

## **Navigating to the Survey Stations**

Each survey route contains three to six survey stations along a section of trail or road. Some sites are permanently marked with fire tacks (small, reflective tacks placed in a tree; these tacks are for location confirmation once you have navigated to your point). Volunteers will be provided with a topographic map of their route depicting the location of each survey station along the road or trail. Each map is accompanied by station documentation, including latitude/longitude coordinates, a photo, and a written description. The distance between each point is 250 m as the crow flies. This amounts to approximately 325 steps for a person of average height walking on flat or gently rolling terrain. If the station has changed since it was documented, such as a trail reroute or blow down, please record the changes and return to the coordinator with your data. If appropriate photos of your stations are not provided and if you have a digital camera with you, please take pictures at each station and note the direction each picture faces.

**Note:** To see additional pictures of your route, please visit <http://www.flickr.com/search/> and search the People category for “Mountain Birdwatch”. Click on “Mountain Birdwatch 2.0” and go to “Sets”. Additional pictures of most routes are available here- navigate through the sets to find your route’s number/name.

## **Bird Survey Methods and Cone Count Protocol**

The Mountain Birdwatch protocol consists of four consecutive 5-min counts at each survey station, for a total sampling period of 20 min per point. Observers are asked to conduct repeated simple counts for all target species during each 5-min period. During the first 10 minutes of the survey, observers will track individual Bicknell’s Thrushes within four distance categories on a minute-by-minute basis. Up to six points will be surveyed along a trail or road on a single visit in June. A count of visible fir and spruce cones is conducted immediately after the bird survey at each station.

### Timing of the Survey

Surveys should be conducted during the month of June. While surveys can be conducted until the last day of June, we ask volunteers to plan to conduct their survey between 1 June and 21 June in the United States. If you find that you are unable to conduct your survey, **please notify the MBW director as soon as possible and no later than 21 June.**

In order to increase the likelihood of detecting Bicknell’s Thrush, which is most vocal during the pre-dawn period, observers should begin the survey 45 min before sunrise. This will also ensure that the survey is finished by 8:00 am when vocal activity may be waning. Observers should determine local sunrise using a published resource, such as the U.S. Naval Observatory ([http://aa.usno.navy.mil/data/docs/RS\\_OneYear.php](http://aa.usno.navy.mil/data/docs/RS_OneYear.php)) or The Weather Network (<http://www.theweathernetwork.com/>).

### Survey Conditions

Inclement weather can greatly reduce an observer’s ability to detect birds in the field (Simons et al. 2007). Each survey should be conducted in temperatures above 35°F and when precipitation

and wind conditions permit. Occasional drizzle or a brief shower is acceptable, but steady drizzle or prolonged rain is not. A light wind with occasional gusts is acceptable, but a steady breeze that causes small trees to sway (>20 mph) is not. If cold temperatures, rain, and/or high winds are encountered, delay the survey until 30 minutes after the conditions have improved. If poor conditions persist, the survey should be rescheduled for another morning.

### Pre-survey Set-up

Once positioned at the first survey location, pace out 25 m in one direction along the trail and place a marker. The marker will be used to help judge the distance to birds detected during the survey. Return to the survey point and wait for about 30 seconds to catch your breath and allow time for the birds to settle back into the area. Location and weather conditions can be noted at this time. When you are ready, start a digital stopwatch or suitable time-keeping device. Don't forget to remove your marker when you have finished the survey!

### Repeated simple counts

At each survey location, conduct four consecutive 5-min counts over a total sampling period of 20 minutes. Within each 5-min interval, record all individuals in the target species group (see sample datasheet p. 23). To reduce the risk of counting the same individual twice, use the datasheet to map each individual and its observed or presumed movements. Mark each individual bird/squirrel on the circle in its approximate location within or outside of the 50-m radius circle. Note whether each bird/squirrel was initially heard or visually identified by writing an "h" or "v" next to the species code. If the bird/squirrel moves to another location within the 5-minute period, draw a line to the new location and note whether it was heard ("h") or visually ("v") identified at the new location.

### Bicknell's Thrush Protocol

Collect additional information on Bicknell's Thrush (BITH) during the first 10 min of the 20-min sampling period. Use the circular plots for the first and second count periods on the datasheet to map each BITH by writing "BITH" in the approximate location of **each** individual (see sample datasheet p. 23). Pay special attention to the four distance categories (0-25 m, 25-50 m, 50-100 m, and beyond 100 m) marked on the sheet. The circles are meant to help you keep track of each individual bird's movements and to estimate density and abundance, so please use your best judgment to place the bird in the appropriate distance band.

Below each "BITH" notation, record the minute in which it was detected and the form of detection. Record the minute of detection as the number of minutes that have elapsed since you started the count (the minute shown on your stop watch, from 0-9), followed by an "h" if the bird was initially heard or a "v" if it was initially visually detected. If you hear and see a bird, note this with "hv", although you will only enter your *initial* detection type into the database. Separate multiple detections of an individual by commas such that a possible record might read (1h, 3h, 4hv), indicating that the thrush was heard in the second and fourth minutes and heard and seen in the fifth minute. After the first 10 minutes of the survey, continue to record Bicknell's Thrush according to the repeated simple count protocol for the other target species.

## Cone Count Protocol

After completing each bird count, collect an index of cone mast at each station. This information will be used in conjunction with red squirrel and avian abundance data to assess the relationship between pulses in cone mast and population dynamics of high-elevation birds and their principal nest predator. The procedure, based on LaMontagne et al. (2005), involves three steps.

1. At each survey station, find the nearest balsam fir tree in each cardinal direction (N, E, S, W) with branches that are visible for 3 m down from the top. If no tree fits this description, move along the trail for up to 50 m and stop upon locating suitable trees. If no suitable tree is found, note this on the datasheet with an 'X' to distinguish from a count of zero cones. The fir should be at least 4 m tall to ensure that it is of flowering age, unless it is near treeline or in stunted conditions, in which case the closest tree that is at least 2/3 of the canopy height should be chosen. **IMPORTANT:** Do not select the closest tree with cones. Select the closest tree that is of flowering age (as described above), which may or may not have cones.
2. If your tree has fewer than ~100 cones and it is easy to see each distinct cone, count the number of **fresh** cones in the top 3 m of the tree using binoculars. Do not move from your vantage point while counting cones (only cones visible from your position will be counted). Record the number of cones on the datasheet in the appropriate cells. If your tree has more than ~100 cones, it may be difficult to count each individual cone. Focus on one group of cones within the top 3 m of the tree and count the fresh cones within that area. Then, look at the entire top 3 m of the tree and estimate the number of similar groups of cones. Multiply the number of cones in your group by the number of cone groups to estimate the total number of fresh cones on the tree. Do not move from your vantage point while counting cones (only cones visible from your position will be counted). Record the number of cones on the datasheet in the appropriate cells.
3. Repeat steps 1 and 2 for red spruce in the U.S. and black and white spruce in Canada. To qualify for the count, red spruce trees should be canopy height or higher, while black and white spruce trees should be at least 2/3 of the canopy height. If you are near treeline, pick a tree that is at least 2/3 canopy height. If no tree fits this description, move along the trail (in either direction) for up to 50 m and stop upon locating a suitable tree. If no suitable tree is found, note this on the datasheet with an 'X' to distinguish from a count of zero cones.