

Barn Swallow Nest Monitoring Methods

Introduction

These methods have been developed to guide volunteers in collecting data on the activities and productivity of Barn Swallow nest sites. Effort has been made to standardize these methods for consistent interpretation and application, with the goal of collecting quality data for use in conserving and recovering Barn Swallows and their habitats. Important information in these methods has been unlined.

Who

All monitoring will be completed by volunteers. Monitoring methods, data sheets, and training will be provided, with the specific date and location of training still to be determined.

What

The purpose of monitoring is to document the types and timing of breeding activities and changes in the species' abundance and distribution at a sample of Barn Swallow nest sites. Data may be used to inform the management of nest sites and contribute to provincial and federal recovery planning and implementation processes. The following is a summary of the results being sought from nest site monitoring:

- Timing of breeding activities (e.g., arrival, nest building, egg laying, hatching, fledging, departure).
- Number of adults returning and attempting to breed at nest sites.
- Number of young fledged per breeding attempt or nest.
- Overall success/productivity of nests and nest sites.

Specific data to be collected is not provided in these methods, but is outlined on field data sheets that will be provided to volunteers. Volunteers are asked to record data from a distance, with as little disturbance as possible to Barn Swallows. Volunteers are not to loosely examine or physically investigate Barn Swallow nest sites, nor enter private property or buildings to visually see nests and breeding activity.

When

Nest site monitoring will be undertaken from approximately late April to late August, capturing the majority of nesting activities between the start (i.e., nest building) and end (i.e., fledging of juveniles) of the nesting season. Volunteers will preferably visit nest sites on a weekly basis to obtain continuous and precise data. However, the frequency of monitoring may need to be flexible to volunteer capacity. Data collection may occur during the time when volunteers are surveying Barn Swallows to document habitat use and distances traveled around nest sites. The following information indicates key considerations for deciding when to conduct monitoring.

Timing of Breeding Activities

The timing of Barn Swallow breeding activities are variable due to a number of factors, including the time individual birds return to their breeding sites and changes in environmental conditions, in particular weather, which includes the effects of climate change (e.g., extreme weather events). The presence of breeding Barn Swallows in the Lower Mainland region ranges from early April to late September. An overview of key Barn Swallow breeding activities is provided as a supplemental document to help guide monitoring (see document titled 'Timing of Barn Swallow Breeding Activity in British Columbia').

The time of the breeding season will influence the type and amount of activity observed at Barn Swallow nest sites. Barn Swallows are known to have greater movements when first arriving on the breeding grounds (i.e., foraging over large, mostly undefined areas) and will likely visit nest sites infrequently. As adults pair up, establish territories around nest sites, and begin nest building, their area and range of movement decreases significantly and the frequency of visits to the nest site will increase. Adult activity around the nest site is most confined during the nestling rearing period, with most foraging activity taking

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place as close to the nest site as possible (Turner 2006), as the amount of foraging required to feed themselves and their young increases. Adult movement will start to increase once young have fledged, as they are not tied to the nest site. Increased flight and foraging by young will also permit further adult movement. Note that Barn Swallows usually have two broods, thus allowing volunteers to collect data during two breeding periods.

Time of Day and Weather Conditions

Birds are usually most active early in the morning and late in the afternoon so these are the best times to undertake monitoring. However, swallows can be actively flying and visible during the entire day if weather conditions are appropriate.

Clear days with high air pressure and low winds are preferred conditions for swallows and their insect prey, leading to greater foraging activity. When air pressure decreases, winds are high, and precipitation is present then swallows and their insect prey usually fly closer to the ground. Swallows will also fly in proximity to hedge rows or other linear features where winds are reduced and insects are concentrated. Cold weather can increase the activity of swallows. Turner (1980) found 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 or less. If adverse weather persists or severe weather events occur (e.g., long wet or cold periods), this can impact the ability of swallows to successfully rear young and can risk their own survival. Volunteers are asked to plan their surveys for days when there is no to little precipitation and wind to enhance detections of Barn Swallows.

Where

Data will be collected at a select number of nest sites in the Lower Mainland. Volunteers will be advised of these sites once they've been defined and the need for their help has been established. Where necessary, volunteers will be introduced to the property owner with the nest site and be permitted to access the site to collect data.

How

Marking Nests

Volunteers will determine the location of the nest site through the collection of a Universal Transverse Mercator coordinator and document nests at the site using a detailed site map, photos, and/or markers to ensure accurate data collection. It's preferable that this be completed prior to Barn Swallow arrival and nest building (i.e., before late April) or following breeding to minimize disturbance. Activity around the nest site should be minimized during the nest building and egg laying stages and not occur during the fledgling rearing period (i.e., when young are greater than 10 days of age) to avoid pre-fledging nestlings. Nest markers may be small (e.g., quarter size or smaller) metal or plastic numbered tags, duct tape, or a small piece of flagging labeled with the nest name/identification and placed adjacent to nests to clearly identify and track each nest. Using a site map and/or photos to document the location of nests are also suitable techniques if markers can't be placed up (e.g., not acceptable to landowner, difficult to place near the nest due to height or other barriers, may attract predators). Using multiple methods to document the location of all nests will permit more detailed tracking overtime (e.g., as the location and number of nests change). If a detailed map is drawn or photos are taken, it's recommended that they include as much of the nest site, existing nests, and possible future nest locations as possible.

Recording Data

Volunteers are asked to record the actual or estimated arrival and departure date of Barn Swallows to the nest site. All nests present (i.e., new, active, and old) are to be recorded as best as possible. Volunteers are asked to survey as many nests as possible that are visible (i.e., volunteers can see the nest and the number and activity of adults and young). If nests that are active can't be monitored (i.e., nest contents

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are not visible, detailed seasonal monitoring data can't be collected), but you have reason to believe that eggs or young are present (e.g., adults sitting on nest, adults bringing food) then record unknown. If nest's are inactive then record this status to ensure complete and consistent nest site monitoring.

Nests should be monitored every 5 to 7 days or as regularly as possible throughout the breeding season (e.g., from the first visit until the nest fledges or fails). Visiting nests more frequently than every 5 days is not to be undertaken as there is some indication that more frequent visits may negatively impact nesting success for Barn Swallows. A nest should be visited one last time after you're certain that it's empty to determine if any unhatched eggs or dead young are present. Adult songbirds, such as swallows, carry eggshells away from the nest or eat them, thus, shells found at the bottom of their nest would indicate predated eggs. Remember that some pairs of Barn Swallows raise two broods so be cautious and sensitive when approaching and looking in nests that you may believe are inactive.

When monitoring a nest from a distance, watch birds for clues to its status (e.g., adult sitting on nest indicates incubation or newly hatched young (i.e., brooding); eggshells in vicinity of the nest may indicate young have hatched, but also possible nest predation; adults carrying food to the nest and fecal sacs away or fecal material under nest indicates young are present; begging calls indicates young are present). As the young get older you may be able to see them from a distance, especially with binoculars and when they're being fed. Try to count the number of heads or mouths you see. Some nests may be difficult to observe and some young may not be visible, so do your best. Young may die in or be pushed or fall from the nest, often resulting from the nest being infested by the larvae of the parasitic blowfly *Protocalliphora*, in which larger nesting colonies are often more infested than smaller colonies.

A select number of adults and juveniles may be banded at certain nest sites by a certified Master Bander to collect survival and distribution data.

Nest Monitoring Code of Conduct

Data on active Barn Swallow nests should be recorded from a distance through visual observations, with as little disturbance as possible to breeding birds. Physical contact with and close inspection of nests is not necessary, but may be undertaken at certain sites to collect more accurate timing and status data. Please contact the project coordinator for further instructions on how to monitor nests more closely and further measures to minimize disturbance.

Please adhere to the following conditions or conduct before, during, and after your nest monitoring.

1. Respect Private Land

It is essential to obtain permission from a private landowner before searching for nests on their property. Please treat landowners and their property with the utmost respect.

2. Choose an Appropriate Time

Always consider the following factors when planning your visits to a nest site:

- Time of day: It's best not to disturb birds on a nest (e.g., flush them) early in the morning or close to dusk.
- Weather: Eggs and young are most vulnerable during weather extremes (e.g., extreme cold or hot periods, heavy rain), so avoid monitoring nests during this time. Note that information on the bird's status (e.g., death of eggs, young, adults) following these weather extremes is important to document.
- Nesting stage: Avoid disturbing nests early in the nesting cycle (i.e., during nest building and laying), as birds are more likely to abandon a nest. If you find a nest during the laying stage, make sure your visit is brief and don't flush the adult to check the nest. It's best to start checking nests when you think the birds have begun to incubate a full clutch of eggs.

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- Fledging stage: Do not check nests when young are close to fledging (i.e., avoid approaching nests when young are fully feathered). If you startle young that are close to fledging, they may jump out of the nest. The chances of prematurely-fledged young surviving are low. Thus, observe the nest from a distance at this stage.
- A nest should be checked when an adult is not on it or in the area (i.e., wait until they leave on their own) and checked as quickly as possible.
- Nest monitoring should aim to have as little disturbance to the nest site and all nesting birds.

3. Observe Nests from a Distance

Try to gather information on the status of a nest from a distance (e.g., use binoculars). Find a spot from which you can observe the nest without disturbing the adults (e.g., where they can't see you, aren't agitated, you're not in their flight path). In general, you should watch from no closer than 15 m from the nest. The birds' behaviour will help give you an indication as to whether you are far enough away. If you need to approach the nest to determine its status, it's best to check it when the adult is absent. You can often gather valuable information on the status of a nest by being patient and watching it from a distance, letting the birds show you what you need to know.

4. Watch for Potential Predators

Before approaching a known or suspected nest site, conduct a visual and auditory sweep of the area to make sure you are not being watched or followed by nest predator(s) (e.g., crow and Common Raven, Black-billed Magpie, House Wren, European Starling, owl and other raptor, cat, rat, mouse, squirrel), which are known to eat swallow eggs and young. If predators are present, wait until they completely leave the area or return at another time to check the nest.

5. Minimize Disturbance at the Nest Site

Approach nests casually rather than directly and deliberately, as birds are less likely to regard you as a threat (e.g., predator). A sitting bird should not be given a sudden fright as it may accidentally knock eggs or young out of the nest. Nest boxes should be tapped first and then tapped again with the lid raised to allow the parent to slip away before looking into the box.

Choose a route to a known nest that disturbs as little vegetation and undergrowth as possible (e.g., avoid breaking branches) as damaged or trampled vegetation or a well worn path to a nest can expose it to rain, wind, or predators. Try to approach the nest from a different direction on subsequent visits.

Ideally, there should only be one observer checking a nest, unless two are absolutely necessary (e.g., when using equipment such as a stepladder).

6. Be Careful of Your Movements

Always move slowly and carefully around nests, noting your surroundings and watching your step to avoid disturbing birds or the nest itself.

7. Be Observant of Bird Behaviour

A bird's behaviour (e.g., posture, vocalization) can tell you a lot about how it's feeling. If a bird around you is acting or sounds distressed or agitated, then you are likely close to their nest. Do not stay in the area, back off and watch from a distance, keeping your eye on the adult(s) until the distress behaviour ceases. Once the adult(s) no longer feel threatened by your presence, they will usually resume their activities and they may show you what you want to know. Don't stay in the area if the bird continues to act distressed. Also watch for predators that may cue in on distress behavior. If predators are present, then slowly back away from the nest and leave the area.

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8. Minimize the Length of Your Visit

Be organized and prepared (e.g., review the nest monitoring code of conduct and previous monitoring results/circumstances, have necessary equipment, pre-record standard data fields on your data sheet) before approaching a nest to minimize time at the nest. It is important to know exactly where the nest is when you return to check it for efficiency. Nests that are easily visible in early spring may become more difficult to see or monitor as the season progresses (e.g., foliage becomes denser, additional birds start nesting in proximity to the nest being monitored).

If you need to approach a nest closely to determine its status then don't spend more than 1 minute checking the nest. Mentally note the status of the nest and walk away, making applicable notes away from the nest. Nest site descriptions and nest measurements should be collected after the nesting attempt is complete.

9. Do Not Handle Eggs or Young

Eggs and young are delicate and can be easily damaged, chilled, or stressed and should not be handled. Even in a nest box, displaced nestlings may not be able to crawl back into the nest cup. If an obscured view prevents you from accurately counting eggs or young, then indicate an unknown status and make additional comments.

10. Do Not Leave a Dead-end Trail

When moving away from a nest, take a different route than the one you used to approach it, to reduce the risk of a predator finding the nest.

11. Pre-fledged Young and Nest Failure

If young jump or fall out of a nest before they can fly they will usually flutter to the ground and quickly try to hide. It is unlikely they will survive unless returned to the nest, since they are very vulnerable to predators on the ground and more exposed to the elements. If it is safe to do so, retrieve the young and carefully place them back in the correct nest. Place your hand over the nest, gently holding the young in the nest and wait for them to settle before slowly moving your hand away and leaving the area quietly. Do not attempt to return the young to the nest if there is no safe way for you to access the nest.

12. Protection of Migratory Birds and Species at Risk

Under the *Migratory Birds Convention Act*, 1994, it is illegal to take, possess, buy, sell, disturb, or destroy the nests and eggs of migratory birds, except in cases where special permits have been acquired. In most cases, it is illegal for surveyors to touch or disturb nests and their contents. If you wish to handle nest contents or band birds, a permit is required.

Although Barn Swallows have a high rate of nesting success, nest failures (i.e., no young surviving to the fledging stage) can occur for a number of reasons. If all the eggs disappear or the young are gone before they should have fledged then you'll know the nest has failed. Possible causes of nest failure may include the following.

- Predation: crows and Common Ravens, Black-billed Magpies, House Wrens, European Starlings, owls and other raptors, cats, rats, mice, and squirrels are all possible predators. Rats and mice are more likely to predate nests with eggs. Cats, owls, and raptors usually take all the young from a nest, leaving no trace. Predators are known to predate nests when they're nearing their highest productivity (e.g., maximum number of eggs and young).
- Nest destruction by other species: House Sparrows and Cliff Swallows are known to occasionally take over Barn Swallow nests, sometimes killing eggs in the process. House Sparrows may also take over nests with young, killing nestlings.

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- Ectoparasites: Barn Swallow young are often affected by mites and blowflies. Severe infestations can lead to partial or complete nest failure.
- Human causes: nests may fail due to intentional disturbance or destruction, or unintentional disturbance from human activities near the nest.

Monitoring and Data Entry

Monitoring methods and standard field data sheets will be provided to volunteers in digital format, which they will be required to print for reviewing and recording data collected during surveys. Volunteers will be responsible for marking nest(s), completing the nest site map, and/or taking nest site photos. Training will be provided to volunteers prior to undertaking field work to review methods and data sheets.

The project coordinator will ensure that all nest monitoring activities are undertaken with the landowner's permission and any necessary authorizations are obtained. Certain nest sites where data is being collected using these methods will also be surveyed to determine the location of habitats used by Barn Swallows and the distance they travel from their nest site.

Following monitoring, volunteers will be required to enter their field data into an online database, which is currently being developed. If the online database is not developed prior to the beginning of surveys then an Excel spreadsheet will be provided to volunteers for recording field data. The online database will allow the project coordinator and others to track, analyze, and report project results. Original field data sheets will be collected at the end of the season as hard copy records for the project.

Monitoring Materials

Volunteers will need the following materials to complete surveys:

- Monitoring methods and field data sheets.
- Clipboard and pencils.
- Small metal or plastic numbered tags, duct tape, or a small piece of flagging and a permanent marker for marking nest locations.
- Detailed map of the nest site.
- Binoculars (8 to 10 magnification is ideal).
- Field guide and/or swallow identification key.
- Camera.

The following items are preferred but optional:

- Global Positioning System (very useful for recording nest locations).
- Compass (useful for describing nest locations from reference points).
- Field notebook (useful for sketching nest locations and taking notes).

Safety

Safety is an important part of any field work and surveyors should assess their work for risks before going in the field to take appropriate precautions. Consider the environment you are working in and what circumstances may arise. Below are some general tips to keep in mind:

- Plan ahead:
 - Review the nest monitoring code of conduct to ensure your safety and that of the Barn Swallows you're monitoring.
 - Make sure you have the necessary equipment to complete your monitoring effectively and with as little disturbance as possible (e.g., pre-record standard data before approaching a nest).
 - Check the weather.

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- Bring:
 - A cell phone (make sure it's charged).
 - Adequate food and water.
 - A first aid kit and emergency contact information.
- Wear proper clothing:
 - Long-sleeved shirts and pants, hat and sunscreen, proper footwear (e.g., sturdy and protective footwear, such as hiking boots).
- Be aware of wildlife and domestic animals (e.g., cows, dogs). If you are monitoring a Barn Swallow nest in a barn, move slowly and cautiously around animals that are present so as not to spook them. Do not enter any stalls or pens with animals in them unless you have specific permission to do so from landowners.

Tips on Recording Barn Swallow Nesting Activities

Volunteers should spend time acquainting themselves with the nest site(s) they will be monitoring prior to Barn Swallow breeding. This could include noting the location of the following features or conditions:

- Access points for Barn Swallows to the nest site.
- The location of nests.
- The optimal place to observe the nests.

Close observation of nests and activities of Barn Swallows is important to ensure data is recorded accurately. This may include watching for adults carrying nest materials or food to the nest, feces away from the nest, and young begging/calling. A document outlining important characteristics and life history traits of Barn Swallows will be provided to volunteers to review prior to and during surveys.

Literature Cited

Turner, A. 2006. The Barn Swallow. T & AD Poyser, London.