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COLLISIONS AND IN-FLIGHT CALAMITIES INVOLVING SHOREBIRDS IN WESTERN WASHINGTON

Joseph B. Buchanan
Cascadia Research Collective
218½ W. Fourth Avenue, Waterstreet Building, Suite 201
Olympia, Washington 98501
Joseph.Buchanan@dfw.wa.gov

Collisions and other mishaps involving birds in flight have been well documented, for decades in many cases. Birds have been reported colliding with a variety of structures including windows, buildings, lighthouses, fences, utility lines and towers, wind turbines, aircraft and automobiles (see Erickson et al. 2005). In particular, shorebirds have been documented in collisions with anthropogenic structures (e.g. Bowles 1918, Kitchin 1949, Musters et al. 1996, Buchanan 2002, Conklin and Colwell 2007, Dove and Goodroe 2008). In addition, some birds are involved in other types of collisions: typically those involving predators (Page and Whitacre 1975) and occasionally those with other species or conspecifics (Abraham and Wilson 1997, Jehl 1998). Here I report on collisions and in-flight mishaps involving shorebirds in western Washington. The observations come from a period of >30 years and >1,300 visits to estuaries or beaches in Washington to observe shorebirds.

RESULTS AND DISCUSSION

Collision with Utility Lines

Evidence or observations of collisions with utility lines were noted twice. On 26 January 1981, a flock of several thousand Dunlins (*Calidris alpina*) was flying low above the mud flats in Samish Bay, Skagit County, when part of the flock began to lift up and over a utility line immediately adjacent to the west edge of the bay. The flock splintered, with birds passing both beneath and above the line. Numerous Dunlins narrowly avoided the utility line, but one bird struck it with such force that a wing was severed. On 15 March 1981, another Dunlin – this one also missing a wing – was found on exposed mud flats at virtually the same location where the other bird was found, presumably having collided with the utility line while flying toward the bay from the west. I also observed a near collision at this site on 3 March 1981 and at Eld Inlet, Thurston County, on 7 April 1981. At the latter location, mudflats are exposed in the small space between the Highway 101 and Mud Bay Road bridges. Dunlins that depart to the north after foraging there typically rise abruptly to pass over the utility lines; following near-collisions they circled upward, gaining height before flying over the lines.

Wires and utility lines are a known source of collisions involving birds in other areas (e.g. Cornwell and Hochbaum 1971, Mañosa and Real 2001),

but there are few documented instances of such structures posing a risk to shorebirds. Conklin and Colwell (2007) reported potentially significant shorebird mortality when birds flying above a saltmarsh slough at Humboldt Bay, California, collided with a wire connecting two sections of an electric fence; the authors estimated a cumulative mortality of 432 shorebirds.

Collisions with Automobiles

I have numerous records of shorebirds being struck by moving automobiles in Washington. I found single Dunlins that were killed on roads adjacent to Samish Bay on 13 December 1980 and 25 February 1981, and adjacent to Kennedy Creek estuary, Mason County, on 25 November 1979. An unidentified sandpiper accidentally hit by a vehicle on Long Beach, Pacific County, on 30 December 2006, was stunned for a short period; upon revival it was released and immediately joined a roosting flock of Dunlins (Daniel Varland, personal communication). Larger numbers of shorebirds have been killed in collisions with automobiles on outer beaches. At least 468 shorebirds (340 Western Sandpipers [*C. mauri*], 113 Dunlins, 12 Sanderlings [*C. alba*], and 3 dowitchers [*Limnodromus* species]) were killed on Long Beach, in a single incident on 20 April 1997 (Buchanan 2002). Other reports of shorebirds killed by motorists on beaches include 9 Western Sandpipers and 2 Sanderlings killed on Long Beach on 23 September 2000 (Daniel Varland, personal communication), over 100 shorebirds killed on Grayland Beach on 3 March 2002 (The Sandpiper, Volume 11, Issue 2, March-April 2002), and 24 Sanderlings killed during winter 2009 (Bret Hopkins, personal communication).

Single-bird and multi-bird collisions with vehicles generally occurred in different situations. Collisions of single birds in the Puget Sound lowlands (e.g. Samish Flats, Kennedy Creek estuary) occurred when Dunlins moved between intertidal feeding areas or between those areas and roosting areas on agricultural fields. Such mortality events involving small numbers of birds are likely accidents. In addition to the sites mentioned above, shorebirds in Washington may be vulnerable to vehicle collisions near Padilla Bay, Skagit Bay, Port Susan Bay, and Nisqually River Delta in Puget Sound, the vicinity of the Johns and Elk river estuaries in Grays Harbor, and the Palix River estuary and the area west of South Bend in Willapa Bay. Future collisions of shorebirds with vehicles at Kennedy Creek estuary now seems remote because of the barrier of trees that has developed beside the highway and the invasion of trees and shrubs that made the area south of the highway unsuitable for roosting shorebirds. Most of the collisions on coastal beaches were more significant mortality events than those at estuaries because the former instances involved larger numbers of birds, most of which were at high tide roost sites. Given the speed limits in place on coastal beaches, collisions there should be avoidable.

Crash-Landing to Avoid Avian Predator

On 16 January 2008, a single Dunlin flew at full speed into a dense patch of blackberry (*Ribes* species) on the west shore of Kennedy Creek estuary to escape an attacking Peregrine Falcon (*Falco peregrinus*) that made several capture attempts above exposed mudflats near shore. I subsequently watched for the Dunlin to emerge from cover and later searched the area, but was unable to see it because of the dense tangle of vegetation. Given its rate of speed and the amount and type of vegetation I assumed the Dunlin was killed when colliding with what it chose as protective cover.

Dunlins generally evade falcons through synchronized flocking behavior (Buchanan et al. 1988). Sometimes a Dunlin that has become isolated from the flock will land in water to avoid being captured, but such tactics are generally unsuccessful (Buchanan et al. 1991). The choice of the Dunlin to fly into dense vegetation appears to have been a desperate means to avoid the falcon and suggests that prey sometimes make bad choices to avoid predators (Caro 2005).

Interspecific Collision

On 19 April 2008, I observed a Greater Yellowlegs (*Tringa melanoleuca*) as it flushed from the west shore of Kennedy Creek estuary and was struck by the lead member of a group of six Buffleheads (*Bucephala albeola*) flying rapidly up-channel. The yellowlegs bounced violently off the Bufflehead, flapped its wings awkwardly a couple of times, and landed in shallow water. The Buffleheads landed in water at the point of impact, with the male that struck the yellowlegs crashing into the water and vanishing beneath the surface for ~10 seconds. Neither the yellowlegs nor the Bufflehead appeared seriously injured.

Although the reason for the collision was not clear I believe the yellowlegs did not see the approaching Buffleheads and caused the collision by flying into their pathway. A heavy snow was falling at the time of the collision and visibility may have been impaired. Others have suggested that poor visibility may be a contributing factor in some collisions involving birds and human-made structures (Jehl 1998; see references in Conklin and Colwell 2007). Observations of shorebird flight behavior during snowstorms may provide additional information on whether such conditions impair visibility.

Intraspecific Collisions

A collision involving a Dunlin and its flock mates was observed at Bowerman Basin, Grays Harbor County, on 13 February 1981. A single Dunlin that chronically trailed behind a flock did not turn in synchrony with the rest of the flock and collided with one or more flock members when the flock turned and doubled back on the trailing individual. Impact was not obvious due to the size of the flock, but the single Dunlin tumbled

immediately (i.e., it crashed, and did not fly) and landed in shallow water directly below. It swam briefly and then flew a short distance to exposed mud, but did not rejoin the flock.

A collision involving members of a Dunlin flock was observed at Kennedy Creek estuary on 3 January 2008. As a rising tide was about to cover the mudflats, a flock of ~750 Dunlins approached a patch of exposed mudflats and hovered briefly before settling down, apparently because the density of birds was so great that care was required to prevent landing on flock members. The flock flushed <30 sec later and ≥20 Dunlins were immediately involved in collisions with flock members, many of these birds then falling into shallow water before rejoining the flock.

It appeared that the single Dunlin in the first observation was weak and had had difficulty remaining with the in-flight flock. Dunlin flocks change direction rapidly when in flight, particularly when under attack by a predator (Buchanan et al. 1988). Any Dunlins that trail behind a flock when it suddenly doubles back would be at risk of colliding with flock mates. Dunlins sometimes forage at high densities in very small areas, and often occur at high densities when roosting. Because of the close spacing of birds in these situations any sudden flushes, as was the case in the second observation, might be expected to result in collisions of flock members.

Near-Collisions with Other Birds

On 16 January 2008, at Kennedy Creek estuary, I observed 151 Black-bellied Plovers (*Pluvialis squatarola*) and ~980 Dunlins flying together about one m above exposed mud, each species aggregated with conspecifics in the mixed-species flock. Once, the Black-bellied Plovers flying at the head of the mixed flock turned abruptly and reversed direction. This maneuver compromised flock unity and some Dunlins and Black-bellied Plovers (about 15 or 20 of each species) flying at the bottom edge of the front of the flock were forced to scatter upward into the path of other flock members to avoid being forced to the mud or colliding with the birds that had doubled back. This upward movement resulted in a momentary (few seconds) collapse of flock structure and disarray, which I had never observed previously.

That Black-bellied Plovers and Dunlins might be involved in near or actual collisions should not be surprising given both their close association (Byrkjedal and Thompson 1998) and nearly simultaneous reaction to falcons. Although the two species don't generally fly together in the same flock, they often fly in close proximity when evading predators (J. Buchanan, personal observation). Also, Black-bellied Plovers are one of the fastest flying shorebirds (Bent 1929), but they do not maneuver as quickly as Dunlins. I suspect that the flight pattern that resulted in the near mishap is uncommon when the two species fly high in the air because the ground does not constrain movement of individuals in the flock. The flock I observed was very low above the mudflats, eliminating space in

which the trailing birds could maneuver, therefore resulting in the temporary breakdown of the flock.

On 30 March 2008, two Black-bellied Plovers nearly collided at Kennedy Creek estuary. One of the plovers flew from the mudflats as another plover, engaged in rapid erratic flight, flew 1 m overhead. The erratic flier abruptly veered away, barely avoiding collision with the other bird.

The near collision of two plovers was not surprising given the regular occurrence of the irregular, rapid flight by individual plovers (J. Buchanan, personal observation). I suspect the probability of such collisions is higher in areas where the species is aggregated (e.g. Jehl 1998). In areas of high densities of Black-bellied Plovers, such as Kennedy Creek estuary, closer attention to these rapid flights may produce more observations of near or actual collisions.

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