

**INTRODUCTION:**

This guidance note has been compiled in response to the large number of queries received by Butterfly Conservation regarding the nature of annual indices and the methods used in index calculation in Transect Walker. The aim of this document is to help understanding of how annual indices are calculated and the changes to index calculation implemented in Transect Walker 2. Further information is provided in the Transect Walker ‘Help’ files, accessible from within the program itself.

**Please take time to read this before contacting Butterfly Conservation with any queries regarding Annual Index calculation in Transect Walker.**

**PURPOSE OF THE INDEX:**

An annual index provides a measure of the abundance of a butterfly species at the site for the whole year. The index is used to assess substantial changes in abundance over time.

**CALCULATING THE ANNUAL INDEX AND DEALING WITH MISSING WEEKS:**

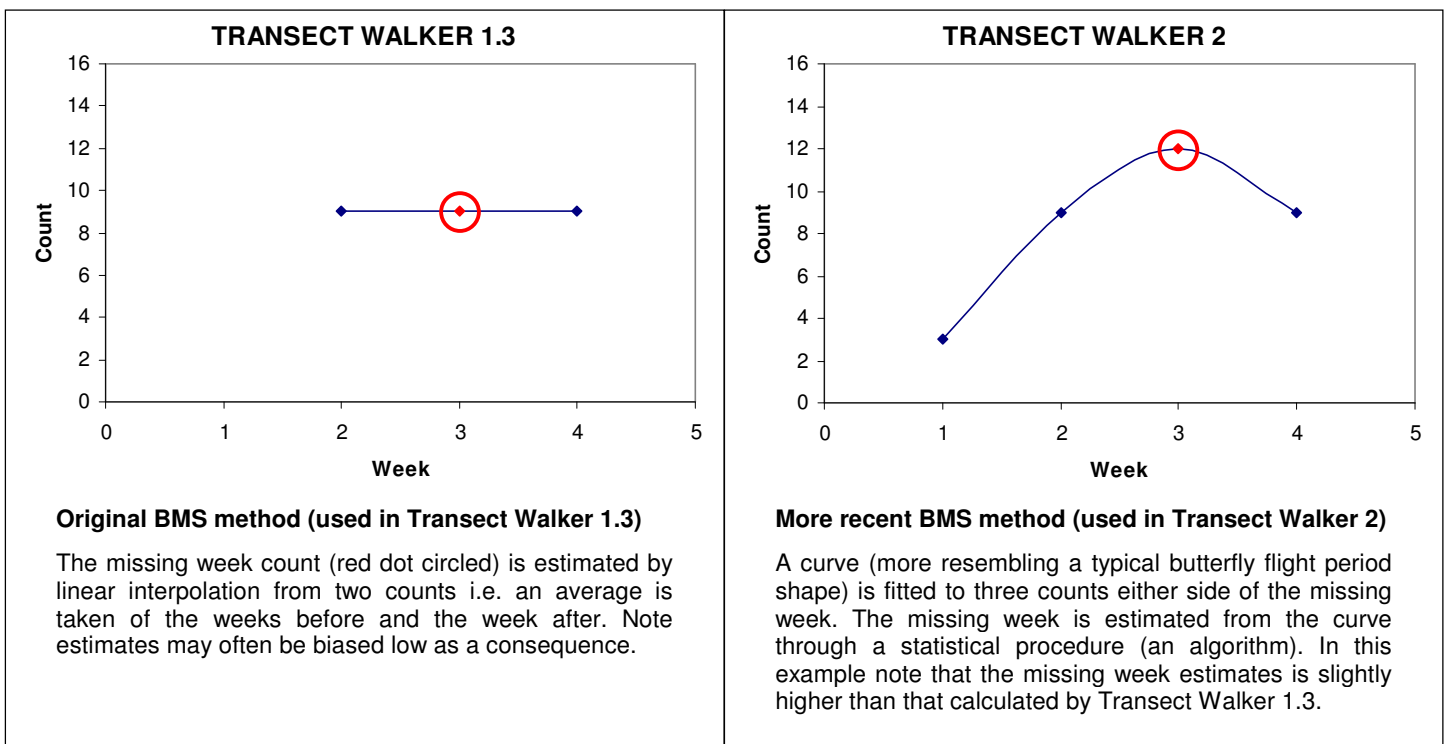
- The Annual Index for each species is the sum of weekly counts, with a count required for each week of the butterfly flight period (including zero counts before and after the flight period).
- If counts are made in suitable weather conditions for all 26 weeks of the flight season, the annual indices for all species will be the same as the total numbers seen.
- However, it is usually the case that some weeks are missed, or counts made in unsuitable weather (note Transect Walker effectively treats these as missing), so annual indices are most often made up of real counts and estimated values for weeks when the transect was not walked.
- Missing week values are calculated by using a set of rules and an automated statistical procedure - see Transect Walker Help files for more details.

**ANNUAL INDICES MAY CHANGE EVEN THOUGH THE UNDERLYING DATA HASN'T:**

- Statistical procedures are improving all the time; and indices derived from the same data may change over time to reflect the improvements.
- The way in which Transect Walker 2 calculates annual indices has been enhanced to incorporate improvements developed by CEH for calculating Butterfly Monitoring Scheme (BMS) indices.
- Indices in Transect walker 2 may therefore be slightly different to those calculated by Transect Walker 1.3 and earlier.

**ESTIMATING COUNTS FOR MISSED WEEKS AND CHANGES IN TRANSECT WALKER 2:**

The different methods of estimating counts for missing weeks used by the previous and latest versions of Transect Walker are illustrated in the two examples below.



**LIMITATIONS OF AN AUTOMATED PROCEDURE:**

Building in rules to calculate missing values is a complicated matter, and it is not possible to fully automate common sense judgements for missing week values. Hence, at times missing week values and indices can not be calculated, even though the possible index may look obvious to you. This is a limitation in building automated software that enforces a common standard for all sites, but this standardisation is essential for a UK-wide monitoring scheme.

If there are too many missing weeks for Transect Walker 2 to calculate a scientifically validated UKBMS standard index for a particular species, a '-1' is given in the index column. Sometimes it may not appear obvious why an index was not calculated, so we have listed here some of the common causes (also refer to the 'Handling missing values' section of Transect Walker 2 Help).

- The number and the timing of missed weeks will determine the ability of the program to calculate an index e.g. several missed weeks in a row are more likely to result in no index than missed weeks spread out among real counts.
- Real counts made in weather conditions below the minimum criteria are treated as missing weeks, which can result in too many missing weeks for an index to be calculated. The minimum criteria are either 13+°C with at least 60% sunshine (or 11°C and 50% sun in April), or 17+°C without rain (can be cloudy).
- For most species, if the estimated counts amount to greater than 30% of the final index value, the program will not produce an annual index. This '30% rule' ensures that indices are not too heavily based on estimated values. Exceptions to this rule include migrants and other species occurring in low numbers throughout the year (i.e. total count less than 10 over minimum of 15 weeks walked) in which case the estimated component of the index may exceed 30%.

**GENERATING AN INDEX FROM IMPERFECT DATA – THE 'WEAK' INDEX:**

As described above, there are many reasons why an index may not be calculated. We appreciate how frustrating this can be, especially if nearly all weeks have been walked! Many recorders still want an index of sorts in this situation, so Transect Walker 2 has been programmed to supply a 'Weak' index for imperfect data by relaxing some of the scientific rules used for the UKBMS standard.

The weak index can give a useful measure of the number of butterflies present in the year. At best the weak index may be very similar to the scientifically validated Index. At worst, it may be a poor representation of the numbers present in the year. **Because the weak index cannot be defended in scientific terms, we recommend that it is not used as evidence to make important conservation management decisions.**

**AND FINALLY....**

Please do not worry if the exact index values for each species differ from your expectations e.g. if you think the index should be 5 and transect walker gives the value as 3, 6 or even 8. **The transect methodology is not sensitive to detect changes by a few individuals – the aim is to detect more substantial changes over time.**

**FOR FURTHER INFORMATION:**

Visit the UK Butterfly Monitoring Scheme website ([www.ukbms.org](http://www.ukbms.org)) or the Butterfly Conservation website ([www.butterfly-conservation.org](http://www.butterfly-conservation.org)).

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Join the transect walking e-group by visiting <http://groups.yahoo.com/group/UKTransect>