

Beneficial Management Practices for Barn Swallow (*Hirundo rustica*)

Introduction

Barn Swallows (*Hirundo rustica*), like other migratory birds in Canada, are managed under Federal, Provincial, and Territorial legislation, to protect and conserve individuals and populations, and their nests and eggs. Barn Swallow populations in Canada have declined over the past four decades, indicating the need to take measures to ensure their conservation and recovery. This Beneficial Management Practice document focuses on British Columbia (B.C.) and is provided to stakeholders [e.g. government and non-government agencies, Aboriginal organizations, resource managers, rural landowners, farmers, transportation authorities] to assist in making proactive management decisions for activities that might affect Barn Swallows, with the overall intent of encouraging shared stewardship and conservation.

Information presented here constitutes advice only. It is not intended to be relied on as official advice concerning the legal consequences of any specific activity and does not provide a guarantee that activities or practices will avoid contravening laws and regulations. All persons must adhere to all pertinent laws, regulations, and permit requirements that relate to their activities.

Species Description

The Barn Swallow is a medium-sized swallow [17-20 g], with adults being recognized by their steely-blue upperparts, rufous underparts, chestnut throat and forehead, and long, deeply forked tail with white spots on inner webs (Brown and Brown 1999) (Figure 1). Males have longer outer tail feathers (Pyle 1997) and tend to be darker chestnut on underparts than females.



Figure 1. Barn Swallow, adult male, B.C.

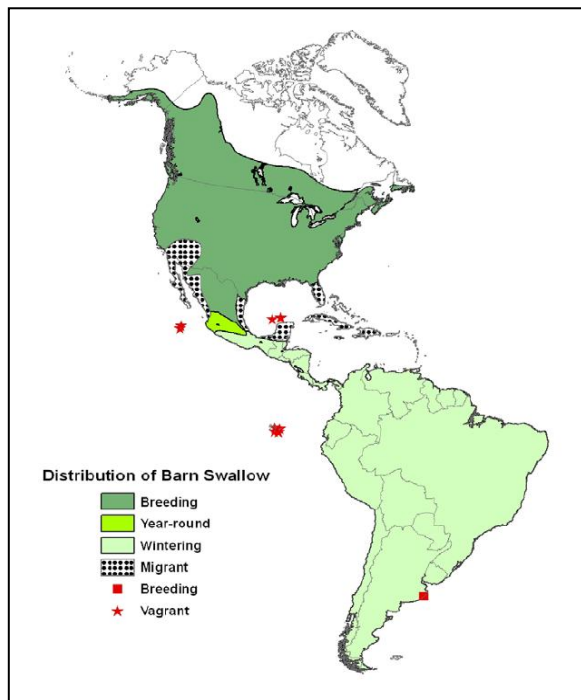


Figure 2. Range of Barn Swallow in the Western Hemisphere (COSEWIC 2011).

Distribution

The Barn Swallow is found on every continent except Antarctica (American Ornithologists' Union 1998). In North America, it breeds in all the provinces and territories in Canada, throughout the United States (U.S.), and in northern Mexico, and is a long-distant migrant that winters through Central and South America (Brown and Brown 1999) (Figure 2). Campbell et al. (2009) and data from Christmas Bird Counts (National Audubon Society 2010) indicate that Barn Swallows have overwintered in small numbers in southern Canada, in particular the Fraser River delta of southwestern B.C., since 1962 and 1970, respectively. The highest numbers of Barn Swallows occur in the Fraser Lowland of the Georgia Depression (Campbell et al. 2009).

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Status

The Barn Swallow is still common and widespread in Canada, but Breeding Bird Survey (BBS) data from 1970 to 2009 indicates an overall decline of 76% and a decadal decline of 30% from 1999 to 2009 (COSEWIC 2011). In B.C., BBS data from 1968 to 1993 indicates that the number of birds on coastal routes decreased at an average annual rate of 4% (Campbell et al. 1997). The species is listed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (Government of Canada 2013) and Blue listed by the B.C. Conservation Data Centre in British Columbia (B.C. Conservation Data Centre 2013). Barn Swallow is currently being assessed by the Canadian Minister of Environment for listing on Schedule 1 of the Federal *Species at Risk Act* (Government of Canada 2013).

Habitat Preferences

Barn Swallows prefer various open habitats [e.g. grassy fields, pastures, various agricultural crops, farmyards, cottage areas, lakes, rivers, streams, wetlands, coastal bays, lagoons, estuaries, beaches, cleared right-of-ways and forested areas, and subarctic tundra] (Peck and James 1987, Campbell et al. 1997) that are close to foraging and nesting sites (Figure 3). In B.C., most reported nests were associated with human-influenced habitats [i.e. rural areas, cultivated farmlands, and suburban and urban areas] (Campbell et al. 1997). Barn Swallows require wet sites that have a source of mud nearby (e.g. Barclay (1988) reported availability of mud less than 200 m from nests) as their nests are constructed of mud pellets (Brown and Brown 1999). Barn Swallows have been recorded from near sea level to at least 2400 m in B.C. (Campbell et al. 1997).



Figure 3. Barn Swallow foraging area, Fraser River delta, B.C.



Figure 4. Barn used for nesting by Barn Swallow.

The Barn Swallow primarily nested in caves, holes, crevices, and ledges of cliff faces prior to European colonization (Speich et al. 1986, Peck and James 1987, Campbell et al. 1997) and now sometimes nests in larger colonies than probably occurred in natural settings (Brown and Brown 1999). The species is currently closely associated with human-influenced habitats, nesting almost exclusively in or on human-made structures [i.e. 92% of nests in B.C. were found in or on buildings, including barns, garages, sheds, and houses, whereas other structures, such as bridges and wharfs, made up 4% of nest locations (n = 2,896)] (Campbell et al. 1997) (Figure 4). Nesting structures are often close to open habitats and provide access to either a horizontal ledge or vertical wall [nests on walls often being near juncture with the ceiling], with an overhang that provides shelter (Brown and Brown 1999). Of the 2,537 nests assessed by Campbell et al. (1997) in B.C., 46% were found attached to rafters or beams of buildings, 18% under eaves, 11% on shelves or ledges, 9% on walls, and 5% over light fixtures (Figure 5).

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Behaviour

Breeding and Roosting

In B.C., the number of breeding birds begins to increase in late March and early April, with breeding beginning approximately early April, peaking in June and July, and the majority of nesting completed by the end August, with some birds continuing to breed into late September (Campbell et al. 1997).

Following breeding, Barn Swallows are known to aggregate in flocks as large as 2,000 birds during their southward migration, which begins in early August and peaks in late August and early September in B.C. (Campbell et al. 1997). These flocks are known to aggregate at roost areas just before sunset and leave just before sunrise (Bates 1895). In B.C., roost areas predominantly occur in the southwestern corner of the province and consist of dense marsh vegetation, including cattails and bulrushes (Campbell et al. 1997). In Maine, a flock was reported roosting in willows (Bates 1895).

Nesting

Both adults help to build the nest; a cup or half-cup shaped structure made primarily of mud mixed grass and lined with feathers, grass, and hair (Campbell et al. 1997, Brown and Brown 1999). Nests can range in height from 0.3 to 30 m, with 57% between 2.4 and 3.5 m (n= 2,563, Campbell et al. 1997). Barn Swallows commonly reuse nests from previous years and can produce two clutches within the same year (Samuel 1971, Anthony and Ely 1976, Barclay 1988). Safran reports that on average Barn Swallows were able to breed earlier and have greater seasonal reproductive success (i.e. number of fledged young) using old nests (2006), with a reproductive increase of 25% for individuals reusing nests versus constructing new nests during their first breeding attempts (2004).



Figure 5. Small cluster of old Barn Swallow nests on vertical rafters.

Barn Swallows commonly nest together, with colonies in B.C. ranging in size from 3 to 83 nests, with 56% between 5 and 14 nests (n = 135, Campbell et al. 1997). Grzybowski (1979) found the distance between active nests in a colonial setting ranged from 1 to 8 m, with 60% less than 3 m. Snapp (1976) reports nests seldom being less than 3 m apart, likely due to nest and approach defense. He also notes that nests may be closer if on different beams and with different approaches, and that the number of nesting pairs in a colony rose in parallel with the increase in the size of the building [i.e. larger and more open structures] and/or the number of entrances to the building. Clearance between a nest and overhang [i.e. ceiling] is usually 2.5 to 6 cm (Grzybowski 1979, Lohofener 1980).

Barn Swallows have been shown to respond most strongly to the nest site [i.e. location of nest on or in a structure] when breeding (Grzybowski 1979). Safran (2004) reports that the number of nests at the start of the breeding season at thirty six Barn Swallow sites positively predicted 83% of the variation in the number of breeding pairs that settled at that site. This indicates a significant positive relationship between the number of old nests at a site and group size [i.e. number of breeding pairs] and the important cue old nests play in site selection decisions by Barn Swallows.

Foraging

Barn Swallows are aerial insectivores [i.e. birds that forage on flying insects while in flight], feeding on insects captured over open habitats [e.g. waterbodies, pastures with livestock, woodland edges] (Brown and Brown 1999, Evans et al. 2007). In samples taken throughout North America, 40% of prey items were flies (Diptera), 23% Hymenoptera, 16% beetles (Coleoptera), and 15% bugs (Hemiptera) (Beal 1918). Pastures grazed by cattle contain higher numbers of aerial invertebrates (Moller 2001, Evans et al. 2007)

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and foraging by Barn Swallows than agricultural lands used to grow fodder crop and are ungrazed or used for growing cereal [e.g. wheat, barley] and other crops [e.g. maize, oilseed rape, peas] (Evans et al. 2007). Hedgerows have a higher number of invertebrates, in particular during bad weather and when adjacent to winter wheat fields than grazed pasture fields, and corresponding greater Barn Swallow use (Evans et al. 2003). As well as providing more insects, hedgerows may also reduce the energy costs of flight because of the lower wind speeds and warmer temperatures associated with them (Evans et al. 2003).

Barn Swallows usually forage low down above the ground or water, with Waugh (1978) reporting a mean height of 7 m throughout the breeding season and Evans (2001) an average height of 1.1 – 1.3 m while adults were feeding chicks. In relation, Morand (2000) found insects were seven times less abundant at 7 – 8 m above ground than at ground level. Size also varies in this way, with larger insects being concentrated low down (Waugh 1978). Turner (1980) found the average distance traveled by Barn Swallows while feeding the first brood to be 188 m and 138 m for the second. He also reports that the average distance traveled by Barn Swallows during the breeding season was 148 m when the temperature was above 20°C but increased to 203 m when it was 16°C (1980). Bryant and Turner (1982) found that the distance traveled by adults from the nest to the center of their foraging patch was 0.17 km \pm 0.12 SD ($n = 118$) and Snapp (1976) reports observing foraging within 400 m of the colony.

Threats

Reasons for the decline of Barn Swallow in Canada are not well understood, but the following threats are believed to be contributing factors:

- Loss of suitable, open foraging habitat on breeding grounds due to habitat conversion [e.g. change from conventional to modern agricultural practices [e.g. greenhouses] and/or crops [e.g. berries], increases in other land uses [e.g. residential and industrial buildings]] (Environment Canada 2013).
- Loss of human-made nesting sites [e.g. accessible buildings - houses, barns, and sheds, and bridges, culverts, and docks] (Pearson and Healy 2011) or their alteration [e.g. replacement of wooden-style farm structures with modern buildings that lack easy access (Campbell et al. 1997) or have metal-roofs versus wood, which could lead to heat-induced mortality of nestlings].
- Direct removal or destruction of nests, including old nests that may be re-used or used as cues to nest sites.
- Reduced abundance of flying insects, possible due to wide spread use of pesticides (Pearson and Healy 2011).
- Increased mortality of adults and/or young due to a possible increase in climate perturbations [e.g. cold snaps that are out of phase with the species' annual cycle, disruptions to insect populations and/or their cycles].
- Predation by domestic pets, primarily house cats (Pearson and Healy 2011), and other species [e.g. rats, squirrels, raptors].
- Issues on the wintering grounds and/or during migration [e.g. habitat loss, pesticide use, inadequate energy levels].
- High loads of ectoparasites [e.g. parasitic blowfly *Protocalliphora*] in nests, which reduce the survival of young (Barclay 1988, Campbell et al. 1997). This is particularly true for nests in large colonies versus smaller colonies or single nests (Shields and Crook 1987).

Protection

In Canada and British Columbia, the Barn Swallow and its nests and eggs are protected under the following legislation:

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Federal *Migratory Birds Regulations* (Government of Canada 1994)

- Section 6: Subject to subsection 5(9), no person shall disturb, destroy or take a nest, egg or nest shelter... of a migratory bird, or have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird except under authority of a permit.

Federal *Migratory Birds Convention Act* (Government of Canada 1994)

- Section 5: Except as authorized by the regulations, no person shall, without lawful excuse, (a) be in possession of a migratory bird or nest; or (b) buy, sell, exchange or give a migratory bird or nest or make it the subject of a commercial transaction.
- Section 5.1(1): No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

British Columbia *Wildlife Act* (Province of British Columbia 1982)

- Section 34: A person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys (a) a bird or its egg, (b) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl, or (c) the nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg.

Beneficial Management Practices

Avoidance

- Avoid disturbing [e.g. physical or auditory, checking/monitoring] active and non-active nests of Barn Swallows from early April to late September in southwestern British Columbia, especially the nest site and territorial areas, but also surrounding habitats used for foraging [e.g. open fields, agricultural crops, manure piles], nest building [e.g. areas of mud, such as water bodies and their margins], and drinking.
- Avoid maintenance [e.g. repairs, modifications, cleaning, painting] activities of nest structures [e.g. barns, sheds, bridges] during the breeding season.
- Avoid the use of insecticides and herbicides whenever possible.

Conservation

- Retain existing nest structures [e.g. barns, sheds, garages, bridges] and access [e.g. open doors, windows] to them during the breeding season, but also during the non-breeding season.
- Retain [i.e. do not disturb] existing and previously used nests throughout the year.
- Conserve valuable habitats, such as wetlands, native and grazed grasslands, and hedgerows [e.g. install fencing, erect educational signage].
- Utilize integrated pest management programs to reduce and avoid the need for traditional chemical pest control methods (Zevit 2010), especially for cosmetic purposes and during the breeding season.
- Maintain grazed pastures in close proximity to nest structures / colonies to sustain higher aerial invertebrate densities in close proximity to preferred Barn Swallow foraging areas, especially where surrounding agricultural land-use is intensive [e.g. tillage crops] (Evans et al. 2007).
- Control domestic pets, in particular cats (Pearson and Healy 2011); preventing their access to habitats used by Barn Swallows.
- Document Barn Swallow breeding sites and areas of habitat use to better understand the species' abundance and distribution and to inform conservation activities. Sightings, in particular nesting and roosting locations, including number of nests and birds observed, should be reported to the [B.C. Conservation Data Center](#), [Bird Studies Canada](#), a local naturalist group [[BC Nature](#)], or via [eBird](#).

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- Educate [e.g. provide presentations and education material, install educational signage] and work with landowners [e.g. farmers], land managers, the public, and others to conserve Barn Swallows and important habitats [i.e. shared stewardship].

Enhancement, Mitigation, and/or Compensation

- Maintain, enhance, or restore Barn Swallow nesting, foraging, and roosting habitats.
- Modify buildings to make them accessible to Barn Swallows [i.e. create or widen openings].
- Install nesting surfaces [i.e. ledges/platforms, vertical beams] and/or artificial nest cups (e.g. American Artifacts) (Figure 6). Nesting surfaces should be wider 10 cm, placed in close proximity [e.g. within 6 cm] of a horizontal overhang, out of reach [e.g. greater than 2.5 m] of animals [e.g. cats], have limited visibility to surrounding nest sites, and be greater than 1.5 m apart for other nests in view (Bird Studies Canada 2013).
- Create nesting structures and associated surfaces from rough cut / weathered and unpainted wood and avoid continuous horizontal surfaces/ledges.
- Install structures [e.g. smooth sheet metal, cones] around surfaces used by predators to access nesting locations (Figures 7 and 8) and avoid placement of perches for avian predators (Bird Studies Canada 2013).
- Erect nesting structures before Barn Swallows return to breed. Prior to April 1st is advised for British Columbia.



Figure 6. Artificial Barn Swallow nest cup.



Figures 7 and 8. Metal sheeting and cones around supports for Barn Swallow nesting structures.

- Consider the following factors when locating nesting structures:
 - In open areas, where livestock [e.g. cattle] are present or have foraged/grazed or resided [e.g. stables, barns], where intact native plant communities are present [e.g. pasture, grasslands, hedgerows], where there is permanent or semi-permanent standing water (e.g., wetlands, ponds, rivers), and where mud is present or where it could be supplied, particularly during dry weather, as it is needed for nest building.
 - Protection from precipitation, temperature extremes, and wind.
 - Avoiding current or future disturbances [e.g. traffic, noise, light pollution, agricultural activities such as machinery or pesticide use].
 - Avoiding areas [e.g. nesting, roosting, and perching locations] that may result in aesthetic or nuisance concerns [e.g. droppings].

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- Where maintenance activities must take place during the breeding season, netting or other appropriate systems may be temporarily installed prior to the arrival of birds in the spring, in order to prevent birds from initiating nesting on the structure.
- If nesting opportunities must be prevented [e.g. access restricted] or will be lost [e.g. removal of nest structures], it is recommended that sites be assessed/monitored for one or more breeding seasons prior to activities to determine use. Alternate nesting opportunities, which provide nesting sites [i.e. surfaces, artificial nest cups] that are equal to or greater than the number of nests or nesting sites found in structures to be closed or removed, should be provided one or more breeding seasons in advance. Access restriction or nesting structure removal should occur outside of the breeding season [e.g. identify how birds enter the building and block those entries after nesting is completed or before the birds return to nest the following season].
- If you require further advice regarding Barn Swallow conservation, please contact Environment Canada's Canadian Wildlife Service office in your region.

Additional information about managing migratory birds, including Barn Swallows, can be found under the Government of Canada's [Incidental Take of Migratory Birds in Canada website](#) or by contacting Environment Canada's Canadian Wildlife Service office in your region.

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Further Information

- B.C. Species and Ecosystems Explorer <http://www.env.gov.bc.ca/atrisk/toolintro.html>
- British Columbia's Coast Region: Species and Ecosystems of Conservation Concern http://www.geog.ubc.ca/biodiversity/factsheets/pdf/Hirundo_rustica.pdf
- E-Fauna BC <http://www.geog.ubc.ca/biodiversity/efauna/>
- Ebird Canada <http://ebird.org/content/canada/>
- Government of Canada - Incidental Take of Migratory Birds in Canada <http://ec.gc.ca/paom-itmb/Default.asp?lang=En&n=C51C415F-1>
- Government of Canada - Species at Risk Public Registry http://www.sararegistry.gc.ca/default_e.cfm
- NatureServe Explorer <http://www.natureserve.org/explorer/index.htm>
- Stewardship Centre BC - Species at Risk and Local Government: A Primer for British Columbia <http://www.speciesatrisk.bc.ca/node/8053>

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