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An Updated Account of Wading Bird Foraging Behavior

Jay F. Kelly,^{1,2,4} Dale E. Gawlik,¹ and David K. Kieckbusch^{1,3}

ABSTRACT.—This paper presents an updated account of 34 wading bird foraging behaviors presented by Kushlan (1978a) with findings from later studies for nine wading bird species, including: Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Little Blue Heron (*Egretta caerulea*), Tricolored Heron (*Egretta tricolor*), Great Blue Heron (*Ardea herodias*), Green Heron (*Butorides virescens*), Glossy Ibis (*Plegadis falcinellus*), White Ibis (*Eudocimus albus*), and Wood Stork (*Mycteria americana*). We also include occurrences of the behavior Prey Dropping, which was not described as a foraging behavior in Kushlan (1978a). Received 23 May 2002, accepted 14 December 2002.

Kushlan (1976) presented a thorough summary of previously documented foraging behaviors for North American herons (e.g., Meyerriecks 1960, 1962) to provide a source for “standardized terminology, clear understanding of the descriptive aspects of each behavior, and knowledge of the occurrences of various behaviors in different species.” The synopsis was expanded to include additional heron species, as well as tactile-feeding behaviors represented by stork relatives and ibises in Kushlan (1978a). Here, these accounts of wading bird foraging behavior are updated with results from later studies for the following species: Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Little Blue Heron (*E. caerulea*), Tricolored Heron (*E. tricolor*), Great Blue Heron (*Ardea herodias*), Green Heron (*Butorides virescens*), Glossy Ibis (*Plegadis falcinellus*), White Ibis (*Eudocimus albus*), and Wood Stork (*Mycteria americana*).

To obtain a list of wading bird behaviors and their definitions, we conducted a literature search for studies on the aforementioned spe-

cies, published since Kushlan (1976), adding any behaviors not recorded in Kushlan (1976) or Kushlan (1978a) to a revised list (Table 1). Of the 38 behaviors that were listed by Kushlan (1978a), 34 were relevant to the nine species considered here. Definitions for foraging behaviors follow those in Kushlan (1978a). More detailed descriptions for herons can be found in Hancock and Kushlan (1984) and Hancock et al. (1992). The criteria in Rodgers (1983) was used to distinguish among Walking Slowly (≤ 1 step/s), Walking Quickly ($>1 \leq 2$ steps/s), and Running (>2 steps/s).

The literature search revealed nine studies on wading bird foraging behavior (Willard 1977, Kushlan 1978b, Bildstein 1983, Hom 1983, Rodgers 1983, Hancock and Kushlan 1984, Kushlan et al. 1985, Gonzalez 1997, Toland 1999) that reported behaviors not recorded for these species in Kushlan (1978a). The behavior described by Toland (1999) as Mid-air Capture was listed in Kushlan (1976) as Standing Flycatching, and is included in Table 1 under that name.

We also observed and included in the revised list the behavior Prey Dropping, in which the focal bird drops the prey it captures rather than consuming it. This behavior was not described in Kushlan (1978a), but was mentioned in Rechnitzer (1956), Kahl (1964), and Kushlan (1979), and appears to occur in relation to transient, superabundant sources of prey, either with regard to the satiation of the focal birds (DEG unpubl. data), or attempts to capture large numbers of fleeing prey (Kahl 1964). Whereas the other studies described the birds merely dropping their prey, our focal birds would continually strike and drop the same injured or dead fish, often until it was stolen by another bird.

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TABLE 1. Foraging behaviors of nine species of wading birds and first report of occurrence¹ following Kushlan (1976).

Behavior	Great egret	Snowy egret	Great blue heron	Tri-colored heron	Green heron	Little blue heron	Glossy ibis	White ibis	Wood stork
Stand And Wait	K	K	K	K	K	K	K1	K1	K1
Walk Slowly	K	K	K	K	K	K	B	B	K1
Walk Quickly	H	K	H	K1	—	K	Ga	Ga	Ga
Running	W	K	K1	K	—	K	Ga	Ga	G
Hopping	K	K	K1	K	—	K	—	—	G
Jumping	—	Ga	K1	Ga	K	Ga	—	—	—
Leapfrog Feeding	K	W	—	K	—	K	—	—	—
Bill Vibrating	W	K	—	—	—	—	—	—	G
Baiting	—	—	—	—	K	—	—	—	—
Tongue Flicking	—	K	—	—	—	—	—	—	—
Standing Flycatching	—	T	K	T	K	—	—	—	—
Gleaning	K	H	K	—	—	K4	—	—	G
Wing Flicking	K	K	K	K	—	K	—	—	K1
Openwing Feeding	—	K	—	K	—	K	—	—	K1
Underwing Feeding	—	K	—	K	—	—	—	—	—
Foot Stirring	W	K	—	K	K	W	—	—	K1
Foot Raking	—	K	—	K	K	K	Ga	Ga	Ga
Foot Probing	Ga	K	—	—	—	—	—	—	—
Foot Paddling	Ha	K	—	—	—	—	—	—	—
Foot Dragging	Ga	K	—	K	—	K	—	—	—
Hovering	K	K	K	K	—	K	—	—	—
Hovering Stirring	—	K	—	K	—	—	—	—	—
Dipping	K	K	—	K	—	K	—	—	—
Plunging	K	Ga	K	Ga	Ha	Ga	—	—	—
Diving	H	H	—	Ga	K	—	—	—	—
Feet First Diving	Ga	Ga	K	Ga	—	K	—	—	—
Swimming Feeding	K	—	K	K	K	—	—	—	—
Head Swaying	W	W	—	—	K1	W	—	—	—
Neck Swaying	W	—	—	—	K1	—	—	—	—
Head Swinging	K1	—	—	—	—	—	K1	K1	K1
Groping	—	—	—	K1	—	—	K1	K1	K1
Probing	H	H	H	—	—	K4	K1	K1	G
Pecking	W	W	Ha	W	—	K1	K1	K1	—
Steal	W	W	W	Ga	K2	K2	—	K2	K2
Prey Dropping	Ga	Ga	—	Ga	—	Ga	—	K3	R1

¹ Key to symbols: Bildstein 1983 (B), Gawlik unpubl. data (Ga), Gonzalez 1997 (G), Hancock and Kushlan 1984 (Ha), Hom 1983 (H), Kushlan 1976 (K), Kushlan 1978a (K1), Kushlan 1978b (K2), Kushlan 1979 (K3), Kushlan et al. 1985 (K4), Rehnitz 1956 (R1), Toland 1999 (T), Willard 1977 (W).

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