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BEHAVIOR OF COMMON LOONS IN WINTER

BETSY C. DAUB[1]
Department of Zoology
Connecticut College
New London, Connecticut 06320 USA

Abstract.—Common Loons (*Gavia immer*) wintering at Weekapaug, Rhode Island showed no signs of territoriality and were observed primarily as solitary individuals. Their most frequent activities were drifting, feeding, and preening. Feeding occurred most often in water depths of 1.5–5.5 m, whereas drifting and preening occurred more frequently in depths of 5.5–9 m. Loons occupied shallower waters at low tide and deeper waters at high and mid tide. Occurrences of kleptoparasitism of Common Loons by Herring Gulls (*Larus argentatus*) were observed.

CONDUCTA DE *GAVIA IMMER* DURANTE EL INVIERNO

Resumen.—Individuos de somormujo *Gavia immer,* que pasaron el invierno en Weekapaug, Rhode Island, no mostraron signos de territorialismo, y se observaron mayormente solos. Sus actividades más frecuentes resultaron ser el flotar a la deriva, alimentarse y el acicalarse. La alimentación se llevó a cabo particularmente en aguas cuya profundidad varió entre 1.5 a 5.5 m, mientras que el flotar y el acicalarse se llevó a cabo en aves con aguas más profundas (5.5–9 m). Los somormujos ocuparon aguas llanas cuando la marea estaba baja, y aguas más profundas cuando la marea estaba media o alta. Se observaron episodios de kleptoparasitismo por parte de gaviotas (*Larus argentatus*).

This study examined the wintering behavior of Common Loons (*Gavia immer*) in the coastal waters of Weekapaug, Rhode Island. My research focused on the relationship between tides and loon behavior. The behavior of Common Loons during the breeding season has been the subject of numerous studies, but only McIntyre (1978) has published a study of the behavior of Common Loons in winter. I sought to discover if Common Loon activities altered with changes in water depth, time of day, and tidal period. Information was gathered also on social behavior and habitat use by loons in winter, and any signs of human disruption to either these habitats or to loon behavior were noted. Not only does such information contribute to a greater understanding of loons, but it may be important for future conservation efforts. The Common Loon's numbers have dropped alarmingly in much of its range (McIntrye 1986) and in 1981 and 1982 it was placed on the *American Bird's* blue-list because of the serious decline in its numbers (Tate 1986). A past history of shooting and a recent increase in recreational pressures detrimental to breeding sites have greatly reduced Common Loon populations in many regions (Palmer 1962). In addition, loons have suffered on both their breeding and wintering grounds due to oiling and entanglement in fish nets (Palmer 1962, Vermeer 1973). To better protect loons, a greater understanding of their behavior and ecology in both summer and winter is needed.

[1] *Current address: Hawk Mountain Sanctuary, Route 2, Kempton, Pennsylvania 19529 USA.*

STUDY AREA AND METHODS

The study was conducted from 31 Jan. through 3 Apr. 1987 at Weekapaug, Rhode Island. The Weekapaug study area is a 2.8 km stretch of sandy beach on Block Island Sound 8 km southeast of Westerly, Rhode Island (40°20'N, 71°45'W). Weekapaug was selected as the study site because loons were consistently present and were within easy range for observation. The maximum offshore distance at which I made observations of loons was 180 m. The range of water depths within this region was 1.5–9 m (mean low water). Locations and water depths for individual loons were determined through the use of a 1:40,000 scale nautical chart (National Oceanic and Atmospheric Administration).

Observations were made from the beach using a 20× Bushnell spotting scope. Loon positions were determined from a compass reading and a distance measurement from locations on the beach that were marked on a map. Distances of 100 m or less were measured with a Ranging 620 rangefinder. Loon positions beyond 100 m were calculated by reading the notches on the focus knob on the spotting scope, which had been calibrated to the nearest 10 m. Tidal times (White 1986) were recorded for each observation period.

Activities of an individual loon or group of no more than five individuals were recorded at 60 second intervals for a duration of 5 min. This technique (instantaneous sampling) involves scoring an individual's behavior at predetermined "points" in time (Lehner 1979). Statistical tests were performed using the last activity observed during the 5-min period. I divided activities into sleeping (head laid over the back), swimming, maintenance (preening, head rubbing, bathing), peering (forehead placed underwater in search of food), feeding (indicated by multiple dives and by directly observed feeding of surfaced loons), diving, underwater (loons below the surface after diving), drifting (sitting on the surface not engaged in any of the previously mentioned activities). Any other forms of behavior were also noted.

Field observations were at least an hour in duration, and were made at various times of day, from early morning to early evening. A count of the total number of Common Loons in the study area was made during each observation period.

RESULTS

The average number of loons recorded at Weekapaug was highest in January and February, dropping in March and early April as migration began. From 31 Jan. through 13 Feb. an average of 23 loons/d were recorded, and from 15 Feb. through 28 Feb. an average of 30 loons/d were counted. From 3 Mar. to 12 Mar. an average of 7 Common Loons were recorded, and from 19 Mar. through 3 Apr. an average of 9 individuals were counted. The maximum number of loons recorded for one day was estimated to be close to 100 individuals.

Common Loons in the Weekapaug study site showed no signs of either

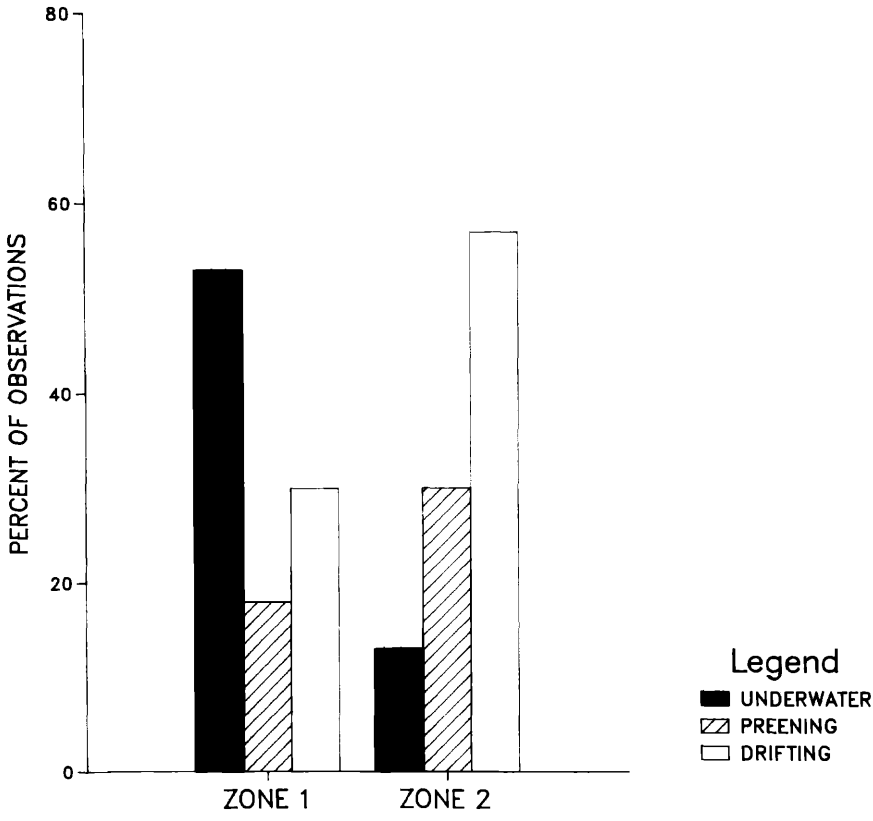

FIGURE 1. The percentage of time spent underwater, preening and drifting in Zone 1 (depth = 1.5–5.5 m; n = 34) and Zone 2 (depth = 5.5–9 m; n = 67). "Underwater" means multiple dives followed by a period underwater, a behavioral pattern associated with feeding. These percentages are based on the last recorded activity during the five minute sampling period.

feeding assemblages or territoriality. I observed occasional clusters of two to five individuals, but these proved to be loose aggregates that often dispersed as spontaneously as they formed. At no time did I record defense of feeding waters or any other intraspecific displays such as McIntyre (1978) observed in Virginia. Loons appeared to move independently, generally as singles, ignoring others as they passed. I found no evidence that pairs remain together in winter. No vocalizations were ever heard in contrast to McIntyre's (1978) findings.

Analysis of activity patterns was based on 151 observations of Common Loons. Drifting occurred with the greatest frequency (37% of observations) followed by feeding (indicated by multiple dives and by directly observed feeding) (23%), maintenance (18%), swimming (9%), sleeping (9%) and peering (4%).

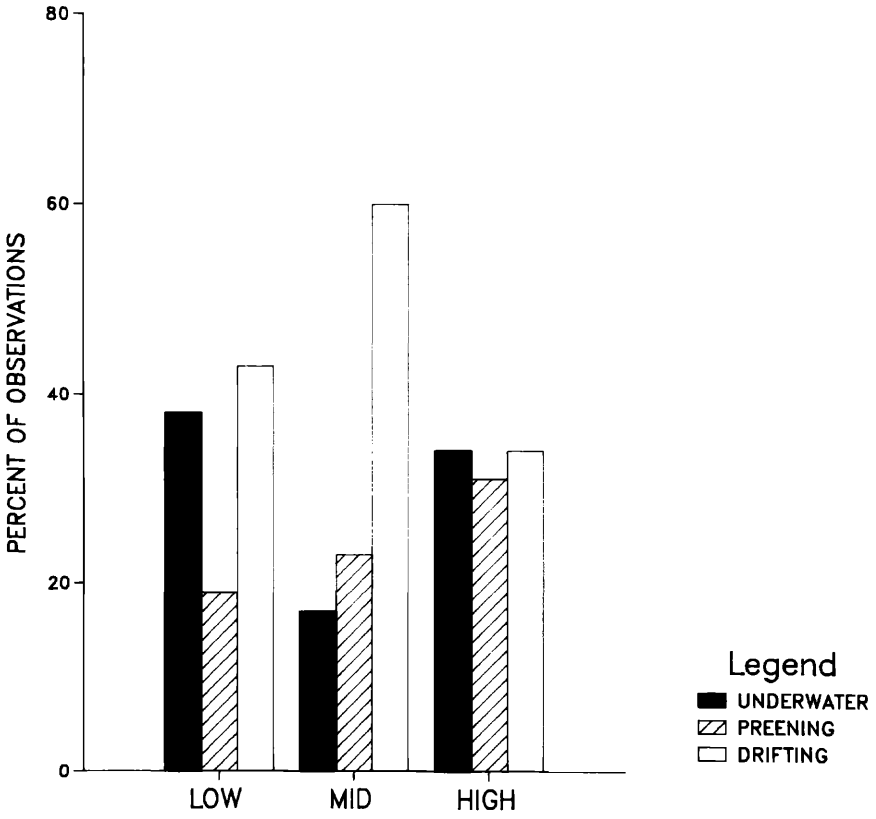

FIGURE 2. The percentage of time spent underwater, preening and drifting at low (n = 21), mid (n = 47) and high (n = 32) tide. Mid tide includes both a rise and ebb in the tide. "Underwater" means multiple dives followed by a period underwater, a behavioral pattern associated with feeding. Percentages are based on the last recorded activity of the 5-min sampling period.

Drifting, diving and feeding, and preening activities occurred at significantly different frequencies in deep and shallow water (χ^2 = 18.01, df = 2, $P < 0.05$, Fig. 1). Feeding (indicated by loons underwater) was most frequent (53% of observations) in water depths of 1.5–5.5 m (Zone 1). Drifting and preening occurred most often in depths of 5.5–9 m (Zone 2) (30% and 50% of observations). The frequency of these activities was not significantly different for different stages of the tide, however (χ^2 = 6.85, df = 4, $P > 0.05$, Fig. 2). Generally, loons engaged equally in feeding, drifting and maintenance behavior at low, mid, and high tidal periods.

Loons seemed to drift more from middle to late morning and to preen less during this period, but loon activities and time of day showed no

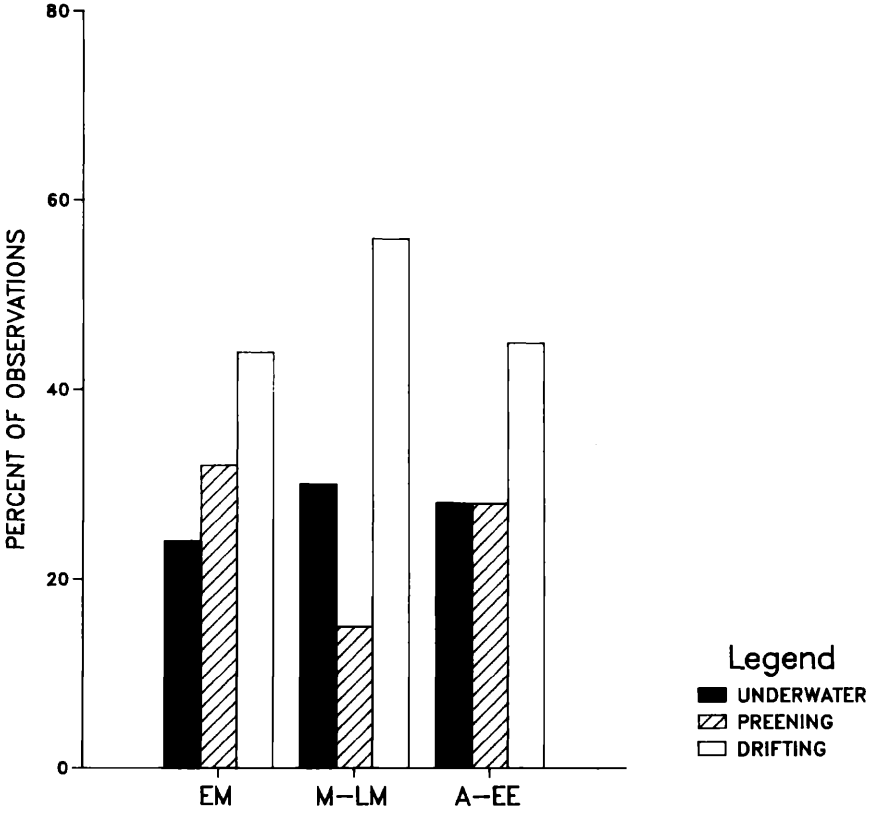

FIGURE 3. The percentages of time spent underwater, preening, and drifting at early morning, "EM" (0600–0930; $n = 34$), middle to late morning, "M–LM" (0930–1200; $n = 27$), and afternoon to early evening, "A–EE" (1200–1800; $n = 40$). "Underwater" means multiple dives followed by a period underwater, a behavioral pattern associated with feeding. Percentages are based on the last recorded activity of the 5-min sampling period.

significant relationship ($\chi^2 = 2.60$, df = 4, $P > 0.05$, Fig. 3). Rafting was never observed.

Although loon activity patterns were independent of tidal cycles, loon locations at low, mid, and high tides changed significantly ($\chi^2 = 6.24$, df = 2, $P < 0.05$). More loons occupied Zone 2 (5.5–9 m depth) during mid and high tides than Zone 1 (1.5–5.5 m depth), and at low tide more loons occupied Zone 1 than Zone 2.

Although most feeding occurred underwater, I was able to observe direct feeding by loons on 21 separate occasions. I observed loons feeding on crabs on 10 separate occasions. Loons with fish were also seen, although it was not possible to identify the particular kinds of fish or crabs being

eaten. Surfaced loons crushed and dissected their crabs or fish before swallowing. Often loons with food dove with their prey shortly after surfacing.

Twice I witnessed Herring Gulls (*Larus argentatus*) attacking and stealing fish from surfaced loons. On two other occasions I thought I observed this, but did not see the entire encounter. Once I recorded a loon without prey looking up repeatedly in an agitated manner as a Herring Gull flew overhead. On yet another occasion I noticed a loon with food dive just as a gull approached. The gull then landed where the loon had been and picked at the remaining pieces of floating food. I frequently saw gulls attack and steal food from Red-breasted Mergansers (*Mergus serrator*).

Aside from this disruptive behavior induced by gulls, no other disturbances to wintering loons were observed. No loon mortality was detected.

DISCUSSION

The shallower water depths in Zone 1 may explain the greater frequency of feeding activities in this region because loons need only dive 1.5–5.5 m to obtain prey items. Drifting and maintenance behavior occurred most often in Zone 2, perhaps due to the greater distance from shore, approximately 120–180 m. Thus, drifting and preening loons avoided the greater rise and fall of waves in Zone 1.

A significant correlation between loon activities and tidal heights was detected by McIntyre (1978). Maintenance activities (preening, head rubs, bathing) were most frequent during the period of most rapid rise in tide. As the rate of tidal rise slowed, feeding activities peaked, but sharply declined at high tide, when most individuals drifted. Feeding activities also increased at the beginning of ebb tide. The feeding location of the loons at high tide showed no correlation to tidal height, but during ebb tide loons moved into shallow water.

In my study, the relationship between loon activity patterns and tidal cycle differed markedly from McIntyre's study (1978). Loons at Weekapaug, unlike the loons in Virginia that McIntyre studied, showed no correlation of behavior with tidal cycle. The average rise and fall of the tide at Weekapaug is 0.76 m (White 1986), a relatively small change in depth. McIntyre hypothesized that loons took advantage of the "lag effect" in which receding tides concentrate prey. Because tidal changes at Weekapaug are minimal, there is probably not one tidal period when food is concentrated and consequently loons feed, drift, and preen at all tidal times.

King (1976) noted that small crabs were the staple diet of Common Loons in the harbors of Penzance and Newlyn in Great Britain. King's study revealed that wintering loons often consumed their prey below the surface, sometimes surfacing with the crab momentarily before diving again with the prey. Like King, I too found that loons consumed a great number of small crabs. Because direct feeding was observed much less frequently than loons were recorded to be underwater, and because loons

frequently dived with their prey, I surmise, as did King (1976), that much prey consumption occurs below the surface.

Although past observations of loons suggest the possibility of winter feeding territories (McIntyre 1978, Palmer 1962), I found no evidence of such territories or feeding assemblages among loons at Weekapaug. McIntyre (1978) also recorded intraspecific displays and aggressive vocalizations in association with these feeding territories. These were also absent among loons at Weekapaug.

While it is unknown at what distances wintering loons can be found offshore, my study indicates that there are steady concentrations of loons inshore. Clearly wintering loons at Weekapaug were utilizing inshore waters.

The kleptoparasitic behavior of Herring Gulls is a possible detrimental factor to loons and deserves further examination. Conceivably the threat of such attacks pressures loons to eat their prey below the surface. It did not appear that the gulls were robbing the Weekapaug loons of a substantial amount of food, but in regions where loons are not healthy this might be possible.

In conclusion, Common Loons wintering in the Weekapaug, Rhode Island study site displayed no indications of territoriality or feeding assemblages. Behaving primarily as solitary individuals, loons engaged most frequently in drifting, feeding and preening. Feeding activities occurred most often in shallower water, whereas drifting and preening occurred more frequently in deeper waters.

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