

## Sequential Polyandry in Piping Plover, *Charadrius melodus*, Nesting in Eastern Canada

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On Cape Sable Island, Nova Scotia, we confirmed that a banded female Piping Plover (*Charadrius melodus melodus*) produced two broods of chicks during the 2000 nesting season, the second on a beach approximately 2 km from the first. The female abandoned her second brood two days after hatching, leaving the male to complete brood rearing.

Key Words: Piping Plover, *Charadrius melodus*, sequential polyandry, Nova Scotia.

Piping Plovers (*Charadrius melodus*) generally have been thought to be monogamous, with males establishing and defending territories and raising only one brood per season (Wilcox 1959; Cairns 1982; Haig and Oring 1988; Haig 1992). Renesting in Piping Plovers is common if a clutch is lost (Haig 1992) and occasionally occurs if a brood of chicks is lost (MacIvor 1990). In Manitoba, Piping Plovers exhibited sequential polyandrous behavior (Oring 1982; Haig 1992) where some breeding adults had multiple nests and mates (Haig and Oring 1988) after predation or storm events caused nest loss.

The best example of polyandry in shorebirds has been documented in the Spotted Sandpiper (*Actitis macularia*) (Oring and Knudson 1973). Within Spotted Sandpipers, females are larger and more aggressive than males and establish and defend nesting territories. Female Spotted Sandpipers lay several clutches of eggs while different males incubate eggs and complete brood-rearing tasks for each.

Bottitta et al. (1997) published the first observations of Piping Plovers successfully fledging two broods in one nesting season, at Griswold Point in Old Lyme, Connecticut, and Assateague Island National Seashore, along the Maryland and Virginia coast. During the Bottitta et al. (1997) studies (1989-1994), eight Piping Plover pairs successfully raised two broods each within a reproductive season. Although not all birds involved were banded to enable identification of individuals, mates in most cases were thought to have been retained because of plumage characteristics and proximity of second nests to locations of first nests.

The potential for Piping Plovers *P. m. melodus* to raise a second brood in eastern Canada is thought to be small, owing to the later, and therefore shorter, nesting season associated with a more northerly location. With aid of a banding program, we documented the production of a second brood by the same female Piping Plover in southwestern Nova Scotia during the 2000 nesting season.

### Study Area and Methods

Piping Plovers have been closely monitored on two beaches (Daniels Head beach [43°26'N, 65°36'W] and Stoney Island beach [43°28'N, 65°34'W]) on Cape Sable Island in southern Nova Scotia since 1997 (P. MacDonald, unpublished data). Daniels Head beach encompasses a 15-90 m (high-low tide) wide stretch of light-coloured sand extending the full length of the 3.3 km beach, broken by four rocky points and an inlet to a sandy tidal-flat area. Low vegetated (*Ammophila breviligulata* and other grasses) dunes provide a break between the beach and a brackish inland marsh. Stoney Island is a light-coloured sand beach bordered by low, densely vegetated dunes (*Ammophila breviligulata*, grasses, and shrubs). The 15-75 m (high-low tide) wide beach extends 1.8 km in a crescent shape from a rocky point in the south to an embankment in the north. The beaches are separated by an approximately 2 km long coastal stretch characterized by rocky shoreline, a tidal channel, and headland on which a fish processing plant is located (Boates et al. 1994\*). Daniel's Head beach supported from three to seven nesting pairs of Piping Plovers in the 1997 to 2000 period. Conversely, the single pair at Stoney Island beach was the only successful nesting event since 1997.

We trapped and banded birds on several occasions during May-July 2000. A modified Weller trap was used to capture adult birds incubating eggs (Weller 1957). A trapped bird was immediately removed from the trap, banded with a United States Fish and Wildlife Service numbered metal incoloy band on the lower right leg (for adult birds) and a Canadian Wildlife Service bicoloured plastic band on the lower left leg (specific to province) and released.

### Results

On 24 May 2000, we trapped and banded a female Piping Plover incubating four eggs on Daniels Head beach. Four chicks hatched from this clutch on 30 May. The female was not observed with the brood after 13

June, at which time only one chick remained. This chick was considered fledged on 25 June. The adult male remained with the juvenile and both were observed together until 5 July. A nest containing three eggs was discovered on 23 June on Stoney Island beach. Four eggs were confirmed on 25 June. We trapped a female bird on this nest on 29 June and her leg band number confirmed that this individual was the female banded on 24 May at Daniels Head beach. This second nesting event appears to have been completed with a different mate as the male from the first nest remained with the surviving chick until 5 July, well after fledging. The second pair hatched four eggs on 18 July and the female was not observed with the brood (4 chicks still remained) after 20 July. One chick from this brood was considered fledged on 13 August, the last day both the juvenile and adult male were observed. Males from each nest were unbanded, facilitating identification of which adult (male or female) was present with the chicks.

## Discussion

Although Haig and Oring (1988) documented polyandry in Manitoba, their observations included re-nesting following nest loss but never more than one brood per nesting season. Our observations represent the first documented occurrence of a female Piping Plover relocating to produce a second brood within a nesting season on Canadian nesting grounds. Bottitta et al. (1997) were the first to report Piping Plovers raising more than one brood in a season. However, their occurrences were documented in the United States and on a single nesting beach. Although closely related species such as Killdeer (*Charadrius vociferus*) and Snowy Plover (*Charadrius alexandrinus*) are known to produce two broods, this behaviour is thought to be extremely rare among Piping Plovers (Wilcox 1959; Cairns 1982; Whyte 1985; Haig and Oring 1988; MacIvor 1990; Strauss 1990; Loegering 1992). Thus, most second nest attempts are renests following nest loss. Presumably, the second nest on Stoney Island beach was initiated 18-19 June as Piping Plovers average 6-8 days to complete laying of a full clutch (Haig 1992). The interval between the last sighting of this female with her first brood (13 June) and the calculated initiation of her new clutch is brief (5-6 days). However, Piping Plovers have been known to initiate re-nesting after a lost clutch in as few as 4 days (Whyte 1985; Haig and Oring 1988; MacIvor 1990; Loegering 1992).

Bottitta et al.'s (1997) long-term study documented several examples of two broods being produced within a nesting season, all of which were thought to have been completed with the same mates. That is consistent with re-nesting Piping Plovers generally retaining the same mate (Wilcox 1959; Whyte 1985; Haig and Oring 1988; MacIvor 1990). However, in southern Manitoba, re-nesting birds often chose a new mate in

cases of high predation and nest loss (Haig and Oring 1988). Our record of intra-year mate switching suggests that switching may occur in cases where nest loss has not occurred and may increase an individual's productivity.

Several studies have indicated that it is not uncommon for one adult, usually the female, to abandon its brood prior to chicks fledging (Cairns 1977; Whyte 1985; Haig 1987). However, this is the first documented case of a female plover abandoning its brood in order to produce another nest. These observations indicate that a small number of females may leave early to re-nest and leave further parental care to the male.

Previously documented cases of sequential polyandry in Piping Plovers have been in circumstances associated with high predation rates and catastrophic storm events (Haig and Oring 1988; MacIvor 1990). Our observations demonstrate that sequential polyandry may also occur where there is potential for increasing productivity. The documentation of a second brood produced by one female underscores the importance of having early nest attempts succeed. Such success would allow greater chance for a second nesting event to occur, resulting in greater productivity. MacIvor (1990) reported that more young fledge from first nest attempts than from renests and from early versus late nests. MacIvor (1990) suggested that increased vulnerability of chicks later in the breeding season (July-August) was due to a greater human presence on beaches then. Haig and Oring (1988) reported greater parental care on first nest attempts versus renests; however, no difference in hatching or fledging rates was noted. Therefore, measures to enhance nest success such as placing predator enclosures (Bottitta et al. 1997), symbolic fencing, and beach guardian patrols may be particularly important for first nest attempts as a successful early nest may increase reproductive success.

The incidence of producing two broods within a nesting season is thought to be fairly low, but documentation of one apparent double nesting event by an individual has significant implications for conducting population counts of adult Piping Plovers. This event justifies adherence of any Piping Plover census to a brief window of time, as in the absence of information such as provided by this study, the second nesting event might have been erroneously recorded as two additional individuals. Counts within a prescribed time frame will decrease the potential for double-counting birds that have relocated to re-nest or produce a second brood. In past censuses, observers often have considered an adult found on a nest or a single adult with a brood as a nesting pair (i.e., two adult birds), even if only one adult was observed. Our observations suggest that a small proportion of late-nesting pairs may actually be successful early nesters on a second nest attempt. Hence, danger in overestimating numbers

exists when counting adult Piping Plovers outside a census window as our observations indicate not all birds retain the same mate or beach in a nesting season.

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## American Dipper, *Cinclus mexicanus*, Preys Upon Larval Tailed Frogs, *Ascaphus truei*

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The American Dipper (*Cinclus mexicanus*) is an aquatic songbird that inhabits fast-flowing mountain streams in western North America. Although dippers are known to feed primarily on aquatic invertebrates, they will also eat juvenile fish and salmon eggs when available. In 2002, while monitoring and photographing nesting activities of the American dipper, we observed and photographed adult dippers capturing Tailed Frog (*Ascaphus truei*) tadpoles and feeding them to their young. This note is intended to document a rarely observed occurrence and identify interactions between two relatively uncommon species.

Key Words: American Dipper, *Cinclus mexicanus*, Tailed Frog, *Ascaphus truei*, feeding, Chilliwack River, British Columbia.

American Dippers (*Cinclus mexicanus*) are North America's only truly aquatic songbirds occupying mountain streams of western North America from Alaska south to Mexico (Kingery 1996). Dippers are known to feed almost exclusively on in stream fauna, diving underwater and probing among the rocks for

benthic invertebrates and small fish (salmon and trout) as well as fish eggs (Kingery 1996). To our knowledge, there have been no previous records in the literature of dippers feeding on amphibians. However, while studying and photographing American Dippers in southwestern British Columbia, we observed dippers