An example of year-round nest fidelity among urban-resident Glaucous-winged Gulls (*Larus glaucescens*) in Vancouver, B.C., Canada

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Abstract: An exceptional case of nest fidelity in a pair of Glaucous-winged Gulls (*Larus glaucescens*) is described. From 2011 May to 2016 September, the pair was recorded living on and actively defending their nesting territory from conspecifics in downtown Vancouver, B.C. on an almost daily basis, year-round. While gulls are well-known to vigorously defend their nesting territory over multiple years during breeding seasons, it is highly unusual to observe such behaviour in the fall and winter months.

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Introduction

It is known that gull pairs display considerable fidelity to each other and to productive nesting sites across breeding seasons (Vermeer 1963, Southern and Southern 1982, Reid 1988, Nisbet *et al.* 2017). This seems to hold for both highly migratory and relatively sedentary populations (Vermeer 1963, Butler *et al.* 1980, Hatch *et al.* 2011). The Glaucous-winged Gulls (*Larus glaucescens*) of southern coastal British Columbia typically arrive at their breeding grounds in March and depart once chicks have fledged in August and September (Vermeer 1963, Reid 1988). Gull pairs fiercely defend their breeding territories from conspecifics and other intruders throughout the breeding season, but commonly abandon these sites in the fall and winter months (Vermeer 1963, Ward 1973, Hatch *et al.* 2011).

This note documents an exceptional case of one mated Glaucous-winged Gull pair, dubbed "Boris and Doris" or BD for short, that were observed actively living on and defending their nest site year-round for at least 5 years. The author observed this pair from his private residence and kept personal records on a daily basis, with the exception of short, infrequent trips away from home, from 2011 May to 2016 September. The pair nested atop a 7-storey commercial building at 1575 W. Georgia St. in downtown Vancouver, B.C., Canada. The rooftop spanned 42 metres by 21 metres, and consisted of a metal frame covered by a weather-protective tarp atop of which grew dense patches of grass and moss (Figure 1). The rooftop was only accessible to humans via a maintenance ladder, and no humans were observed on the rooftop at any time from 2011 May to 2016 May, when demolition of the entire structure began (see next section). The author observed the pair from his private residence, a 21st-storey apartment immediately across the street, approximately 75 metres from the BD-territory.

Behaviour of the BD-pair

The BD-pair was first noticed incubating eggs in 2011 May. From 2011 to 2015, the pair used the same exact nesting location (Figure 1a), always producing three chicks and raising their entire yearly brood to fledge. Moreover, this pair would maintain their nest even in the fall and winter months, usually loafing and sleeping in the actual nestcup or immediately adjacent (Figure 1b and 1c).

The BD-pair would loaf each day and all day at their nest site from January to August. Absentee days during these months were extremely rare (less than 5 days per calendar year). The pair spent the least amount of time on their territory in the weeks of September and early October, immediately after the fledging of that year's chicks. During this time, the BD-pair was observed on their territory typically only 3 or 4 days each week, usually with one or more fledglings in tow. By mid-October however, fledglings were rarely seen at the BD-territory and the adult pair began to spend more hours of the day at their nest. They also began to spend more days of the week on their territory, increasing to a daily rate by the end of December.

The BD-pair vigorously defended their territory from all other gulls year-round. As is typical (Vermeer 1963), they would actively take flight to chase away and harass interlopers during the breeding season. However, the pair never allowed an adult conspecific more than a moment's rest atop their rooftop territory even in the fall and winter months. Usually, the male would shoo away an intruder by raising his wings and charging on foot during these months, only rarely taking flight to chase the intruder. The pair would also trumpet loudly if any conspecific flew too close to their territory during this time. During the breeding season, the pair would not allow other species access to their rooftop territory either; however, during the winter months, they would regularly tolerate dozens of Rock Pigeons (*Columba livia*), European Starlings (*Sturnus vulgaris*), and even small groups of Northwestern Crows (*Corvus caurinus*) congregating on their territory.

The BD-pair displayed all the usual pair-bonding behaviours of mated, adult gulls during the breeding season (Vermeer 1963, Ward 1973). It was always rare to see a single gull on the territory for long. Given that Coal Harbour and the Burrard Inlet lie less than 250 metres from the BD-territory, and that English Bay (opening into the Strait of Georgia) lies 1 kilometre from the BD-territory, it seems likely that the pair did not ever have to travel far for food, as these bodies of water house significant, though declining, forage fish populations (Therriault *et al.* 2009). When only one of the BD-pair left the territory, the remaining partner would actively defend it from conspecifics in all seasons. When the absent partner would return, the pair would invariably greet each other with the characteristic trumpeting call, again in all seasons. Moreover, the female of the pair would usually mew and head-thrust upon reuniting with her partner, who often reciprocated.

In 2016, the building below the BD-territory was slated for demolition. The building's inside was cleared of objects in the early months of 2016, causing the BD-pair no disturbance. However, in May, deconstruction of the roof began. The weather-protective tarp on which grew the lush grasses that comprised the surface of the BD-territory (Figure 1) was removed first, exposing the metal frame underneath (Figures 2a and 2b). Construction work occupied the hours of approximately 07:00 to 15:30 on

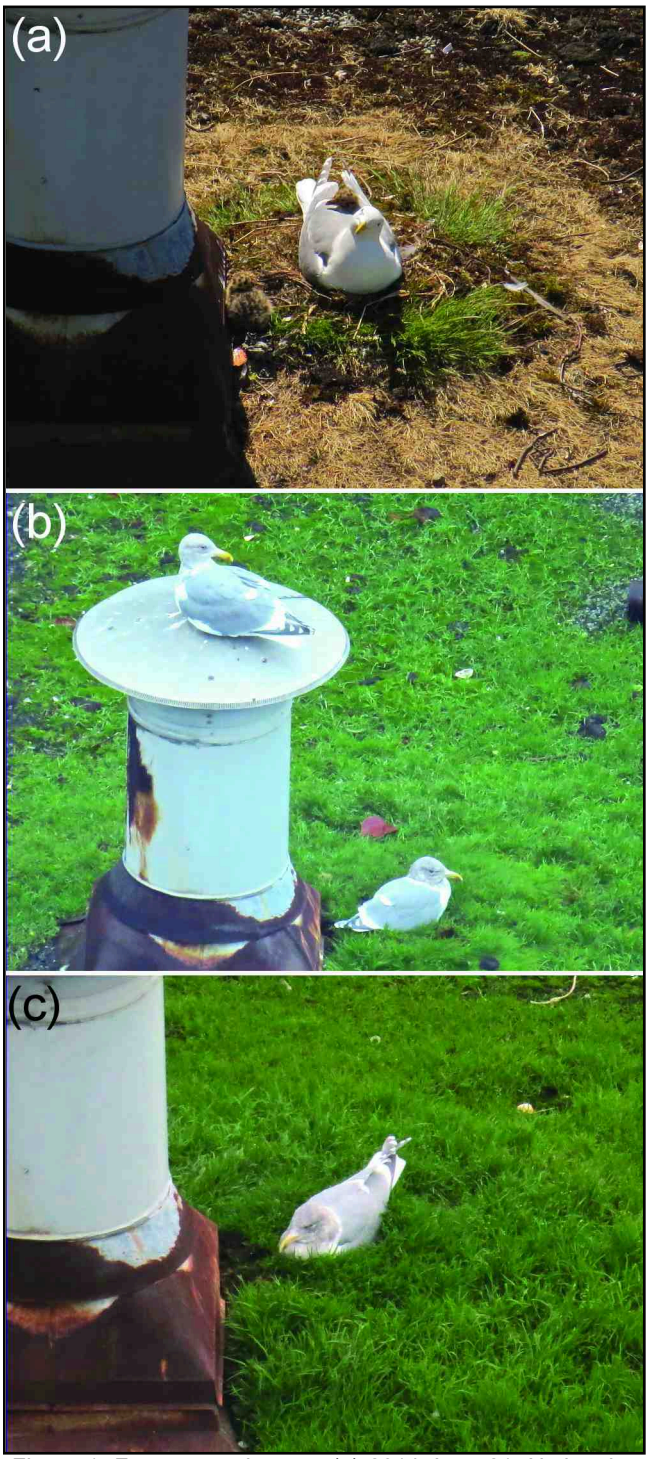

Figure 1. From top to bottom: (a) 2014 June 21. Notice the hatchling resting atop the nesting gull's back. Such behaviour is common among certain species of the *Mergus* and *Gavia* genera, but unusual in gulls. (b) 2014 December 05. The BD-pair on their territory. Note the one gull resting in the nestcup. (c) 2015 December 06. Again, resting in the nestcup.

Figure 2. (a) 2016 May 09. Immediately after the removal of the grass roof. (b) 2016 May 12. A new nest, at the precise location of the original nest, constructed within an hour after construction stopped for the day. (c) 2016 May 21. The roof has been removed, making it impossible to reconstruct a nest at the original BD-site. A new nest is constructed as close to the original site as possible, identified by the roosting gull. (d) 2016 May 23. Close-up of the new nest-site. (e) 2016 September 10. Schematic of the BD-territory, post-demolition of 1575 W. Georgia St. The dotted box outlines the former roof of 1575 W. Georgia St., projected to ground-level; the solid circle inside identifies the location of the BD-nest. The solid white box identifies the small, adjacent, though unadjoined, rooftop the BD-pair annexed as part of their territory. (f) 2016 September 10. The BD-pair with a fledgling at the old annex to their traditional territory, identified by the solid white box in Fig. 2e.

weekdays, Pacific Daylight Time. During this time, the BD-pair would loaf on a small, adjacent roof-space (see the solid white box in Figure 2e). This unattached space was treated as an annex of the BD-territory, as they had actively defended it against all conspecifics in past years. After work hours, the BD-pair would spend the remaining daylight hours on their territory as usual (see Figure 2a).

The most interesting aspect of this development is that the BD-pair would reconstruct their nest within two hours of the end of daily human work (Figure 2b). And each subsequent workday morning, the new nest would be cleared by construction personnel as they continued to dismantle the rooftop (the nest would remain over weekends). This pattern continued even after the roof was removed (Figures 2c and 2d), only stopping when all objects had been removed from the rooftop and the topmost level of the building was collapsed, a span of more than two weeks from the original removal of the grassy foundation of the BD-territory.

At this time, the pair was likely within days of laying their first eggs of 2016 (average lay date of the BD-pair in previous years occurred on May 25). As their territory no longer existed, they presumably found a replacement. No gulls were observed at the old BD-territory until late August, by which time the structure at 1575 W. Georgia St. had been completely removed (Figure 2e). At this time, a pair with fledglings appeared on the BD-territory annex roof (Figure 2e). This pair was not from any neighbouring territory that was visible to the author (in 2016, 10 nests were situated within a one block radius of the BD-territory); thus, the author presumes this was the BD-pair. The pair spent most days of late August and early September loafing on the annex rooftop and tending to their fledglings when needed (Figure 2f). By late September, the territory was once again abandoned.

From 2016 October to present day (2018 March), only the occasional single gull has been observed loafing for a short while atop the annex rooftop. The 1575 W. Georgia St. site remains under heavy construction. The 2017 breeding season saw no indication of an attempted return of the BD-pair to their old territory or its annex nor the presence of other gulls on the territory. Presumably, the pair has moved on.

Conclusions

It should be noted that although the BD-pair had no particularly distinguishing morphological features, the pair's daily-observed behaviours over several years render the possibility of multiple pairs occupying the same space highly implausible. Their behaviours were extremely consistent, both toward each other and toward conspecifics. In particular, their constant napping and loafing at the exact spot of their nestcup, even in the non-breeding season, greatly supports the inference that the events described in this note pertain to a single, mated pair of Glaucous-winged Gulls.

The BD-pair exhibited not only strong fidelity to their nesting territory in each breeding season from 2011 to 2015, but also a constant and tenacious set of maintenance and defence behaviours toward their territory throughout the calendar year. The author has watched many other pairs of urban-nesting Glaucous-winged Gulls return to their nest sites each breeding season, some even as early as January, but the BD-pair remains exceptional in their sedentary lifestyle and year-round devotion to their territory.

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