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Testing hypotheses of social gatherings of common loons (*Gavia immer*)

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Abstract

Three hypotheses are tested to explain the function of common loon social gatherings: Cooperative Foraging, Familiarity, and Reconnaissance. From 1993 to 1999, I studied social gatherings through behavioral observations in Michigan, Wisconsin and Maine. There was no or little evidence for the Cooperative Foraging Hypothesis. Partial or indirect evidence for the Familiarity Hypothesis included the following: (1) Social gatherings lasted both longer and occurred more frequently later in the breeding season (2) Approximately 25% of all the social gatherings observed occurred on neutral territories, and (3) Social gatherings consisted of the same individuals on consecutive days. Predictions from the Reconnaissance Hypothesis were also supported in that a large proportion of individuals participating in social gatherings were non-breeders and that the number of social gatherings observed were not equally distributed across loon territories, but instead increased on territories that had recently undergone a divorce. No one hypothesis was adequate to explain social gatherings and more observations on uniquely marked individuals are needed to further substantiate these initial findings.

Introduction

Common loons, *Gavia immer*, are highly aggressive following their return to their breeding territories in late April through early June (depending on latitude) and attack both conspecifics and most other waterbirds. However, by mid-July many populations begin to join in short-term aggregations of three to 15 individuals (occasionally more). This social behavior is in stark contrast to the previous highly territorial and aggressive behavior exhibited one or two months prior. These aggregations have been called social gatherings (McIntyre, 1988) and although they appear to play an important role in the life history of loons there remains much speculation about their function. Previous researchers have suggested that they may form for the benefit of cooperative foraging (Cooperative Foraging Hypothesis: Rand, 1948; Olson, 1951; Nero, 1963, 1974), may function to reinforce cooperation among adults prior to migration (Familiarity Hypothesis: McIntyre, 1988), or may be composed of individuals searching for new or unoccupied territories (Reconnaissance Hypothesis: Piper et al., 1997). These hypotheses may not necessarily be mutually exclusive. The primary difficulty facing researchers addressing this question is that the relationship of participants in social gatherings is unknown (McIntyre & Barr, 1997). Loons are monomorphic, and although males are on average 28% heavier than females (Evers, 2001, 2004), this size difference is detectable only under certain conditions. Unless an entire population is banded, it is difficult to know the sex, breeding status, and relationships among the individuals in the social gatherings in order to differentiate and test the proposed hypotheses.

There is some confusion in the literature regarding the term "social gathering." According

to McIntyre (1988), social gatherings have distinct "ritualized and stereotyped" components (e.g., circle swimming and jerk-diving, line swimming, facing away, bill dipping, etc.) and occur later in the breeding season (e.g., beginning in mid-July). Loons do flock in late spring and late summer/early fall and these aggregations are often confused with social gatherings, but they lack distinct ritualized and stereotyped behaviors. Also, encounters between residents and territorial intruders during late spring/early summer typically display ritualized components, but these encounters are mostly intrusions of a single individual and should not be classified as a social gathering.

The objectives of the study were to study social gatherings and evaluate the three hypotheses proposed for their occurrence. Specific predictions made from each hypothesis were tested. Predictions derived from the Cooperative Foraging Hypothesis include the following: (1) Loons should spend a significant proportion of time underwater during social gatherings; (2) Loons should be diving synchronously if they are foraging, as seen in Double-crested Cormorants; (3) Loons should be facing the same direction when in groups; (4) Loons should periodically surface with prey; and (5) When loons surface after diving, they should be spatially distributed as they were when they dove. The following predictions were derived from the Familiarity Hypothesis: (1) Loons should exhibit low levels of aggression when in social groups; (2) Social gatherings should occur more frequently later in the breeding season; (3) Social gatherings should be longer later in the breeding season; (4) Social gatherings should occur at neutral sites; and (5) Social gatherings should consist of the same individuals on consecutive days. Predictions from the Reconnaissance Hypothesis include that a large proportion of individuals participating in social gatherings should be non-breeders and that social gatherings should not be randomly distributed across loon territories, but occur more frequently on territories that may not be as vigorously defended (e.g., recently undergone a divorce) or are more productive (e.g., presence of chicks). This study is unique in that the majority of individuals in two breeding populations were uniquely marked and studied for several years.

Study site

Loons were studied (1993, 1994, 1997–1999) at Seney National Wildlife Refuge (Seney NWR), Michigan and Turtle Flambeau Flowage (TFF), Wisconsin (1995–1997). Videotaping of loon social gatherings occurred at TFF in 1996 and 1997 and also at Aziscohos Lake, Maine, 1998.

Seney NWR (45° N, 86° W) is located in the eastern Upper Peninsula of Michigan. It contains 21 artificially controlled, shallow pools, generally 1 m deep, but up to 3 m deep along the dikes. The refuge is divided into 3 management units, but the majority of established loon pairs reside in Unit 1 (50–60%). I restricted the investigation of loon social gatherings to Unit 1 pools because loon territories were highly aggregated and easily accessible, unlike loon territories in Units 2 and 3, which were spaced considerably further apart. The size (ha) of the pools in Unit 1 are: A = 104.8, B = 98.4, C = 122.3, D = 79.8, E = 198.4, and G = 81.8. Lake alkalinity, pH and clarity (Secchi disc) were measured for each pool in June. Total alkalinity varied most, but was low overall (29.9–54.8 mg/l), pH was slightly basic (7.7–8.7) and water clarity was high (1.8–2.0 m). Banding of juveniles began in 1987 and adults in 1989 (Evers, 1993). Banding has been conducted annually since 1989 by BioDiversity Research Institute (Evers, pers. com.), with a minimum of 80% of the adult population marked during any one year. Between seven and 11 nesting pairs of loons have been present each of the summers from 1989–1999 (Evers et al., 2000).

Turtle Flambeau Flowage (TFF) (46° N, 90° W) is a large impoundment (5978 ha) created in 1926 in northern Wisconsin. The average depth is 3 m, with a maximum depth of 16 m. Less than 5% of the shoreline is developed with cabins/resorts. It has over 150 islands and irregular shorelines. The breeding loon population (22–24 nesting pairs) was monitored since 1985 with some associated banding efforts in 1987 (Belant, 1989). Annual banding of this population began in 1992 (Evers et al., 2000) with approximately 55–65% of the adult population being marked at any one time (Paruk, 1999a). Dominant recreation use includes fishing and camping. Lake alkalinity, pH and clarity (Secchi disc) were measured from four locations in June. Alkalinity was low (avg. = 28.2 mg/l),

pH was slightly basic 7.5 and water clarity was high, 1.9m.

Aziscohos Lake, Maine (45° N, 71° W) is a large impoundment (2506 ha) created in 1911 with <1% of the shoreline developed. It has an average depth of 9.9 m and a maximum depth of 19.2 m. The breeding loon population consists of 18 nesting pairs. Annual banding of adults and juveniles began in 1994, and 83% of the adult population is banded (D. Evers, pers. com.).

Methods

The capture and banding procedure has been reported previously (Evers, 1993, 2001). All adults were fitted with a single U.S. Fish and Wildlife Service band and one to three UV-resistant colored plastic bands (Hermes, Inc., New York) on their legs in unique combinations. Identification of color-marked individuals was determined through close (10×50 binoculars) and remote (20–60× spotting scope) observations. Band colors are most easily determined during frequent foot waggling and preening behaviors.

Each loon territory was surveyed during the breeding season at least once every three-four days to evaluate the status of each breeding pair. Data recorded include the following: egg first laid, egg first hatched, number of young that hatched, number of chicks that fledged (as observed 6–8 weeks after hatching). Thus, breeding status information was known at a high resolution and allowed for testing the various predictions made by the Familiarity and Reconnaissance Hypotheses.

Predictions derived from the Cooperative Foraging Hypothesis were tested and analyzed by videotaping (Sony Camcorder image stabilizer, 60×) social gatherings from the time they were first detected until the last individual left. Eleven hours and 50 min of videotape were logged from thirty-one social gatherings either from shore or boat in 1996–1997 at TFF and in 1998 at Aziscohos Lake, Maine. To determine distances from the videotape between individual loons the length of an adult loon was used, or one loon unit (LU, a loon 5 body lengths from a conspecific = 5LU's).

Social gathering surveys

Social gathering surveys were restricted to early morning and late afternoon as these are the times they most frequently take place (McIntyre, 1988; Paruk, 1999a). At Seney NWR, surveys were conducted by car once or twice a day and 5–6 times per week from 15 July to 20 August (1993–94, 1997), from 30 July to 20 August (1998) and Aug 1 to Aug 15 (1999). All areas of each pool were observable from either one or two locations so the likelihood of missing a social gathering was low. At TFF, surveys were conducted by boat from 15 July to 15 August in 1996 and 1997. The routes afforded excellent views of multiple loon territories ($n = 11$) and neutral sites or non-territories ($n = 8$) that covered greater than half of the TFF. Inclement weather and concomitant increased wave action occasionally limited surveys to once a day (22%) or 4 times a week (28%) in 1996. If a social gathering was observed, the observer stayed until the participants flew off the lake. Individuals were identified as they left with the use of a spotting scope or binoculars. It took 2.0–3.0 h to complete a survey. The following data were collected each year for every social gathering: date, time of day, number of loons involved, and duration. A brief description of each social gathering was also recorded.

Data analysis

Duration of social gatherings was not normally distributed and could not be normalized using standard transformations. Thus, a nonparametric Spearman rank correlation coefficient (r_s) was used to assess the relationship between duration of the gathering with day in the breeding season. The number of loons at a gathering was normally distributed and this was correlated with days in the breeding season using Pearson's correlation coefficient (r). Surveys of daily social gatherings at TFF and Seney NWR were normalized using square root transformations and compared using a Proportion's Test. Both the Chi-square and G test were used for contingency table analysis. If the former was used, a continuity correction was incorporated (Zar, 1984). A Fisher's Exact Test was employed when N was <30. All statistical tests were two-tailed with an acceptance of a Type 1 error 0.05.

Results

In total, 320 social gatherings were observed at Seney NWR ($n = 137$) and TFF ($n = 183$) over their respective study periods. Social gatherings were most common during the first three hours after sunrise ($n = 201$, 62.3%, 0600–0900 h) and late in the afternoon ($n = 100$, 31.2%, 1700–2000 h). Both males and females were present at every social gathering (94%), although not always in equal abundance. At Seney NWR, more banded females than banded males were observed at social gatherings (66%–34%, respectively) (G test: G1 = 6.87, $p < 0.05$) (Table 1) Moreover, females were roughly twice as likely as males to intrude on another loon's territory (41–21 intrusions respectively)(G test: G1 = 6.05, $p < 0.05$) (Table 1).

Cooperative foraging hypothesis

Loons spent 81% of their time above water during a social gathering ($n = 31$) and above water time was positively correlated with group size ($r_s = 0.64$, $p < 0.05$). Most dives (74.5%, $n = 65$) were of relatively short duration (<30 s), and resurfacing individuals did not face the same direction (82% of the time). In most cases (86%, $n = 27$,), if one individual dove, the whole group did. Loons that did not dive were typically >5 LU's away. Individuals or pairs resurfacing a considerable distance from each other would regroup 56.2% of the time and continue ritualized and stereotypical behaviors. At no time did an individual bring fish or any other prey item to the surface.

Familiarity hypothesis

Duration of the social gathering was positively correlated with day of breeding season (simple regression, $r_s = 0.56$, $p < 0.05$). More loons participated in social gatherings later in the year (Spearman's $r = 0.41$, $p < 0.05$). There were significantly more social gatherings observed in established pairs' territories ($n = 16$) versus non-breeding territories ($n = 10$) (proportions test $Z = 3.31$, $p < 0.05$). The same individuals were observed repeatedly at social gatherings on consecutive or multiple days. For example, the same five birds (all banded) were observed at TFF each morning between 0610 and 0630 for three consecutive days (July 23–25, 1995). This group consisted of a female from the central territory (successful nester) and two pairs (both males and females) from adjacent territories (unsuccessful nesters). The male from the central territory remained with the two chicks each morning. There was a minimum of six cases when individual birds could be recognized as revisiting and interacting with the same individuals on consecutive days. Aggression levels were positively correlated with the amount of time spent peering ($r_s = 0.36$, $p < 0.05$).

Reconnaissance hypothesis

There were significantly more unbanded ($n = 194$, 55%) than banded birds ($n = 156$, 45%) involved in social gatherings ($\chi^2 = 12.35$, 1 df., $p < 0.05$) at Seney NWR (Table 1). Most territorial loons at Seney NWR were banded (80–90% annually) thus the unbanded loons participating in social gatherings were presumably coming from outside the refuge. Because nearly half of the population at TFF was unbanded, the ratios of banded and unbanded loons were not included in the analyses.

July social gatherings consisted more of unsuccessful nesters (69.0%) than successful nesters (31.0%) ($\chi^2 = 6.3$, 1 df., $p < 0.01$) among breeding

Table 1. Total number of social gatherings at Seney NWR, Michigan 1997–1999

Year	Total # loons	# Banded	# Un-banded	Unknown*	Banded Males	Banded Females	Male Intrusions	Female Intrusions
1997	193	81	98	14	35	37	5	20
1998	58	21	33	4	6	10	1	3
1999	125	54	63	8	17	26	15	18
Total	376	156	194	26	58	73	21	41

*6.9% of the total number of loons could not be identified.

birds. This difference did not exist during August social gatherings ($\chi^2 = 1.34$, 1 df., NS). The number of successful nesters in August social gatherings increased from 31% to 48%. Earlier in the breeding season (1–21 July), loons were more likely to arrive at social gatherings individually rather than in pairs, ($\chi^2 = 5.344$, 1 df., $p < 0.05$); however, after 21 July, loons were just as likely to arrive in pairs or as individuals ($\chi^2 = 2.987$, 1 df., NS).

Social gatherings were not randomly distributed across loon territories at Seney NWR ($\chi^2 = 1.85$, 4 df., $p < 0.05$, Table 2) and TFF ($\chi^2 = 6.23$, 7 df., $p < 0.05$, Table 3). During 35 territory-years of late summer observations at Seney NWR, territories that had experienced a recent divorce (within same-summer or previous summer) had the highest percentage of social gatherings.

Four of five territorial loon pairs divorced between 1993 and 1999. In 1994, no established pairs divorced, but 45% of all the social gatherings took place on G pool, where a divorce occurred the previous year. Similarly, in 1997, 42% of social gatherings took place on B pool, a pool that had experienced a divorce in 1996. Thus, the proportion of all social gatherings observed on B pool remained high the year following a divorce (the exception being E pool in 1998). A similar pattern emerged at TFF, where territories experiencing divorce within season and one year after the event had disproportionably more social gatherings than territories that did not undergo divorce. For example, in 1996, 67% of the gatherings occurred at just 4 locations (out of a possible 19, Table 2). One location was a neutral territory, Crow, ($n = 36$, 29%), the other was an established territorial pair (Merkle) that had undergone a divorce that season ($n = 19$, 15%). Other loon territories that did not experience a divorce averaged ~1 social gathering/territory. Similarly, in 1997, a territory that experienced a divorce, South Horseshoe, saw a dramatic rise in social gatherings from <1% to 12%.

There was no significant difference between the number of social gatherings on territories with chicks (n = varied annually from 7 to 11) or without chicks (n = varied annually from 5 to 9) (G test: G1 = 1.56, NS).

Table 2. Total number of social gatherings recorded (%) at Seney NWR, Michigan 1993–94 and 1997–99 (% given only for those >10)

Year	Pools							Total
	A	B*	C	D	E	F	G	
1993	1	3	3	4	3	0	**13 (49)**	27
1994	2	4	5	5	4	0	16 (45)	36
1997	3	15 (42)	0	3	**13 (33)**	0	5	39
1998	1	6 (50)	2	0	2	1	0	12
1999	0	1	6 (22)	**14 (60)**	0	0	2	23
Total								**137**

Bold = pair broke up early in the year.
*B pool pair broke up in 1996.

Table 3. Summary of social gathering participation at 11 territories and 8 neutral sites at Turtle Flambeau Flowage, Wisconsin, 1996–1997

Year	Crow*	Merkle**	S. Horse-shoe***	Trude-C	Trude-W	Trude-E	Others	Total
1996	36, 29%	19, 15%	2, <1%	16, 13%	13, 10%	1, <1%	38, 30%	125
1997	14, 24%	6, 10%	7, 12%	8, 14%	4, 7%	0, 0%	16, 28%	58
Total								183

*Crow was a neutral site.
** Merkle experienced a pair break up in 1996.
***S. Horseshoe experienced a pair break up in 1997.

Discussion

Foraging hypothesis

There is no any evidence that the function of social gatherings is for individual members to benefit from flock feeding. Loons spent the majority (81%) of the time during a social gathering interacting with one another on the surface of the water. Although loons primarily swallow their prey whole underwater, they often bring large fish to the surface to swallow (Barr, 1996; McIntyre and Barr, 1997; Paruk pers. obs.). At no time during a social gathering did a loon surface with a prey item. When the group dove, 42% of the time they surfaced at a greater distance apart from each other than when they dove. Moreover, they were not facing in the same direction as is typical of species that flock feed. For example, Bartholomew (1942) observed large foraging groups of Double-crested Cormorants, *Phalacrocorax auritus* (Lesson) and movements of individuals were highly synchronized with individuals diving and surfacing in unison. Also, most of the Cormorant's flock's time was spent underwater and flock members surfaced with prey frequently. Without observing underwater behavior of loons, it is difficult to ascertain what each loon is doing, but such coordinated patterns in movements were not observed in common loon social gatherings during July and August at Seney NWR, TFF or Aziscohos Lake. Synchronized foraging, or flock feeding, does exist in common loons, but this behavior has only been observed during late summer/fall flocking (Olson, 1951; Nero, 1963; McIntyre and Barr, 1997; Vlietstra, 2000; Paruk pers. obs.). Thus, social gatherings do not serve individuals for any possible benefits associated with cooperative foraging.

Familiarity hypothesis

This hypothesis predicts that loons should frequently engage in group foraging during post-reproductive aggregations, they should exhibit lower levels of aggression and should serve to foster familiarity and cooperation among loons (McIntyre, 1988). Social gatherings then would facilitate reduced levels of aggression among conspecifics which may be important during migration when many individuals migrate in small groups and stage at lakes where feeding flocks occur (McIntyre and Barr, 1983). Conspecific foraging, especially in areas with schooling fish, or where food availability is unknown, may be more successful than solitary individuals (McIntyre, 1988; Vlietstra, 2000). Similarly, groups of wintering loons may have higher survival than solitary ones if rafting loons have lower depredation rates than solitary ones (McIntyre, 1978; Daub, 1989; L. Vlietstra, pers. comm.). The highest mortality rates of loons occur during migration and winter (McIntyre and Barr, 1997; Piper et al., 2000; Evers, 2001; 2004).

This hypothesis proved difficult to test directly and will remain elusive for future researchers until uniquely marked individuals can be (1) followed during the time of social gatherings and (2) subsequently followed to measure survivability and reproductive success. From my observations, some initial speculations can be made. First, some social gatherings consisted of the same individuals on consecutive days suggesting the potential for familiarity (and cooperation) among group members exists. Second, 22% of all the gatherings recorded were observed at neutral locations, or non-breeding territories, where it would seem the only real purpose such a location offers is to allow for familiarity with other loons. Third, the duration of gatherings increased more during August than July (31 min to 19 min), the number of individuals participating in them also increased similarly (4.1 individuals/July vs. 6.8 individuals/August) and gatherings appeared less aggressive over time. The above suggests individual birds are more comfortable with each other possibly due to familiarity with neighboring conspecifics.

Lastly, some social gatherings occurred each year in neutral locations (primarily on large lakes >1000 ha) (Olson, 1951; Nero, 1963; McIntyre, 1988; Paruk, 1999a) where it would appear there is little information to be gained by residents and/or nonbreeders with regard to territorial openings and habitat quality. Thus, it remains possible that this fact alone may serve as indirect evidence for the Familiarity Hypothesis. On average, first-year breeding age in loons is seven years (Evers, 2004) and since most loons are philopatric and return to breeding areas at age three, there is a time period of several years when they interact with resident loons during social gatherings.

Reconnaissance hypothesis

The Reconnaissance Hypothesis maintains that social gatherings represent efforts by non-breeders to locate future territories (Piper et al., 1997). The following data supports the Reconnaissance Hypothesis: (1) 55% of the loons involved in social gatherings at Seney NWR were unbanded and most likely non-breeders since the great majority of all of the adults on the refuge in any one year were banded (80–90%); (2) I observed three cases in mid-late July where unbanded individuals interacted aggressively with a territorial pair member resulting in usurpation of one member of the established pair and (3) social gatherings increased over 200% on territories that had experienced a divorce during the breeding season.

Several banded pairs outside of the refuge had never been observed on the refuge. This suggests that the unbanded birds are probably nonbreeders. I observed many large gatherings on both Lake Superior and Lake Michigan, situated just north and south of the refuge, respectively, during the breeding season. Given an average fight speed of 160 km/hr an exploratory flight from either Great Lake to Seney NWR would take about 30 min. Croskery (1988) observed many nonbreeding loons in western Ontario remained in flocks on large lakes where arrivals and departures were frequent throughout the breeding season. Thus, it is likely that nonbreeders are using large lakes to feed as bases, but then make forays inland to potential breeding lakes. Previous studies have found that unsuccessful territorial pairs, nonbreeding pairs and unpaired adults are prevalent on breeding grounds and may comprise up to 46% of an entire summer loon population (Taylor and Vogel, 1999).

A more reliable support of the Reconnaissance Hypothesis would be to show that individuals participating in social gatherings return the following year and challenge for that territory. This happened three times during the study period. Piper et al. (1997, 2000) and Paruk (1999b) documented similar usurpations and given that divorce rates in common loons has recently been shown to be between 15 and 20%, (Evers, 2001), this allows for the distinct possibility that social gatherings are a way of nonbreeders to assess territory availability, territorial quality and possibly mate stability. Consequently, it would be more appropriate to broaden the Reconnaissance Hypothesis (Piper et al., 1997) to include some aspect of information transfer. In many birds, nonbreeders are likely to acquire territories they visited more frequently during the post-breeding period (Reed & Oring, 1992; Zack & Stutchbury, 1992; Piper et al., 2000).

One or two territories always had more social gatherings each year. An intriguing aspect of this shifting visitation is the associated status of the resident loons upon the most visited site. At Seney NWR, all pools which had 10 or more social gatherings were not only occupied by a breeding pair, but were also territories where there was a divorce within the previous months. For example, D pool, which had been held by the same pair since 1993, and which had seen little late summer visitation in recent seasons, underwent two changes in 1999 with the death of the resident male in spring and the displacement of his successor following nest failure. During August, with the resident female now paired to her third male (unbanded) of the season, D pool became the nexus of social gatherings. Interestingly in 1998, a year where no birds divorced, the number of social gatherings was the lowest recorded. This pattern was also seen at TFF, where two pairs that experienced divorce had significantly more social gatherings. Overall, this pattern suggests that loon social gatherings are not simply individuals aimlessly wandering between or among lakes in a shotgun approach, but instead appear to be nonrandom and directed to territories that have unstable or recently formed pair bonds.

The Reconnaissance Hypothesis further proposes that nonbreeding loons will visit territories that produce chicks more often than those that do not as an indication of habitat quality (Piper et al., 1997). Of the five heavily visited pools mentioned above, three pairs had bred successfully during the season, but overall the pattern did not hold. Social gatherings occurred on territories without chicks just as frequently as they did on territories that produced chicks. Piper et al. (2000), however, had a larger sample size and found more social gatherings on lakes with young than without.

One final consideration is that it may not be the nonbreeders who are choosing which territory to visit, but rather the resident pair that determines

how many social gatherings are allowed or permitted to take place in the territory. For example, the E pool pair had been together since 1989 and very few social gatherings were observed there during all those years. Then in 1997, the nest failed and the female appeared to lose interest in the resident male and was observed with two other males during the rest of the summer. Moreover, E pool was one of the sites where most of the social gatherings occurred that year. It appeared that the E female was leading and orchestrating the gatherings. How do loons choose mates? Is the territory more important or the mate? Piper et al. (2000) concluded that usurpation is common in loons as a means of acquiring a territory and that it is the territory that loons are competing for, not necessarily mates. Although my data support this notion, several observations, such as the ones on E and B pool, suggest in some situations, it may be the individual rather than the pair that may control the number of social gatherings on a territory.

Conclusions

The temporal and spatial patterns of social gatherings in loons has no doubt been shaped by selection such that they occur at specific times, both daily and seasonally, and often at specific places, both within and outside of established territories. This important aspect of loon life history has important implications for conservation.

Social gatherings occur primarily in the morning and late afternoon/early evening. Lake water tends to be calmest in the early morning thus allowing the best opportunity for loons to find aggregates of conspecifics. Late afternoon gatherings were not as consistent or as numerous as early morning ones. When lake water was turbulent and winds were strong (>20 km), social gatherings rarely occurred. A set time and a set place would allow for predictable visits by both breeders and nonbreeders. These aggregations, or social gatherings, occur in animals of all kinds and allows for communication and public information to take place (Wagner & Danchin, 2003). Such information sharing would include such things as developing social skills for cooperation and flock foraging (copying), territory availability, habitat quality, territorial pair stability, potential neighbors and rivals, and intra-sexual assessment. Both the Familiarity and Reconnaissance Hypotheses are possible explanations for social gatherings in common loons. More intense monitoring of individually marked loons will be necessary to further substantiate these initial findings.

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