

TERRESTRIAL FOOT-PADDLING BY A GLAUCOUS-WINGED GULL

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Gulls are known to use a variety of foraging techniques in a variety of habitats (Burger 1988). One behavior, referred to as "foot-paddling," consists of rapidly alternating raising and lowering of the feet (Simmons 1961a). This behavior can be divided into two functions (Tinbergen 1962). First, on tidal mudflats, in pools of water, and on saturated sand, this behavior suspends sediment in water and creates quicksand, bringing buried invertebrates to the surface or inducing them to move so that they become visible. Second, foot-paddling on solid but moist grassy soil, hereafter referred to as terrestrial foot-paddling, is thought to induce earthworms to come to the surface in response to the vibrations in the soil (Tinbergen 1962, Edwards and Bohlen 1993; but see Sparks 1961).

On 23 February 2007 at 16:45, I observed an adult Glaucous-winged Gull (*Larus glaucescens*) performing terrestrial foot-paddling on the lawn of the parliament buildings on Belleville Street in Victoria, British Columbia, Canada. Observations were made from a distance of approximately 5 meters for a duration of approximately 5 minutes. I recorded 1 minute 58 seconds in three parts on a Nikon Coolpix 5200 digital camera at 640 × 480 pixels and 30 frames per second. These three videos are available from the author upon request.

The gull created vibrations in the damp soil by rapidly stomping both feet, alternating left and right, for continuous periods of 4 to 24 seconds. In the video-recorded portion of the behavior, the gull spent 78 of 118 seconds foot-paddling at a mean frequency of 3.2 stomps per foot per second and a maximum frequency of 4.5 stomps per foot per second. After each bout of foot-paddling the gull paused and struck at worms that had risen to the surface of the soil in front of it. The gull struck at the ground in front of it 9 times in the 118 recorded seconds and successfully captured and ingested one oligochaete earthworm (species not determined). The gull continued the behavior as I discontinued observation and left the area. Several other Glaucous-winged Gulls were within a few dozen meters of the described gull, but none of the others employed this behavior during the period of observation.

Foot-paddling to form quicksand in muddy or sandy substrates has been recorded for many species previously, especially plovers, but also geese, ducks, swans, flamingoes, and herons (reviewed in Simmons 1961a, b). This function of foot-paddling has also been reported in many species of gulls, including the Mew (*Larus canus*), Ring-billed (*L. delawarensis*), California (*L. californicus*), Great Black-backed (*L. marinus*), Kelp or Southern Black-backed (*L. dominicanus*), Glaucous-winged, Western (*L. occidentalis*), Herring (*L. argentatus*), Black-headed (*L. ridibundus*), Gray-hooded (*L. cirrocephalus*), Silver (*L. novaehollandiae*), Red-billed (*L. scopulinus*), Black-billed (*L. bulleri*), Bonaparte's (*L. philadelphia*), and Laughing (*L. atricilla*) (Williams 1933, Simmons 1961b, Fordham 1963, Buckley 1966, Dawson 1966, Moyle 1966, Tangren 1982, Burger 1988, Hendricks and Hendricks 2006). Although Moyle (1966) reported Glaucous-winged Gulls using foot-paddling in gravel-bottomed pools to acquire salmon eggs, foot-paddling behavior by this species was not mentioned in two other studies that included Glaucous-winged Gulls and reported foot-paddling behavior by other species (Tangren 1982, Burger 1988).

The second function of foot-paddling, drawing worms to the surface of grassy soil, has also been used by several bird species (e.g. Simmons 1961b, Tinbergen 1962, Heather 1977) and even a turtle (Kaufmann 1986) but has not been reported for any gull in North America. Terrestrial foot-paddling has not been mentioned in previous

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studies of Glaucous-winged Gull foraging (e.g., Moyle 1966, Tangren 1982, Irons et al. 1986, Burger 1988, Verbeek 1993). Thus my report apparently represents the first documentation of terrestrial foot-paddling by a Glaucous-winged Gull.

It would be interesting to know the geographic distribution of terrestrial foot-paddling behavior in the Glaucous-winged Gull. Only in the southernmost part of its current breeding range and through about half of its nonbreeding range does the Glaucous-winged Gull occur with native earthworms. North of Vancouver Island the only earthworms are species introduced since Europeans colonized the area (e.g., Callahan et al. 2006). Terrestrial foot-paddling may have been transmitted through learning from other species or adapted from foot-paddling in saturated substrates. In the Black-headed Gull, foot-paddling is apparently instinctual as it developed as early as 12 days after hatching in captive-born gulls and was even exhibited by a blind individual (Rothschild 1962). Whether terrestrial foot-paddling for worms in the Glaucous-winged Gull is learned or instinctual, this behavior may be expected to spread into areas where the species did not evolve with earthworms but where this food resource has recently become available.

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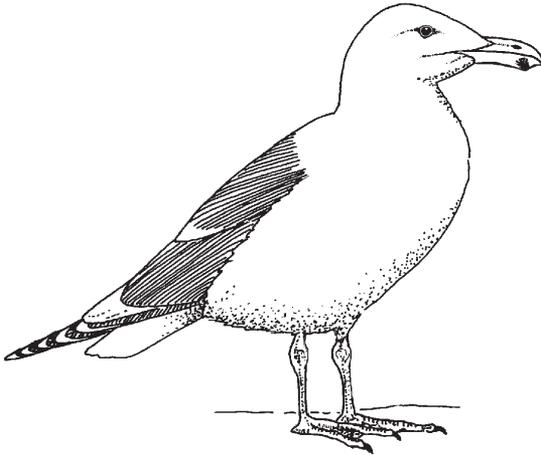
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Glaucous-winged Gull

Sketch by George C. West