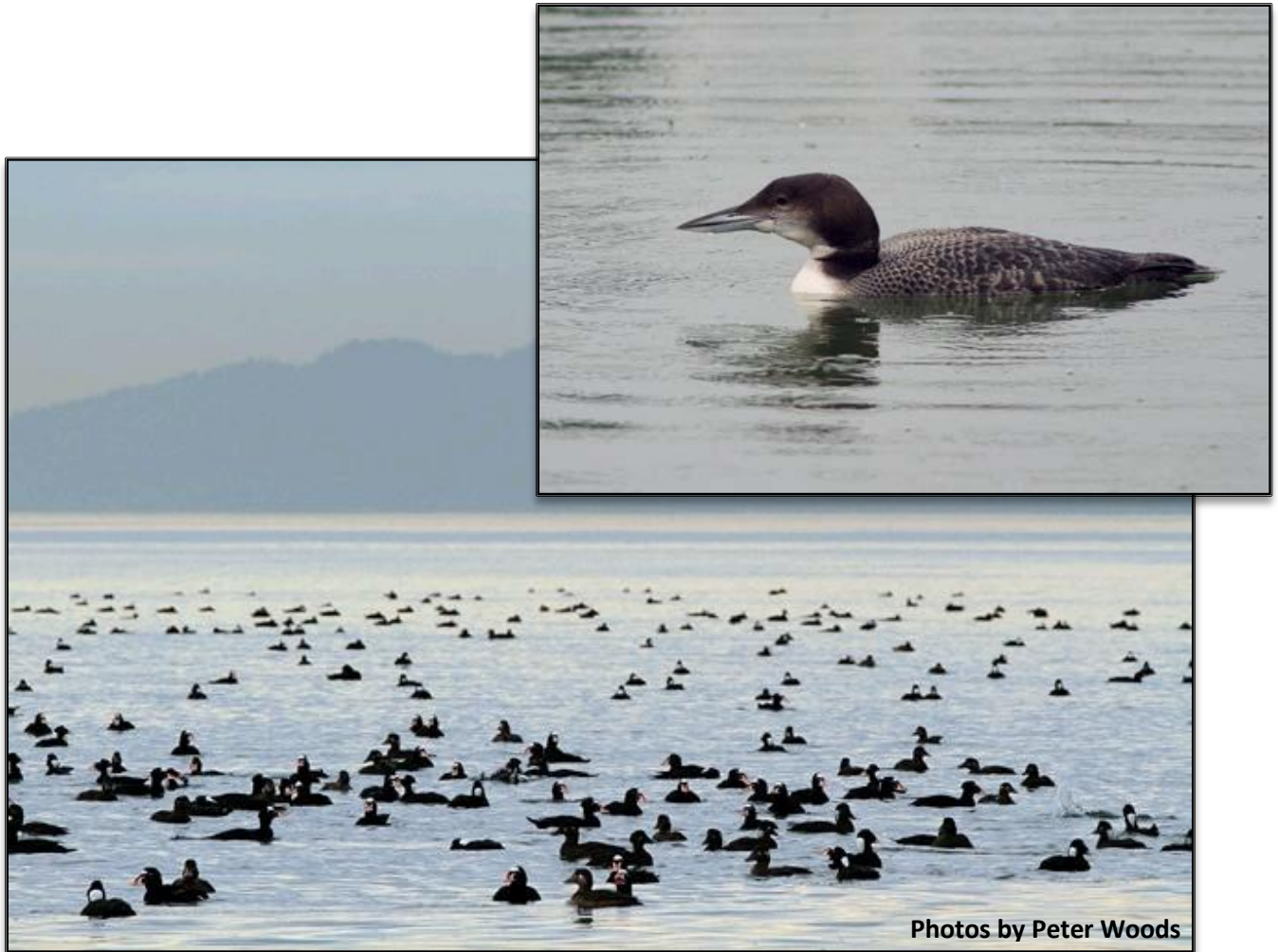


# Trends in the Abundance of Wintering Waterbirds Along the Stanley Park Shoreline Between 2001/2002 and 2010/2011



Robyn Worcester, Dipl. Tech., B.Sc, RPBio

Conservation Programs Manager, Stanley Park Ecology Society

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## Summary

Stanley Park's shoreline is part of the English Bay - Burrard Inlet Important Bird Area (IBA) of Canada because of the high concentration of wintering waterbirds using it. As a co-caretaker for this IBA, the Stanley Park Ecology Society (SPES) works in partnership with Bird Studies Canada to provide monitoring and education of the IBA including working with the BC Institute of Technology's Fish, Wildlife, and Recreation program (BCIT FWR) and the Canadian Wildlife Service to conduct annual winter bird surveys from the shoreline. This report compares data from two of these surveys conducted along the Stanley Park seawall in the winters of 2001-2002 and 2010-2011 to show trends in winter waterbird populations. The data confirm the local knowledge held by naturalists and bird watchers that there have been declines in many species of wintering waterbirds, including loons, grebes and other fish-eating birds using the park's marine habitat. These declines indicate threats to the ecological integrity of this IBA are negatively impacting birds and highlight the need for bird conservation in the area.

## Acknowledgments

The author would like to recognise the work of students and faculty of BCIT's Fish, Wildlife, and Recreation program who contributed the time to collect the data in this report. This project was possible thanks to BCIT Instructor Daniel J. Catt and Dr. Sean Boyd of the Canadian Wildlife Service who supervised the student projects. I would also like to thank local naturalists Peter Woods and Michael Price as well as Danny Catt for reviewing and editing the report.

## About the Author

Robyn Worcester, Registered Professional Biologist and SPES Conservation Programs Manager, is a graduate of BCIT's Fish, Wildlife, and Recreation program, and received a BSc in Biology from Simon Fraser University. Having begun her work with SPES in 2004, Robyn is responsible for designing and delivering wildlife and habitat monitoring, GIS mapping and research programs, while also overseeing the urban wildlife and environmental stewardship programs in Stanley Park. She also works occasionally on contract to do biological work in a variety of capacities including with consulting companies conducting wildlife inventories as well as for the Vancouver Park Board doing environmental monitoring and wildlife management. Recent publications include: The State of the Park Report for the Ecological Integrity of Stanley Park (2010) found at [www.stanleyparkecology.ca](http://www.stanleyparkecology.ca) and Cross-continental Patterns in Timing of Southward Peregrine Falcon Migration in North America (Worcester and Ydenberg, 2008) in Journal of Raptor Research 42(1).

[conservation@stanleyparkecology.ca](mailto:conservation@stanleyparkecology.ca)

604-718-6547

Twitter: @RobynWorcester

Website: <https://sites.google.com/site/robynworcester/>

For more information on the Stanley Park Ecology Society and the Important Bird Area program please visit [www.stanleyparkecology.ca](http://www.stanleyparkecology.ca) or [www.ibacanada.ca](http://www.ibacanada.ca).

## Introduction

In 1999 English Bay – Burrard Inlet was designated an Important Bird Area (IBA) of Canada by Nature Canada and Bird Studies Canada with the support of the Canadian Wildlife Service (CWS). This area was deemed special because it supported large concentrations of overwintering waterbirds including globally significant populations of western grebe (*Aechmophorus occidentalis*), and Barrow's goldeneye (*Bucephala islandica*) (IBA, 2011). In the same year, winter waterbird monitoring of the intertidal areas off Stanley Park was started as a partnership between the Canadian Wildlife Service and the BC Institute of Technology's Fish, Wildlife, and Recreation program (BCIT FWR). For the past several years groups of students undertaking the winter-long survey have also worked in partnership with the Stanley Park Ecology Society (SPES) to receive bird identification and survey methodology training and to provide data for SPES's ongoing bird monitoring programs. In 2010 through a partnership with Bird Studies Canada, SPES became a co-caretaker for the English Bay-Burrard Inlet IBA, to provide monitoring and education in the areas around Stanley Park. As a caretaker, SPES aims to ensure that changes within this IBA or threats to its ecological integrity are properly documented and hopefully avoided or resolved.

Almost every winter for the past 12 years, students have surveyed the seawall for winter birds, focusing on Barrow's goldeneye and surf scoter (*Melanitta perspicillata*), and tracking all species observed in the study area. This report compares data from similar dates across two seasons; October through April 2001/2002 (Boisclair-Joly and Worcester, 2002) and October through April 2010/2011 (La Fond and Thomas, 2011). These time periods were compared because the data were available in raw form, the same project supervisors were in place, and the students followed nearly identical survey methods. The goal was to see if trends in bird populations were evident in the data and to confirm local knowledge that declines have been occurring in certain species groups in the area.

The Barrow's goldeneye is the focal species for winter waterbird surveys conducted from the Stanley Park seawall by BC Institute of Technology's Fish, Wildlife, and Recreation program students.

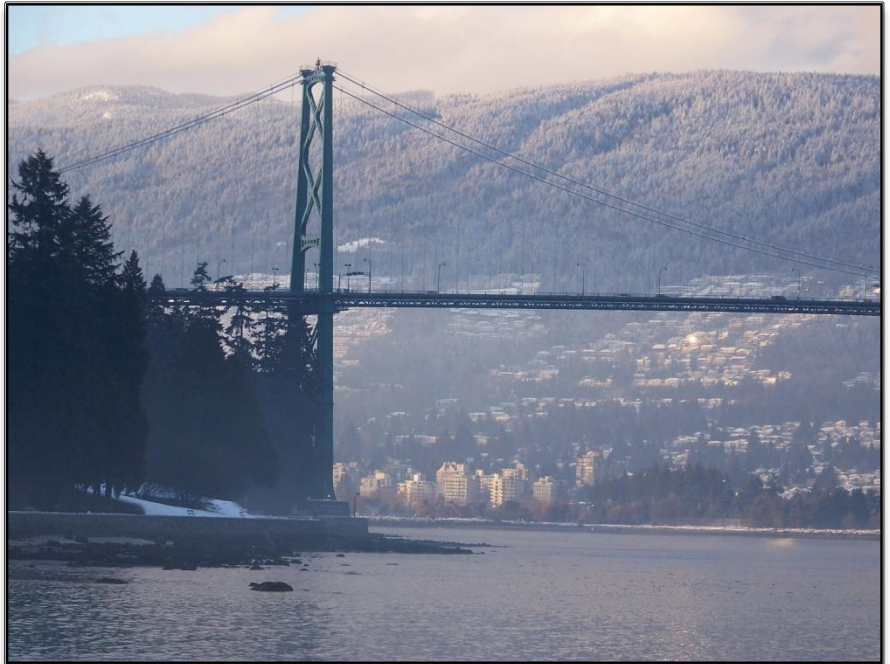


## Study Area

Stanley Park is one of the largest urban park in North America and likely the most famous in Canada. It is a 405 hectare peninsula of forest, gardens, freshwater lakes and intertidal shorelines. Along the outer edge of Stanley Park is an 8.85 km seawall which is used extensively for recreation and also provides an ideal location for viewing marine birds.

The upper limit of the intertidal area is largely defined by the seawall and the low tide mark ranges from 30 m (near the Lions Gate Bridge) to 200 m (near Second and Third Beaches) offshore. The intertidal areas of the Park include rocky, cobble, and sand beaches with some kelp beds slightly offshore particularly in the protected waters of Burrard Inlet's middle and inner harbours.

The diversity of habitats within the study area accommodate many species of wintering marine birds. The rocky shoreline provides haul out rocks as well as a variety of foods for both dabbling and diving ducks. Tide levels dictate when marine birds can access the rich food resources - mussels, barnacles, clams, and other invertebrates of the intertidal area. Extensive beds of blue mussel (*Mytilus edulis*) occur on the western side of the Stanley Park foreshore. Large numbers of wintering surf scoter and Barrow's goldeneye must come in close to shore to feed on this resource.



First Narrows separates Burrard Inlet and English Bay

## Methodology

The survey area was broken down into twenty-two survey zones from Coal Harbour to the end of Second Beach (Figure 1). The zone delineations were adapted from those used for the Burrard Inlet Environmental Action Program bird survey in 1996 (Watts and Breault, 1996). They were first adapted for the Barrow's goldeneye feasibility study by the CWS in 1997, and subsequently followed by all BCIT FWR student projects teams. All of the significant mussel beds on the west side of the park are in Zones 45 to 54 (Boisclair-Joly and Worcester, 2002).



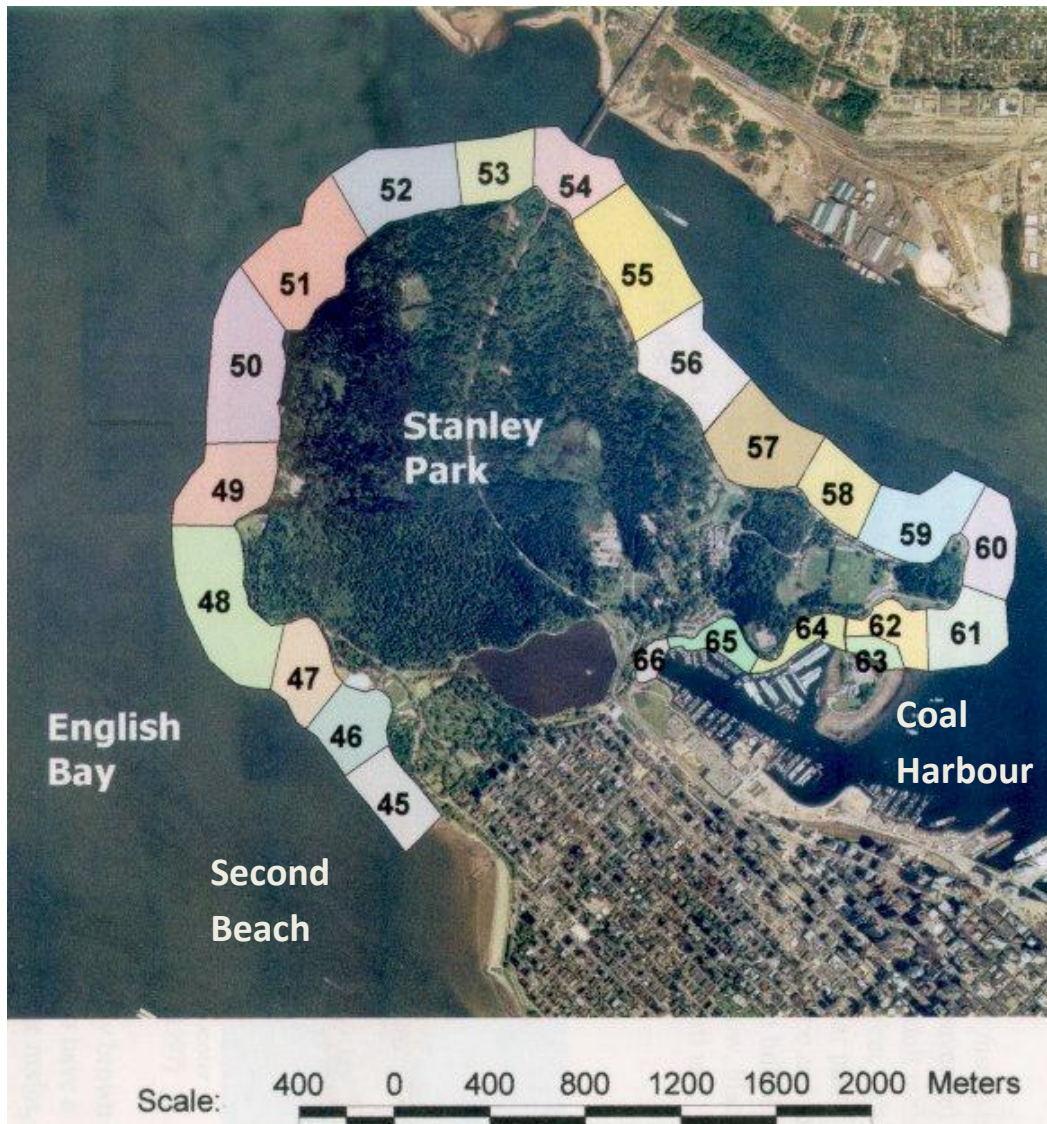


Figure 1: Zones used in both the 2001/2002 and 2010/2011 winter waterbird surveys along the Stanley Park foreshore, Vancouver, British Columbia (Source: Watts and Breault, 1996).

Bird survey methods were approached the same way in both 2001/2002 and 2012/2011. Surveys were done approximately once a week from October 6 through April and took from 3 to 5 hours to complete. Beginning at approximately 10:00 h two or more observers walked a circle route around Stanley Park along the seawall, alternating starting points each week to reduce potential bias caused by the time of day (ex. zone 45 one week, then zone 66 the following week). The observers recorded the abundance and distribution of all marine birds, paying special attention to large groups of Barrow's goldeneye and surf scoters. On each survey day they recorded the time, temperature, weather conditions, sea state, visibility, and tide level. Data were recorded for every bird sighted between the shoreline and one kilometre away

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from the foreshore for each zone polygon. A spotting scope was used to identify distant birds. All birds were counted when possible and large flocks were estimated using standard techniques. To avoid duplicate counts, birds observed flying towards the area yet to be surveyed were not counted. Birds seen taking off from or landing in the zone being surveyed and flying towards the area already surveyed were counted.

In 2010, the students received training from SPES Conservation Programs Manager Robyn Worcester who was a student during the 2001/2002 survey. Care was taken in 2010/2011 to ensure the students conducted their survey with the same methodology as the earlier study so that data comparisons could be made between years. If observer bias existed it was likely with bird identification skills. This bias could be controlled during data analysis by the grouping of individual species into broader species groups. In 2010/2011, the large flocks of scoters observed were also photographed and counted to confirm that initial estimates were accurate.



Horned grebes

Photo by Peter Woods

Data were grouped from the species level into families with the exception of Barrow's goldeneye, surf scoter, western grebe, pigeon guillemot, Canada goose and great blue heron. Dates were used if they were similar between both years (i.e. the first week of December was surveyed in both years so it was used but the third week of January was not, so it was dropped). The data were then simply compiled using Microsoft Excel graphs to visually compare the number of individuals observed over the season from October through April in each time period. Bar charts were used when there were high numbers of zero counts for species groups during the survey weeks. Overall abundance is defined as the total number of individuals counted during the survey period. Trend lines were added to some charts to show trends in the overall abundance of birds in each season. Peak numbers were defined as the highest number of birds counted on one survey day.

**Results**

Results of the analysis show that declines are evident in both overall abundance and peak numbers of most groups in the last ten years. Declines are most dramatic in some bird groups that rely on this area in winter to feed on small fish. These include loons (Figure 2), grebes (Figure 3), and pigeon guillemot (*Cephus Columba*) (Figure 4), but can also be seen in western

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grebe (Figure 5), great blue herons (*Ardea herodias*) (Figure 6), shorebirds (Figure 7), Barrow’s goldeneye, (Figure 8), and mergansers (Figure 9). Those species only experiencing slight declines in this time period include dabbling ducks (Figure 10) and diving ducks (Figure 11) (excluding Barrow’s goldeneye and surf scoter). Surf scoters were in statistically significant higher numbers in 2010/2011 compared to 2001/2002 (Figure 12). Large groups of scoter gather off Stanley Park each fall, and the flocks were around 4500 individuals in 2010/2011 but peak numbers seen in 2001/2002 only reached 3167. There were also increases in the number of cormorants (Figure 13) and Canada geese (Figure 14) observed in the study area. Table 1 outlines the general patterns in species groups and indicates the degree of change in overall abundance over the nine years between surveys. Figures 2- 14 below show the abundance of species and groups over the two survey periods. See Appendix 1 for a full list of species observed during the two surveys and an explanation of the species codes used in the figure captions.

**Table 1: Comparison of peak numbers and overall abundance of bird species groups observed from the Stanley Park seawall during the winters of 2001/2002 and 2010/2011.**

Bird Group	Peak Numbers		Overall Abundance (OA)		
	2001/2002	2010/2011	2001/2002	2010/2011	% Difference in OA
Loons	26	1	245	1	-100%
Grebes	21	3	229	10	-96%
Pigeon guillemot	9	1	40	1	-98%
Western grebe	20	3	64	4	-94%
Great blue heron	7	3	22	10	-55%
Shorebirds	86	47	490	242	-51%
Barrow's goldeneye	992	517	8814	4343	-51%
Mergansers	30	20	282	157	-44%
Canada goose	16	31	94	141	+33%
Surf scoter	3167	4500	9783	14047	+30%
Cormorants	88	83	959	1163	+18%
Diving ducks	160	152	1807	1502	-17%
Dabbling ducks	822	393	3001	2723	-9%

Trends in the abundance of wintering waterbirds along the Stanley Park shoreline between 2001/2002 and 2010/2011

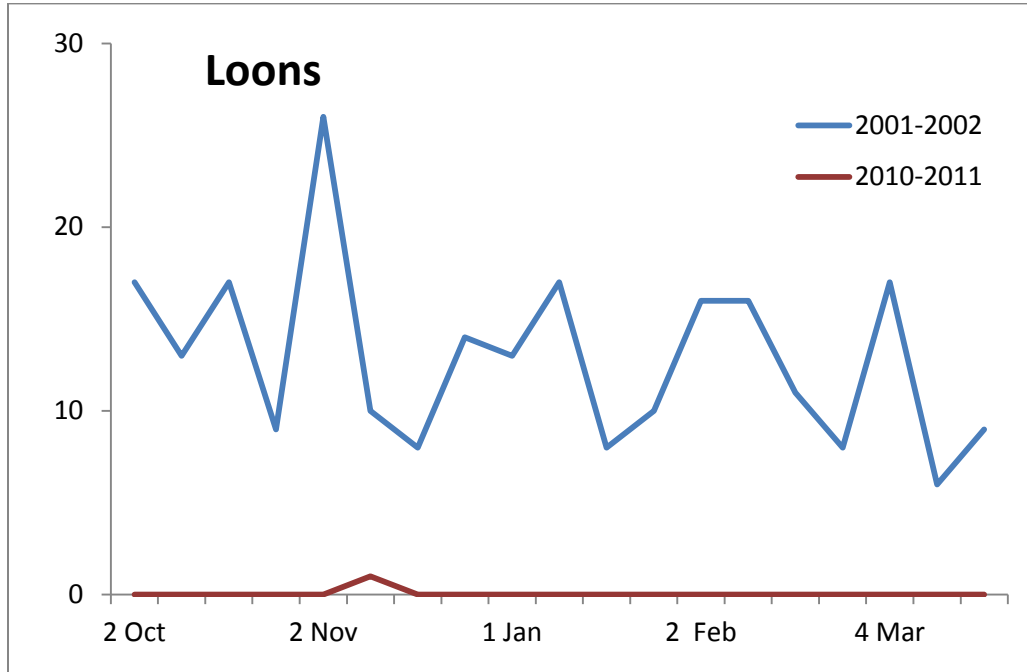


Figure 2: Loon abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011. Species observed include: COLO, PALO, RTLO and unidentified loon species.

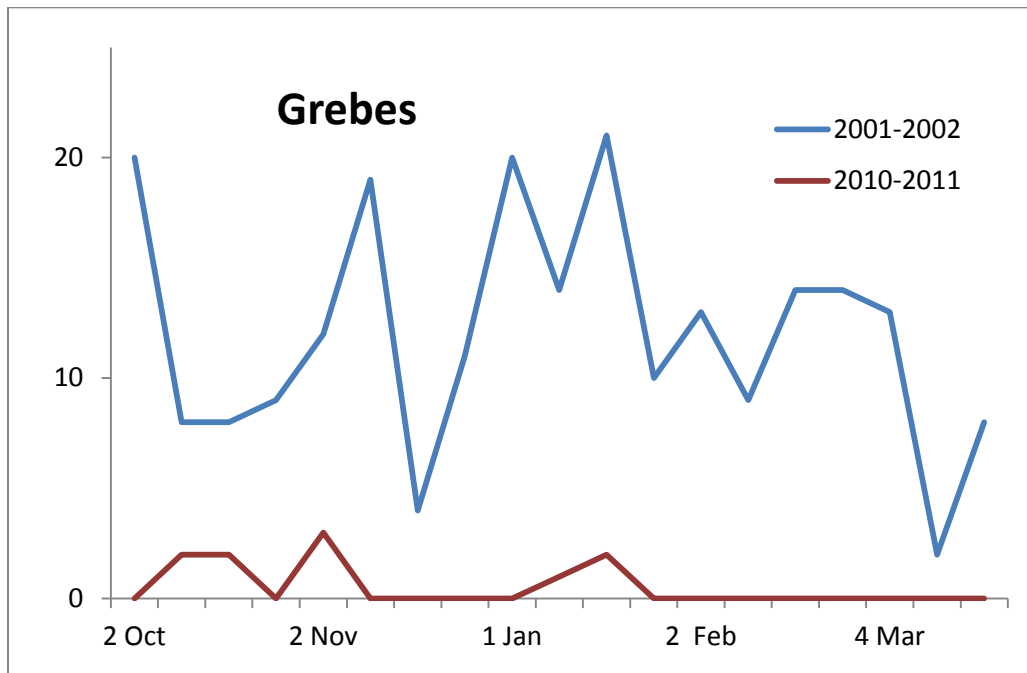


Figure 3: Grebe abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011. Species observed include: HOGGR, WEGR, and RNGR.



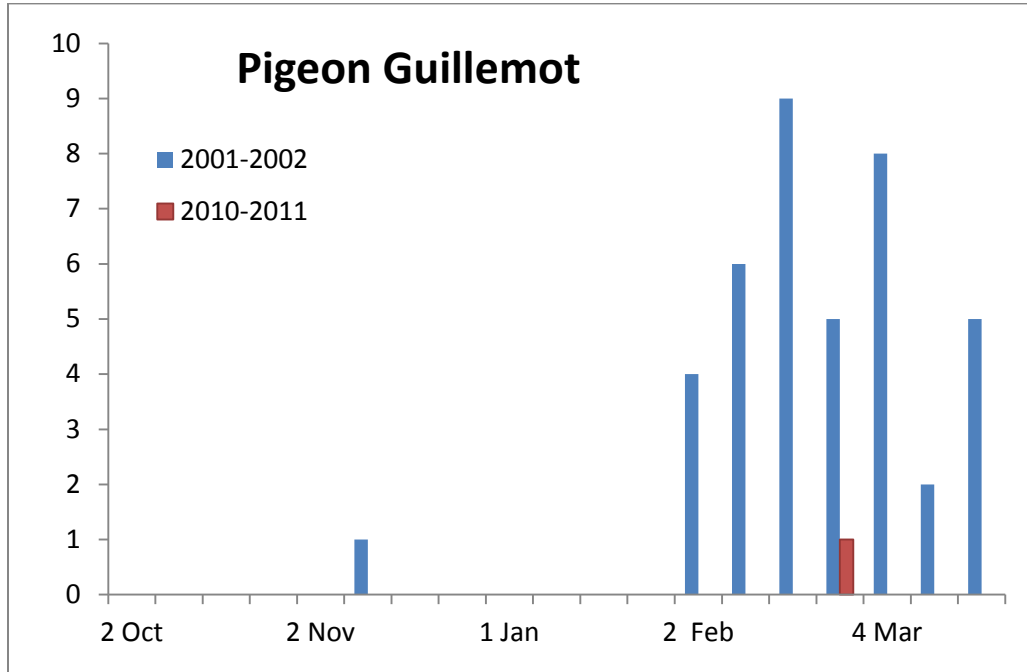


Figure 4: Pigeon guillemot (alcid) abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011.

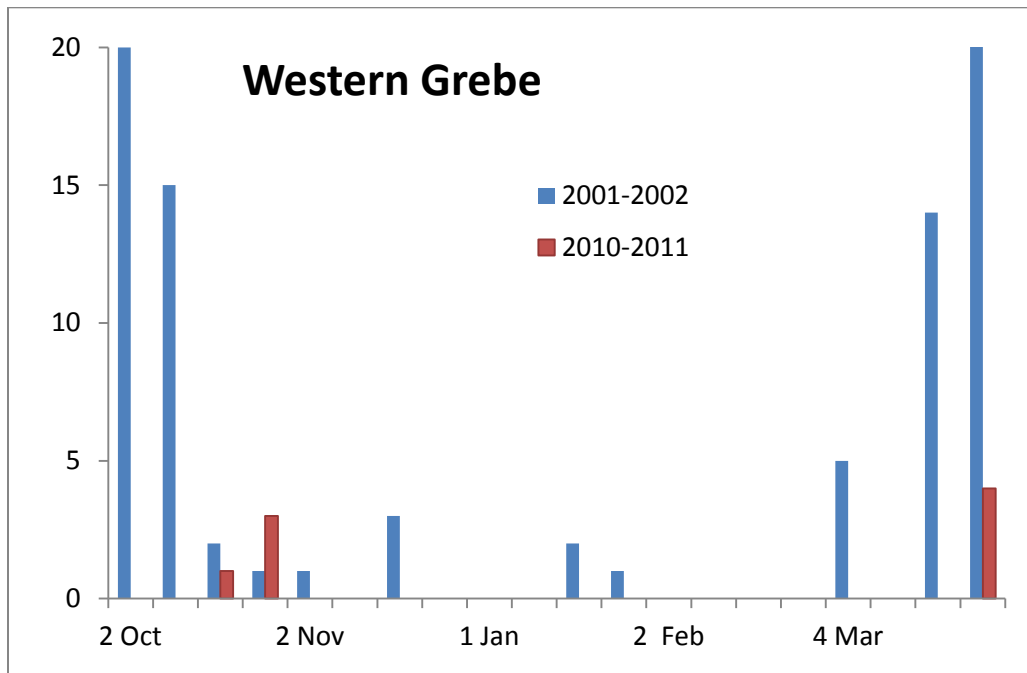


Figure 5: Western grebe abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011.

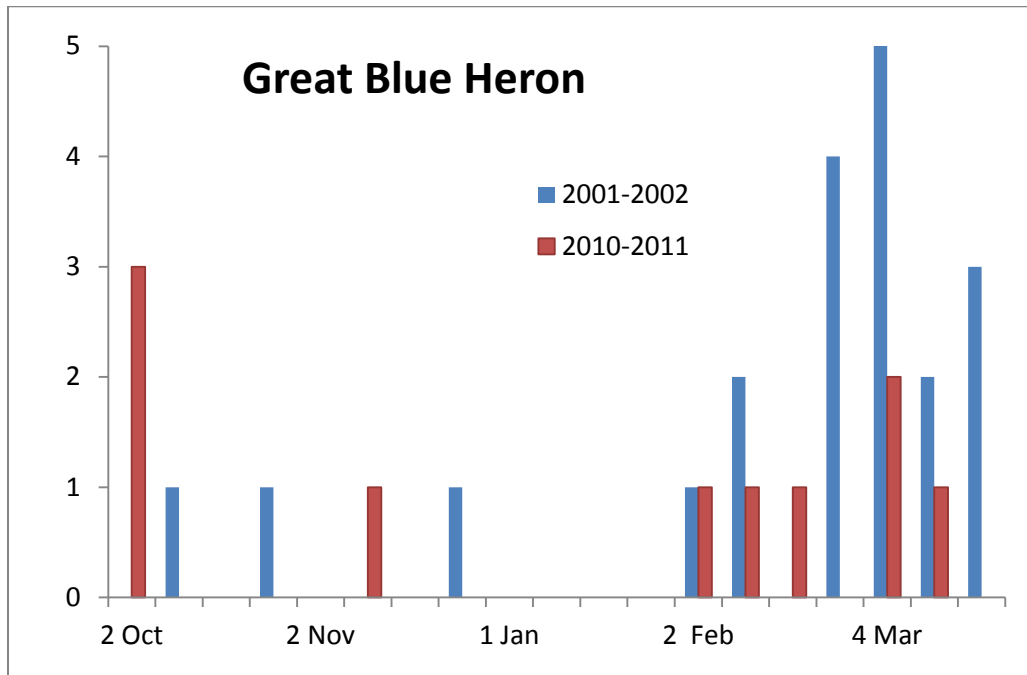


Figure 6: Great blue heron (wading bird) abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011. Species observed include: GBHE.

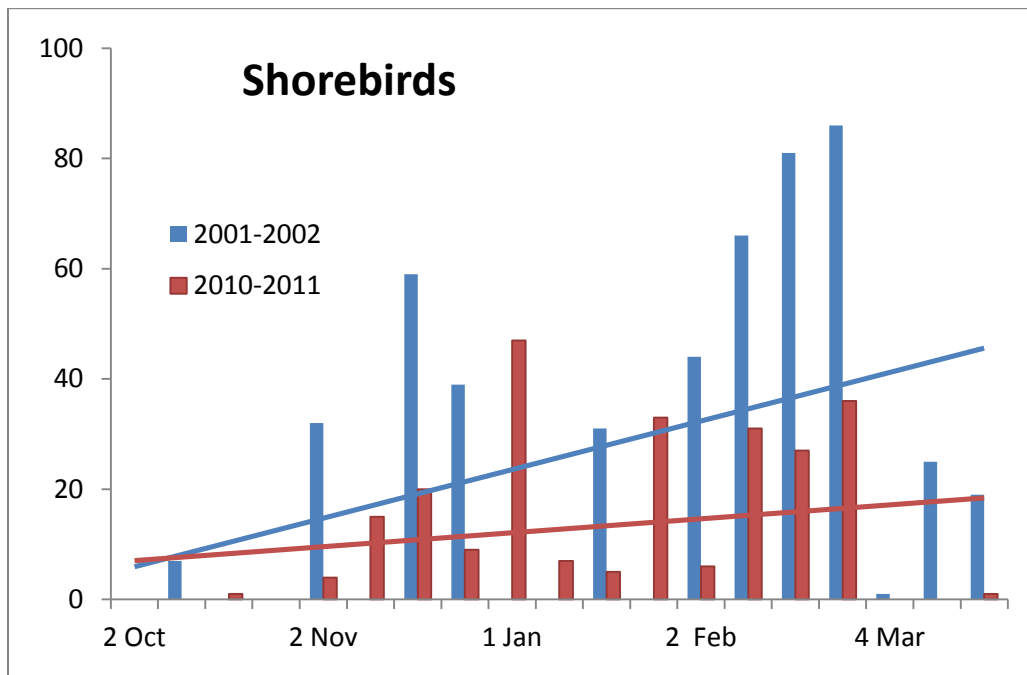


Figure 7: Shorebird abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011. Species observed include: BLOY, BLTU, DUNL, KILL, and SAND.

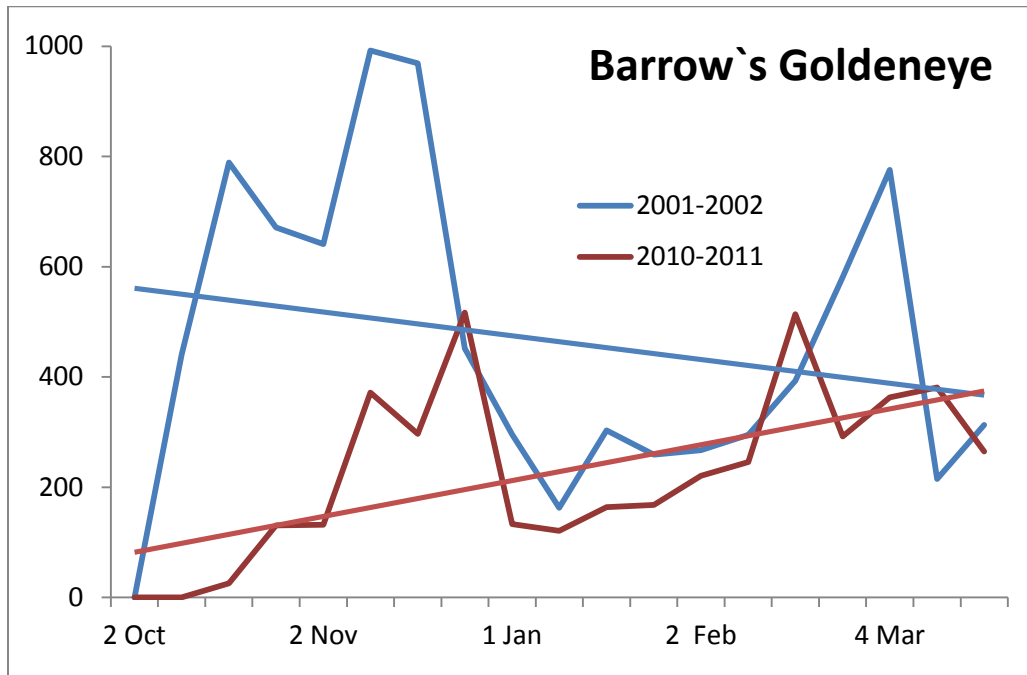


Figure 8: Barrow's goldeneye abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011.

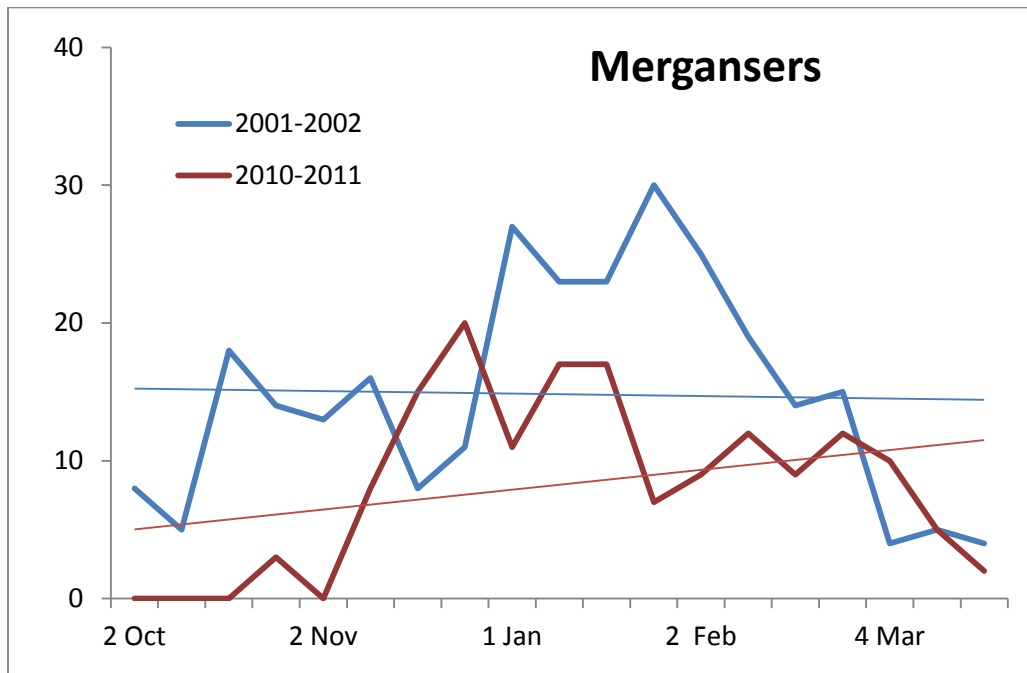


Figure 9: Merganser abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011. Species observed include: COME, RBME, HOME, and unidentified merganser species.

Trends in the abundance of wintering waterbirds along the Stanley Park shoreline between 2001/2002 and 2010/2011

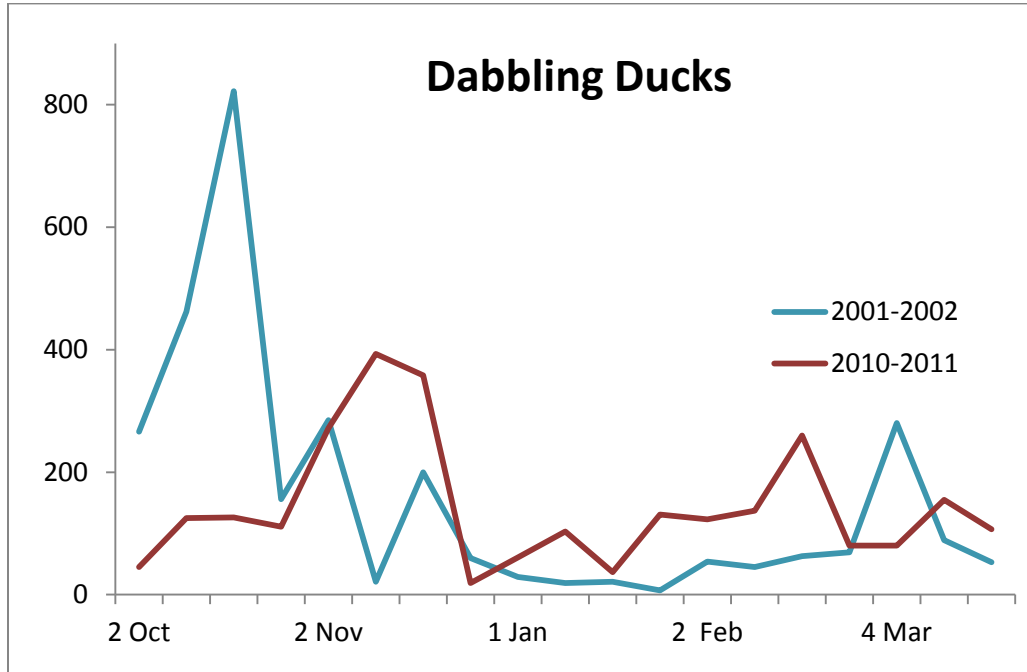


Figure 10: Dabbling duck abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011. Species observed include: AMWI, EUWI, MALL, GWTE, and GADW.

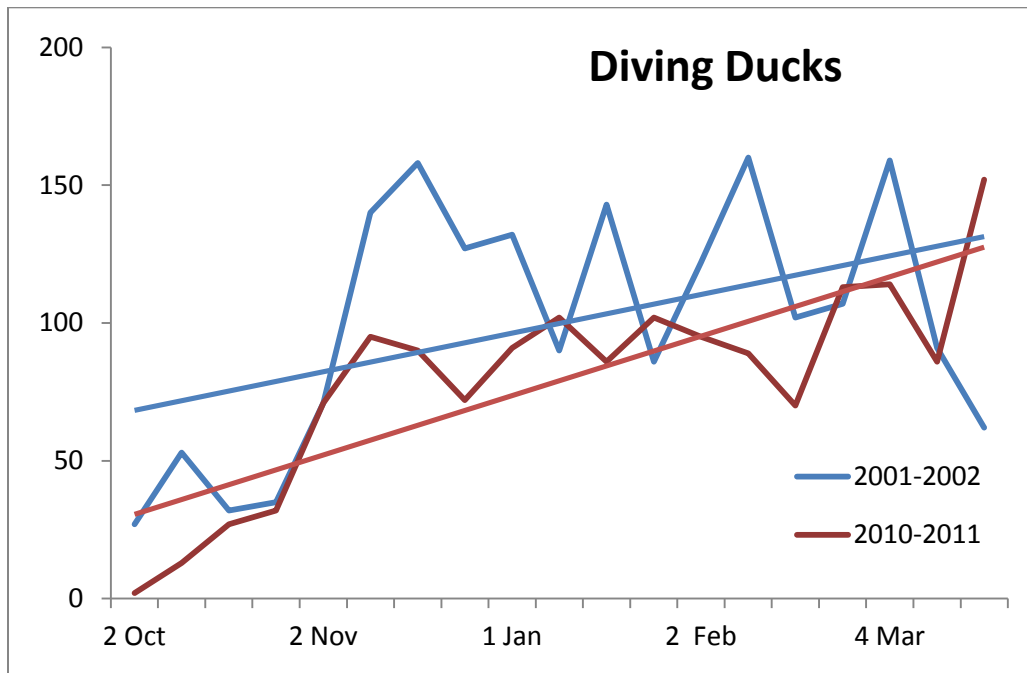


Figure 11: Diving duck abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011. Species observed include diving seaducks (BLSC, WWSC, COGO, HADU, LTDU), diving ducks (GRSC, LESC, RNDU) and unidentified diving duck species.



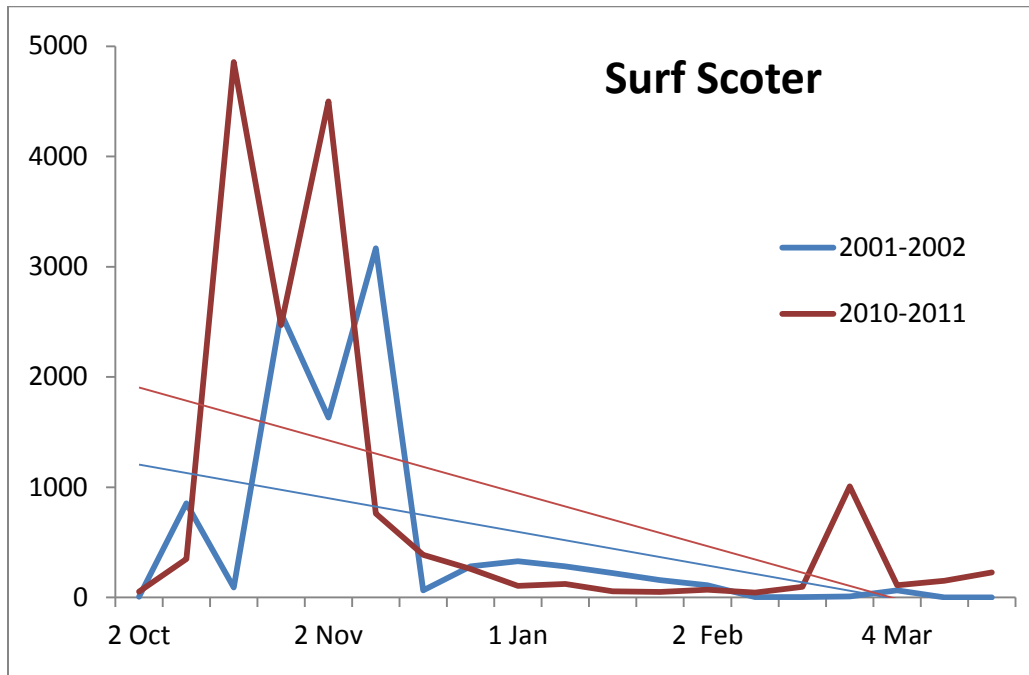


Figure 12: Surf scoter abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011.

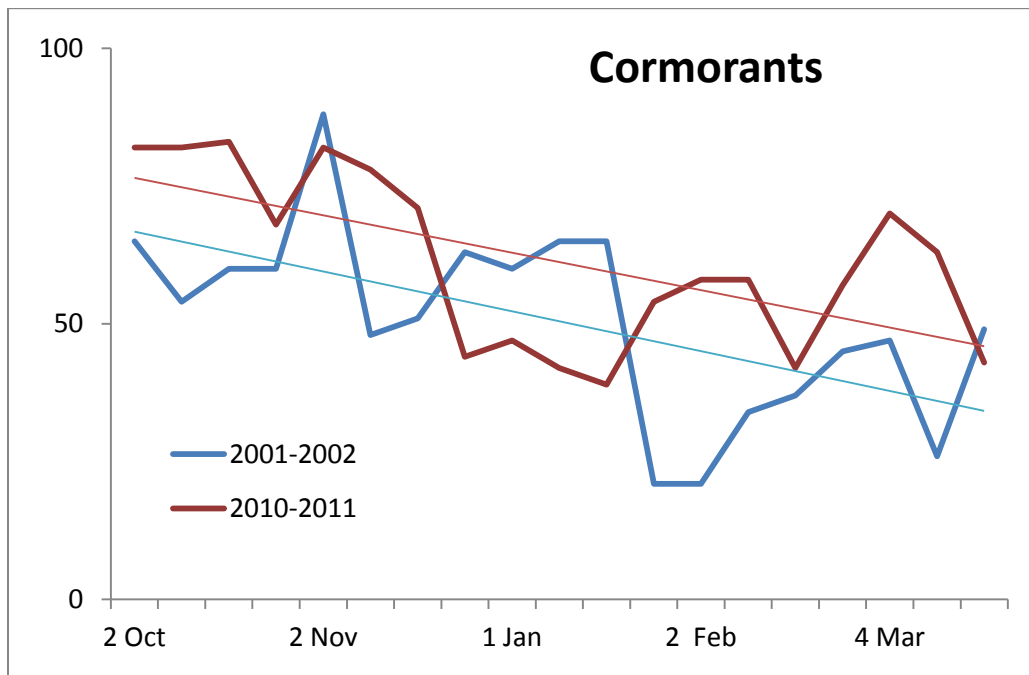


Figure 13: Cormorant abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011. Species observed include: PECO, DCCO and BRCO.

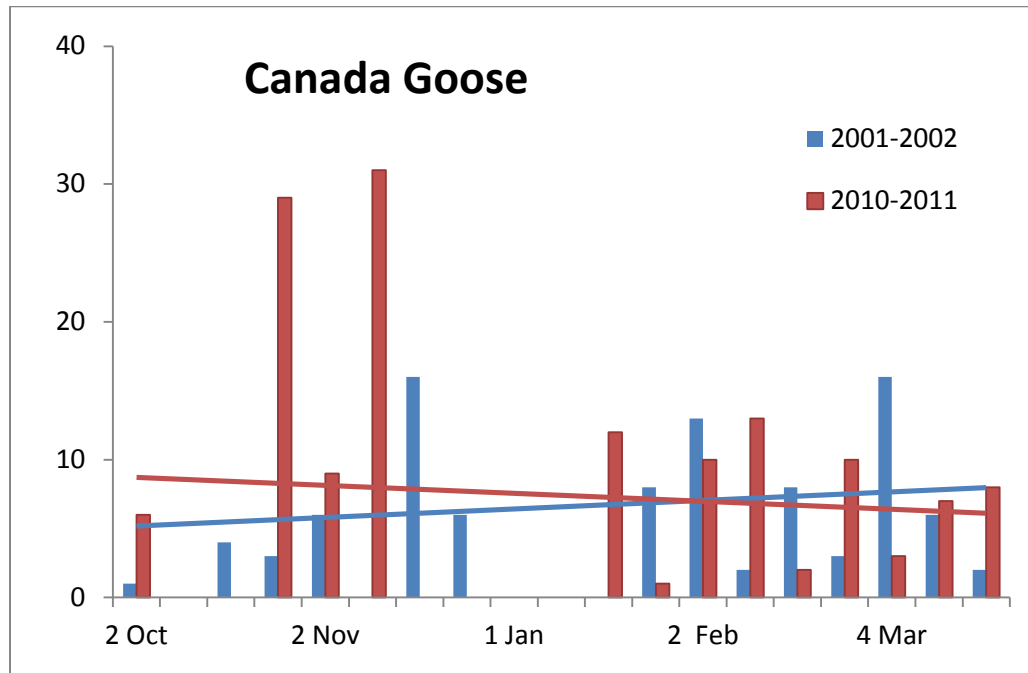


Figure 14: Canada goose abundance along the Stanley Park seawall between October and April 2001-2002 and 2010-2011.

## Discussion

Comparing data between survey years provides evidence for trends in the abundance of species of wintering birds using the Stanley Park foreshore that have been observed by local birders and naturalists. In the State of the Park Report for the Ecological Integrity of Stanley Park (Worcester, 2010), SPES reported a noticeable decline in fish-eating diving bird species in the past 30 years which has been documented by local naturalists (Price and Worcester, 2009). These same concerns have been suggested in similar coastal environments in Washington State where surveys suggest decreasing trends for wintering goldeneye and western grebe and possibly an increasing trend for scoters (Anderson et al., 2009). Counts for western grebes in this IBA have historically varied from year to year, but the peak count (~15,000 individuals) occurring in the winter of 1969-70 shows how steeply these numbers have declined (IBA, 2011). Likewise, in 1999, Barrow's goldeneye were regularly recorded in globally significant numbers in the IBA in winter, with the peak record of 7,126 birds being over 4% of the world population (IBA, 2011).

Large scale threats that may influence wintering bird populations in Burrard Inlet are industrial pollution including tanker ballast and oil spills (exports of petroleum and canola), overfishing,

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habitat degradation, urban encroachment, and the negative effects of climate change such as changes in mussel bed distribution and fish spawning habitat. Local threats that have been documented to negatively affect birds using the shoreline include direct disturbance by people and off-leash dogs using the beaches as well as personal watercraft in intertidal areas such as jet skis, kayaks and paddleboards. These disturbances have been observed to influence the resting and feeding habits of shorebirds, gulls and dabbling ducks using the shoreline as well as the large flocks of surf scoter, Barrow’s goldeneye and other waterfowl that gather here in large numbers in winter.

The slight increase in the number of cormorants is curious despite declines in the other fish-eating birds and may be due to their apparent habituation to disturbance caused by humans. They have adapted well to city life, and in recent years pelagic cormorants (*Phalacrocorax pelagicus*) have been successful at breeding under the Burrard Street and Granville Bridges which may also account for their increasing number.



Spotted sandpiper

Photo by Peter Woods

Most species are not just affected by the conditions of their wintering grounds, but also by the availability and quality of their breeding habitat. Recent studies have shown cause for concern about low breeding success for species such as the common loon (*Gavia immer*) (HWW, 2011). These birds nest on interior lakes and are susceptible to the effects of pollution, development, and disturbance often leading to the abandonment of their nesting areas (HWW, 2011). Loss of habitat results from lakeshore development and physical interference with nests or young, and increased boat wake on lakes which may swamp or destroy nests (HWW, 2011).

Whatever the reasons for declines in many of our wintering waterbirds, conservation of their habitat and a reduction of human disturbance is needed for their protection. There is no question that the English Bay – Burrard Inlet IBA is heavily impacted by human use and that birds in the area are under stress. SPES is committed to providing ongoing public education, monitoring and stewardship of the areas in and around Stanley Park, but all of the local shorelines need attention. Although some of the impacts on these birds are beyond SPES’s control, there are many ways we can help in their conservation.

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**Appendix 1: Species of wintering waterbirds observed along the Stanley Park seawall  
between October and April 2001/2001 and 2010/2011.**

<b>Common Name</b>	<b>Latin Name</b>	<b>Code</b>
American Widgeon	<i>Anas americana</i>	AMWI
Barrow's Goldeneye	<i>Bucephala islandica</i>	BAGO
Black Oystercatcher	<i>Haematopus bachmani</i>	BLOY
Black Scoter	<i>Melanitta nigra</i>	BLSC
Black Turnstone	<i>Arenaria melanocephala</i>	BLTU
Brandt's Cormorant	<i>Phalacrocorax penicillatus</i>	BRCO
Bufflehead	<i>Bucephala albeola</i>	BUFF
Canada Goose	<i>Branta canadensis</i>	CAGO
Common Goldeneye	<i>Bucephala clangula</i>	COGO
Common Loon	<i>Gavia immer</i>	COLO
Common Merganser	<i>Mergus serrator</i>	COME
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	DCCO
Dunlin	<i>Calidris alpine</i>	DUNL
Eared Grebe	<i>Podiceps nigricollis</i>	EAGR
Eurasian Wigeon	<i>Anas penelope</i>	EUWI
Gadwall	<i>Anas strepera</i>	GADW
Great Blue Heron	<i>Ardea herodias</i>	GBHE
Greater Scaup	<i>Aythya marila</i>	GRSC
Green-winged Teal	<i>Anas carolinensis</i>	GWTE
Harlequin Duck	<i>Histrionicus histrionicus</i>	HADU
Horned Grebe	<i>Podiceps auritus</i>	HOGR
Hooded Merganser	<i>Mergus merganser</i>	HOME
Killdeer	<i>Charadrius vociferous</i>	KILL
Lesser Scaup	<i>Aythya affinis</i>	LESC
Long-tailed Duck	<i>Clangula hyemalis</i>	LTDU
Mallard	<i>Anas platyrhynchos</i>	MALL
Northern Pintail	<i>Anas acuta</i>	NOPI
Pacific Loon	<i>Gavia pacifica</i>	PALO
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	PECO
Pied-billed Grebe	<i>Podilymbus podiceps</i>	PBGR
Pigeon Guillemot	<i>Cephus columba</i>	PIGU
Red-breasted Merganser	<i>Mergus serrator</i>	RBME
Ring-necked Duck	<i>Aythya collaris</i>	RNDU
Red-necked Grebe	<i>Podiceps grisegena</i>	RNGR
Red-throated Loon	<i>Gavia stellata</i>	RTLO
Sanderling	<i>Calidris alba</i>	SAND
Surf Scoter	<i>Melanitta perspicillata</i>	SUSC
Western Grebe	<i>Aechmophorus occidentalis</i>	WEGR
White-winged Scoter	<i>Melanitta fusca</i>	WWSC