Gulls in the Town of Sidney, BC: Problems and Suggested Solutions

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EXECUTIVE SUMMARY

The vast majority of the gull species, i.e. more than 90 percent, inhabiting the Sidney area are Glaucous-winged Gulls (*Larus glaucescens*), one of the largest North American gulls. By 1986, the downtown Vancouver nesting population had reached 500 pairs of roof-nesting gulls and two years later, there were also a hundred pairs on roofs in Victoria. In general, Glaucous-winged gulls are omnivorous, eating a wide variety of fish, marine invertebrates, garbage, and carrion. Most young birds move only 100 km or less from their natal site and about 90 percent of the young up to 25 months of age move no further than 322 km from their natal colony, e.g. Sidney, if they move at all. When young birds do disperse, they may return to their natal area after about two to three years. These gulls are vocal year-round, but much more so during breeding season and feeding bouts. They can be heard calling in the dead of night, but mostly in the daytime. Their eggs and chicks are eaten by conspecifics (their own kind), ravens, crows, owls, Bald Eagles, and foxes and their chicks are taken by Bald Eagles, River Otters (*Lutra canadensis*), and adults are are preyed upon by Bald Eagles (*Haliaeetus leucocephalus*), Snowy Owls (*Nyctea scandiaca*), and River Otters. Glaucous-winged Gulls are monogamous breeders; they are also colonial nesters, but will breed in single pairs, especially on smaller roofs. These gulls usually arrive back at their colonies in early February; by late April, they are all back. Single males holding a territory advertise to females throughout April and early May. Territory sizes range from 5.5 to 9.6 to 20.2 sq m with older birds holding larger territories. The first nests appear throughout March and April with serious nest building being done in late April and May. If one walks near a nest, the adults will circle overhead, alarm calling, and defecating. Occasionally, a bird will strike the intruder from behind with its feet, sometimes drawing blood. The roof-nesters prefer to nest on flat roofs as well as on flat portions or near structures on peaked roofs of buildings near water. The nest site is scraped bare and is usually enclosed by a ring of torn-up turf, moss and other vegetative material. Some nests have lots of materials, while others have little. It can take as little as 10 minutes to build a nest. They lay one to four, often three, sub-elliptical, smoothly textured eggs coloured in various kind of earthy greens and marked with scrawls, blotches or spots ranging from dusky brown to olive gray. Glaucous-winged Gull chicks are semi-precocial, meaning that they are covered in down, their eyes are open, and they are capable of leaving the nest with two days. The young gulls make their first flight anywhere from 37 to 53 days and they leave the colony on average after 57 days. The age of first breeding in some studies is about five and a half years. The hatching success can range from 30 to 80 percent. Glaucous-winged Gulls rarely live longer than 15 years; the average life expectancy is about 9.5 years, after having reached 4 years of age. Glaucous-winged Gulls are not currently listed as endangered in any way, but their numbers appear to be declining in recent years for reasons unknown, perhaps due to increasing Bald Eagle populations and/or nesting birds shifting to urban centres. The roof-nesting population in Victoria has increased 10-fold in the last 20 years. Gulls can pose several problems for the town of Sidney, i.e. transmission of disease and parasites, unsightly, smelly feces, damage to metal surfaces by corrosive feces, potential obstruction of drains by nest debris and feathers, aggressive behaviour toward humans with food and to building managers, and issuing loud,

screeching calls at all times of the day and night. On the other hand, bird-watching has become highly popular and birders especially like seeing gulls and thus, their contribution to biodiversity is important. The welfare of these gulls can help forewarn us about impending and ongoing problems with the planet, e.g. overuse of toxic chemicals, changes in the numbers of fish and other marine organisms, and climate change. As scavengers, gulls help keep the environment clean and they constitute a food supply for several predators. Glaucous-winged Gulls, including their nests and eggs, are completely protected by the *Migratory Birds Convention Act, 1994* in Canada. A permit may be granted to remove and destroy gull nests if the property owner demonstrates that the gull nests are or are likely to cause damage to property or danger to human health and safety. In response to several complaints about feces and excessive noise from gulls lodged by citizens in Sidney, BC, the overall aim of this report is to investigate the situation regarding the presence of Glaucous-winged Gulls in the town of Sidney. The specific objectives were to examine potential problems posed by the gulls and to provide some potential solutions to those problems. Two walking surveys of downtown Sidney were performed on July 10 and August 3, 2018 to make a very rough count of the gull numbers, their points of concentration, perceived problems associated with them, and general observations of control measures in place. Owners of the three tallest buildings were contacted to allow roof visits. Airport authorities at the Victoria International Airport, biologists with the Canadian Wildlife Service and elsewhere, and several pest control companies were also contacted. While the figures are by no means accurate, an estimated 100 juvenile and adult Glaucous-winged Gulls appear to be using the Sidney downtown area within the three main avenues, i.e. Bevan, Beacon, and James White/Sidney, at any given time in the summer months. As for anthropogenic sources of food, there are at least four sources: 1) waste food, e.g. partly eaten sandwiches, fries, etc., discarded by tourists and even residents near benches and in parking lots; 2) human food deliberately given to them by misguided, lonely folks; 3) fish and crab remains left on the pier and the main marina; and 4) the discarded fish offal from the Fish Market. The latter constitutes a major source of food for Glaucous-winged Gulls in the Sidney downtown area. While the pier railings and posts and various rocks in the Sidney port area provide excellent loafing spots for gulls, there also exist a number of well-used roosting or loafing perches away from the port area categorized as follows: 1) hydro poles with cross-arms; 2) lamp posts; 3) pitched or peaked roofs, and 4) flat roofs. There did not seem to be any obvious preferences for the gulls loafing on flat roofs versus pitched roofs. A fair number of roofs bear some sort of gull deterrents, but several 'problem' buildings with none at all were home to many roosting and nesting gulls and large amounts of feces. Any kind of destructive methods of population control, e.g. shooting, trapping, poisoning, and destroying eggs with perhaps the exception of trained falcons, will not be popular with the citizens and tourists of Sidney and are basically not worth considering. The federal government is even loathe to issue permits just to tamper with nests at any stage of construction. The most obvious long-term and most publicly acceptable means of deterring Glaucous-winged Gulls is exclusion, both from the loafing perches and from the roofs for roosting and breeding. Virtually all of the methods and materials offering various kinds of exclusion are evaluated in this report; some are totally ineffectual, some more cost-prohibitive than others, and some lose their effectiveness over the long-term.

Under a scenario of a limited budget, the following recommendations are offered:

a. Install exclusion devices on hydro poles and lamp posts, at least on the serious 'problem' ones for a start;
b. Encourage building owners to not only install exclusionary devices, e.g. spikes, wires, etc. on their buildings but also to maintain them over the years;
c. Pass an ordinance, if there is not already one, to force the owners of new building construction projects to put into place gull deterrents;
d. Have a discussion with the owner of the Fish Market to determine some amicable way of reducing this rich source of food for the gulls;
e. Communicate with the safety authorities of the Victoria International Airport to let them know that the town of Sidney is aware of the gull problem and attempting to rectify it;
f. Disseminate this report to any interested parties and particularly to those stakeholders who are 'part of the problem'.

TABLE OF CONTENTS

A. THE GLAUCOUS-WINGED GULL – BASIC BIOLOGY

For much more detail on the Glaucous-winged Gull (*Larus glaucescens*), see the Birds of North America report by Hayward and Verbeek (2008); unless otherwise indicated, the basic biology information on this species below has been paraphrased from that report. Some key references have been included and some information relevant to the Sidney situation have been added here and there.

i. Appearance

The vast majority of the gull species, i.e. more than 90 percent, inhabiting the Sidney area are Glaucous-winged Gulls, one of the largest North American gulls. The head, neck, breast, and

tail are white, while the mantle and wing tips are light gray. Their iris colour is brown with a reddish purple orbital ring, the beak is a dull yellow with a red spot at the terminal end of the lower mandible, and the legs and feet are dull pink. The adult males range in length from 58 to 62 cm, averaging 60 cm, while the females are 57 cm. They can range in weight from 890 to 1360 g with males averaging 1224 g and the females 957 g (James-Veitch and Booth 1954). A hatched downy nestling is buff-coloured with dark blotches on the back and neck but with a lighter-coloured head. When they fledge from their nest, they appear more gray to dark gray with spotted wings and back. In their first year, the subadults are mostly pale gray-brown with dark bills and without the blackish primaries and tail that one sees in most first-winter gulls.

Glaucous-winged Gulls do hybridize with both Herring Gulls (*L. argentatus*) and Western Gulls (*L. occidentalis*) ; hybrids with the latter species appear darker. It is entirely possible that some of the gulls in the town of Sidney are such hybrids. One-year old birds have light brown heads with gray backs and dark bills, while two-year old birds have white heads with light brown streaks and dull yellow bills dark at the tip. Intermediate molts and plumages and their timing have not been well-studied and the existence of those hybrids makes this a difficult and complex task. The primary molt of feathers of this species breeding on Mandarte Island near Sidney, BC starts anywhere from April 10 to June 8, averaging May 10 (Verbeek 1979). The Glaucous-winged gull is sexually mature at 4 years of age.

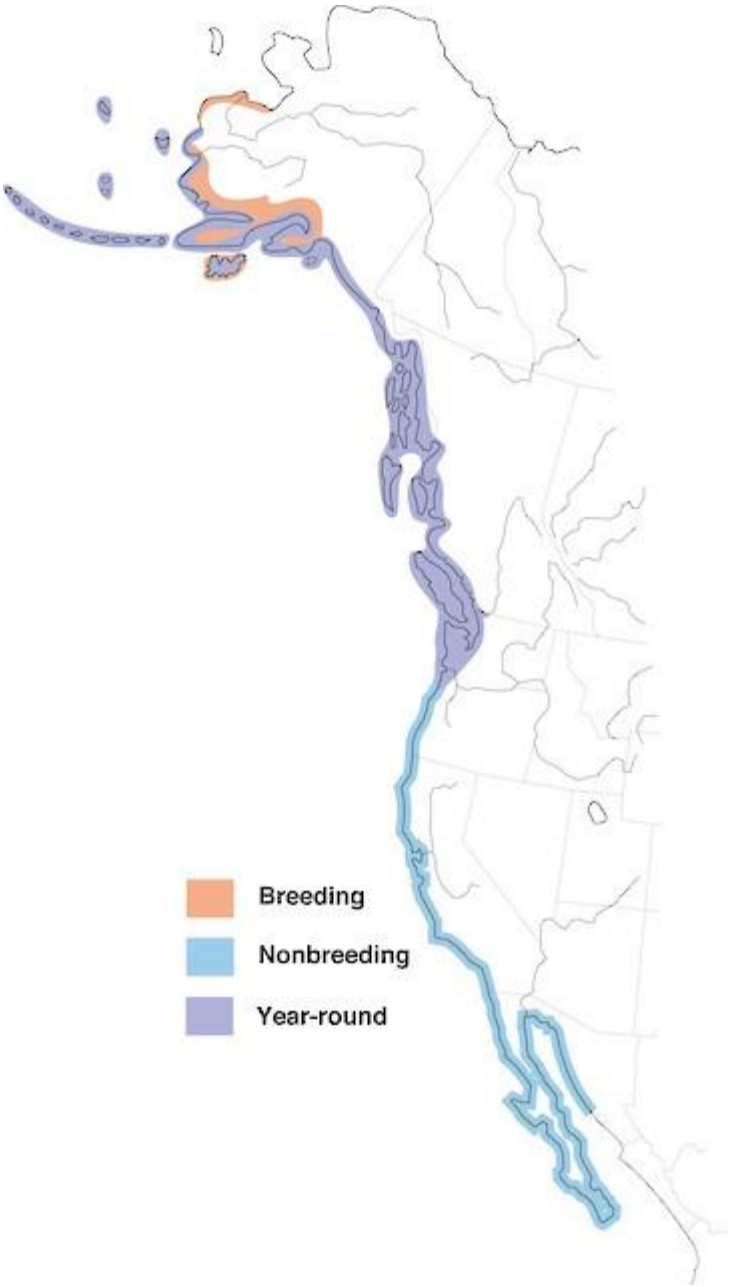

Figure 1. Breeding and nonbreeding (generally winter) range of the Glaucous-winged Gull. eBird range map for Glaucous-winged Gull (Generated from eBird observations (Year-Round, 1900-present) (from Hayward and Verbeek 2008).

ii. Breeding Range

Glaucous-winged Gulls breed on coastal islands and cliffs on the west coast of North America from St. Matthew Island in the north-central Bering Sea and Cape Romanzof, Alaska south to northwestern Oregon (see Fig. 1; Hayward and Verbeek 2008). Occasionally it can be found

nesting in the freshwaters of British Columbia (BC), Washington, and Oregon. They have been known to feed offshore anywhere from 100 to 300 km (Hayward and Verbeek 2008).

iii. Winter Range and Migratory Movements

In winter one can find Glaucous-winged gulls anywhere from the sea-ice front zone in the Bering Sea, e.g. Aleutian Island, southward along the coast and out to sea from Alaska to BC and even down to the Gulf of California (Hayward and Verbeek 2008). However, they can be found on the Saanich Peninsula year-round, especially in town centres like Victoria and Sidney, however in much reduced numbers (D. Bird, pers. obs.). Most of these birds move only 100 km or less from their natal site and about 90 percent of the young up to 25 months of age move no further than 322 km from their natal colony, e.g. Sidney, if they move at all (Butler et al. 1980). In general, first-year birds disperse farther than the older ones, but the mean dispersal distance is the same among all age classes. When young birds do disperse, they may return to their natal area after about two to three years.

iv. Habitat in Breeding Range

Glaucous-winged gulls typically nest on treeless and small offshore islands close to the mainland in areas of good visibility, e.g. Mandarte Island. Nesting colonies are usually located in areas vegetated with grass, herbs or shrubs and sometimes just rock or shingle (Vermeer 1963). In larger colonies, the nests are situated close to human habitations. Single pairs can be found nesting on pilings at ferry terminals, e.g. Swartz Bay. The first roof-nesting pairs were reported in Vancouver with 49 nests on flat roofs, 25 nests on pitched roofs, and 40 nests on support beams of the Second Narrows Bridge. By 1986, the downtown Vancouver nesting population had reached 500 pairs. Hooper (1988) recorded 99 pairs on roofs in Victoria with one to nine pairs on a given roof.

v. Feeding

During the breeding season, Glaucous-winged Gulls feed in both rocky and muddy intertidal zones, as well as in brackish waters, bays and landfills. They employ various strategies to obtain food, including walking; plunging head-first from about 1–1.5 m above the water surface, not always completely submerging; and seizing food from the water surface or just below it in flight or while swimming. Sometimes they make plunge dives from a floating position and jump into the air to become partially or totally submerged. They do have an expandible proventriculus (crop) for food storage. They pull chitons, barnacles, and limpets off rocks during ebbing tides while they are still submerged. They are also known to drop hard items like clams, crabs, and oysters on hard substrates like rocks (but see below) to crack them open. They catch fish stranded in tidal pools or in shallow water near the shore. Glaucous-winged Gulls do steal food from other gulls and also hang around carnivores like bears, eagles and other raptors to eat any remains. They have been known to kill and eat each other's eggs

and nestlings, as well as consume full-sized birds like pigeons and their eggs, and European rabbits which appear to be in good supply in the Sidney area. Some gulls in a colony actually specialize in cannibalizing the eggs and young of other nearby nesting gulls. Glaucous-winged gulls can also be seen in dense feeding groups where they engage in feeding frenzies by rapidly and repeatedly plunge-diving for herring in so-called "herring balls". A similar behavior can be seen in a sudden release of food from garbage in landfills, from human hand-outs, and cleaning of fish and discarding bait by fishermen. These gulls, like others, will feed upon the chicks of murres expelled from their nests when the latter are frightened by raptors like eagles. Glaucous-winged Gulls can generally displace Northwestern Crows (*Corvus caurinus*) and pigeons from food items, but several crows working together usually win the day. Bald Eagles (*Haliaeetus leucocephalus*) easily displace these gulls from a food item.

In general, Glaucous-winged gulls are omnivorous, eating a wide variety of fish, marine invertebrates, garbage, and carrion. In short, if it is edible, they will eat it! Food habit studies rely on observation and analyses of regurgitated pellets of indigestible material, e.g. fur, feather, and fish parts. These birds can develop a conditioned aversion to shellfish affected by paralytic poisoning which can be lethal to humans. If these gulls do ingest infected prey, they have the ability to detect and regurgitate it before it does any harm (Kvitek 1991). They are not known to store food.

vi. Drinking, Pellet-Casting, and Defecation

Glaucous-winged gulls drink fresh and saltwater. They excrete the salt by means of two salt glands located in depressions in the skull above, and slightly anterior to, the eyeball orbits. A duct leads from each gland into the nasal cavities from where the fluid leaves via the nostrils. As mentioned earlier, they do cast pellets and they defecate on land, in the air, and on water.

vii. Vocalizations

Glaucous-winged Gulls make calls very similar to those of other large gulls, such as Herring Gulls. Chicks in the egg and while pipping out of the egg make a *pe-ep* sound. Chicks beg for food or attention with a thin *we-e-e* call. Larger young and fledglings beg for food by calling *pliahah*. They do issue a wide variety of calls, including their typical call note, a longer call, a head toss call, a choking sound, an alarm call, a yelp, mew call, alarm call, anxiety call, attack call and a copulation call. These gulls are vocal year-round, but much more so during breeding season and feeding bouts. They can be heard calling in the dead of night, but mostly in the daytime. Some people find their calls quite annoying.

viii. Other Relevant Behaviours

They sleep standing on both legs but also on one with the other tucked in. Sometimes they lay down on their abdomens with their bill tucked under their scapular feathers. During sleep, gulls do remain partially "alert" by occasionally opening and closing their eyes.

In the off-breeding season, they sometimes roost in flocks of 6,000 to 30,000 birds in sheltered bodies of water or on log booms. They leave the roost about 45 min before sunrise and return about 45 min after sunset. Sun-bathing has not been reported.

On occasion, Glaucous-winged gulls engage in fierce fights by grasping and tugging on their opponent's beak, head, wings and tail, sometimes drawing blood. They also try to flick their wing wrists at each other, which can be painful. They have three threat displays, the most common being a silent one whereby they hold their head and neck erect and tilt their bill downward. They usually attack their opponent when the latter is turned away.

Glaucous-winged Gulls can be seen alone and in pairs, but are usually gregarious. They occasionally nest in isolation but more typically in colonies. Sibling chicks do play by taking an object in their beak, jumping about with it, engaging in tug-of-wars, and chasing each other.

ix. Spacing and Territory

While mated birds might approach each other closely during the breeding season, sometimes touching one another, there is a clear individual distance between birds, i.e. 46 cm, in the non-breeding season. During feeding frenzies, this distance can break down.

Territory sizes range from 5.5 to 9.6 to 20.2 sq m with older birds holding larger territories. They establish them with aggressive displays, calling, and fighting. Males are more aggressive during the pre-laying period and interact more with intruders than females. Older females are significantly less aggressive than younger ones; aggressive residents lay fewer eggs but fledge more young than less aggressive birds. Dominance hierarchies have not been reported.

x. Predation

Their eggs are eaten by conspecifics (their own kind), ravens, crows, Bald Eagles, and foxes and their chicks are taken by Bald Eagles, River Otters (*Lutra canadensis*), and Great Horned Owls (*Bubo virginianus*). Adult Glaucous-winged Gulls are preyed upon by Bald Eagles, Snowy Owls (*Nyctea scandiaca*), and River Otters. The gulls will mob an eagle either perched or flying by giving the attack call and diving at the bird and pulling up at the last moment. Chicks usually scatter to hide somewhere in the presence of a predator. If a human walks through a colony, the birds will form a cloud around the intruder, circling overhead, alarm calling, and defecating. Occasionally, a bird will strike the intruder from behind with its feet, sometimes drawing blood.

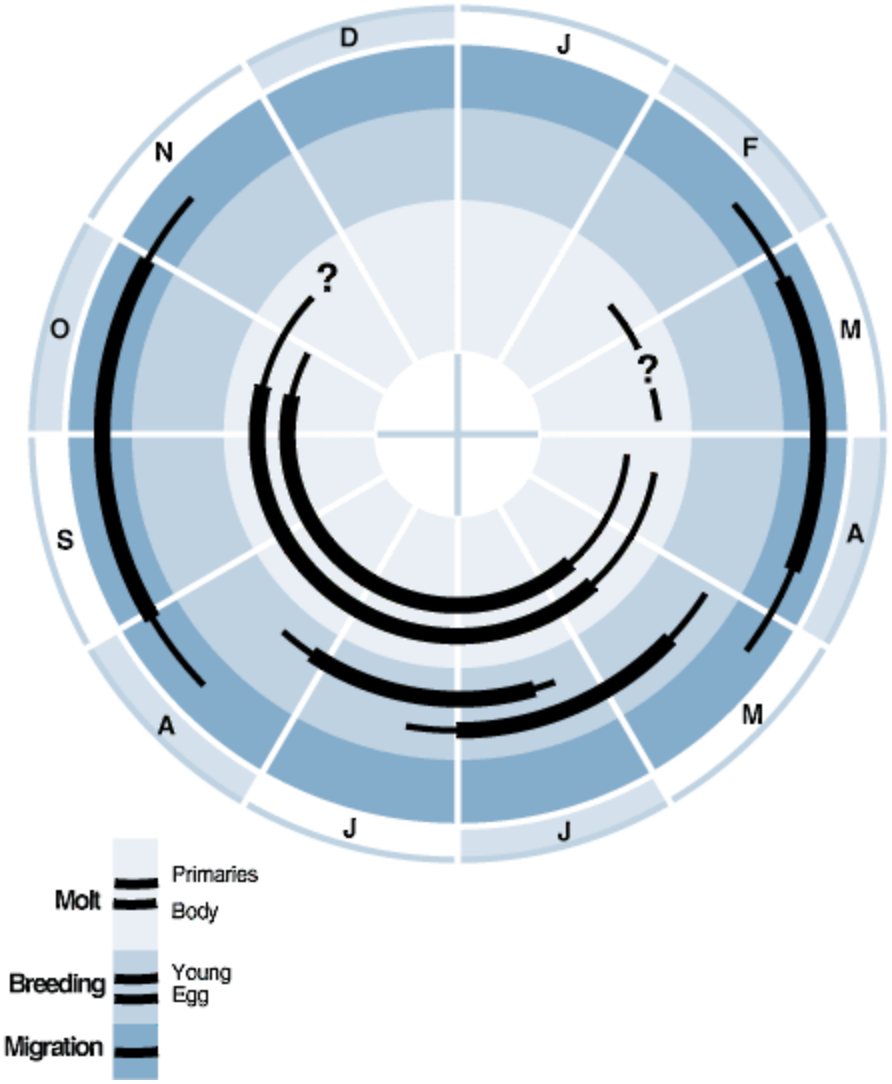

Figure 2. Annual cycle of molt, breeding and migration of the Glaucous-winged Gull in southern British Columbia. Thick lines show peak activity, thin lines off peak (from Hayward and Verbeek 2008).

Figure 3. Glaucous-winged Gull nest and eggs from Katmai Natl. Park, AK in June (from Hayward and Verbeek 2008)

xi. Phenology

Figure 2 shows the general phenology of Glaucous-winged Gulls throughout the calendar year. These gulls usually arrive back at their colonies in early February; by late April, they are all back. Single males holding a territory advertise to females throughout April and early May. The first nests appear throughout March and April with serious nest building being done in late April and May. Older birds, especially females, start their clutches significantly earlier than younger birds, and there is generally only one brood raised per season. On Mandarte Island, hatching occurs between June 12 to 30, with most out of the eggs by July 4.

xii. Mating

Glaucous-winged Gulls are monogamous, however no sex ratios have yet been reported. They do occasionally perform extra-pair copulations with birds other than their mates. Forced copulations, if attempted, are usually unsuccessful. On the breeding territory, the birds engage in head tossing, a jerky movement repeated at short intervals, to induce the male to regurgitate food. Sometimes they do allo-preening where they preen each other's head feathers. Males

regurgitating food for females usually happens twice daily at 10-hour intervals, lessening as egg-laying approaches and then stopping after the clutch is laid. Just prior to copulation, both birds do a head-toss and then the male, making the copulation call, mounts the female by squatting on her back, beating his wings, and waggling the tail from side to side.

Neither sex plays a dominant role in choosing the location of the nest site. They might start several nests, but only one is completed. As said earlier, many nest on 2- to 10-hectare rocky islands with little vegetation, but the roof-nesters prefer to nest on buildings near water, either on totally flat roofs or on the flat portions or near structures of peaked roofs. The nest site is scraped bare and is usually enclosed by a ring of torn-up turf, moss and other vegetative material; the nest materials themselves are highly variable including loosely stacked grass, weeds, moss, roots, twigs, string, bones, seaweed, etc. Some nests have lots of materials, while others have little. Their size is around 40 cm in outside diameter, 22 cm in inside diameter, and up to 11 cm in depth. It can take as little as 10 minutes to build a nest.

They lay one to four, often three, sub-elliptical eggs, averaging 72 mm in length and 49 mm in the widest girth. The base colours of these smoothly textured eggs range from various kind of greens, e.g. lime, yellowish-olive, bunting, paris, to grayish olive, and are marked with scrawls, blotches or spots that range from dusky brown to olive gray (see Fig. 3). The eggs are mostly laid in the first hour of sunrise with a day to a day and a half between eggs. They will lay replacement clutches about 12 days after the loss of all their eggs.

The females become broody just before egg-laying and they start incubating the eggs with the laying of the second egg. However, full, serious incubation does not take place until all of the eggs are laid. The pipping of the egg can occur anytime in the day and it takes about 2.75 days for the chick to emerge from the shell after pipping occurs. The parents carry the empty shells on foot or in flight, dropping them up to 20 m away from the nest.

Glaucous-winged Gull chicks are semi-precocial, meaning that they are covered in down, their eyes are open, and they are capable of leaving the nest after just two days. They weigh on average around 68 g and they are fed by both parents. Most of the growing takes place in the first four weeks of like. Between Day 6 and 26, the nestlings put on 27 g of weight per day. Average fledging weight is between 86 percent and 92 percent of adult weight.

The chicks generally stay in the nest for the first two days after hatching and are quiet during alarm calls. But two days later, they run to hide themselves, first near the nest and then later in familiar places on the territory. They seek shade to avoid the hot sun. The chicks begin flapping their wings after the first week. They must avoid wandering into a neighbour pair's territory or risk getting attacked and killed. To induce their parents to regurgitate food, they peck anywhere on their beaks, and sometimes compete aggressively for food. When they get older, they pump their necks up and down and adopt a hunched posture. They can recognize their parents' mew calls from quite a distance. With older chicks, parents arriving with food regurgitate it as a bolus and allow the young to peck at it. If it is too tough, the parents will tear pieces off. The parents usually devour the leavings. On Mandarte Island, the number of daily

feedings ranges from 5.4, 7.5 to 9.5 for broods of 1, 2 and 3, respectively. Sometimes parental foraging trips can take 160 minutes. When there are eggs or chicks in the nest, the parents tend to defecate off the territory; otherwise, the feces can clog the pores of the eggs and reduce hatching success.

The young gulls make their first flight anywhere from 37 to 53 days and they leave the colony on average of 57 days. The first flights are naturally clumsy with awkward landings, but when they depart from the colony, they are graceful fliers.

xiii. Demography and Mortality

The age of first breeding is about five and a half years. The hatching success can range from 30 to 80 percent, depending on the location and several variables such as age of the female parent and clutch size. Fledging rate appears to be higher in larger colonies than smaller ones. Reproductive success at any stage, e.g. egg-laying, hatching, fledging, may be strongly related to food.

Glaucous-winged Gulls rarely live longer than 15 years. The average life expectancy is about 9.5 years, after having reached 4 years of age. Both sexes appear to survive equally well.

In terms of fidelity to their territories, 47 of 68 leg-banded adults on Mandarte Island returned to their territory in 1962, while 10 shifted to new territories.

What kills Glaucous-winged Gulls? Besides the predators listed earlier, various diseases and body parasites, both within and on the body, take their toll. Prior to hatching, infertility and unhatched eggs, along with egg predation, can take out about 30 percent of potential birds that could have been added to the population. Chick mortality can range from 9 to 30 percent. In the early 1990s in BC, 20 percent of beached carcasses were Glaucous-winged gulls.

B) POPULATION NUMBERS AND STATUS

How many Glaucous-winged Gulls are out there? In the late 1980s, there were 133,000 pairs recorded in Alaska by the U.S. Fish and Wildlife Service. Campbell et al. (1990) estimated there to be 25,000 pairs in BC. The total nesting population along the western coast of North American is thought to be 200,000 pairs (Vermeer and Irons 1991). One large colony on Protection Island in Washington held 6,785 nesting pairs. The average size of 14 colonies in the southern Strait of Georgia in 1986 was 365 pairs, ranging from 6 to 2,259 (Sullivan et al. 2002). The most recent study, and a very thorough one by Blight et al. (2015), involved collating all available information to develop a (non-continuous) 111-year time series of counts at breeding colonies, and combining these counts with demographic vital rates to assess how changes in historical gull egg harvesting practices, forage fish abundance, and Bald Eagle numbers affected gull population trajectories from 1900 to 2010. Mean counts at 87 breeding colonies in the

Georgia Basin showed a nonlinear trend, increasing from historical low counts in the early part of the twentieth century to peak values in the 1980s, and declining thereafter to the end of the time series.

If one was to study the populations of Glaucous-winged Gulls in cities though, one might conclude that their populations appear to be increasing, largely due to the reduction in human persecution, adaptation to nesting in towns and cities, and increased foraging on human and fish waste. The number of nesting pairs of urban-nesting gulls in downtown Victoria and the adjacent industrial area have increased from an estimated 30 to 40 in 1988 to an estimated 335 pairs in 2017-18 (Blight and Bertram 2018). However, Bald Eagle populations in BC have also increased significantly in recent years, with as many as 2,000 counted in the Vancouver Landfill Site at one time and up to 10,000 at the Chehalis River flats during the salmon runs (D. Hancock, unpubl. obs.). Many of these eagles are nesting in urban/suburban areas and their eventual impact on gull numbers remains to be seen. One pair of Bald Eagles in downtown Victoria specialized in taking these gulls and the immediate area below their nest was littered with their carcasses and feathers (D. Hancock, pers. obs.). For juvenile gulls, the mean estimate for first-year survival is 60.7% and second-year survival, 80.0%. The median age of death for first-year birds is 4.1 mo and for second-year birds, 15.9 mo.

C) EFFECTS OF HUMAN ACTIVITY

Glaucous-winged Gulls are not prone to being disturbed at their nest sites, as long as one moves slowly through the colony. However, as mentioned earlier, the parents will defend their young even to the point of striking one with their wings. Hooper (1988) reported that when nests on a roof were removed periodically, 16 pairs rebuilt their nests on average 4.7 times rather than move to another site. While limited egg and chick harvesting by First Nations does continue in parts of BC, it is not a problem for the Sidney nests. The population of Glaucous-winged Gulls has benefited greatly from the ever increasing supply of garbage and fish waste, but now that Bald Eagle numbers are on the rise, this has possibly counteracted any population increase to some degree, at least in some areas of BC. In recent years, neither pesticides nor oil spills have presented any kind of problem for this gull species.

Glaucous-winged Gulls are not currently listed as endangered in any way, but there are concerns about their impact on other species such as the Black Oystercatcher (*Haematopus bachmani*; (Vermeer et al 1989). Thus, some form of management could be necessary in the future.

These gulls do roost at airports and thus, present a problem for air traffic (more on this later). Playing distress calls, removing nests from airport buildings, trained falcons, shooting, and more recently drones, are all used as measures to minimize this problem. A similar situation exists at landfill sites. Roof-nesters in towns and cities can cause the blockage of drainage pipes and the chemical erosion of roof materials, as well as create an unhealthy environment for apartment and condo dwellers with their copious amounts of smelly feces (more on this later).

D) POSITIVE ASPECTS OF GLAUCOUS-WINGED GULLS

Birding (AKA bird-watching) continues to be one of the fastest growing hobbies in North America. One in five Canadians spends an average of at least 133 days a year watching, monitoring, feeding, filming, or photographing the 450 or so different kinds of birds in our country. It almost doubles the 70 days a year Canadians spend gardening. Birds, being so numerous, so colourful and so diverse, are likely the most common types of wild animals we see on a regular basis. More than a quarter of our households have installed feeders and bird houses in our backyards and almost ten percent of us have bought bird identification books and binoculars and taken trips specifically to see birds and attend hundreds of bird festivals all over North America. That is big bucks for our economy!

Recently, hundreds of avid birders from 16 states and five provinces flocked to the tiny Maritime town of Miramichi, New Brunswick to see the very first mistle thrush from northern Europe land on our shores. This past February, over 62 percent of the world's 10,000 bird species comprising 27 million individual birds were recorded by 200,000 bird-watchers in over 100 countries during a four-day period called the Great Backyard Bird Count. No less than 14,000 of them were Canadians.

But it's not about the money! Birds do a lot for humans. They eat pests, pollinate our plants and crops, disperse seeds; their eggs and meat (yes, chickens are birds!) feed us and their feathers keep us warm. They have even helped us win wars by teaching our military about flight, camouflage, sentry systems, and acting as vital message carriers. Birds have saved human lives not just by serving as literal 'canaries in coal mines' but also by globally warning us of other environmental health hazards such as carcinogenic pesticides and industrial by-products. And sadly, it took the unbelievable senseless annihilation of literally billions of Passenger Pigeons (*Ectopistes migratorius*) on our continent to help promote a burgeoning conservation movement and herald a new era of environmentalism.

However, we also celebrate birds because of their intrinsic value. Who can deny that birds entertain us in so many ways with their beauty, their song and their flight? How many great writers, artists, film-makers, and even aviators and astronauts were inspired by these amazing unique creatures?! If you ask a bird-watcher what they see in birds, they might respond by saying "What does one see in the works of Shakespeare, the paintings of Van Gogh, or the music of Mozart?" In short, a world without birds will not just be a biologically diminished world but also an emotionally diminished one. And if we lose our birds, we will lose ourselves.

Glaucous-winged Gulls are all part of the above. A number of birders especially like watching gulls and thus, their contribution to biodiversity is important. The welfare of these gulls can help forewarn us about impending and ongoing problems with the planet, e.g. overuse of toxic chemicals, changes in the numbers of fish and other marine organisms, and climate change.

Gulls also help keep things clean by scavenging on the increasing amount of garbage created by humans. They also constitute a food supply for Bald Eagles, Snowy Owls, and River Otters. While the Glaucous-winged Gull is not listed as threatened or endangered on any list and the bird is increasingly nesting in towns and cities, its population has been reported to be declining overall for reasons not yet entirely clear to us. Perhaps increasing numbers of its major predator, the Bald Eagle, are to blame, or something more insidious, e.g. climate change. To some rural folks, particularly senior citizens sitting on a park bench, these gulls can provide a small form of non-costly entertainment. And while some people find the screeching calls of these calls annoying, one can argue that the sounds are simply part of the scene of a seaside town like Sidney.

E) PROTECTION AFFORDED TO THESE GULLS

Glaucous-winged Gulls, including their nests and eggs, are completely protected by the *Migratory Birds Convention Act, 1994* in Canada. A nest as defined includes parts of the nest, therefore even nest fragments and new nests are protected. A permit may be granted to remove and destroy gull nests if the property owner demonstrates that the gull nests are or are likely to cause damage to property or danger to human health and safety, but more on this later. See Appendix 1 for more details on acquiring a permit. Fines for disturbing or destroying the nest of a migratory bird are about $150 with $50 per additional nest. See http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-313/page-10.html#h-12 for more details. Birds (including Glaucous-winged Gulls), eggs, and nest trees, are also protected under Section 34 of the B.C. Wildlife Act.

F) OVERALL AIM AND OBJECTIVES

The overall aim of this report is to fulfil a contract obligation in which I agreed as a consultant to investigate the situation regarding the presence of Glaucous-winged Gulls in the town of Sidney. My specific objectives were to examine potential problems posed by the gulls and to provide some potential solutions to those problems. This contract was a result of the town receiving a half-dozen complaints about an overabundance of feces from the gulls on sidewalks and building roofs, as well as at least one about excessive noise made by these birds.

G) MATERIALS AND METHODS

i. Study Area

As per verbal agreement with Mr. Tim Tanton, one of Sidney's town engineers and my direct employer, I delineated my study area as being bordered by Bevan Ave. to the south and James White/Sidney Aves. to the north, east to the Mary Winspear Centre and Travelodge, and west to the seashore and Sidney Pier area. It was our reasoning that the majority of the gulls generating complaints would be inhabiting the downtown core of the town of Sidney.

ii. General Methods

I undertook two walking surveys of the study area on July 10 and August 3, 2018. This included walking from the top of all three main streets, i.e. Bevan Ave., Beacon Ave., James White/Sidney Ave. to the seaside and all of the cross streets therein. I used my Swarovski 8X32 binoculars and my Swarovski spotting scope up to 60 power to observe the birds, as well as a notebook to record data. I also took numerous photos with my I-Phone 5S (see Appendix 2). The purpose of the two walks was to make a very rough count of the gull numbers, identify their points of concentration and perceived problems associated with them, and make general observations of control measures in place.

I also made contact with employees of The Sidney Hotel and Spa (Chris Wright in charge of Hotel Maintenance and Bob Hegland in charge of condominium maintenance); Darryl Jackson of Firm Management which manages The Landmark condominium unit and Glen Williams in charge of maintenance of The Landmark; and finally, Patrick Archer, the volunteer 'custodian' of the Meridian Residence.

Furthermore, I contacted and conversed with Captain Scott Snow, who is involved in airport safety of the Victoria International Airport, to discuss whether they had an active program in place for gull control. A letter and report submitted to the Canadian Wildlife Service is included in Appendix 3.

I also had a conversation with Louise Blight, Adjunct Associate Professor in the School of Environmental Studies at the University of Victoria, while attending the International Ornithological Congress from August 19 – 26, 2018 in Vancouver. She was presenting a poster on the use of drones to count gulls in the downtown Victoria area.

I had several email communications with Kevin Fort, Head of the Marine & Terrestrial Unit of the Canadian Wildlife Service under Environment and Climate Change Canada, to discuss protective laws regarding the gulls.

Finally, I consulted the literature to learn of the very latest scientific studies evaluating both old and new technologies, as well as communicated with the heads of several pest control companies in North America about gull problems.

H) RESULTS AND DISCUSSION

i. Numbers of Glaucous-winged Gulls in Downtown Sidney

On both days I did the walking surveys, the weather was sunny and pleasant with excellent visibility. But getting any kind of accurate data for the actual number of Glaucous-winged Gulls in the downtown Sidney area was problematic for several reasons. First, there is seasonal variation, i.e. there are certainly more gulls around in the warmer months. Second, not every flying gull is necessarily a Glaucous-winged Gull; there are at least two other similar-looking species, i.e. Western Gulls and Herring Gulls. However, I believe that it is reasonable to assume that 99 percent of the large gulls seen perched and flying in downtown Sidney are Glaucous-wings. Third, while many of the gulls perch on the edges of buildings, posts and hydro poles or fly by, some of the birds could have been standing in the middle of any given roof or close to some infrastructure on the roof, possibly guarding their chicks, and thus, they were simply not visible to an observer walking the streets. Trying to get an accurate count of the gulls loafing in the Sidney pier area was also problematic due to the constant movements and hiding places. It is quite conceivable that some of the birds were counted twice or maybe even thrice because they did not always remain in one place. This is certainly true of the flying birds being counted. Having said that, I got remarkably similar numbers on both days, i.e. 89 and 84, respectively. From that, I would estimate that there are approximately 100 juvenile and adult Glaucous-winged Gulls using the Sidney downtown area within the three main avenues, i.e. Bevan, Beacon, and James White/Sidney, at any given time in the summer months.

It is equally true to say that getting an estimate of the numbers of nesting pairs of Glaucous-winged Gulls was also problematic. To do this properly, one would have to spend considerable numbers of hours on top of the flat roofs of the highest buildings in Sidney with a spotting scope, and even then, one would not be able to see them all.

Using a fixed-wing or rotary drone would normally be a useful tool to get accurate photographs and thus, counts of nesting pairs (Blight and Bertram 2018), but acquiring a permit from Transport Canada to fly one over the roofs of downtown Sidney which is right in the flight path of the Victoria International Airport immediately across a busy four-lane highway would likely be impossible, even for a skilled pilot. Blight teamed up with Douglas Bertram of the Wildlife Division of Environment and Climate Change Canada in Sidney to evaluate using drones to monitor urban-nesting Glaucous-winged Gulls in downtown Victoria. The drones worked quite well in revealing gull nests, but more interesting and important to the town of Sidney is the fact that the number of nesting pairs of urban-nesting gulls in downtown Victoria and the adjacent industrial area have increased from an estimated 30 to 40 in 1988 to an estimated 335 pairs in

2017-18 (Blight and Bertram 2018). Whether the gull population is undergoing a similar transformation in the town of Sidney requires further study, but it is safe to say that the authorities in charge of airport safety at the Victoria International Airport might become alarmed, should this become a reality (more on this later).

ii. Present and Future Problems Posed by Glaucous-winged Gulls in downtown Sidney

Food Sources: The Glaucous-winged Gulls can access food in one of two ways: natural and anthropogenic. Since Sidney is located on a seaside shoreline, all of the live bounty of the sea, including fish, crabs, clams, oysters, barnacles, etc. as well as washed-up food items such as fish and seal carcasses, is available to them (see earlier section on feeding). They are also known for killing pigeons and eating their eggs and young, as well as cannibalizing the eggs and young of other members of their own species. As for anthropogenic sources, I see at least four possibilities: 1) waste food, e.g. partly eaten sandwiches, fries, etc., discarded by tourists and even residents near benches and in parking lots; 2) human food deliberately given to them by misguided, lonely folks; 3) fish and crab remains left from processing catches of the day on the Sidney Pier and perhaps on the docks of the Port Sidney Marine; and 4) the discarded remains of fish and other sea organisms from the Fish Market. On a number of occasions while walking about in the port area, I observed the owner of the Fish Market tossing out fish remains to as many as a dozen waiting gulls out of the back of his building. In my estimation, this constitutes a major source of food for Glaucous-winged Gulls in the Sidney downtown area.

Loafing Perches: On both occasions where I surveyed the gulls in Sidney, it was clear that the pier railings and posts and various rocks in the Sidney port area provide excellent loafing spots for them, partly because it allows them an excellent observation point for detecting food along the shoreline and from the Fish Market. There were usually more than 15to 20 gulls at any one time, loafing there. However, judging from the copious amounts of feces on roofs and sidewalks, I noted quite a number of well-used roosting or loafing perches away from the port area. I can categorize them as follows: 1) hydro poles with cross-arms; 2) lamp/traffic posts; 3) pitched or peaked roofs, and 4) flat roofs.

Poles and Posts: Some hydro poles and lamp/traffic posts are more popular than others and are easily recognized by the large amounts of feces on the perches and on the pavement and sidewalks below. I also noted a number of vehicles parked under these poles and posts, which sported a fair bit of gull feces. Two excellent examples of well-used hydro pole are the ones at the corner of Bevan Ave. and 4th St. and on 3rd St. near Beacon Ave. very close to the Bank of Montreal. On both of these poles, there was almost always a gull perched on top. In fact, I encountered a man who works for the Blast Off Pressure Washing Co. who informed me that they have a contract to clean the gull feces from the sidewalks and that they have to do certain

poles quite frequently. As for lamp posts, two good examples are the one on Resthaven Dr. near Beacon Ave and the one in the middle of the Fairway Market parking lot. I differentiate between hydro poles and lamp/traffic posts mainly because 'treating' them to dissuade perching gulls will require slightly different approaches (see Figs. in Appendix 2).

Roofs: There did not seem to be any obvious preferences for the gulls loafing on flat roofs versus pitched roofs. Because the gulls do prefer to perch in a location offering a good lookout for both potential danger but more important, anthropogenic food sources, many of the birds either stood on the peaks of the roofs or on the edges. Both roof types featured lots of gulls. However, there was one important feature of any given roof that largely determined whether it was home to either a large number of gulls, just one or two, and none at all --- gull deterrents, e.g. wires, spikes, etc. The ones featuring the deterrents which were reasonably well-maintained appeared to have no obvious gulls perched (but see below) on them, e.g. The Meridian Residence, the Old Cannery, the Sidney Pier Hotel and Spa, and the Landmark Hotel, but upon closer inspection while on the roof-tops in August, I could see one or two nesting pairs with young out of the nest defended by at least one vigilant adult. One building, i.e. the Old Post Office, had 6 young on it, suggesting either two or three active nests on it. These could not be seen during either of my street-level surveys. While some of these aforementioned buildings and others, e.g. Portside Condos on Bevan Ave. and 1st St. did feature gull deterrents, i.e. spikes, a closer look on both the roofs and from the street level revealed that wherever these spikes were absent either from not being originally installed everywhere or having broken off the roof, gulls made use of the spaces for perching. I also learned from one of the building managers that the gulls are capable of knocking the spikes, if not installed properly, off the roof edge by striking them with either their body parts or other objects. Apparently, they are fastened to the metal roof edgings by magnets. Also, as seen with city pigeons, gulls will also lay sticks on top of the spikes to make a platform for nesting. Interestingly, some buildings in downtown Sidney have not been treated with any obvious gull deterrents and yet had very few gulls, if any, on them and very little feces, e.g. Mary Winspear Centre, Thrifty's/Lodge Hotel, Save-On, Fairway, and the current Fire Hall. The bottom line is that if a given building is not treated with some sort of gull deterrent, e.g. spikes, wires, they will eventually attract a fair number of gulls to loaf upon them and perhaps nest too. It is my feeling that there are several buildings in the downtown Sidney area that could be called 'problem buildings' due to the fact that they are completely devoid of any gull deterrents. The most obvious ones, due to the numbers of gulls roosting on their roofs and the associated large amount of feces on them, are The Old Post Building, Quality Auto Services, Marks Work Wear, the 5-storey white condo at the corner of Sidney Ave. and 2nd St., the yellow/brown 4-storey condo at the corner of 5th St. and James White Blvd., and the Fifth Street Centre. It is important to note that I am only using the names of businesses to help denote the location of the building and not to lay any blame on them for the lack of gull deterrents. As long as these buildings provide loafing spots for Glaucous-winged Gulls in downtown Sidney, there will likely always be a large population of these birds in the town, and along with that, copious amounts of feces on building roofs, hydro poles, lamp posts, and sidewalks.

Nesting on Roofs:

The popularity of buildings as nesting places for gulls is not a new thing (Monaghan and Coulson 1977). As mentioned at the beginning, gulls do prefer flat roofs for nesting, especially ones that might offer some infrastructure on them to provide shade from the hot sun and cover from inclement weather, as well as hiding spots from cannibalistic gulls and other predators like Bald Eagles. However, in perusing the literature, it is possible for the gulls to nest on a pitched or peaked roof, provided there is some sort of infrastructure to allow them to build a nest whereupon the eggs will not roll out and the young have some cover. While I was not able to gain access to any peaked roofs, I did manage to get up on three flat roofs, as described earlier, to get an idea of the nesting situation concerning the Glaucous-winged Gulls. The first thing I learned is that even from the highest of these three buildings, I could not view all of the roofs of the other buildings in the downtown and I could only see the entire roof of just a few buildings adjacent to my 'lookout' buildings. I could not determine if any gulls nested on the pitched roofs. From the flat roofs that I could see, several, but not all, had mostly one nest, but some as many as three pairs of gulls nesting on them, each with a youngster. The most favoured roofs appeared to be these with any kind of vegetation growing on them, e.g. moss, or covered in small stones, but there were gulls nesting on tar roofs as well, likely bringing in their own vegetation, e.g. grasses, to make a nesting substrate. They appear to prefer to nest in the corners of the roofs as opposed to the middle. Surprisingly, some flat roofs that appeared to be appropriate for nesting gulls did not have any nesting pairs. As mentioned earlier, it was beyond the realm of this study to get any kind of estimate of the number of nesting pairs in the downtown Sidney area.

Why are gulls nesting on roofs a problem? Most cities and towns in the world, especially those located near the seaside or lakes, have a population of roof-nesting gulls of various kinds (see review by Belant 1997). As said earlier, food is not a problem because gulls will eat anything that is edible. That leaves the other factor limiting population growth of organisms – a place to breed and raise young. According to Belant (1997) and my personal observations, the potential impacts of roof-nesting gulls are as follows: 1) the foraging adults and fledged young can present a hazard to air traffic, in Sidney's case, the nearby Victoria International Airport (see Appendix 3); 2) they can transmit unhealthy pathogens, e.g. *Escherichia coli*, *Listeria* spp., and *Salmonella* spp., etc. and parasites to humans and other organisms by contaminating water sources; 3) they can damage buildings from the build-up of their nesting materials and moulted feathers which can obstruct roof drains and cause flooding, and by their corrosive feces affecting metal parts; 4) their accumulated feces and associated odour can permeate air conditioners and open windows, thereby presenting an uncomfortable living situation and even transmit disease to the occupants; 5) their feces can accumulate on the sidewalks below the nest buildings, as well as on the cars of both residents and tourists, resulting in costly clean-up bills and angry citizens; 6) nesting gulls can be highly territorial, harassing and potentially injuring building personnel; 7) they can become a frightening and/or dangerous nuisance, even biting human hands in efforts to take food, at picnic and bench sites where misguided folks feed them; and least important of all, 8) some folks find their loud screeching calls at all hours of the day or night somewhat offensive. Vermeer (1988) reported that the lifespan of a roof

which cost $350,000 U.S. to build would only be half as long as credited because of chemical erosion from gull defecation and water damage caused by feathers and nest debris obstructing drainage. While some gull species, e.g. Herring Gulls, can transport over 4,000 L of nest material to build 248 nests on to various roofs (Belant 1997), my personal observations of several Glaucous-winged Gull nests on the three buildings in Sidney tell me that the latter species do not appear to use large amounts of material in their nests. Thus, water damage to roofs in Sidney may not constitute a serious problem.

iii. Destructive and Non-Destructive Solutions

Solutions to the problem of an overabundance of any kind of gulls can fall into two categories: 1) destructive; and 2) non-destructive.

1) Destructive: It is safe to say that because of the potential impact on public safety and the well-documented high numbers of bird strikes on aircraft number of airports (see Belant 1997 but for detailed statistics in Canada, see the Transport Canada web site https://www.tc.gc.ca/eng/civilaviation/publications/tp13549-chapter7-2144.htmeither), most airports provide their own staff or hire a professional company by putting out bids for tenders. In either situation and depending on the target birds, such solutions entail a combination of using bangers and other loud devices, trained dogs and falcons, robot or drone falcons, alarm calls, raptor calls, decoy birds, laser beams, and of course, firearms with live ammunition. Some are more effective than others because birds can become habituated to things that do not harm them. In general, the public seldom, if ever, sees any of these programs in place due to airport security and the airports not broadcasting it and equally important, because many of us fly in airplanes and want to be safe, we are content with the success of such control programs. No one wants to see birds shot, especially those in declining populations, but human safety takes precedence. See report in Appendix 3 for details on the Victoria International Airport.

Almost all of the aforementioned solution to gull population control are <u>not</u> feasible in cities and towns like Sidney for two reasons. First, firing guns and making loud noises in densely human-inhabited areas would definitely not be acceptable to the general public. Second, there is a growing number of folks who are opposed to any kind of harm imposed upon wildlife. This includes even hunting down and killing down large predators like cougars and bears that have actually killed a human! However, hiring a falconer with trained raptors does seem to be a solution that sits well with the public; in recent years, the city of Halifax did just that. Most of the time, it is merely the presence of a flying raptor that chases off the target birds, but every once in a while, the hawk or falcon does make an occasional kill to remind the birds of its potential danger. The main downside of this techniques is that it can become costly to hire such folks on a regular basis. And when the program stops, the gulls return. I am not aware of any bonafide published scientific studies that indicate that all by itself, it is a cost-effective and permanent solution.

I am also not aware of any trapping-and-kill programs being used on city-living gulls, largely because the public would regard it as inhumane and simply unacceptable. Similarly, I am aware of poisoning programs, e.g. alpha chloralose, avitrol, even strychnine, used to control pigeons in cities, however these are basically illegal for a variety of reasons, e.g. inhumane, publicly unacceptable, etc. Alpha chloralose is apparently one of the more humane poisons for killing birds, basically inducing sleep, whereas strychnine offers a very violent and inhumane death and also biomagnifies up the food chain to keep killing. Avitrol is not a poison, but instead is designed to send consumers into flight alarm patterns, which presumably scare off other members of the flock from an area. Regrettably, it is often illegally used as poison by means of using lethal overdoses and has also caused the deaths of raptors consuming pigeons eating it. Thus, it is banned from use in Canadian cities.

In today's environment, applying for a permit to use any of these destructive solutions would not only be a complete waste of time, but could anger the public and bring negative media attention to the town of Sidney, should consideration even be given to them. One building manager told me of a letter that was distributed to certain businesses in Sidney which had hired individuals to destroy any nests on their buildings; the letter warned of "$15,000" fines if the activity was continued. I was unable to find out any more details. But it did signify to me that there are folks in Sidney who are serious about protecting the gulls there.

Other less obtrusive but destructive ways to control gull populations include oiling or pin-pricking eggs so as to preclude hatching but make the adults go through the full incubation process and then run out of time to lay a new clutch. Unless the gulls, including Glaucous-winged Gulls in Sidney, were causing a very serious health hazard to humans, acquiring permits to engage in egg destruction of any kind is a complete non-starter. I know this because the federal government, i.e. the Canadian Wildlife Service (CWS) of Environment Canada and Climate Change (ECCC), is loathe to even issue permits to allow nest destruction. An email conversation back and forth with the CWS revealed the following. First, tampering with any migratory bird's nest, including their eggs and young, contravenes the Migratory Bird Convention Act (MBCA), 1994 and can result in fines as outlined earlier. Largely in the hands of the ECCC Wildlife Enforcement Division, the MBCA, specifically Regulations Prohibition 6a, prohibits disturbance, harm, destruction etc. of a migratory bird's nest. However, things may not be that simple. For instance, another serious problem bird in the Sidney area is the ubiquitous Canada Goose (*Branta canadensis*). The CWS appears to have come to grips with this situation and is now allowing more liberal control measures to be taken. As yet though, nothing is in place for the Glaucous-winged Gull. While this species is not considered rare or endangered, trends at historical breeding sites have been declining since the 1980's, but whether this is a result of a shift in breeding to urban sites is not yet known (Blight et al. 2015). As stated earlier, their numbers have indeed been increasing significantly in downtown Victoria (Blight and Bertram 2018).

Thus, until a well-developed policy is finalized, the CWS is forced to act in a precautionary way when it comes to issuance of Damage or Danger MBCA permits. Individual property managers

tampering with gull nests to dissuade nesting attempts may well engage in these behaviors, but they do so entirely at their own risk. ECCC Enforcement officers do, in fact, regularly respond to public complaints, including those relating to rooftop-nesting gulls in urban environments and especially when eggs or young are present. The CWS does strongly encourage property owners concerned about nesting gulls on their rooftops to take measures in advance to discourage nesting, especially if any kind of maintenance activities are planned for which the gulls would be problematic. For example, a 'Damage or Danger' permit could be issued by the CWS in those cases where, for example, adult gulls are harassing maintenance workers trying to make necessary and time-sensitive repairs, or where the nest is located on or very near to an air intake vent or drainage hole. Otherwise, when a property owner or developer is confronted with an active gull nest with nestlings, the CWS recommends that they simply wait until after the young fledge, which can take several weeks. See Appendix 1 for how to apply for a Damage or Danger permit.

2) Non-Destructive: The most obvious long-term and most publicly acceptable means of deterring Glaucous-winged Gulls is exclusion, both from the loafing perches and from the roofs for roosting and breeding.

The "lowest-hanging fruit" in the town of Sidney are those hydro poles and the lamp posts. While one could purchase those anti-bird spikes from a company to install in these situations, they can be expensive, problematically hard to install, and even unsightly. In a conversation with an employee of Blast Off Pressure Washing whose job it is to clean the feces from the sidewalk, he suggested making and installing metal triangular pieces of metal on edge on the top of the hydro poles and on any associated cross-arms where the birds perch. The peak of the triangles, if high enough, should prevent the birds from perching in these spots. They would be cheap to produce locally at a sheet metal shop and if painted gray or brown, would look less unsightly than the shiny sharp spikes (see a mock-up in Appendix 2). As for the lamp posts, I believe that one could fasten a stiff but flexible quarter-inch wire at the top of the post that would basically hang above the drooping part of the lamp and prevent the bird from sitting on it. I am certain that some ingenuity on behalf of the town engineers could create other perch deterrents to fit the various scenarios where gulls are perching and creating a lot of feces. Surely these deterrents would pay for themselves in short order, considering what it costs to hire professional pressure-washers to clean off sidewalks.

As for the roof tops, it was very clear to me that the buildings that had gull deterrents installed, e.g. spikes, wires, were mostly free of gulls perching on them and defecating everywhere. On some 'spiked' buildings, one could see that there were spots where the spikes had either been broken off or not installed in the first place. In other words, they did not appear to be regularly maintained. It was clear that the gulls took advantage of these open spots to perch. And speaking of maintenance, the three flat-roofed buildings that had low numbers of perching gulls but one or two nesting pairs with young had something else in common, i.e. a person, either hired or voluntary, to provide regular maintenance for the roof of the building. The building manager of the Sidney Pier Hotel and Spa goes on the roof three times a week to check

on the state of the spikes and the netting which has been laid down from wall to wall to prevent the gulls from picking up rocks in their beaks and dropping them onto the glass-walled ceilings of infrastructures, cracking or breaking the glass. Why do they do this? Some scientists claim that it is a form of adaptive play behaviour to teach young gulls how to drop clams and other hard-shelled food items onto hard surfaces to crack them open. Crows have been observed engaging in a similar behaviour. In any case, the fine netting seems to be effective against that behaviour, but it did not prevent the one pair of gulls from raising a nestling that I saw. The maintenance worker in charge of the roof of The Landmark ventures on to the roof five times a week Monday through Friday to check on the spikes and also to see whether the nesting gulls are posing a damage problem in any way. While there were few loafing gulls, there was at least one nesting pair on the roof at the time of my visit. Interestingly, he told me that the nesting gull pairs were highly territorial, and perhaps on the smaller roofs, one nesting pair excludes either other nesting pairs as well as potential cannibalistic gulls. The third building, i.e. the Meridian Residence, did not have a hired employee but instead a voluntary 'custodian' living in the building. He has tried a number of bird deterrents, including spikes, alarm calls from the California company, *Bird-B-Gone*, and other measures. His determined and fairly through effort is paying off because I saw few or no loafing gulls and no nesting gulls on the roof of the Meridian Residence.

Other than the few buildings in Sidney which have control measures in place, some maintained and some not, there still exist a number of buildings which have not put any deterrents in place (see above). Thus, their buildings are serving as a 'reservoir' for the gulls and are basically helping to maintain their numbers. Whether the town of Sidney can officially order them to do so by passing an ordinance and enforcing it is not known to me. It is quite obvious that the town is in a strong construction phase, i.e .densification, with many new buildings going up. Perhaps the town can at least pass some sort of ordinance to request these future new building owners to install gull deterrents right at the beginning before the buildings become a problem.

iv. Potential Solutions for Building Owners: What Works and What Does Not Work

So, what is a current or future building owner in Sidney to do about deterring gulls from nesting and-or loafing on one's building? Listed below are the various current options for installing devices that exclude birds from given structures and places. Some are effective, some are expensive, some could be dangerous to the public, and some do not work (see review by Bishop et al. 2003).

Fake Owls and Other Predators: Allow me dispel one so-called solution immediately – the use of fake owls. Simply put, they do not work and they are a total waste of money! Years ago, against my advice, my former employer, McGill University, went ahead with a program of using fake owls to disperse pigeons from the downtown campus. Their intention was to move them around to make them seem 'alive'. The next spring, I saw one of these owls swinging in the

wind by a wire and covered in pigeon feces. The target birds quickly habituate to them in a matter of three or four days, as they do to most 'predator' models, e.g. cats, hawks, etc., which do them no physical harm.

Shiny Objects and Large Eyes: One can purchase from bird control companies various devices made of shiny metal that spin in the wind, balloons bearing highlighted extra-large eyes, and reflective holographic tape that supposedly repel birds. For that matter, one could save a lot of money by obtaining a load of old CDs and hang them from wires in some manner to the same effect. Again, without inflicting any kind of physical harm to the gulls, they would soon habituate to them. However, they could make the birds uncomfortable enough to avoid one roof if there are others available without any bird control at all.

Spikes (Quills) and Spiders: Clearly the spikes, spiders and various renditions on the market, if well maintained, do work. One could purchase them from local pest control companies in Victoria such as Old Island Pest Control and either install them themselves or hire the staff of such companies to do so. They can be a bit costly, but present a cheaper solution to wiring. As said earlier, gulls can knock them out of place if not installed properly, because the magnets are not strong. Silicone glue could resolve this issue as needed. Metal spiders with radiating arms work on the same principle and are effective when installed on chimneys and venting shafts.

Wiring: Wiring an entire flat roof is another option whereupon metal wires are strung 2 to 3 meters apart across a roof to dissuade gulls from even landing on a roof, let alone nesting. This is generally cost-prohibitive and only done in cases where there is a potential of a large nesting colony of gulls to establish themselves, which could lead to serious infrastructure damage to a building. Partial wiring, i.e. stringing wires on small posts along building peaks or along building edges, might be less expensive than installing spikes.

Electric Tracks: If spikes or wires present a visual problem, one could install low-profile electric tracks to prevent the birds from landing or nesting in unwanted areas. These electrically charged tracks impart a mild electric shock when birds land on them and they eventually become conditioned to avoid areas where they are installed. The downside of this technology is the expense, but they could be affordable for small jobs on any flat or curved surface. They also require some sort of power source.

Gels: Various pest control companies are willing to sell and install anti-bird gels, which are oil-based, non-toxic, and do not trap the birds physically. The idea is that the birds do not like perching on it. The downside is that it does not last forever and eventually traps dust and becomes ineffective. Replacing it time and again can be expensive, especially on a large roof situation.

Netting: Like spikes and wires, netting definitely can work. As said earlier, the Sidney Pier Hotel and Spa has netted their entire roof, but not for the purpose of deterring gulls from nesting. The gulls can build their nests right on top of the netting, but the netting makes it difficult for the gulls to pick up stones in their beaks and drop them onto the glass surfaces of

infrastructure (see above). Netting is expensive and it also has a limited shelf-life slowly deteriorating in the hot sun and precipitation.

Sound Bird Deterrents: Distress and predator calls emitted by a machine on a roof are designed to make birds like gulls feel uncomfortable, but not present discomfort to the human ear. They can easily be installed on roofs and can be solar-powered. The lifespan of the rechargeable battery can be a problem though (P. Archer, pers. comm). I am not convinced that these sounds really work in the long run. As long as no physical harm is done to the birds, they could become habituated to these sounds. If they were truly 100 percent effective, then there would be no need for airports to spend millions of dollars hiring bird control companies year-round. Some airports, e.g. Edmonton International Airport, have recently leased the technology of a Dutch-based company that employs drones resembling eagles and falcons and issuing their calls. It was not cheap, i.e. $100,000 or more. The company has been reporting good success in repelling nuisance birds with their drone raptors, but it is too early to decide whether this is a fully cost-effective solution. There are also those claims that machines playing ultra-sonic or super-sonic sounds will deter birds, but since we still know little about the hearing senses of birds, I am highly skeptical of them. They are being sold in magazine ads and on television as being able to disperse rodents, but years ago at my university, a wildlife biology professor did some testing on captive animals and found these machines to be ineffective. Such sounds may also be audible to humans, and thus, would not be acceptable in a small town such as Sidney. The same can be said for pyrotechnics, e.g. propane cannons, which are widely used in vineyards to the point of birds becoming totally habituated to them.

Laser Beams: A somewhat brand-new bird-deterrent technique out there is the use of lasers. Having talked to a number of ornithologists on this subject, it is clear that birds do not like green laser beams. Bird control companies are just now beginning to explore using this method and some are claiming an almost 100 percent reduction in bird damage to crops by installing laser beam guns on poles among the fields. I have long thought about the concept of mounting a turret laser gun on a drone to disperse birds from crops, but getting permission from Transport Canada could be problematic, given the problems they have had with thoughtless individuals shining lasers at airplanes near airports and illuminating cockpits to the point of nearly blinding the pilots and endangering lives. When I mentioned this new laser technology being used by farmers to scare birds away from crops to two drone research partners of mine, the first word from both of them was “dangerous”, meaning “to humans”. As a follow-up, I spoke with Dan Hall of Bird-X, Inc. in Chicago; they have experimented with lasers in bird control. He informed me that lasers could potentially be effective against gulls, but it really depends on placement and proper usage. Their company uses both fixed or handheld lasers. The fixed lasers do not have a strong beam and are not harmful to humans or birds. Their handheld lasers put out about 50 mW, which, while generally safe for birds and humans, could cause damage with prolonged exposure. Apparently, there are more powerful lasers on the market, but anything over 50 mW could be dangerous and thus, not recommended for bird control.

Inflatable Scarecrows: These devices, costing around $1000 or more, are mainly being used to disperse birds from agricultural crops and aquaculture facilities. Essentially, these inflatable

scarecrows are similar to the ones used by car dealerships and other commercial businesses to attract customers. Operating from a battery source, these human-sized, brilliantly coloured inflatable men are fully automated and can be timed to inflate every 20 minutes or so during daylight hours. They also emit an accompanying loud noise. Studies to date (see Bishop et al. 2003) have reported that they have an immediate impact on scaring away herons and cormorants from fish ponds, but that after a week or two, they lose their effectiveness.

v. Physical Reduction of Gull Numbers at the Population Level

As said earlier, using any kind of destructive means to decrease the Glaucous-winged Gull population in Sidney is simply not desirable. Since some studies suggest that their population is in decline and because there is a growing public sentiment about not destroying wildlife, any kind of program, e.g. oiling or pin-pricking eggs, shooting, trapping, poisoning, etc., to decrease the numbers of gulls in the Sidney area or anywhere else on Vancouver Island, would be met with great protest from both biologists and the public-at-large. A perfect example is the ongoing battle between deer-lovers and deer-haters in Oak Bay. Even the federal government is loathe to issue permits for even just tampering with nests during their construction.

On the other hand, the airport safety office is using destructive means to control gulls on their runways. They are not broadcasting their efforts, but it is likely that the general public, interested in their own safety while flying, would not disapprove. Their 2017 report to the Canadian Wildlife Service is appended (see Appendix 3). To summarize, only 4 Glaucous-winged Gulls and one Herring Gull were killed by shotgun in that year. It is my feeling that the airport authorities would welcome any attempts to disperse gulls from the town of Sidney due to its very close proximity to the runways. Should the numbers of gulls nesting and loafing in Sidney rise to any significant extent, this would likely be met with some form of protest by the Victoria International Airport.

However, there is one possibility that could be acceptable in the eyes of public – contraception. This is currently being attempted with the deer problem by the Oak Bay municipal government. I was initially skeptical of using contraceptive measures to decrease nuisance animals if only because early experiments in the 1970s and 1980s at McGill University with blackbirds met with failure. Later I attended a conference on contraception in the U.S. and results using such endocrine-disrupting chemicals were still largely unsuccessful or impractical. However, it is now 2018 and much research over the years fueled by public demand for less harmful wildlife control measures has been accomplished.

In terms of birth control for birds, a company called OvoControl (www.OvoControl.com) employs a chemical called nicarbazin 0.5%, which acts as a contraceptive in birds. It is considered effective in all avian species with the proviso that that the birds consume an adequate amount of bait, daily, in advance and during their respective breeding season.

OvoControl's contraceptive development program, together with the National Wildlife Research Center run by the U.S. Department of Agriculture in Fort Collins, CO, documented the interference with egg hatchability in quail, ducks, geese, and pigeons. I spoke with Eric Wolf, the CEO of the company, about whether it would be effective for gulls. He felt strongly that OvoControl will have the same effect in the eggs from a gull that it has in a pigeon and he felt that the gulls would likely readily consume OvoControl, but could not provide any concrete data. He also added some further caveats. First, unlike pigeons, many gulls migrate. Therefore, the application of OvoControl must be at the nesting colonies as opposed to where they might be a problem. While Sidney could be regarded as a 'loose' colony of nesting gulls, their nesting territories are spread far and wide over the town. So, offering a baiting station might not be so feasible. On the other hand, since many gulls do migrate, OvoControl application would be limited to their breeding season, a significant cost savings. However, at this time, a baiting program and protocol for this species would need to be developed. At this time, OvoControl is only registered by PMRA for use in pigeons. Therefore, if the town decided to attempt to use the product in gulls, it would need an experimental permit from federal, provincial, and animal care authorities. Finally, the cost of an OvoControl program is very typically a function of bird numbers – more birds, more bait, more feeders, more management. I imagine that it is not an inexpensive solution.

Besides eliminating potential nesting sites at outlined above, there is one more non-destructive means of reducing gull numbers in a locality – reducing food sources. Public education through signage and fines (see below) is one means, but there is another serious source of food for the gulls in downtown Sidney --- the Fish Market. Urging and even forcing the owner of the Fish Market to no longer dump his fish offal out of the back of his building and into the sea for dozens of waiting gulls will not be popular with him due to the added inconvenience of dumping it into garbage cans and removing it elsewhere from the town. Personally, I am grateful to have this commercial business in Sidney and I would not want this issue to force the closure of his market. It certainly would not be popular with the residents of Sidney. Perhaps there could be some discussion with the owner to reach some amicable, practical solution.

vi. Public Education Concerning the Gulls

Besides the offal remains from the Fish Market, fishermen and crab-trappers on the Sidney Pier and at Port Sidney Marine, as well as their natural foods, gulls are well known for consuming garbage, anything edible, left by humans on picnic tables and park benches. In some cases, sentimental but misguided folks give hand-outs to the gulls. It is well known that gulls can become quite aggressive and physically harm children and adults by grabbing food with their sharp beaks. If there is to be a concerted effort to lessen the gull problem in Sidney, an obvious step is to install signage forbidding such activity and even impose fines on those caught doing it. This would include signage telling fishermen and crabbers not to leave their fish remains after cleaning on the docks or worse, giving it directly to the gulls. Any means of broadcasting these messages by the town would be useful.

I) CONCLUSIONS AND RECOMMENDATIONS

Despite studies showing a slight decline in the overall populations of Glaucous-winged Gulls in the world, there seems to be no related decline in urban centres, including the town of Sidney. In the last 20 years, their numbers have gone up ten-fold in downtown Victoria. The impact of the growing numbers of Bald Eagles, their major predator, is not yet known. I estimate a population of roughly 100 large adult gulls, about 99 percent of them being Glaucous-winged Gulls and the remainder being Herring Gulls, inhabiting the downtown core of the town of Sidney.

Complaints about potential infrastructure damage, an overabundance of feces, and even the annoyance of their calls, have been made to the town of Sidney. Not all solutions to this problem are possible, mainly due to growing animal welfare sentiments among the general populace. Some are more cost-prohibitive than others, while others are less effective over the long-term.

Under a scenario of a limited budget, I make the following recommendations:

g. Install exclusion devices on hydro poles and lamp posts, at least on the serious 'problem' ones for a start;
h. Encourage building owners to not only install exclusionary devices, e.g. spikes, wires, etc. on their buildings but also to maintain them over the years;
i. Pass an ordinance, if there is not already one, to force the owners of new building construction projects to put into place gull deterrents before tenants move in;
j. Have a discussion with the owner of the Fish Market to determine some acceptable way of reducing this rich source of food for the gulls;
k. Communicate with the safety authorities of the Victoria International Airport to let them know that the town of Sidney is aware of the gull problem and attempting to rectify it;
l. Disseminate this report to any interested parties and particularly to those stakeholders who are 'part of the problem'.

J) ACKNOWLEDGEMENTS

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Hotel and Spa, Darryl Jackson of Firm Management which manages The Landmark condominium unit and Glen Williams in charge of maintenance of The Landmark, and Patrick Archer, the volunteer 'custodian' of the Meridian Residence, for allowing me on their roofs and for their interesting and helpful insights; Captain Scott Snow, Bird and Wildlife Coordinator, Victoria Airport Authority, for the information on the Victoria International Airport's gull control measures; John Elliott, Rhonda Millikin, and Kevin Fort of the Canadian Wildlife Service for their help with federal government permit information; the anonymous employee of Blast Off Pressure Washing for his insights and good advice on exclusion of gulls on hydro poles; Eric Wolf, CEO of OvoControl on contraceptive programs for birds; Dan Hall, National Account Manager of Bird-X in Chicago, IL and Barry Fast, President of Seagull Control Systems in NY, for information on the use of lasers and general information on controlling gulls; Louise Blight, Procellaria Research and Consulting and Adjunct Associate Professor, School of Environmental Studies, University of Victoria; and finally, Tim Tanton, Tara Mason and Mike Van Der Linden of the Town of Sidney.

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L) APPENDICES

Appendix 1

Damage Permits for Migratory Birds

Damage Permits to scare/kill migratory birds (waterfowl that includes ducks, geese and swans), are issued by the Canadian Wildlife Service. Damage Permits are issued if the following conditions are met:

- Migratory birds are causing or are likely to cause damage to agricultural crops, private property (golf courses, parks) or pose a threat to human safety (airfields etc.).
- The area is open to hunting and/or the discharge of firearms.
- The area is closed to hunting and/or the discharge of firearms. However, a permit may be issued if the applicant includes, with the written request, a list of nominees and a signed copy of either:
    a. A by-law exemption issued by the municipality or other local enforcement authority; or,
    b. An exemption letter to discharge firearms from the local RCMP or other police department.

BE AWARE: the issuance of a Canadian Wildlife Service Federal Damage permit does not supersede the necessity or legal requirement to acquire any other pertinent provincial or municipal permit.

Applications for a permit can be made by applying to:

Gloria White
Canadian Wildlife Service
Permit Section
5421 Robertson Rd., RR #1
Delta, BC V4K 3N2

Phone: 604-350-1950
Fax: 604-946-7022
E-mail: Gloria.White@ec.gc.ca

Appendix 2

Appendix Figure 1. This hydro pole is a favourite perch with copious amounts of feces on the sidewalk below.

Appendix Figure 2. This hydro pole beside the BMO is another favourite perch with lots of feces below it on the sidewalk. There is almost always a gull perched on this pole.

Appendix Figure 3. A close-up of a hydro pole with a gull using it. Exclusionary devices may need to be installed on all of the cross arms.

Appendix Figure 4. It is also important to install gull deterrents on smaller infrastructures like ventilator shafts; otherwise despite spikes on the peaks and edges, the gulls will use them.

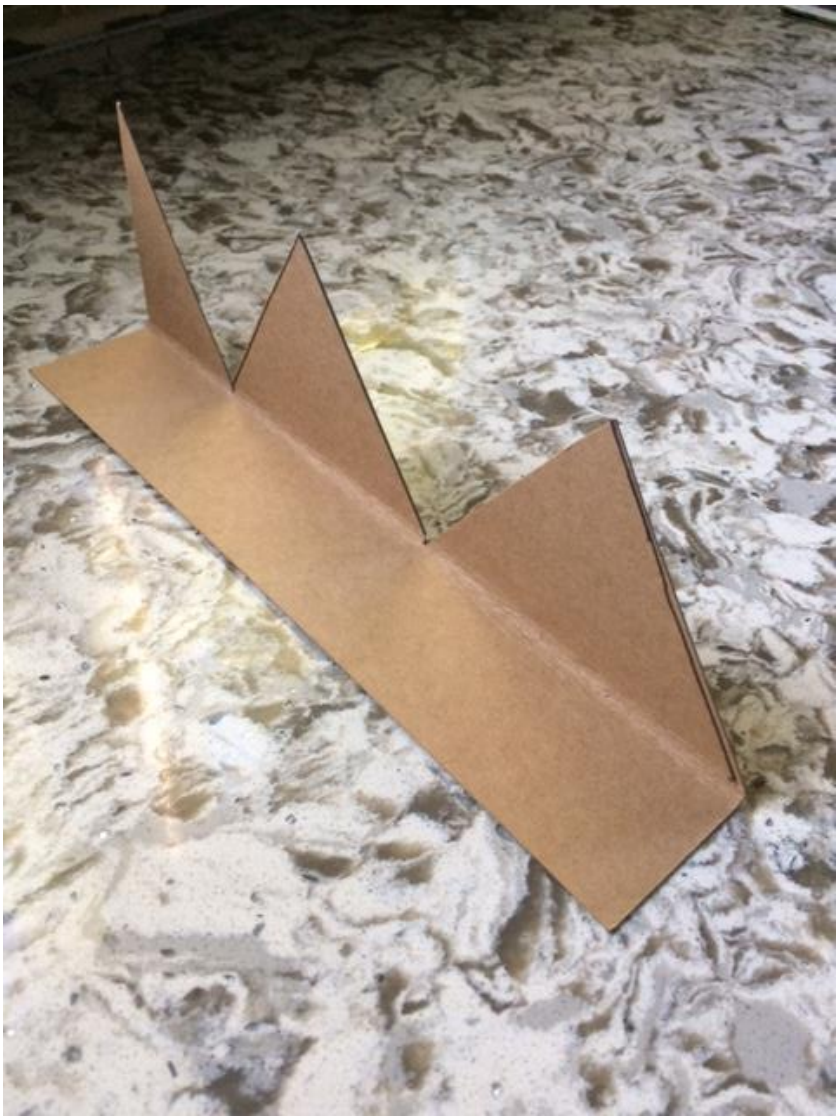
Appendix Figure 5. This building, not equipped with deterrents, always had lots of gulls roosting on it.

Appendix Figure 6. On that favourite 'gull' building with no deterrents, the birds prefer roosting on the edges and on the peaks to allow for good observation of potential food sources and of predators.

Appendix Figure 7. A close-up of the building in need of exclusionary spikes or wires.

Appendix Figure 8. This building, not equipped with gull deterrents, was adorned with gull feces. It would not favoured for nesting though.

Appendix Figure 9. Another favoured hydro pole on Bevan Ave.



Appendix Figure 10. Something like this mock-up but made of thin sheet metal and screwed on top of the cross arms of hydro poles might be a less costly solution and less unsightly than purchasing expensive spikes.

Appendix Figure 11. A flexible, bending piece of quarter-inch rod affixed to these light poles would be an effective and inexpensive deterrent against perching gulls.

Appendix Figure 12. Spikes in place on a low commercial roof.

Appendix Figure 13. Gulls perched on railing and on the water await lunch from within.

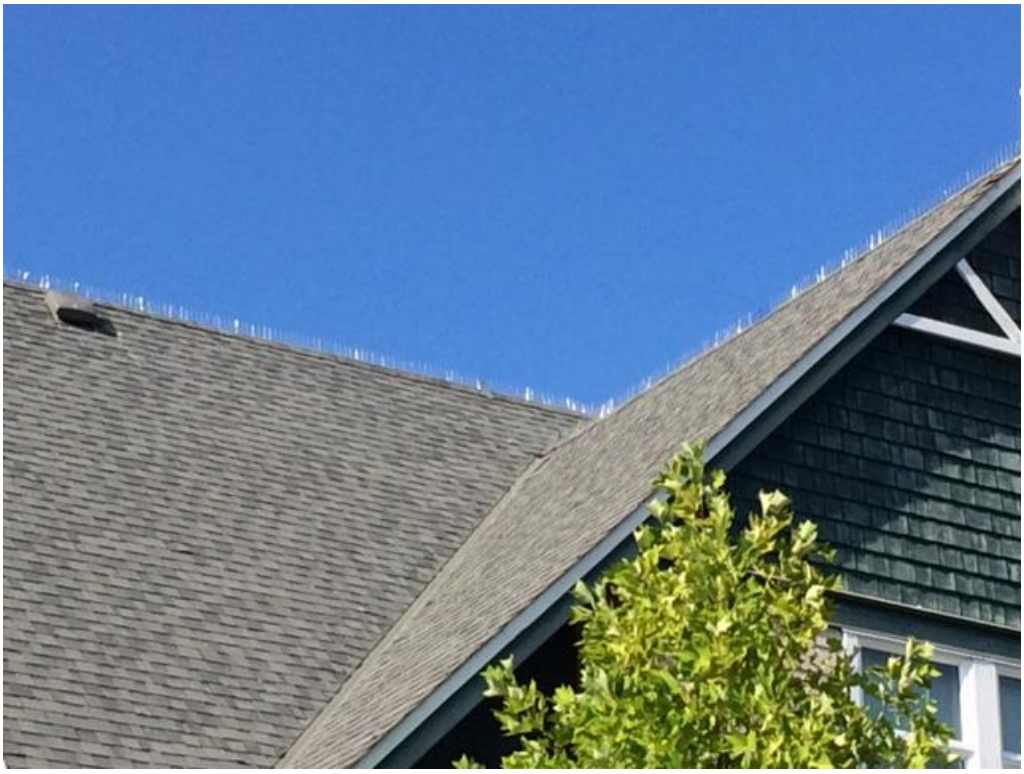
Appendix Figure 14. An appropriate sign for this food resource.

Appendix Figure 15. This building needs gull deterrents.

Appendix Figure 16. Note the proximity of the gull feces to the living quarters of the residents.

Appendix Figure 17. Another building roof requiring spikes.

Appendix Figure 18. A close-up of the feces build-up on the peek. Note the proximity of the feces to the air shaft.



Appendix Figure 19. An effective use of spikes on the peak of a roof.

Appendix Figure 20. Copious amounts of feces on the sidewalk below a hydro pole favoured by perching gulls.

Appendix Figure 21. This netting has been installed on the Sidney Hotel and Spa to prevent gulls from picking up the rocks and dropping them on glass surfaces. It does not deter nesting though.

Appendix Figure 22. Spikes in place on the Sidney Hotel and Spa.

Appendix Figure 23. All of these flat roofs on buildings in downtown Sidney offer prime nesting locations for gulls.

Appendix Figure 24. It is important to place the spikes on all infrastructures on a roof; otherwise the gulls will use the accessible perches.

Appendix Figure 25. The magnets holding these spikes are not strong and thus, the gulls can knock them out of place; use of some sort of bonding glue is advised for total, long-lasting effectiveness as a deterrent. Also note the glass ceilings on to which the gulls drop the rocks.

Appendix Figure 26. An example of a gull perching on a portion of a roof edge where the spikes have been knocked out of place.

Appendix Figure 27. Detritus on a flat roof usually attracts nesting gulls, but as seen in this photo, not always.

Appendix Figure 28. An adult gull watching over her fledged chick.

Appendix Figure 29. Lots of feces buildup on a flat roof without gull deterrents, e.g. spikes.

Appendix Figure 30. Despite the installation of the spikes, gulls still manage to perch and defecate upon small infrastructures on flat roofs.

Appendix Figure 31. A roof without deterrents like this one provides a perfect roosting and nesting site for glaucous-winged gulls.

Appendix Figure 32. Surprisingly, the flat roof of the Fairway Market has not attracted much attention from the Sidney gull population.

Appendix Figure 33. A typical gull nesting attempt thwarted by the use of netting.

Appendix 3

(courtesy of Captain Scott Snow, Victoria International Airport)

Victoria International Airport

Permit # BC-AK-0029-15

January 31, 2018

Gloria White
Environmental Stewardship Branch
Canadian Wildlife Service
5421 Robertson Road, RR#1
Delta, BC V4K 3N2

Dear Gloria:

During the period of January 1st 2017, and 31 December 2017 the Victoria Airport had 12 confirmed Bird Strikes and 7 incidents of unconfirmed Bird Strikes where remains could not be found or not reported by pilots, and 5 reports of near miss bird strikes for a total of 24 strikes with 26 birds involved. During this period we killed 15 birds. Attached are our annual reports including total birds killed, also a list of all confirmed and unconfirmed bird strikes. All remains of birds were disposed of at our local landfill.

Please accept this report.

Sincerely,

Scott Snow
Bird & Wildlife Coordinator
Victoria Airport Authority

250-953-7568

Scott.snow@victoriaairport.com

WILDLIFE REPORT

Statistical overview with parent-category species summary

DATE RANGE: Jan 1 - Dec 31, 2017

Total Days Reported	**365**
Total Records	**738** (2/day)
Total Wildlife Encountered	**3,065** (8.4/day)
Total Culled	**15** (0.49%)
Total Bird Near Miss	**5**
Total Bird Strike	**11** (806.2g/strike)
Total Bird Strike Suspected	**4**
Total Bird Strike Suspected	**3** (216.3g/strike)
Total Mammal Near Miss	
Total Mammal Strike	
Total Mammal Strike Suspected	

Total Aircraft Movements	**126,716**
Average Movement per Day	**347.2**
Encountered to Movement Ratio	**1 : 41.34**
Culled to Movement Ratio	**1 : 8,447.73**
Bird Near Miss to Movement Ratio	**1 : 25,343.20**
Bird Strike to Movement Ratio	**1 : 11,519.64**
Bird Strike Suspected to Movement Ratio	**1 : 31,679**
Bird Strike Suspected to Movement Ratio	**1 : 42,238.67**
Mammal Near Miss to Movement Ratio	-
Mammal Strike to Movement Ratio	-
Mammal Strike Suspected to Movement Ratio	-

	Birds	Mammals
Records	**252**	**5**
# Ecountered	**3,058**	**5**
Max Encountered	**200**	**2**
# Culled	**14**	**1**
# Struck	**16**	
Bird Near Miss	**5**	
Bird Strike	**12**	
Bird Strike Suspected	**5**	
Bird Strike Suspected	**2**	
Mammal Near Miss		
Mammal Strike		
Mammal Strike Suspected		

Printed Jan 31, 2018

WILDLIFE REPORT

Culled list, grouped by species

DATE RANGE: Jan 1 - Dec 31, 2017 **CATEGORIES:** All **SPECIES:** All

Goose - Canada

ID	Date/Time	Grid	# Culled	Attractant	Dispersant
2017-0095	2017-Feb-23 20:30	AE11	3	Grass	12g Live Shot
2017-0364	2017-Jun-22 22:05	AD11	5	Grass	

Gull - Glaucous-Winged

ID	Date/Time	Grid	# Culled	Attractant	Dispersant
2017-0068	2017-Feb-09 15:05	W11	1	Earthworms	
2017-0102	2017-Mar-02 10:40	AP17	1	Earthworms	12g Live Shot
2017-0108	2017-Mar-04 07:10	Y14	1	Earthworms	12g Live Shot
2017-0198	2017-Apr-03 08:05	AA22	1	Earthworms	12g Live Shot

Gull - Herring

ID	Date/Time	Grid	# Culled	Attractant	Dispersant
2017-0228	2017-Apr-12 08:53	Y22	1	Earthworms	12G Cracker & 12G Cracker

Raccoon

ID	Date/Time	Grid	# Culled	Attractant	Dispersant
2017-0679	2017-Nov-20 11:11	R28	1		12g Live Shot

Vulture - Turkey

ID	Date/Time	Grid	# Culled	Attractant	Dispersant
2017-0350	2017-Jun-16 08:00	AB7	1	Rodents	

Printed Jan 31, 2018

WILDLIFE REPORT

Strike location map

DATE RANGE: Jan 1 - Dec 31, 2017 **CATEGORIES:** All **SPECIES:** All

= Bird Near Miss = Bird Strike = Bird Strike Suspected = Bird Strike Suspected = Mammal Near Miss = Mammal Strike = Mammal Strike Suspected

Printed Jan 31, 2018