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Whimbrels use novel high tide roosts during the contranuptial season in southern Chile

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Shorebirds inhabiting coastal areas that experience large tidal ranges need to balance their daily energy budget between maximizing energy input while feeding and minimizing energy output when roosting. To minimize energy drain when not feeding, shorebirds select roost sites that are located near feeding areas, allow disturbance-free respites from real and perceived predators, and provide shelter when environmental conditions are adverse. Influence of these factors on choice of roost sites varies among sites and depends on their relative contributions to the daily energy budget (Furness 1973, Rehfish *et al.* 2003, Rogers *et al.* 2006, Rosa *et al.* 2006). High tides can concentrate predator and human-induced disturbances into narrow bands of potential roosting habitat.

Chiloé Island (42°30' N, 73°45' W), located in southern Chile, is the contranuptial destination for a majority of eastern Pacific coast populations of the Whimbrel *Numenius phaeopus* and Hudsonian Godwit *Limosa haemastica* (Espinosa *et al.* 2006, Morrison & Ross 1989). The island's eastern coastline consists mainly of rocky shores and mixed sand and gravel beaches and is perforated by numerous large to small bays (Subiabre & Rojas 1994). In general, large bays provide mudflat and saltmarsh environments, whereas smaller bays do not. Aquaculture is an important industry on the island, and shellfish farms are present in most bays and along other protected shorelines. Shellfish are cultured on lines or in nests suspended from arrays of hundreds or thousands of Styrofoam or plastic floats.

During Jan. and Feb. 2007, we conducted surveys of Whimbrels and Hudsonian Godwits along the coastline of Chiloé Island. At high tide, we observed 30–50 Whimbrels at five sites, and <10 Whimbrels at more than five sites, roosting on Styrofoam or plastic shellfish floats, which were

usually located in small bays or along steep, narrow shorelines within 200–500 m of the shore. Float roosts were located in areas where Whimbrels were known to forage during low tide. Roosting Whimbrels appeared at ease on the floats and were observed preening and sleeping. In addition to Whimbrels, floats also provided roosting or resting sites for Neotropical Cormorants *Phalacrocorax brasilianus*, Imperial Cormorants *Phalacrocorax atriceps*, American Oystercatchers *Haematopus palliatus*, Kelp Gulls *Larus dominicanus*, Brown-hooded Gulls *Larus maculipennis*, Franklin's Gulls *Larus pipixcan*, and South American Terns *Sterna hirundinacea*. In addition, the latter species was observed to nest on a float, where we saw an adult attending a downy chick. We never observed a Hudsonian Godwit roosting on floats; they appeared to be more sensitive to shoreline disturbance and are more selective than Whimbrels in their choice of roost sites. Numbers of Whimbrels roosting on floats were considerably less than numbers of birds found roosting in marshes or on tidal flats at the heads of large, shallow bays on the island (up to 666 individuals).

Shorebirds are known to use artificial roosts, those both intentionally and unintentionally created (Burton *et al.* 1996, Cramp & Simmons 1983). Use of shellfish floats by non-breeding Whimbrels on Chiloé Island differs markedly from their choice of natural beach and marsh roost sites elsewhere on the island. Shellfish float roosts were primarily found in smaller bays or along linear stretches of beach, where the extent of shoreline habitat was limited during high tide. Shellfish floats do offer efficient and safe roosts for Whimbrels, because 1) disturbance by humans is limited during the high tide; 2) disturbance by terrestrial predators, particularly domestic dogs, is limited (Whimbrels are large enough to escape from local aerial predation pressure), 3) floats are



close to feeding sites, and 4) shellfish aquaculture sites are relatively protected from wind and provide an alternative to wave-influenced shorelines. Shellfish float roosts may offer non-commuting alternatives along shorelines where beach disturbance is high or roosting habitat is limited; we are unaware of any previous reports of this novel roost site use. Because we usually conducted surveys ≥ 2 hours before and after high tide, our high tide observations were rather limited. Therefore, use of shellfish floats as roost sites by Whimbrels may be more widespread on Chiloé Island than we report here.

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Whimbrel roosting on Styrofoam float, Chiloé Island, Chile, February 2007 (photo: Jorge Valenzuela).

