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## Westward Expansion of the Glossy Ibis *Plegadis falcinellus* in North America: Records for the New Millennium

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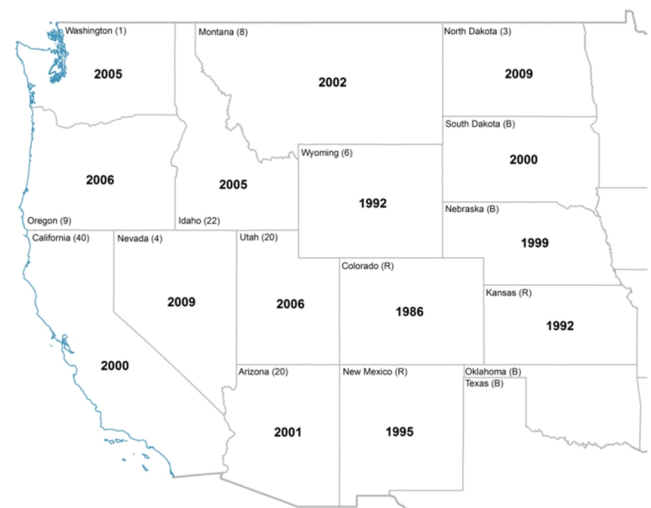
### Short Note

When Europeans colonized the New World, the Glossy Ibis *Plegadis falcinellus* remained in its Old World haunts, a broad, discontinuous breeding distribution from southern Europe east to southern Asia and wintering distribution from Africa east to Australasia. As the Cattle Egret *Bubulcus ibis* would accomplish decades later, the Glossy Ibis colonized the New World, in its case in the early 1800s (Patten and Lasley 2000; Oswald *et al.* 2019). The ibis had established itself as a breeder in the southeastern United States by the turn of the twentieth century and had begun to expand westward by the turn of the twenty-first century (Patten and Lasley 2000). Expansion apparently was rapid: by 2000, the species had become more-or-less regular in the southern Great Plains and southern Rocky Mountain region and had occurred as far west as southeastern California (Patten and Lasley 2000).

The Glossy Ibis's manifest density did not halt with the new millennium; rather, records continued to accumulate across the western United States (Faulkner 2004). By 2009 the species had been recorded in each of the western states (Figure 1). To the north, the species regularly occurs at a single site in southwestern Manitoba (Artuso *et al.* 2018) and has reached the Pacific Northwest in both Oregon (Contreras *et al.* 2006) and Washington

(Mlodinow and Aanerud 2008), yet it is considered hypothetical in Saskatchewan (Smith 2017).

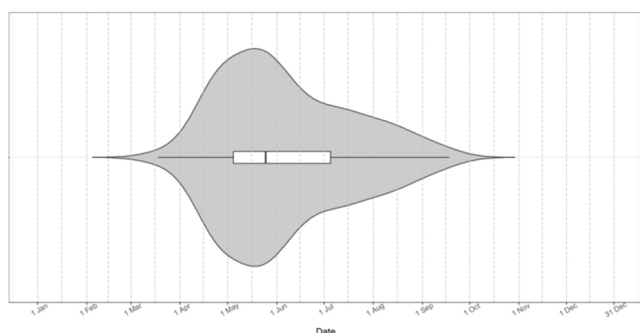
**Figure 1.** Year of first occurrence of the Glossy Ibis by state in the western United States. Figures in parentheses are the approximate number of accumulated records of the state, or “R” indicates regular occurrence and “B” signifies breeding documented



Twentieth century vanguards were concentrated in April and May (Patten and Lasley 2000), a pattern that has not changed: records since 2000 in the western United States are overwhelming from the

early spring (Figure 2), suggesting the possibility that most occurrences are of early migrants that “overshot”—to the north and west—traditional breeding sites, perhaps to establish new breeding sites. Indeed, the Glossy Ibis has begun to breed in the central Great Plains states of Nebraska (Jorgensen and Silcock 2015) and South Dakota (Drilling 2013), the latter only a dozen years after the first state record (Bardon 2001). Breeding, presumptive breeding, or interbreeding with the White-faced Ibis *P. chihi* has been reported in Oklahoma, Wyoming, and Colorado (Arterburn and Grzybowski 2003; Faulkner 2005; Leukering 2008).

**Figure 2. Violin plot of seasonal occurrence of twenty-first century records (N=136) of the Glossy Ibis in the western United States. Note the high seasonal peak in May, a pattern that has held for several decades**



Hybridization remains a challenge to field observers and continues to hinder tracking of the Glossy Ibis’s westward expansion. Individuals with a phenotype intermediate with the White-faced Ibis have been documented in Texas, Oklahoma, Wyoming, Colorado, Arizona, and California (Arterburn and Grzybowski 2003; Faulkner 2005; Leukering 2008; Rosenberg *et al.* 2011; McCaskie *et al.* 2018). No clear hybrid zone exists between these two species; rather, admixture is dispersed widely (Oswald *et al.* 2019), implying adventitious and occasional hybridization, perhaps typically of lone individual Glossy Ibis in White-faced Ibis

rookeries. Many individuals with intermediate phenotype had an introgressive genotype that pointed toward past hybridization rather than F<sub>1</sub> hybrids (Oswald *et al.* 2019), implying that hybrids are fertile.

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