline during recent decades (negative trends of 2–5%/year; Sauer et al. 2020). However, BBSs do not census such species well, and the relatively low confidence level and lack of statistical significance associated with these trends makes them uncertain.

Despite a net increase in total wetlands in Sacramento County between Atlas 1 and 2 (see Chapter Two), these species all showed considerable loss of breeding range (Table 6-1). There was substantial overlap in the range losses between these three birds (Figure 6-1). There were 18 blocks that included confirmed breeding in Atlas 1 but lacked any breeding detections in Atlas 2 for at least two of these three species (Table 6-2). If we examine habitat changes in those blocks, we see no apparent net loss of wetland, but a substantial increase (39%) in development. These blocks are nearly all in one of the four primary areas of development during the time between Atlases 1 and 2. They include the Natomas Basin, the south Sacramento–Elk Grove area, Folsom, and Rancho Murieta. Without careful study of the factors in each area, speculation about reasons for the apparent disappearance of these species is difficult. A difference in observer effort between the two atlases could be a factor. However, 10 of those 18 blocks (55%) were completed in Atlas 2 (95% of likely breeding species at least possible, 75% probable, and 50% confirmed). That compares favorably with the percent completed for ALL blocks for both atlases (57% for Atlas 1 and 51% for Atlas 2). Even if the efforts of Atlas 1 observers were more focused on confirming breeding, one would still expect that Atlas 2 observers would have at least noticed the presence of these species that were recorded in Atlas 1. It may be that, while wetland habitats may still be present in some of these areas, they are now surrounded by development. Such development now requires avoidance or mitigation for loss of such wetlands. The result of on-site avoidance is many small patches of habitat within a matrix of residential or commercial development. Perhaps these species have abandoned these areas because of disturbance from humans or predation by domestic animals or wildlife attracted to such developed areas (e.g., raccoons, *Procyon lotor*; skunks, *Mephitis mephitis*; etc.). It is also possible that pesticides and herbicides are polluting these wetlands through runoff from residential irrigation. While some bird species seem to be able to thrive in urbanized areas, many others cannot.

Another factor that has impacted the availability of water for wetlands during the breeding season in some locations (e.g., the Bufferlands and Cosumnes River Preserve) has been increased pressure (especially since the arrival of West Nile virus in 2004–2005) by the local mosquito control agency to decrease summer water that might produce

Figure 6-1. Comparison of results of Atlas 1 (left) and Atlas 2 (right) for the Pied-billed Grebe, Common Gallinule, and American Coot. Blue shading shows water and wetland areas.



mosquitoes (CC pers. obs., S. Scott and J. Trochet pers. comm.). It is surely no coincidence that the Common Gallinule, in particular, is now rare at both locations. There is a recognized tension between managing habitat to optimize wildlife habitat and protecting public health by keeping potentially disease-bearing mosquito numbers low (Kwasny et al. 2004).

Northern Harrier **109**

The reduced breeding range we observed between the two atlases for the Northern Harrier (*Circus hudsonius*) was not unexpected. The species has been in long-term, widespread decline across its range (Sauer et al. 2020). The negative trends are particularly dramatic in California (Sauer et al. 2020), where it is considered a state Bird Species of Special Concern (Davis and Niemela 2008). Loss of wetland breeding habitat and grasslands where this species commonly forages (and often breeds) appears to be the main driver of this raptor's decline (Davis and Niemela 2008, Smith et al. 2020). As noted in earlier chapters, conversions of grassland to orchards and vineyards have reduced both foraging and potential breeding habitat in Sacramento County. Because this species needs relatively tall vegetation for breeding and foraging, heavy grazing and/or haying operations can also render these rangelands unsuitable, or even destroy active nests (Davis and Niemela 2008).

Looking at the geographic pattern of range reduction for the harrier, we see a similar pattern to that described above for the wetland-nesting grebe, gallinule, and coot. Of the nine blocks with confirmed breeding Northern Harriers in Atlas 1 but no breeding observations during Atlas 2, seven of those blocks were either in the Natomas Basin or near Folsom, Elk Grove, or Rancho Murieta. This suggests that, as noted above, remaining wetland and other potential habitats in these recently urbanized areas have been degraded and can no longer support breeding harriers.

Block	Pied-billed Grebe	Common Gallinule	American Coot
F-1	**x**		**x**
F-10	**x**	**x**	
G-11	**x**		**x**
G-3	**x**	**x**	
G-9	**x**	**x**	**x**
H-2	**x**		**x**
H-3	**x**		**x**
H-4	**x**	**x**	
I-8		**x**	**x**
I-9	**x**	**x**	
J-6		**x**	**x**
J-9	**x**	**x**	**x**
K-1	**x**		**x**
K-10	**x**	**x**	**x**
L-3		**x**	**x**
M-10	**x**		**x**
M-6		**x**	**x**
N-6	**x**	**x**	**x**

Table 6-2. The "x's" above indicate an atlas block in which that species was confirmed during Atlas 1 but showed no recorded breeding behaviors during Atlas 2.

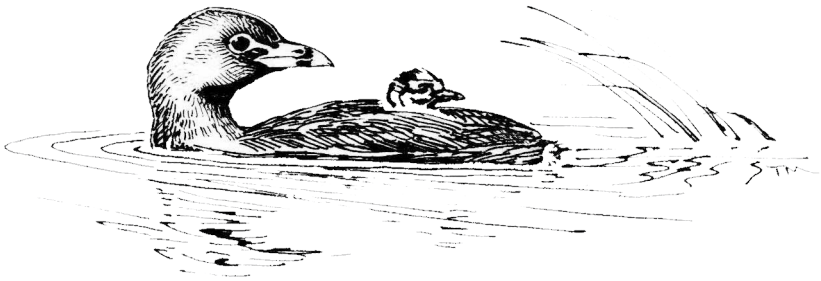
Hidden in Plain Sight

Comparing data from Atlas 2 with Atlas 1, we were somewhat surprised to see that our BBA methodology did not highlight known declines in two of our most imperiled species: Burrowing Owl (*Athene cunicularia*) and Purple Martin (*Progne subis*). A combination of factors may explain this. Most simply, because we made no attempt to estimate relative abundance during Atlas 2, each block was classified as confirmed, probable, possible, or left blank (no breeding behaviors detected) regardless of the number of breeding pairs within that block. Thus, this methodology may mask actual declines despite indicating continued breeding.

Another factor that can confound interpretation is the relative level of survey effort focused on each species. In recent years, intensive survey efforts have concentrated on Burrowing Owls and, especially, Purple Martins in Sacramento County. While these survey efforts were separate from the Atlas 2 project, most surveyors included their observations in eBird. Therefore, it is possible that these single-species survey efforts were more effective at documenting owls and martins than the multispecies efforts of Atlas 1 participants.

Last, a rapid decline during an atlas period can be hidden by detections early in the project. A species declining from a consistent breeder every year to an occasional or extirpated breeder would still show as confirmed in that block. Data from a number of sources (Airola 2020, CC pers. obs., eBird) confirm that Burrowing Owls and Purple Martins were at their lowest known densities for Sacramento County during the last three years of Atlas 2. Those working closely with these species are unsure if they will be regular breeders in the county 25 years from now, when it is time for Atlas 3.

So, what is driving these losses? While habitat loss has been considered a primary factor in the decline of Burrowing Owls, areas that appear unchanged no longer have owls. Similarly, Purple Martin numbers have declined from sites where the overpass structures they use remain suitable. It is possible that these declines are partially related to climate change and drought (causing lower ecosystem productivity). In addition, the increased use of neonicotinoid insecticides has been implicated in declines of the Purple Martin and other insectivorous species (Forister et al. 2016, Airola 2020, Li et al. 2020). While the majority of biomass in a Burrowing Owl's diet comes from rodents, insects make up the vast majority of total prey items (Trulio and Higgins 2012). For a species on the margin of persistence, even relatively small reductions in prey availability, at any point in the year, could drive declines and ultimately extirpation.



Pied-billed Grebe with young by Tim Manolis