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# Effects of Human Recreational Activity on The Tameness of Common Loons (Gavia immer) in Northern Wisconsin

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## Introduction


• Common Loons (*Gavia immer*) in Canada and the northern U.S. are exposed to a variety of human activities during the breeding season. Studies suggest that such activity negatively impacts loon fitness (Titus and VanDruff, 1981; Ream, 1976; Heimberger, 1983; Robertson and Flood, 1980). However, few studies specifically identify these effects or quantify the degree of their impact.
• Common Loons are commonly used as a biosentinel of persistent contaminants, particularly mercury, lead, and organochlorines (Evers et. al. 2010). If human activity artificially affects the health of loons, loons may inaccurately reflect environmental health and therefore be unable to serve as a bioindicator.
• Also, the process of habituation, defined as a decreased response to a recurring and insignificant stimuli, is of great interest to behavioral ecologists. Loons have displayed the ability to adjust their behavior to shoreline development (Heimberger et. al. 1983), and the analysis of the ways loons react to other types of human disturbance may lead to insights into how they habituate.

## Methods: Novel Approach Technique

**Tameness Measure Technique**
**Step 1:** Identified loon by looking at the colored bands on its legs

**Step 2:** Used a laser range finder to determine the observers initial distance from the loon

**Step 3:** Observer approached in increments of 4-6m, using the range finder to determine the distance at each stop

**Step 4:** The distance at the last stop on the approach before the loon dove was tameness measure

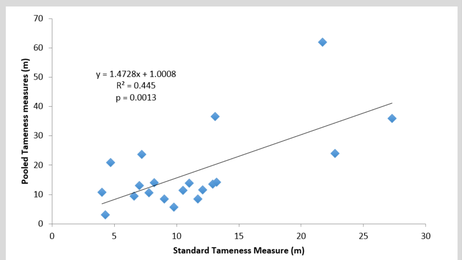


**Fig 1 –** The Interobserver Reliability regression analysis measured the similarity between every observer's determined tameness values for a single loon. The Standard Tameness Measure contains the measurements of the observer who collected the greatest number of tameness measurements. The Pooled Tameness Measure contains the measurements of all other observers. Each of the 20 loons is represented by a single point. If a loon had multiple measurements within either the pooled tameness measures group or the standard tameness measures group, those measurements were averaged to produce the value that was plotted.

## Results: Predictors of Tameness

### *Size: No*

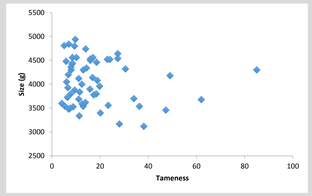


**Figure 2 -** Size did not predict tameness (linear regression, P = 0.36, R2 = 0.014).

• Loons do recognize size differences of conspecifics, especially with regards to territorial disputes (Mager & Piper, 2007).
• However, it is likely that the size of an observer approaching in a canoe is so comparatively large that it eliminates differences in behavior between loons of different sizes.

### *Sex: No*

• Few, if any, behaviors relevant to tameness in loons are driven by sex (Evers, 1994), so this is not a surprising result.

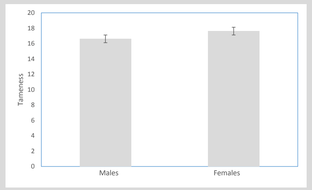


**Figure 3 –** Sex did not predict tameness (two-tailed t-test, T = 0.27, P = 0.78)

### *Intra-Pair Similarity: Yes*

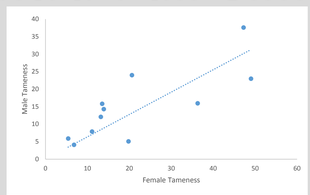


**Figure 4 -** Tameness between pair members was significantly similar (linear regression, P = 0.0043, $R^2$ = 0.61).

• This could possibly be explained either by the influences of proximate conspecifics (i.e. social context) (Fernandez et. al., 2002; Laurson, 2005), or homogenization of tameness between pair members as a function of living together.

### *Human Activity: No*

• The degree of human activity did not correlate to the tameness of both intruders (one-way ANOVA, F = 0.60, P = 0.5533) and resident pair members (one-way ANOVA, F = 1.6, P = 0.2257).
• Though loons are able to compensate for shoreline-development and human nest approach (Titus and Vandruff, 1981), the may not be able to adjust their behavior to compensate for on-lake activity.
• These disturbances should be minimized with the institution of greater or more rigid set back distances, or the minimum length at which human activity is legally allowed (Rogers and Smith, 1995; Blumestead et. al., 2003; Rogers and Schwikert, 2002).

## Research Questions

1. Develop a technique that could adequately quantify a loon's response to an approaching human to measure its tameness, defined as the distance at which individuals dive in response to human approach by canoe.

2. Use the data collected with this technique to analyze various factors that could be used to predict tameness, including human recreational activity.

## Conclusions

• Tameness cannot be explained by habituation to human on-lake activity, sex, or size within sex.
• There is a significant relationship between the tameness of pair members that could be elaborated with further research that accounts for social context.
• While the drivers of tameness have yet to be identified, tameness data can reliably be collected using the highly reproducible approach developed in this study.
• This approach technique has opened the door to many possible threads of research that will allow for a greater behavioral understanding of Common Loons and greater ability to protect them from human disturbance.

## Acknowledgments

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