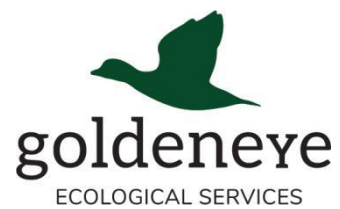


Insight into the Waterbirds of Lake Windermere



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Prepared for Lake Windermere Ambassadors

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Executive Summary

The main purpose of this paper is to provide information for what is currently known about the waterbird species that utilize Lake Windermere habitat. This report will provide the findings of a single-day bird count conducted on the northern half of Lake Windermere in September 2018. Lake Windermere bird data retrieved from an online database (eBird) was reviewed and indicates that 165 bird species have been detected at Lake Windermere, 17 of these species are considered to be at-risk. A review of historic and more recent bird data indicates that Lake Windermere contains important bird habitat. The south end of the lake consistently has large concentrations of staging waterfowl during migration, and has the highest single day bird counts resulting from a regional coordinated bird count (i.e. Columbia Wetlands Waterbird Survey). When compared across 105 survey stations in the Columbia Wetlands, the south end of Lake Windermere appears to contain the most important staging area within the continuous wetlands ecosystem for at-risk grebe species, as well as for other bird species such as American coot. Creek mouths found at Lake Windermere are also important habitat for birds, especially for migrating shorebirds. Information on why birds are important will be presented here, as well as a brief overview on the decline of more than one-third of the world's bird populations. Several suggestions for future action will be provided that may help to ensure that Lake Windermere continues to provide important habitat to birds. These include: a) conducting additional fall bird surveys on the lake, b) completing spring breeding bird surveys in order to assess the utilization of the lake area during a critical life history stage and to identify and conserve key breeding sites, c) minimizing boat traffic in and near nesting, staging, feeding areas during specific times of year, d) public education regarding the importance of Lake Windermere to birds including at-risk species, and e) marking the wildlife management area located at the south end of Lake Windermere with educational buoys alerting all recreational users of this boundary (i.e. current legal restrictions make this area off-limits to motorized water craft). Currently, there are fewer significant wetland areas in the world remaining as habitat for birds. These remaining key areas deserve conservation attention and recognition.

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Background

Why wild birds are important

Birds are all around us. They are the only kind of animal that you are nearly always guaranteed to see, year round, no matter where you go on the Earth. They hold anthropogenic importance for many reasons. They have intrinsic and intangible value in-and-of-themselves. For many people, emotional benefits provided by birds are intangibly important because they capture imagination, stimulate aesthetic views, and enrich spiritual lives (Fitzpatrick & Rodewald, 2016). Seeing birds in the wild brings a sense of peace, excitement and joy to many. This is evident in the growing popularity of birding around the world (Cordell, Herbert, & Nancy, 2002; Steven, Morrison, & Castley, 2015) and in the growing niche market of birding tourism.

Invermere-based 'Wings Over the Rockies' is a birding festival that attracts people from all over the country and beyond. Globally speaking, birdwatchers participating in an ecotourism festival such as this have been shown to have a positive effect on the economy. There are direct and measurable economic benefits including visitor's spending money on local travel costs, accommodation, shops and restaurants; as well as on other incidental expenses like purchasing souvenirs in local shops (The Spruce, n.d.). Events related to birding can also be beneficial for raising awareness around the importance of local conservation issues related to birds and other wildlife species.

Birds also provide a number of additional values such as ecosystem services or benefits that humans acquire from nature. For instance, birds are important for plant reproduction because they act as pollinators and agents for seed dispersal. The Clark's nutcracker (*Nucifraga columbiana*) is a bird that harvest seeds of the whitebark pine (*Pinus albicaulis*) (at-risk tree species) and caches its seeds in the soil that when left uneaten, germinate and establish new pines. The whitebark pine is dependent on the Clark's nutcracker for its regeneration (Hutchins & Lanner, 1982). Birds are involved with nutrient cycling (Sturges, Holmes, & Likens, 1974), they are indicators of the health of an ecosystem (Niemi & McDonald, 2004); Peron, Ferrand, Leray & Gimenez, 2013), and they also link ecosystem processes that are separated by great distances since most birds are migratory species travelling far distances (Whelan, Wenny, & Marquis, 2008). Birds also maintain healthy population levels of their prey, some of which are considered pests to humans such as mice, rats and mosquitoes.

The decline of bird populations

It is important to recognize some of the important values birds hold, but also to understand that birds are facing serious population declines around the globe. A recent report produced by Bird Life International (2018) states:

Analysis of the [Union for Conservation of Nature and Natural Resource](IUCN) Red List shows that there has been a steady and continuing deterioration in the status of the world's birds since the first comprehensive assessment in 1988. Highly threatened species continue to go extinct, while formerly common and widespread species are in sharp decline. At least 40% of bird species worldwide (3,967) have declining populations, compared with 44% that are stable (4,393), 7% that are increasing (653) and 8% with unknown trends (823).

On a global scale, bird species (and biodiversity in general) are experiencing declines at an alarming rate (Cardinale et al., 2007; Isbell et al., 2011; Hooper et al., 2012). There are a number of scientific publications that link biodiversity loss to the Earth becoming increasingly dominated by humans, intensifying pressures on natural ecosystems; human prosperity coming from economic growth is associated with severe landscape modification that is causing serious problems for birds and other animals species (e.g. Austin et al., 2008; Balvenera et al., 2001; Cardinale et al., 2007; Daily, 1997; Diaz et al., 2006; Ehrlich & Mooney, 1983; Foley et al., 2005; Guo, Zhang, & Li, 2010; MEA, 2005; Nagendra et al., 2013; Sala et al., 2000; Wilson & Peter, 1998). "The wave of extinction currently underway is occurring at a pace and scale fully comparable to the five greatest extinction episodes in the earth's history, but this sixth mass extinction [currently underway] is directly caused by human activities across the globe (Fitzpatrick & Rodewald, 2016)."

According to the IUCN, the main threats to birds include residential and commercial development, agriculture, human intrusions and disturbance, spread of invasive species, pollution, climate change and severe weather (Fitzpatrick & Rodewald, 2016). Also, a wide range of potentially detrimental behavioral patterns have been documented for waterbirds in response to recreationists.

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Examples include reduced foraging and resting periods, increased nest abandonment and egg loss, discouragement of late-nesting pairs from breeding and disruption of pair bonds and parent-offspring bonds (Liddle & Scorgie, 1980; Korschgen & Dahlgren, 1992). Repeat disturbances during critical breeding times eventually cause ducks to nest elsewhere or not at all (Korschgen & Dahlgren, 1992). Other studies have shown that human disturbance can cause increased flushing, flight times and energy expenditure by birds and reduce their overall energy intake. Birds are sensitive to disturbance wherever they are present during migration, a critical time when they need to rest and feed due to the huge amount of energy required to migrate.

Some types of recreational activities create fundamental changes to ecosystems, which can have serious repercussions on waterfowl and other wildlife (Liddle & Scorgie, 1980). Waterfowl are very sensitive and seek refuge away from all forms of disturbance, especially those associated with rapid movements and loud noise, e.g. power-boating, water-skiing and aircraft (Liddle & Scorgie, 1980). Other forms of disturbance (but with little noise) come from sailing, wind surfing, paddle boarding, swimming, bird-watching, hunting, photography and hiking (Liddle & Scorgie, 1980). Additionally, it has been found that aquatic plants and animals are threatened by the development of marinas on lakes (Fournier, Mengel, & Kremetz, 2018).

Much of the interconnected habitat that birds rely upon for breeding, stopover and staging habitat during migration has already been lost. For instance, since approximately 1900 AD, 50% of the world's wetlands (wetlands contain significant bird habitat) have been lost (Davidson, 2014). Migratory birds depend upon a network of interconnected sites (Runge et al., 2015). It is important to protect remaining important bird habitat areas so that there is a future for the world's birds. Birds in Canada are protected under the federal Migratory Birds Convention Act, 1994, as well as under provincial jurisdiction of the British Columbia Wildlife Act.

Birds in the Columbia Wetlands

The Columbia Wetlands are an important area for birds in terms of the high habitat value they provide during critical life stages of breeding and migration (Darvill, 2017; Hammond, 1997). The wetlands are a vital part of the Pacific Flyway, a migration route that extends from the Arctic Tundra southward into South America. It has been estimated that at least one billion birds migrate along the Pacific Flyway each year, but this estimate is a small fraction of the number of birds that used the flyway a century ago (Audobon, n.d.). Habitat within the Pacific Flyway provides breeding grounds as well as feeding and resting refuge for waterfowl (i.e.

swan, duck, goose). This type of habitat is essential to conserve for the maintenance of global waterfowl populations (Pedology Consultants, 1983).

Mainly owing to the recognition that the Columbia Wetlands holds significant wildlife habitat, much of the wetlands (approximately 69%) (BC Hydro, 2014) were designated as a wildlife management area (WMA) in 1996. This is managed by British Columbia's Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD). There are four additional parcels that are collectively known as the Columbia National Wildlife Area (NWA), which are owned by The Nature Trust of British Columbia and managed federally by the Canadian Wildlife Service. There are also some additional smaller conservation parcels within the wetlands, and approximately 20% remains privately owned land (BC Hydro, 2014). Additionally, the portion of Columbia Wetlands located within the boundaries of the WMA was designated as a Ramsar site in 2005.

The Ramsar designation recognizes these wetlands as being internationally significant. When designated as a Ramsar site, the Columbia Wetlands met all eight Ramsar criteria. These criteria were based on unique or rare wetlands types, species and ecological communities, fish and other taxa, as well as specific criteria set out for waterbirds (Ramsar, 2014). Within British Columbia, there are only two other Ramsar sites and four other NWA's. (Hammond, 1997). Due to concern over the impacts that motorized boating can have on birds, both federal and provincial environment ministries, and Fisheries and Oceans Canada, supported a series of boating regulations for the Columbia Wetlands to protect its important ecological values (Hammond, 1997). However, these boating regulations apply only to the habitat within the WMA and NWA, not areas located outside of these boundaries such as Lake Windermere.

Until recently, relatively little research had been conducted on the waterbirds of the Columbia Wetlands. Some of the more interesting data that has been collected includes results from an aerial survey conducted in 1977 documenting 1200 adult Tundra/Trumpeter Swans on March 28 (Kaiser, McHelvey, & Smith, 1977). A single count of 30,000 American Coots was documented by Demarchi and Smith in 1967. The Columbia Wetlands Waterbird Survey (CWWS), a coordinated citizen-science bird count project that aims to have the wetlands designated as an 'Important Bird and Biodiversity Area' and has documented much recent bird

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data, including a high count of 20,796 individual birds seen during a three-hour period on October 15, 2016 from 85 ground-based survey stations (Darvill, 2017). On this survey date only 30-35% of the entire Columbia Wetlands were surveyed, so the bird count would have been higher if the entire ecosystem could have been surveyed. Similarly, a high count of 20,575 individual birds was counted by the CWWS project on October 15, 2018 when approximately 40% of the wetlands were surveyed at 105 ground-based survey stations over a three hour period (Darvill, 2018a).

The Columbia Wetlands Marsh Bird Monitoring Project (2016-2018), which took place during peak breeding season (May-June), detected more than 130 species of bird, suggesting that at least this many bird species were breeding in the wetlands (Darvill, 2018b). Furthermore, there are documented accounts for 264 bird species using habitat found in the Columbia River Valley (Ferguson & Halverson, 1997).

Documented bird data for Lake Windermere

Near the southern end of the Columbia Wetlands lies Lake Windermere, located within the continuous portion of the Columbia Wetlands. The lake is approximately 18 kilometers long, 0.7 - 2 kilometers wide, with its deepest section measuring 5.5 – 7 meters, depending on the time of year. Much of Lake Windermere is considered a shallow open water wetland (or pond), since much of the lake's depth is usually less than 2 meters deep in mid-summer, representing a transition between a lake and marsh (National Wetlands Working Group, 1997).

Much of Lake Windermere is heavily used by humans for recreational pursuits (e.g. motorized boating, swimming, cross-country skiing, fishing, etc.) in both summer and winter. These activities and resulting tourism market has provided Inveremere and surrounding communities with increased economic opportunities. The lake provides excellent aesthetic views and there are a number of homes along the foreshore of Lake Windermere, mainly situated along the northern half. From a human-use perspective it is very popular, however, the lake does not receive much attention or recognition for the significant bird habitat it provides for large migrant flocks and breeding birds. Both the CWWMA and Ramsar designations exclude Lake Windermere (and Columbia Lake) from its boundaries, with the exception of the very south end of Lake Windermere (most southern 1 kilometer stretch) where there are dense stands of emergent vegetation in

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the CWWMA. This is because boundaries for the CWWMA and Ramsar were not based on ecological attributes, but rather on the crown land boundaries located within the Columbia Wetlands. Regardless of boundaries and designations, the wetlands at Lake Windermere are significant with many important ecological features (McPherson & Hlushak, 2008).

Previous bird surveys in the continuous Columbia Wetlands (including Lake Windermere) have documented Lake Windermere as important bird habitat when compared to the rest of the Columbia Wetlands ecosystem. Kaiser, McKelvey & Smith (1977) conducted a ground-based survey on October 18, 1977 at Rushmere, a community located near the southwest corner of Lake Windermere; the count was as follows:

American coot 6000
Mallard 16
American wigeon 237
Northern pintail 20
Canada goose 41
Red-breasted merganser 25
Canvasback 24
Redhead 1040
Ring-necked duck 145
Scaup spp. 136
Bufflehead 10

“During both spring and fall migrations large flocks of coot [American coot (*Fulica americana*)] congregate on Wasa Sloughs, Wilmer National Wildlife Area and some of the large lagoons between Brisco and Golden. Those numbers are dwarfed however, by the huge raft of coots that occupy the southern end of Windermere Lake” (Kaiser, McKelvey & Smith (1977). Additionally, large numbers of American wigeon [*Mareca Americana*] were consistently recorded through aerial surveys during migration in 1977 and most of these wigeon were detected on the larger waterbodies, such as Windermere Lake (Kaiser, McKelvey & Smith, 1977).

Caspell et al. (1979) had similar findings during their project that aimed to inventory migrant waterbirds in the Columbia Valley and to compare bird use in different portions of the valley. They detected large concentrations of American coot at the south end of Lake Windemere, along with Redhead (*Aythya Americana*) and other ducks, claiming that of all the habitat units they surveyed, “the Rushmere Unit may have been the most important” (Caspell et al., 1979).

It was reported that “tens of thousands” of [American] coots congregated at the south end prior to freeze up and that “[t]he huge number of coots and the unique concentration of redhead and other diving ducks at the southern end of Windermere Lake constitutes one of the amazing wildlife spectacles in British Columbia (Caspell et al., 1979).”

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More recently, data from the 2015-2018 Columbia Wetlands Waterbird Survey (CWWS) (project of Wildsight Golden) revealed that large numbers of waterfowl still congregate at the south end of Lake Windermere, although American coot numbers do not appear to be as large as the observations from 1977 or 1979. The following data is from the CWWS:

- October 5, 2016 – At the south end of Lake Windermere, 2,586 individual birds were recorded (2,016 were American coot; 314 were American wigeon).
- April 16, 2017 – The highest species counts in the Columbia Wetlands for spring 2017 occurred at Lake Windermere-Rushmere Road where 1,817 individual birds were counted, an estimated 1,500 of these were American coot.
- September 29, 2017 – The highest bird count during fall 2017 was from the south end of Lake Windemere where 4,585 individuals were recorded. 4,183 were identified as American coot.
- October 5, 2017 - The south end of Lake Windermere had a count of 2,505 birds (2,000 were American coot).
- October 15, 2017 - 2,955 individual birds were recorded at the south end of Lake Windermere, with 2,000 of these identified as American coot.
- October 15, 2018 – 2,302 individual birds recorded at the south end of Lake Windermere; 1,354 were American coot and 773 were American wigeon. Also, 1402 individuals were recorded at Lake Windermere – Ruault Road on this date, with 1,110 identified as American coot and 257 Canada goose.

Both the Caspell et al. (1979) and Kaiser, McKelvey & Smith (1977) studies stated that large numbers of redheads were also found at the southern end of Lake Windermere, yet the CWWS data has not shown this. However, redheads could have gone undetected during CWWS counts due to large flock size at the survey stations, and also due to far observation distances for

volunteer surveyors. There are several CWWS reports from the south end of Lake Windermere that list unidentified duck species, some (or all) of these could have been redheads.

In addition to the large flocks of waterbirds that have been detected at the south end of Lake Windermere, Kaiser, McKelvey, and Smith (1977) reported that red-necked grebes (*Podiceps grisegena*) became “very numerous at the northern end of Windermere Lake...” The CWWS also found that three at-risk grebe species [horned grebe (*Podiceps auritus*), eared grebe (*Podiceps nigricollis*), western grebe (*Aechmophorus occidentalis*)] seen in the Columbia Wetlands appeared to concentrate at larger waterbodies such as Lake Windermere, when compared to all of the other survey stations. Lake Windermere, and potentially Columbia Lake, appears to contain the most important staging areas within the continuous Columbia Wetlands for three at-risk grebe species, as well as for other bird species (Darvill, 2017).

Lake Windermere, along with Columbia Lake, appears to contain the most important staging areas within the continuous Columbia Wetlands for three at-risk grebe species, as well as for other bird species.

Research objectives

There is a relatively new online public database (eBird) has been gaining significant traction with birders locally, regionally, and globally, as it allows anyone with an interest in birding to enter their sightings into the easily accessible database. The eBird interface also allows the public to view entries of bird observations. As explained previously, some historic and recent bird surveys have documented the significance of Lake Windermere to birds, but there have been relatively few bird surveys on the lake given the important habitat values. In the past five to six years, the eBird database has produced numerous bird checklists for Lake Windermere. This report will summarize that eBird data available for Lake Windermere, which has been reported by volunteers through eBird’s public birding locations (hotspots). It will also summarize the data available on eBird (hotspot and personal locations) for at-risk bird species. Additionally, a bird survey that was conducted on Lake Windermere specifically for this project (by boat) will be reported on. This report will allow those with an interest in Lake Windermere to learn more about the bird species utilizing the lake. Suggestions for how bird habitat on Lake Windermere can be conserved or protected through human actions will be suggested.

Methods

Bird survey on Lake Windermere

A survey for birds was conducted on Lake Windermere with the use of an aluminum boat and outboard motor, and with a crew of two people (one driver and one observer). At the beginning of the survey, the weather was partly cloudy with light winds. However, the winds picked up substantially during the survey and it was no longer safe to be on the water, the survey was forced to completion when located near Windermere Creek (approximately half way down the lake). Therefore, bird species and numbers presented represent only those detected on the northern half of the lake.

The survey occurred on September 21, 2018 and began at 09:22am. The duration of the survey was 1 hour and 39 minutes and distance travelled in the boat for the survey was 20.3 kilometers one-way. This distance does not include the return trip when birds were not surveyed. The survey began at the north end of Lake Windermere (Althamer) and the boat travelled southward using zigzag transects. If a detected bird(s) was not able to be identified due to distance, the boat was moved toward the bird(s) in order to get close enough for identification. Every attempt was made to not get too close to the bird(s) in order to avoid disturbance. In all cases, the birds were able to be observed from more than 150 m away. The boat survey did not allow for the use of a tripod and scope (rough conditions), binoculars (Vortex Viper HD, 10x50) were used. All birds were recorded to species level when conditions allowed.

Review of eBird hotspot locations at Lake Windermere

The eBird hotspot locations for Lake Windermere were determined by using the 'explore hotspots' tab on eBird. The area of interest (Lake Windermere) was selected on the map view extent available through eBird, and all Lake Windermere hotspots were revealed on the resulting map. All checklists at all Lake Windermere hotspots were viewed, and all bird species names were transcribed to a database (Microsoft Excel) to provide a checklist for the birds detected at Lake Windermere. These methods allowed only checklists coming from eBird hotspot locations to be viewed, while personal locations for bird observations that were submitted into the eBird database were not available and are not represented on the resulting checklist for Lake Windermere.

Review of at-risk grebe sightings at Lake Windermere

In order to view all eBird data available for all Lake Windermere checklists (hotpot and personal locations) for all at-risk species detected, the eBird data was explored using the 'Species Map' query for each individual species. On the resulting map view extent, the Lake Windermere region was highlighted to reveal all eBird checklists that had each individual at-risk species. All search results were transcribed into Microsoft Excel.

Results

Bird survey on Lake Windermere

The bird survey conducted by boat detected 18 bird species, as well as two other taxa (i.e. duck sp., gull sp.) not seen clearly or closely enough to be identified to species level (Table 1). Approximately half of the unidentified ducks were located at the outflow of Windermere Creek. The wind was high and waves prevalent, making positive identification of those ducks impossible from the moving boat. However, these unknown birds were likely to have been mostly (or all) dabbling ducks given their shape, behavior and habitat.

There were 45 red-necked grebes detected during the boat survey that were scattered throughout the survey area. However, there was one larger group of 14 located near the bottom of Coy Road, along with some other unidentified ducks viewed at a distance too far for positive identification. These red-necked grebes and ducks may have been congregating at that location because it was sheltered and protected from the high winds. Two relatively small flocks of American coot were also seen (Figure 1) during the survey, and most of the gull species observed during the survey period were resting along the northern shoreline of Lake Windermere. Figure 2 depicts 14 herring gull (*Larus argentatus*), 12 California gull (*Larus californicus*), and one ring-billed gull (*Larus delawarensis*) that were detected along the shoreline of James Chabot Provincial Park, located at the northern end of Lake Windermere. Four of the species detected during this boat survey are considered to be species-at-risk: eared grebe (Figure 3), western grebe (Figure 4), California gull, and double-crested cormorant (*Phalacrocorax auritus*) (Figure 5).

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Table 1. Species of birds detected during the bird survey conducted by boat on the northern half of Lake Windermere on September 21, 2018.

Species	Count
Canada Goose	36
Mallard	47
Common Merganser	17
duck sp.	52
Red-necked Grebe	45
*Eared Grebe	1
*Western Grebe	6
American Coot	64
Ring-billed Gull	1
*California Gull	12
Herring Gull	14
gull sp.	45
Common Loon	7
*Double-crested Cormorant	1
Turkey Vulture	3
Bald Eagle	2
Belted Kingfisher	1
Northern Flicker	1
Black-billed Magpie	2
Common Raven	2

(*indicates bird species-at-risk).



Figure 1. Flock of American coot detected on east side of Lake Windermere during boat survey conducted on September 21, 2018.



Figure 2. Mixed flock of gulls (14 herring gull, 12 California gull (at-risk-species), 1 ring-billed gull) located on the shoreline of James Chabot Provincial Park during bird survey conducted by boat on September 21, 2018.



Figure 3. At-risk eared grebe detected on Lake Windermere during bird survey.



Figure 4. At-risk western grebes seen on Lake Windermere a few days previous to the bird survey conducted by boat for this report. This picture was taken on September 17, 2018.



Figure 5. At-risk double-crested cormorant detected during September 21, 2018 bird survey, located near shoreline at the unofficial boat launch at Bayshore apartments.

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Previous to the September 21, 2018 boat survey there had been only five records of eared grebe for Lake Windermere transcribed into the eBird database. The dates of these recorded observations were: two separate observations on May 4, 2015 (one and nine individuals), May 21, 2015 (two individuals), May 19, 2015 (23 individuals), and October 5, 2016 (five individuals). Four of the previous five eared grebe records came from volunteer observations made during official survey dates of the CWWS. Additionally, previous to this boat survey there had been only two reports of double-crested cormorant on eBird for Lake Windermere. Both accounts were observations of an individual bird resulting from personal locations on eBird from June 19, 2010 and August 28, 2015.

Review of eBird data from 14 hotspot locations at Lake Windermere

The review of eBird data for Lake Windermere revealed that there were 14 hotspot locations for the lake. At these locations (as of November 15, 2018), 644 checklists had been submitted and 165 bird species plus eight other taxa (e.g. horned/eared grebe, warbler sp.) were reported. While the double-crested cormorant had been recorded on eBird at Lake Windermere prior to this project's boat survey (as described above), this bird species had not been recorded at an eBird hotspot location, but from two individuals personal eBird locations. Since this species was detected during the September 21, 2018 boat survey, it has been added to the list of bird species for Lake Windermere, which is presented in Appendix 1. This brings to total number of birds to 165 species, plus eight other taxa.

There were 21 shorebird species recorded for Lake Windermere in eBird species, with 17 of these detected at the mouth of Windermere Creek. Nine of those 17 shorebird species were reported from only the Windermere Creek hotspot location and no other area of Lake Windermere. The shorebirds detected only at Windermere Creek were: American avocet (*Recurvirostra Americana*), black-bellied plover (*Pluvialis squatarola*), marbled godwit (*Limosa fedoa*), dunlin (*Calidris alpina*), baird's sandpiper (*Calidris bairdii*), least sandpiper (*Calidris minutilla*), semipalmated sandpiper (*Calidris pusilla*), western sandpiper (*Calidris mauri*), and willet (*Tringa semipalmata*).

At-risk birds detected at Lake Windermere

Of the 165 species reported through eBird for Lake Windermere, 17 are listed as species-at-risk (Table 2). Some of these at-risk birds appear to be rare or unusual occurrences for Lake Windermere, for instance, the American white pelican (*Pelecanus erythrorhynchos*) has been

reported for Lake Windermere on eBird only once (Table 2). Additionally, long-billed curlew (*Numenius americanus*), peregrine falcon (*Falco peregrinus*), Lewis's woodpecker (*Melanerpes lewis*), American avocet (*Recurvirostra americana*), double-crested cormorant and Caspian tern (*Hydroprogne caspia*) have been reported at Lake Windermere through eBird on only two or three occasions (Table 2). Results indicate that there are specific at-risk bird species that utilize the habitat found at Lake Windermere with a greater frequency, [such as western grebe (148 eBird checklists), horned grebe (120 eBird checklists), great blue heron (*Ardea herodias*) (64 eBird checklists)], when compared to other at-risk bird species (Table 3).

Of the 165 species reported through eBird for Lake Windermere, 17 are listed as species-at-risk

All detections reported on eBird as of November 15, 2018 for the western grebe (at Lake Windermere) can be found in Appendix 2. Reported western grebe flock size has numbered anywhere from 1 to 220 individuals. The arithmetic mean flock size is 17.05 individuals. Western grebe have been most commonly reported on Lake Windermere between late April to mid-May and in the fall from middle of September until late October.

Detections reported into eBird for the horned grebe are found in Appendix 3. Horned grebe flock size has numbered anywhere from 1 individual to 120, with a mean flock size of 8.042 individuals. Horned grebe has been most commonly reported to occur on Lake Windermere between mid-April to June, and between late September and early November. At the time of this report, there have only been seven reports of eared grebe at Lake Windermere in the eBird database. However, there had also been 11 reports of horned/eared grebe in addition to 22 grebe sp. accounts on eBird checklists for Lake Windermere. Some of these sightings could have been eared grebes.

Table 2. At-risk bird species reported through eBird at Lake Windermere hotspot locations.

English name	Scientific name	BC List	SARA Status	COSEWIC status	IUCN Red List Category	IUCN population trend	# of locations recorded on eBird for L.Windermere	# of checklists recorded in eBird for L.Windermere
Western Grebe	<i>Aechmophorus occidentalis</i>	Red	1-Special Concern (2017)	Special Concern	Least Concern	decreasing	23	148
Horned Grebe	<i>Podiceps auritus</i>	Yellow	n/a	Special Concern	Vulnerable	decreasing	25	120
Eared Grebe	<i>Podiceps nigricollis</i>	Blue	n/a	n/a	Least Concern	unknown	6	7
Tundra Swan	<i>Cygnus columbianus</i>	Blue	n/a	n/a	Least Concern	unknown	6	13
Great Blue Heron	<i>Ardea herodias herodias</i>	Blue	n/a	n/a	Least Concern	increasing	28	64
Barn Swallow	<i>Hirundo rustica</i>	Blue	1-Threatened (2017)	Threatened	Least Concern	decreasing	2	10
Bank Swallow	<i>Riparia riparia</i>	Yellow	1-Threatened (2017)	Threatened	Least Concern	decreasing	8	16
Long-billed Curlew	<i>Numenius americanus</i>	Blue	1-Special Concern (2005)	Special Concern (2011)	Least Concern	decreasing	2	3
Surf Scoter	<i>Melanitta perspicillata</i>	Blue	n/a	n/a	Least Concern	decreasing	5	16
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Red	Not-at-risk (1987)	n/a	Least Concern	increasing	1	1
California Gull	<i>Larus californicus</i>	Blue	n/a	n/a	Least Concern	decreasing	13	54
Peregrine Falcon	<i>Falco peregrinus anatum</i>	Red	1-Special Concern (2012)	Special Concern (2007)	n/a	n/a	3	3
Common Nighthawk	<i>Chordeiles minor</i>	Yellow	1-Threatened (2010)	Threatened (2007)	Least Concern	decreasing	7	5
Lewis's Woodpecker	<i>Melanerpes lewis</i>	Blue	1-Threatened (2012)	Threatened (2010)	Least Concern	decreasing	2	2
American Avocet	<i>Recurvirostra americana</i>	Blue	n/a	n/a	Least Concern	stable	1	2
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Blue	n/a	Not-at-Risk (1978)	Least Concern	increasing	3	3
Caspian Tern	<i>Hydroprogne caspia</i>	Blue	n/a	Not-at-Risk (1999)	Least Concern	increasing	3	3

Discussion

Importance of Lake Windermere to birds

Through the available information and data on the birds of Lake Windermere, the south end of the lake has been demonstrated through historical and current bird surveys to be significant habitat during migration for large mixed flocks of American coot and other waterfowl (e.g. American wigeon, Canada geese (*Branta canadensis*), mallard (*Anas platyrhynchos*). It appears that the south end of Lake Windermere could be the most important habitat for these specific bird species during migration, as it supports the highest concentrations of migrating waterbirds when compared to 104 other surveys stations located across the entire continuous Columbia Wetlands ecosystem. American coot feed primarily on plant material and principally on pond-weeds such as *Potamogeton* species, along with sedges and algae (Brisbin & Mowbray, 2002). These are indigenous aquatic plant species that are found in high abundance at Lake Windermere, including at the south end (Darvill, 2018c).

Kaiser, McKelvey & Smith (1977) reported that food production at the south end of Lake Windermere may be enhanced by the warm outflow of nearby Fairmont Hot Springs. However, more recent water quality results from the Lake Windermere Ambassadors consistently show the south end is actually colder than the other water sampling sites in the lake (Thea Rodgers, personal communication, December 2018). It is possible that sediment transport from Dutch and Fairmont creeks enriches the lake bottom with nutrients at the south end; also water is shallow and clear in late summer so there are no light limitations to biomass production (Thea Rodgers, personal communication, December 2018). In addition to high food availability, large mixed flocks are present at the south end of Lake Windermere likely because there is less human disturbance due to limited access (Kaiser, McKelvey & Smith, 1977). Also, there is very little shoreline development and motor boats are unable to travel through the shallow waters given the high amounts of vegetative biomass; motors get clogged with aquatic plants.

Western Grebe

The at-risk bird species most frequently reported for Lake Windermere is the western grebe. Once hunted extensively for their plumage for use in human clothes, the western grebe is on British Columbia's provincial Red-List; it is listed as a species of Special Concern by the Committee on the Status of Endangered

The at-risk bird species most frequently reported for Lake Windermere is the western grebe.

Wildlife in Canada (COSEWIC) and it is listed as a species of Special Concern under Canada's Species at Risk Act (SARA). The western grebe is not known to breed on Lake Windermere, but is frequently observed on the lake during both spring and fall bird migration. During routine water sampling events in 2018, the Lake Windermere Ambassadors consistently observed a flock of 10-11 western grebes during the summer (June-September) during the earlier part of the morning before the motorboats came onto the lake (Thea Rodgers, personal communication, December 2018). Prior to this and according to eBird data, summer observations of western grebe on Lake Windermere were relatively uncommon.

Western grebes are near the top of the aquatic food chain, feeding mainly on fish (Stedman, 2018). They have been reported to feed on invasive fish species such as pumpkinseed fish (*Lepomis gibbosus*) and perch (*Perca sp.*) in the Creston Valley (Forbes & Sealy, 1990). Both pumpkinseed and perch occur in Lake Windermere, so western grebe could be beneficial to keeping the invasive fish in check on Lake Windermere. According to COSEWIC (2014), “[t]hreats to Western Grebes during migration are mostly unknown. Migration routes are poorly understood, stopover sites have not been systematically documented, and virtually nothing is known about fidelity to stopover sites or habitat requirements at those sites.”

Horned Grebe

The second most frequently reported at-risk bird using Lake Windermere habitat is the horned grebe. The horned grebe is listed as a species of Special Concern by COSEWIC, and it was recently designated as Vulnerable at a global scale (on IUCN Red List) due its declining population and decreasing population trend (Birdlife International, 2016). Similarly to its relative the western grebe, during the 1800's horned grebe was extensively shot in order to make hats with its winter plumage (Stedman, 2018). While they are no longer killed for hat-making, horned grebes are significantly affected by pesticides and other contaminants in the environment; they are also thought to ingest plastics, but information on this is lacking (Stedman, 2018). The most serious threats to wintering areas are pesticide accumulation and oil spills (Stedman, 2018). It is unknown whether the horned grebe uses any part of Lake Windermere for breeding, but there are regular observations from both spring and fall migration periods. During the summer the horned grebe is known to eat mainly aquatic and some airborne arthropods, and in winter it eats mainly fish, crustacean and polychaetes (Stedman, 2018). “Considerable conservation attention has been given to this species in Europe by local administrative bodies because of its value as an indicator of wetland quality” (Stedman, 2018).

Red-necked Grebe

The red-necked grebe was frequently observed on Lake Windermere during the boat survey conducted on September 21, 2018 (45 individuals records on northern half of lake), during the CWWS, and by the public reporting their observations on eBird. Recent marsh bird breeding surveys indicate that the red-necked grebe breeds at the south end of Lake Windermere (Darvill, 2018), but during bird migration they utilize the entire lake habitat. Kaiser, McKelvey & Smith (1977) found that “[a]lthough the red-necked grebe does not form a cohesive flock prior to the fall migration, they do become very numerous at the northern end of Windermere Lake and in November of 1977 several became trapped in the ice when the lake suddenly froze over. The local conservation officer rescued 10 by means of an airboat and transported them to the open water at the southern end of the lake.” Some recent bird surveys and review of data indicates that red-necked grebes are no longer using the north end to the extent that they did in 1977. Their use is now more scattered, suggesting that there may be higher levels of disturbance at the north end which may have caused them to shift their feeding distribution at Lake Windermere.

A visual predator, the red-necked grebe typically forages alone pursuing fish, aquatic invertebrates that they pluck off the lake bottom and off vegetation, and occasionally amphibians (Stout & Nuechterlein, 1999). Since they are near the top of the food chain, they are highly susceptible to high levels of pollutants such as heavy metals, mercury and organochlorines (Stout & Nuechterlein, 1999), making them susceptible to oil spills. Ingestion of pollutants can lead to egg thinning, high mortality during hatching, and inviable eggs (Riske, 1976; Smet, 1987). Major sources of habitat loss include shoreline development, destruction of emergent vegetation in front of docks or lakefront properties, erosion and decreasing water levels (Riske, 1976). Red-necked grebes are also sensitive to disturbance during nesting; recreational activities near nests have been blamed for reduced breeding productivity (Riske, 1976, Ohanjanian, 1986). Approaching boats may cause small chicks to become separated from adults, and increasing exposure from predators and elements to eggs (when adults leave due to approaching recreationist), may have the most important impact (Ohanjanian, 1986).

Major sources of habitat loss include shoreline development, destruction of emergent vegetation in front of docks or lakefront properties, erosion and decreasing water levels. (Riske, 1976)

Previous reports provide a number of recommendations to protect grebe habitat.

Smet (De Smet 1982) recommended focusing lake habitat preservation efforts on protecting shallow bays with emergent vegetation from development. Kevan (1970) proposed closing off prime nesting areas to recreational use at Astontin Lake, Alberta, and Riske (1976) reported that buoys with signs were placed near grebe nesting areas to prevent boaters from entering, but effects of these actions have not been reported (De Smet 1982). If disturbance to nesting birds is minimized, especially during incubation and early in brood-rearing, Red-necked Grebes can and do become acclimated to human presence and recreational activities on lakes. However, boat traffic in and near nesting areas should be minimized, to avoid nest-damaging wakes and disturbance of incubating or brooding adults. In addition to protecting breeding habitats, key sites away from breeding areas need to be identified and protected.

Shorebirds

It was reported by McPherson & Hlushak (2008) that creek mouths found at Lake Windermere, such as Windermere Creek, are extremely important areas for both fish and wildlife. “The associated riparian areas and their wetlands were found to be highly utilized by birds (McPherson & Hlushak, 2008).” This was also demonstrated by eBird data, where 17 of 21 shorebirds detected at Lake Windermere were observed at the mouth of Windermere Creek. Nine of those 17 shorebirds were reported only from the Windermere Creek hotspot location, including one at-risk species, the American avocet.

Conclusion and Suggestions for Future Action

Much of the world’s natural wetlands within the Pacific Flyway (which had previously supported huge numbers of waterfowl), have been altered or destroyed by hydro-electric developments in the Columbia River and other major drainages of the Pacific Northwest (Kaiser, McKelvey, & Smith, 1977). Prior to the development and destruction of wetlands, there was an unbroken chain of continuous wetlands that numerous bird species would utilize as nesting, staging and molting habitat within the Pacific Flyway (Kaiser, McKelvey, & Smith, 1977). Currently, there are only a few significant wetland areas that remain available to birds, in a series of widely separated wetlands (Kaiser, McKelvey, & Smith, 1977) such as the Columbia River wetlands, including Lake Windermere. Now more than ever, these remaining bird habitats are essential to maintain for bird conservation given the deteriorating state of the world’s birds.

Lake Windermere has been documented as providing habitat for at least 17 at-risk bird species, and the south end of the lake has the highest bird counts when compared to any other locations within the wetlands. Habitat quality at stopover sites is very important to maintain (Fournier, Mengel, & Kremetz, 2018), as are the human uses that occur at those sites. “For the benefits of waterfowl, the harm from human disturbances must be minimized or eliminated” (Korschgen & Dahlgren, 1992). It is strongly recommended that management strategies be implemented that can work to accommodate both human values (e.g. recreation, economic prosperity from tourism) and bird conservation. The following suggestions for management action are science-based and should involve local aboriginal peoples such as the Akisqnuq First Nation, as Akisqnuq neighbors the communities of Windermere to the north and Fairmont Hot Springs to the south. Recommendations are as follows:

1. Since virtually nothing is known regarding the incidence of people approaching at-risk grebe species or other birds on the lake, research should be conducted to determine the extent of human intrusion on the birds of Lake Windermere. If it is determined that birds are being impacted, buffer distances for recreationists could be established. Buffer distances often vary across the type of use and across species. One recent bird study calculated an overall buffer zone for all species of 100 m, and species-specific buffer zones ranging from 41 to 211 m. (McFadden, Herrera, & Navedo, 2017).
2. Given the importance of Lake Windermere as bird habitat, birds need to be strongly considered when making future land-use decisions for Lake Windermere and the riparian area.
3. Many people do not understand that their activities affect wildlife. It is important to communicate that anyone who causes a bird to flee during migration causes harm to the bird, as it may reduce its feeding opportunities (Klien, 1993). There is a need for more public education about the importance of Lake Windermere to birds and about the number of at-risk birds utilizing the lake as significant habitat. Educational materials regarding the birds of Lake Windermere should be developed and provided to all recreational users, e.g. motorized and non-motorized boaters, people on shoreline (birdwatchers, photographers, hikers, etc.). There are several impacts that can be felt by birds during the breeding season (examples described in the introduction), which should become part of an educational awareness piece.

4. It is suggested that previous recommendations coming from McPherson & Hlushak (2008) be adhered to:

“Wetlands are important features in Windermere Lake that should be given greater protection than what is apparent in the OCP. In order to protect their valuable fish and wildlife habitat, we believe that the OCP wording should be stronger to ensure that any proposed wetland alteration (as designated by the ZOS map), does have a development permit completed according to the Section 21 of the OCP. This would require the completion of such tasks as: analysis and identification of endangered or vulnerable flora and fauna species, identification of areas to be altered and areas to remain natural, mitigation of impacts on fish and wildlife values, and establishment of setback distances. Wetlands are considered islands of biological diversity integral to the ecology and species diversity of the lake. For this reason, it is recommended that buffers or set-backs be established by government agencies to ensure their protection. These established buffers should be adequately sized to provide protection of function and should be regulated and enforced regardless of land status.”

5. The south end of Lake Windermere is currently relatively free of human development, has a high amount of food availability for waterbirds, with limited human access or use. It is important to continue with the current habitat conditions found at the south end so that high habitat suitability for migrating birds can be maintained.
6. The south end of Lake Windermere has been documented to be the most important staging grounds for birds in terms of largest mixed flock size detected in the Columbia Wetlands, and this area is likely a key breeding area for marsh birds. The south end is already part of the WMA, therefore it is suggested that this section be marked with educational buoys and signage suggesting that people keep out of this area during sensitive periods for birds (e.g. breeding and migration). Current boating regulations already prohibit motorized boats from entering the WMA.
7. Since little is known about the breeding use of birds on Lake Windermere, we concur with McPherson & Hlushak (2008) and suggest that a complete spring breeding bird survey be conducted, “in order to assess utilization of the area during a critical life history stage.”

8. The Lake Windermere Ambassadors along with other community groups should promote the use of eBird to the public, so that the knowledge base of birds on Lake Windermere can continue to grow. This will allow for population trends to be formulated, which may help with the future management of activities on Lake Windermere.
9. In order to learn more about at-risk grebe species use on Lake Windermere, further boat surveys should be conducted during peak periods of grebe migration on Lake Windermere (e.g. early-mid May and early-late October).
10. Korschgen & Dahlgren (1992) outlined specific management considerations to reduce human intrusion and disturbances on waterfowl, which should be further explored for Lake Windermere. These suggestions include: establish buffer zones around important feeding areas, reduce access points to limit accessibility to habitats that are currently receiving limited amounts of human use (e.g. south end), create inviolate sanctuaries, and reduce the source of loud noises and rapid movements from machines during critical periods.
11. Since at-risk grebe species are at the top of the food chain, feed extensively on fish and are sensitive to aquatic pollutants, it is recommended that a toxic analysis on the fish of Lake Windermere be conducted.

In order to protect the important bird habitat found at Lake Windermere, there needs to be further research conducted to determine the potential capability of nature conservation coinciding with the recreational use of the lake. It is important to find a balance between increasing levels of human use and the conservation of bird habitat which will help to maintain resilient ecosystems into the future. Working towards achieving sustainable levels of recreation with the least likelihood of negative impact to the public or the environment is of paramount importance. The potentially adverse consequences of not adhering to the recommendations provided here may include decreasing amounts of available bird habitat at Lake Windermere, leading to declining bird use and the further decline of bird species populations. The results of this report should be shared with decision-makers and land managers for Lake Windermere.

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The cover photo was taken by the author during the September 21, 2018 boat survey and depicts three red-necked grebes on Lake Windermere.

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Appendices

Appendix 1. List of 165 bird species on checklists for Lake Windermere according to the data available for the 14 eBird hotspot locations as of November 15, 2018.

Order > Family	Species Name	Scientific Name
Anseriformes > Anatidae	Snow Goose	<i>Anser caerulescens</i>
Anseriformes > Anatidae	Canada Goose	<i>Branta canadensis</i>
Anseriformes > Anatidae	Trumpeter Swan	<i>Cygnus buccinator</i>
Anseriformes > Anatidae	*Tundra Swan	<i>Cygnus columbianus</i>
Anseriformes > Anatidae	Trumpeter/Tundra Swan	<i>n/a</i>
Anseriformes > Anatidae	Wood Duck	<i>Aix sponsa</i>
Anseriformes > Anatidae	Blue-winged Teal	<i>Spatula discors</i>
Anseriformes > Anatidae	Cinnamon Teal	<i>Spatula cyanoptera</i>
Anseriformes > Anatidae	Northern Shoveler	<i>Spatula clypeata</i>
Anseriformes > Anatidae	Gadwall	<i>Mareca strepera</i>
Anseriformes > Anatidae	American Wigeon	<i>Mareca americana</i>
Anseriformes > Anatidae	Eurasian Wigeon	<i>Mareca penelope</i>
Anseriformes > Anatidae	Mallard	<i>Anas platyrhynchos</i>
Anseriformes > Anatidae	Redhead	<i>Aythya americana</i>
Anseriformes > Anatidae	Northern Pintail	<i>Anas acuta</i>
Anseriformes > Anatidae	Ring-necked duck	<i>Aythya collaris</i>
Anseriformes > Anatidae	Green-winged Teal	<i>Anas crecca</i>
Anseriformes > Anatidae	dabbling duck sp.	<i>n/a</i>
Anseriformes > Anatidae	Canvasback	<i>Aythya valisineria</i>
Anseriformes > Anatidae	Greater Scaup	<i>Aythya marila</i>
Anseriformes > Anatidae	Lesser Scaup	<i>Aythya affinis</i>
Anseriformes > Anatidae	Greater/Lesser Scaup	<i>n/a</i>
Anseriformes > Anatidae	*Surf Scoter	<i>Melanitta perspicillata</i>
Anseriformes > Anatidae	Bufflehead	<i>Bucephala albeola</i>
Anseriformes > Anatidae	Common Goldeneye	<i>Bucephala clangula</i>
Anseriformes > Anatidae	Barrow's Goldeneye	<i>Bucephala islandica</i>

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Anseriformes > Anatidae	Hooded Merganser	<i>Lophodytes cucullatus</i>
Anseriformes > Anatidae	Common Merganser	<i>Mergus merganser</i>
Anseriformes > Anatidae	Red-breasted Merganser	<i>Mergus serrator</i>
Anseriformes > Anatidae	Ruddy Duck	<i>Oxyura jamaicensis</i>
Anseriformes > Anatidae	duck sp.	n/a
Galliformes > Phasianidae	Wild Turkey	<i>Meleagris gallopavo</i>
Galliformes > Phasianidae	Ruffed Grouse	<i>Bonasa umbellus</i>
Podicipediformes > Podicipedidae	Pied-billed Grebe	<i>Podilymbus podiceps</i>
Podicipediformes > Podicipedidae	*Horned Grebe	<i>Podiceps auritus</i>
Podicipediformes > Podicipedidae	*Eared Grebe	<i>Podiceps nigricollis</i>
Podicipediformes > Podicipedidae	Horned/Eared Grebe	n/a
Podicipediformes > Podicipedidae	Red-necked Grebe	<i>Podiceps grisegena</i>
Podicipediformes > Podicipedidae	*Western Grebe	<i>Aechmophorus occidentalis</i>
Columbiformes > Columbidae	Rock Pigeon	<i>Columba livia</i>
Columbiformes > Columbidae	Mourning Dove	<i>Zenaida macroura</i>
Gruiformes > Rallidae	Virginia Rail	<i>Rallus limicola</i>
Gruiformes > Rallidae	Sora	<i>Porzana carolina</i>
Caprimulgiformes > Caprimulgidae	*Common Nighthawk	<i>Chordeiles minor</i>
Caprimulgiformes > Trochilidae	Rufous Hummingbird	<i>Selasphorus rufus</i>
Caprimulgiformes > Trochilidae	Black-chinned hummingbird	<i>Archilochus alexandri</i>
Gruiformes > Rallidae	American Coot	<i>Fulica americana</i>
Gruiformes > Gruidae	Sandhill Crane	<i>Antigone canadensis</i>
Charadriiformes > Recurvirostridae	Black-necked Stilt	<i>Himantopus mexicanus</i>
Charadriiformes > Recurvirostridae	*American Avocet	<i>Recurvirostra americana</i>
Charadriiformes > Charadriidae	Black-bellied Plover	<i>Pluvialis squatarola</i>
Charadriiformes > Charadriidae	Semipalmated Plover	<i>Semipalmated Plover</i>
Charadriiformes > Charadriidae	Killdeer	<i>Charadrius vociferus</i>
Charadriiformes > Scolopacidae	*Long-billed Curlew	<i>Numenius americanus</i>
Charadriiformes > Scolopacidae	Marbled Godwit	<i>Limosa fedoa</i>
Charadriiformes > Scolopacidae	Dunlin	<i>Calidris alpina</i>
Charadriiformes > Scolopacidae	Baird's Sandpiper	<i>Calidris bairdii</i>

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Charadriiformes > Scolopacidae	Least Sandpiper	<i>Calidris minutilla</i>
Charadriiformes > Scolopacidae	Pectoral Sandpiper	<i>Calidris melanotos</i>
Charadriiformes > Scolopacidae	Sanderling	<i>Calidris alba</i>
Charadriiformes > Scolopacidae	Semipalmated Sandpiper	<i>Calidris pusilla</i>
Charadriiformes > Scolopacidae	Western Sandpiper	<i>Calidris mauri</i>
Charadriiformes > Scolopacidae	Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Charadriiformes > Scolopacidae	Wilson's Snipe	<i>Gallinago delicata</i>
Charadriiformes > Scolopacidae	Spotted Sandpiper	<i>Actitis macularius</i>
Charadriiformes > Scolopacidae	Solitary Sandpiper	<i>Tringa solitaria</i>
Charadriiformes > Scolopacidae	Greater Yellowlegs	<i>Tringa melanoleuca</i>
Charadriiformes > Scolopacidae	Willet	<i>Tringa semipalmata</i>
Charadriiformes > Scolopacidae	Lesser Yellowlegs	<i>Tringa flavipes</i>
Charadriiformes > Laridae	Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>
Charadriiformes > Laridae	Franklin's Gull	<i>Leucophaeus pipixcan</i>
Charadriiformes > Laridae	Mew Gull	<i>Larus canus</i>
Charadriiformes > Laridae	Ring-billed Gull	<i>Larus delawarensis</i>
Charadriiformes > Laridae	*California Gull	<i>Larus californicus</i>
Charadriiformes > Laridae	Herring Gull	<i>Larus argentatus</i>
Charadriiformes > Laridae	gull sp.	<i>n/a</i>
Charadriiformes > Laridae	*Caspian Tern	<i>Hydroprogne caspia</i>
Charadriiformes > Laridae	Common Tern	<i>Sterna hirundo</i>
Gaviiformes > Gaviidae	Common Loon	<i>Gavia immer</i>
Suliformes > Phalacrocoracidae	*1Double-crested Cormorant	<i>Phalacrocorax auritus</i>
Pelecaniformes > Pelecanidae	*American White Pelican	<i>Pelecanus erythrorhynchos</i>
Pelecaniformes > Ardeidae	*Great Blue Heron	<i>Ardea herodias</i>
Cathartiformes > Cathartidae	Turkey Vulture	<i>Cathartes aura</i>
Accipitriformes > Pandionidae	Osprey	<i>Pandion haliaetus</i>
Accipitriformes > Accipitridae	Golden Eagle	<i>Aquila chrysaetos</i>
Accipitriformes > Accipitridae	Northern Harrier	<i>Circus hudsonius</i>
Accipitriformes > Accipitridae	Sharp-shinned Hawk	<i>Accipiter striatus</i>
Accipitriformes > Accipitridae	Cooper's Hawk	<i>Accipiter cooperii</i>

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Accipitriformes > Accipitridae	Northern Goshawk	<i>Accipiter gentilis</i>
Accipitriformes > Accipitridae	Bald Eagle	<i>Haliaeetus leucocephalus</i>
Accipitriformes > Accipitridae	Red-tailed Hawk	<i>Buteo jamaicensis</i>
Strigiformes > Strigidae	Great Horned Owl	<i>Bubo virginianus</i>
Strigiformes > Strigidae	Northern Pygmy Owl	<i>Glaucidium gnoma</i>
Coraciiformes > Alcedinidae	Belted Kingfisher	<i>Megaceryle alcyon</i>
Piciformes > Picidae	*Lewis's Woodpecker	<i>Melanerpes lewis</i>
Piciformes > Picidae	Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>
Piciformes > Picidae	Downy Woodpecker	<i>Dryobates pubescens</i>
Piciformes > Picidae	Hairy Woodpecker	<i>Dryobates villosus</i>
Piciformes > Picidae	Pileated Woodpecker	<i>Dryocopus pileatus</i>
Piciformes > Picidae	Northern Flicker	<i>Colaptes auratus</i>
Falconiformes > Falconidae	American Kestrel	<i>Falco sparverius</i>
Falconiformes > Falconidae	Merlin	<i>Falco columbarius</i>
Falconiformes > Falconidae	*Peregrine Falcon	<i>Falco peregrinus</i>
Passeriformes > Laniidae	Northern Shrike	<i>Lanius borealis</i>
Passeriformes > Tyrannidae	Eastern Kingbird	<i>Tyrannus tyrannus</i>
Passeriformes > Tyrannidae	Willow Flycatcher	<i>Empidonax traillii</i>
Passeriformes > Tyrannidae	Dusky Flycatcher	<i>Empidonax oberholseri</i>
Passeriformes > Tyrannidae	Least Flycatcher	<i>Empidonax minimus</i>
Passeriformes > Tyrannidae	Hammond's Flycatcher	<i>Empidonax hammondii</i>
Passeriformes > Vireonidae	Cassin's Vireo	<i>Vireo cassinii</i>
Passeriformes > Vireonidae	Warbling Vireo	<i>Vireo gilvus</i>
Passeriformes > Corvidae	Steller's Jay	<i>Cyanocitta stelleri</i>
Passeriformes > Corvidae	Blue Jay	<i>Cyanocitta cristata</i>
Passeriformes > Corvidae	Black-billed Magpie	<i>Pica hudsonia</i>
Passeriformes > Corvidae	Clark's Nutcracker	<i>Nucifraga columbiana</i>
Passeriformes > Corvidae	American Crow	<i>Corvus brachyrhynchos</i>
Passeriformes > Corvidae	Common Raven	<i>Corvus corax</i>
Passeriformes > Hirundinidae	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Passeriformes > Hirundinidae	Tree Swallow	<i>Tachycineta bicolor</i>

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Passeriformes > Hirundinidae	Violet-green Swallow	<i>Tachycineta thalassina</i>
Passeriformes > Hirundinidae	*Bank Swallow	<i>Riparia riparia</i>
Passeriformes > Hirundinidae	*Barn Swallow	<i>Hirundo rustica</i>
Passeriformes > Hirundinidae	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Passeriformes > Paridae	Black-capped Chickadee	<i>Poecile atricapillus</i>
Passeriformes > Paridae	Mountain Chickadee	<i>Poecile gambeli</i>
Passeriformes > Paridae	chickadee sp.	n/a
Passeriformes > Sittidae	Red-breasted Nuthatch	<i>Sitta canadensis</i>
Passeriformes > Certhiidae	Brown Creeper	<i>Certhia americana</i>
Passeriformes > Troglodytidae	House Wren	<i>Troglodytes aedon</i>
Passeriformes > Troglodytidae	Marsh Wren	<i>Cistothorus palustris</i>
Passeriformes > Cinclidae	American Dipper	<i>Cinclus mexicanus</i>
Passeriformes > Regulidae	Golden-crowned Kinglet	<i>Regulus satrapa</i>
Passeriformes > Regulidae	Ruby-crowned Kinglet	<i>Regulus calendula</i>
Passeriformes > Turdidae	Mountain Bluebird	<i>Sialia currucoides</i>
Passeriformes > Turdidae	Townsend's Solitaire	<i>Myadestes townsendi</i>
Passeriformes > Turdidae	Swainson's Thrush	<i>Catharus ustulatus</i>
Passeriformes > Turdidae	American Robin	<i>Turdus migratorius</i>
Passeriformes > Motacillidae	American Pipit	<i>Anthus rubescens</i>
Passeriformes > Mimidae	Gray Catbird	<i>Dumetella carolinensis</i>
Passeriformes > Sturnidae	European Starling	<i>Sturnus vulgaris</i>
Passeriformes > Fringillidae	Pine Grosbeak	<i>Pinicola enucleator</i>
Passeriformes > Bombycillidae	Cedar Waxwing	<i>Bombycilla cedrorum</i>
Passeriformes > Fringillidae	Red Crossbill	<i>Loxia curvirostra</i>
Passeriformes > Fringillidae	House Finch	<i>Haemorhous mexicanus</i>
Passeriformes > Fringillidae	Common Redpoll	<i>Acanthis flammea</i>
Passeriformes > Fringillidae	Pine Siskin	<i>Spinus pinus</i>
Passeriformes > Fringillidae	American Goldfinch	<i>Spinus tristis</i>
Passeriformes > Calcariidae	Snow Bunting	<i>Plectrophenax nivalis</i>
Passeriformes > Passerellidae	Fox Sparrow	<i>Passerella iliaca</i>
Passeriformes > Passerellidae	Chipping Sparrow	<i>Spizella passerina</i>

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Passeriformes > Passerellidae	Dark-eyed Junco	<i>Junco hyemalis</i>
Passeriformes > Passerellidae	Vesper Sparrow	<i>Pooecetes gramineus</i>
Passeriformes > Passerellidae	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Passeriformes > Passerellidae	White-throated Sparrow	<i>Zonotrichia albicollis</i>
Passeriformes > Passerellidae	Savannah Sparrow	<i>Passerculus sandwichensis</i>
Passeriformes > Passerellidae	Song Sparrow	<i>Melospiza melodia</i>
Passeriformes > Passerellidae	Lincoln's Sparrow	<i>Melospiza lincolnii</i>
Passeriformes > Passerellidae	Spotted Towhee	<i>Pipilo maculatus</i>
Passeriformes > Icteridae	Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>
Passeriformes > Icteridae	Western Meadowlark	<i>Sturnella neglecta</i>
Passeriformes > Icteridae	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Passeriformes > Icteridae	Brown-headed Cowbird	<i>Molothrus ater</i>
Passeriformes > Icteridae	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Passeriformes > Icteridae	Common Grackle	<i>Quiscalus quiscula</i>
Passeriformes > Parulidae	Orange-crowned Warbler	<i>Oreothlypis celata</i>
Passeriformes > Parulidae	Common Yellowthroat	<i>Geothlypis trichas</i>
Passeriformes > Parulidae	Yellow Warbler	<i>Setophaga petechia</i>
Passeriformes > Parulidae	Yellow-rumped Warbler	<i>Setophaga coronata</i>
Passeriformes > Parulidae	Wilson's Warbler	<i>Cardellina pusilla</i>
Passeriformes > Parulidae	warbler sp. (Parulidae sp.)	n/a
Passeriformes > Cardinalidae	Western Tanager	<i>Piranga ludoviciana</i>
Passeriformes > Cardinalidae	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Passeriformes > Passeridae	House Sparrow	<i>Passer domesticus</i>

(* denotes bird species-at-risk).

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Appendix 2. Accounts retrieved from eBird of western grebe on Lake Windermere, as of November 15, 2018.

eBird hotspot location	Date	# of individuals
Lake Windermere North	October 23, 2018	2
private residence Hilltop Road (northeast Lake Windermere)	October 21, 2018	10
Invmere--Windermere Cemetery/Lake Windermere	October 15, 2018	4
Lake Windermere North	October 13, 2018	20
Invermere--Windermere Cemetery/Lake Windermere	October 5, 2018	3
Invermere--Grizzly Ridge Heights	October 5, 2018	11
Invermere--Kin Beach/Lake Windermere	September 29, 2018	1
James Chabot Provincial Park	September 29, 2018	3
Private beach Area-Baltac Road	September 29, 2018	8
private residence Hilltop Road (northeast Lake Windermere)	September 22, 2018	1
Lake Windermere boat survey	September 21, 2018	6
private residence Hilltop Road (northeast Lake Windermere)	September 18, 2018	12
Lake Windermere boat survey	September 17, 2018	21
private residence Hilltop Road (northeast Lake Windermere)	September 16, 2018	21
private residence Hilltop Road (northeast Lake Windermere)	September 15, 2018	20
private residence Hilltop Road (northeast Lake Windermere)	September 5, 2018	6
CA-BC-Indian Beach Estate (east centre Lake Windermere)	August 24, 2018	3
West Side Lake Windermere across from Terra Vista	July 12, 2018	7
private residence Hilltop Road (northeast Lake Windermere)	May 28, 2018	12
private residence Hilltop Road (northeast Lake Windermere)	May 11, 2018	11
Inveremere--Kin Beach/Lake Windermere	May 8, 2018	9
private residence Hilltop Road (northeast Lake Windermere)	May 8, 2018	55
private residence Hilltop Road (northeast Lake Windermere)	May 4, 2018	5
private residence Hilltop Road (northeast Lake Windermere)	April 29, 2018	6

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private residence Hilltop Road (northeast Lake Windermere)	April 26, 2018	5
private residence Hilltop Road (northeast Lake Windermere)	October 23, 2017	39
Invermere--Grizzly Ridge Heights	October 15, 2017	23
Invermere--Lakeview Meadows	October 5, 2017	1
Lakeshore Resort Campground	October 5, 2017	1
Invermere--Grizzly Ridge Heights	October 5, 2017	3
Lake Windermere--End of Coy Rd	September 29, 2017	1
Lake Windermere - boat survey	September 21, 2017	6
private residence Hilltop Road (northeast Lake Windermere)	May 17, 2017	5
private residence Hilltop Road (northeast Lake Windermere)	May 7, 2017	109
private residence Hilltop Road (northeast Lake Windermere)	October 16, 2016	71
private residence Hilltop Road (northeast Lake Windermere)	October 13, 2016	17
private residence Hilltop Road (northeast Lake Windermere)	October 12, 2016	7
private residence Hilltop Road (northeast Lake Windermere)	October 11, 2016	17
private residence Hilltop Road (northeast Lake Windermere)	September 27, 2016	8
private residence Hilltop Road (northeast Lake Windermere)	September 26, 2016	18
private residence Hilltop Road (northeast Lake Windermere)	September 25, 2016	14
private residence Hilltop Road (northeast Lake Windermere)	September 24, 2016	23
private residence Hilltop Road (northeast Lake Windermere)	September 18, 2016	4
private residence Hilltop Road (northeast Lake Windermere)	September 17, 2016	6
private residence Hilltop Road (northeast Lake Windermere)	June 21, 2016	2
private residence Hilltop Road (northeast Lake Windermere)	May 31, 2016	1
private residence Hilltop Road (northeast Lake Windermere)	May 26, 2016	12
private residence Hilltop Road (northeast Lake Windermere)	May 22, 2016	1
private residence Hilltop Road (northeast Lake Windermere)	May 15, 2016	1
private residence Hilltop Road (northeast Lake Windermere)	May 14, 2016	14
private residence Hilltop Road (northeast Lake Windermere)	May 10, 2016	10

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private residence Hilltop Road (northeast Lake Windermere)	May 1, 2016	1
private residence Hilltop Road (northeast Lake Windermere)	April 27, 2016	20
private residence Hilltop Road (northeast Lake Windermere)	April 27, 2016	31
private residence Hilltop Road (northeast Lake Windermere)	April 26, 2016	36
private residence Hilltop Road (northeast Lake Windermere)	April 26, 2016	71
private residence Hilltop Road (northeast Lake Windermere)	October 30, 2015	12
private residence Hilltop Road (northeast Lake Windermere)	October 23, 2015	1
private residence Hilltop Road (northeast Lake Windermere)	October 16, 2015	9
Invermere--Cardiff Ave Beach/Lake Windermere	October 15, 2015	1
Windermere Cemetery Hill	October 15, 2015	7
Baltac Road, Windermere	October 15, 2015	8
Invermere--Grizzly Ridge Heights	October 15, 2015	10
Lake Windermere North	October 13, 2015	20
private residence Hilltop Road (northeast Lake Windermere)	October 13, 2015	42
private residence Hilltop Road (northeast Lake Windermere)	October 12, 2015	6
Invermere--Kin Beach/Lake Windermere	October 12, 2015	6
private residence Hilltop Road (northeast Lake Windermere)	October 12, 2015	10
private residence Hilltop Road (northeast Lake Windermere)	October 11, 2015	32
private residence Hilltop Road (northeast Lake Windermere)	October 10, 2015	38
private residence Hilltop Road (northeast Lake Windermere)	October 9, 2015	8
private residence Hilltop Road (northeast Lake Windermere)	October 7, 2015	1
Baltac Road, Windermere	October 5, 2015	1
Lake Windermere--End of Coy Rd	October 5, 2015	1
Invermere--Windermere Creek/Lake Windermere	September 23, 2015	6
private residence Hilltop Road (northeast Lake Windermere)	September 21, 2015	27
Invermere--Windermere Creek/Lake Windermere	September 17, 2015	8
private residence Hilltop Road (northeast Lake Windermere)	September 14, 2015	3

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private residence Hilltop Road (northeast Lake Windermere)	September 11, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	September 10, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	September 10, 2015	4
private residence Hilltop Road (northeast Lake Windermere)	September 7, 2015	4
private residence Hilltop Road (northeast Lake Windermere)	September 5, 2015	4
private residence Hilltop Road (northeast Lake Windermere)	August 12, 2015	1
private residence Hilltop Road (northeast Lake Windermere)	August 6, 2015	1
private residence Hilltop Road (northeast Lake Windermere)	August 5, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	July 31, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	July 25, 2015	3
private residence Hilltop Road (northeast Lake Windermere)	June 11, 2015	6
private residence Hilltop Road (northeast Lake Windermere)	June 5, 2015	7
private residence Hilltop Road (northeast Lake Windermere)	May 19, 2015	13
private residence Hilltop Road (northeast Lake Windermere)	May 16, 2015	4
private residence Hilltop Road (northeast Lake Windermere)	May 15, 2015	4
private residence Hilltop Road (northeast Lake Windermere)	May 15, 2015	10
private residence Hilltop Road (northeast Lake Windermere)	May 14, 2015	4
private residence Hilltop Road (northeast Lake Windermere)	May 14, 2015	4
private residence Hilltop Road (northeast Lake Windermere)	May 13, 2015	6
private residence Hilltop Road (northeast Lake Windermere)	May 11, 2015	8
Invermere--Baltac Beach/Lake Windermere	May 9, 2015	16
Lakeshore Resort Campground	May 4, 2015	2
Lake Windermere--Rushmere Road	May 4, 2015	3
Baltac Road, Windermere	May 4, 2015	6
private residence Hilltop Road (northeast Lake Windermere)	November 5, 2014	20
private residence Hilltop Road (northeast Lake Windermere)	November 3, 2014	32
private residence Hilltop Road (northeast Lake Windermere)	November 1, 2014	9

Insight into the Waterbirds of Lake Windermere

private residence Hilltop Road (northeast Lake Windermere)	October 30, 2014	10
private residence Hilltop Road (northeast Lake Windermere)	October 29, 2014	6
private residence Hilltop Road (northeast Lake Windermere)	October 28, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	October 27, 2014	3
private residence Hilltop Road (northeast Lake Windermere)	October 26, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	October 25, 2014	13
private residence Hilltop Road (northeast Lake Windermere)	October 18, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	October 8, 2014	10
private residence Hilltop Road (northeast Lake Windermere)	October 7, 2014	12
private residence Hilltop Road (northeast Lake Windermere)	October 7, 2014	12
private residence Hilltop Road (northeast Lake Windermere)	October 6, 2014	12
private residence Hilltop Road (northeast Lake Windermere)	October 5, 2014	7
private residence Hilltop Road (northeast Lake Windermere)	July 11, 2014	1
private residence Hilltop Road (northeast Lake Windermere)	July 10, 2014	1
private residence Hilltop Road (northeast Lake Windermere)	July 5, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	July 4, 2014	3
private residence Hilltop Road (northeast Lake Windermere)	July 3, 2014	3
private residence Hilltop Road (northeast Lake Windermere)	July 2, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	June 26, 2014	12
private residence Hilltop Road (northeast Lake Windermere)	June 24, 2014	7
private residence Hilltop Road (northeast Lake Windermere)	June 20, 2014	9
private residence Hilltop Road (northeast Lake Windermere)	June 19, 2014	3
private residence Hilltop Road (northeast Lake Windermere)	June 16, 2014	5
private residence Hilltop Road (northeast Lake Windermere)	June 14, 2014	3
private residence Hilltop Road (northeast Lake Windermere)	May 14, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	May 13, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	May 12, 2014	14

Insight into the Waterbirds of Lake Windermere

private residence Hilltop Road (northeast Lake Windermere)	May 11, 2014	18
private residence Hilltop Road (northeast Lake Windermere)	May 10, 2014	22
private residence Hilltop Road (northeast Lake Windermere)	May 7, 2014	15
Baltac Road, Windermere	May 7, 2014	80
Invermere Athalmer Wilmer Circuit	May 6, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	May 6, 2014	49
Invermere--Grizzly Ridge Heights	May 5, 2014	150
private residence Hilltop Road (northeast Lake Windermere)	May 5, 2014	156
Windermere Lake	May 5, 2014	220
private residence Hilltop Road (northeast Lake Windermere)	May 4, 2014	177
private residence Hilltop Road (northeast Lake Windermere)	May 3, 2014	155
private residence Hilltop Road (northeast Lake Windermere)	May 2, 2014	47
Invermere--Grizzly Ridge Heights	May 10, 2013	1
James Chabot Provincial Park	May 10, 2013	1
Lake Windermere--Westside Rd	May 8, 2012	6
James Chabot Provincial Park	August 26, 1992	1
Total number		2541

Insight into the Waterbirds of Lake Windermere

Appendix 3. Accounts retrieved from eBird for horned grebe on Lake Windermere, as of November 15, 2018

eBird hotspot location	Date	# of individuals
CA-BC-Windermere Lake(50.4721, -115.9955) (NE part of Lake Windermere)	October 20, 2018	1
Invermere - Lakeview Meadows	October 15, 2018	4
Athalmer Bridge- Pete's Marina	October 15, 2018	5
Invermere - Lakeview Meadows	October 5, 2018	1
James Chabot Provincial Park	October 5, 2018	2
Lake-Windermere--Rushmere Road	October 5, 2018	3
private residence Hilltop Road (northeast Lake Windermere)	September 18, 2018	4
private residence Hilltop Road (northeast Lake Windermere)	May 11, 2018	7
private residence Hilltop Road (northeast Lake Windermere)	May 2, 2018	35
private residence Hilltop Road (northeast Lake Windermere)	April 25, 2018	11
Invermere--Windermere Creek/Lake Windermere	April 23, 2018	1
private residence Hilltop Road (northeast Lake Windermere)	April 19, 2018	5
private residence Hilltop Road (northeast Lake Windermere)	November 6, 2017	3
private residence Hilltop Road (northeast Lake Windermere)	November 3, 2017	1
James Chabot Provincial Park	October 5, 2017	1
CWWS - Southeast end of Lake Windermere	September 29, 2017	1
Lakeshore Resort Campground	September 29, 2017	1
Lake Windermere - boat survey	September 21, 2017	1
Invermere--Windermere Creek/Lake Windermere	May 8, 2017	1
private residence Hilltop Road (northeast Lake Windermere)	May 7, 2017	8
private residence Hilltop Road (northeast Lake Windermere)	May 4, 2017	19
private residence Hilltop Road (northeast Lake Windermere)	April 23, 2017	16
private residence Hilltop Road (northeast Lake Windermere)	April 17, 2017	1
Invermere--Cardiff Ave Beach/Lake Windermere	November 21, 2016	1

Insight into the Waterbirds of Lake Windermere

private residence Hilltop Road (northeast Lake Windermere)	October 16, 2016	6
Invermere--Kin Beach/Lake Windermere	October 15, 2016	2
private residence Hilltop Road (northeast Lake Windermere)	October 13, 2016	8
private residence Hilltop Road (northeast Lake Windermere)	October 12, 2016	1
CWWS - Southeast End Lake Windermere	October 5, 2016	1
private residence Hilltop Road (northeast Lake Windermere)	September 27, 2016	2
private residence Hilltop Road (northeast Lake Windermere)	September 26, 2016	6
private residence Hilltop Road (northeast Lake Windermere)	September 25, 2016	10
private residence Hilltop Road (northeast Lake Windermere)	September 24, 2016	21
private residence Hilltop Road (northeast Lake Windermere)	September 18, 2016	15
private residence Hilltop Road (northeast Lake Windermere)	September 16, 2016	22
private residence Hilltop Road (northeast Lake Windermere)	June 6, 2016	4
private residence Hilltop Road (northeast Lake Windermere)	May 31, 2016	2
private residence Hilltop Road (northeast Lake Windermere)	May 15, 2016	2
BC - Roadside Pond, Westside Rd	May 12, 2016	4
Invermere--Kin Beach/Lake Windermere	May 10, 2016	6
private residence Hilltop Road (northeast Lake Windermere)	May 1, 2016	28
private residence Hilltop Road (northeast Lake Windermere)	April 27, 2016	30
private residence Hilltop Road (northeast Lake Windermere)	April 27, 2016	40
private residence Hilltop Road (northeast Lake Windermere)	April 26, 2016	6
private residence Hilltop Road (northeast Lake Windermere)	April 18, 2016	29
private residence Hilltop Road (northeast Lake Windermere)	April 18, 2016	57
private residence Hilltop Road (northeast Lake Windermere)	April 17, 2016	8
private residence Hilltop Road (northeast Lake Windermere)	April 17, 2016	10
Invermere--Baltac Beach/Lake Windermere	April 16, 2016	9
private residence Hilltop Road (northeast Lake Windermere)	April 15, 2016	2
private residence Hilltop Road (northeast Lake Windermere)	April 11, 2016	9

Insight into the Waterbirds of Lake Windermere

Invermere--Baltac Beach/Lake Windermere	April 10, 2016	2
private residence Hilltop Road (northeast Lake Windermere)	April 9, 2016	8
private residence Hilltop Road (northeast Lake Windermere)	April 8, 2016	3
private residence Hilltop Road (northeast Lake Windermere)	November 10, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	October 26, 2015	12
Windermere Cemetery Hill	October 15, 2015	4
private residence Hilltop Road (northeast Lake Windermere)	October 13, 2015	6
private residence Hilltop Road (northeast Lake Windermere)	October 12, 2015	1
Invermere--Kin Beach/Lake Windermere	October 12, 2015	1
private residence Hilltop Road (northeast Lake Windermere)	October 12, 2015	8
private residence Hilltop Road (northeast Lake Windermere)	October 11, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	July 25, 2015	3
private residence Hilltop Road (northeast Lake Windermere)	May 21, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	May 16, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	May 15, 2015	1
private residence Hilltop Road (northeast Lake Windermere)	May 15, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	May 14, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	May 14, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	May 14, 2015	3
private residence Hilltop Road (northeast Lake Windermere)	May 13, 2015	2
private residence Hilltop Road (northeast Lake Windermere)	May 10, 2015	1
Invermere--Baltac Beach/Lake Windermere	May 9, 2015	4
Invermere--Windermere Creek/Lake Windermere	May 6, 2015	1
Invermere--Cardiff Ave Beach/Lake Windermere	May 4, 2015	1
Baltac Road, Windermere	May 4, 2015	36
Baltac Road, Windermere	May 1, 2015	1
Invermere--Baltac Beach/Lake Windermere	April 24, 2015	1

Insight into the Waterbirds of Lake Windermere

Windermere (Cardiff Ave Beach area)	November 11, 2014	1
private residence Hilltop Road (northeast Lake Windermere)	November 8, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	November 5, 2014	3
private residence Hilltop Road (northeast Lake Windermere)	November 1, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	October 30, 2014	1
private residence Hilltop Road (northeast Lake Windermere)	October 29, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	October 28, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	June 19, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	June 6, 2014	3
private residence Hilltop Road (northeast Lake Windermere)	June 4, 2014	1
private residence Hilltop Road (northeast Lake Windermere)	June 3, 2014	1
private residence Hilltop Road (northeast Lake Windermere)	May 31, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	May 26, 2014	4
private residence Hilltop Road (northeast Lake Windermere)	May 25, 2014	6
private residence Hilltop Road (northeast Lake Windermere)	May 23, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	May 22, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	May 22, 2014	6
Invermere--Windermere Creek/Lake Windermere	May 13, 2014	2
private residence Hilltop Road (northeast Lake Windermere)	May 12, 2014	9
Invermere (West central side Lake Windermere)	May 10, 2014	1
private residence Hilltop Road (northeast Lake Windermere)	May 10, 2014	16
private residence Hilltop Road (northeast Lake Windermere)	May 8, 2014	4
Windermere Creek Mouth, Windermere	May 7, 2014	1
Baltac Road, Windermere	May 7, 2014	2
Invermere--Windermere Creek/Lake Windermere	May 7, 2014	5
Invermere--Windermere Creek/Lake Windermere	May 6, 2014	1
Invermere Athalmer Wilmer Circuit	May 6, 2014	2

Insight into the Waterbirds of Lake Windermere

Invermere--Kin Beach/Lake Windermere	May 5, 2014	6
Invermere--Windermere Creek/Lake Windermere	May 5, 2014	15
Windermere Lake	May 5, 2014	120
private residence Hilltop Road (northeast Lake Windermere)	May 4, 2014	5
private residence Hilltop Road (northeast Lake Windermere)	May 3, 2014	11
private residence Hilltop Road (northeast Lake Windermere)	May 3, 2014	24
private residence Hilltop Road (northeast Lake Windermere)	May 2, 2014	11
private residence Hilltop Road (northeast Lake Windermere)	April 30, 2014	32
Timber Ridge Rd @ Ridge Place (north part of Lake Windermere)	April 29, 2014	2
Invermere--Grizzly Ridge Heights	May 10, 2013	1
James Chabot Provincial Park	May 10, 2013	10
Invermere--Kin Beach/Lake Windermere	May 8, 2013	1
Invermere (South of Kin Beach)	October 8, 2012	2
Lake Windermere--Westside Rd	May 8, 2012	20
Invermere/Kin Beach	May 7, 2012	30
Total number		964