

BRI₂ calculation procedure

17 functional groups with common ecological, behavioral and physical features have been identified:

1. grebes and loons
2. cormorants, pelicans, swans and geese
3. herons, storks and flamingos
4. ducks, pheasants, quails and little Rallidae
5. great day raptors
6. little day raptors
7. great sea birds
8. little sea birds
9. limicolous and similar
10. pigeons
11. owls
12. swallows and swifts
13. corvidae
14. solitary passerines and similar, woodpeckers and bats
15. gregarious passerines and similar
16. little mammals < 10 kg. mammiferi piccoli
17. great mammals >10 kg.

The following are the data to be provided for each of the 17 functional groups:

- \overline{W} = Mean of weights of each species (of the group) whose presence has been detected in the area (from the beginning of monitoring activity);
- Ag = Aggregation factor, median flock size. Practically the single observations of a certain group of species must be taken in consideration (from the beginning of monitoring activity) and the average number of individuals observed each time must be calculated.
- BS = Number of counted impacts (from the beginning of birdstrike report forms collection).
- EOF = Effects on flight. It is the 95° percentile of reported EOFs (starting from the beginning of bird strike report form collection). Practically each event of birdstrike must be categorized from 1 to 5 depending on its severity, and the 95° percentile of the entire value set must be calculated ($p = \frac{95}{100}$ x number of impacts). Excel allows a quicker calculation with the formula =PERCENTILE(A1:AN;0,95).
- DB = daily average abundance: mean daily number of birds for each month of the year we want to calculate the BRI₂. It is the total number of individuals (of the group) observed in the month divided by the number of complete monitoring inspections of the months (or by the service hours in case of continuous monitoring).

Other data needed are:

- TFN = Mean value of flights per year (starting from the beginning of birdstrike report form collection)
- N = Total number of functional groups present at the airport
- DF = Daily mean of monthly flights (based on the number of flights of the single month) of the year the BRI₂ is being calculated
- TFN = Monthly average of flights for the considered year

Let's start calculating the **Group Factor** (GF) for each single functional group:

$GF = \text{Mean of weights } (\bar{W}) \times \text{aggregation factor } (Ag) \times \frac{\text{Number of impacts } (BS)}{\text{Mean number of flights } (TFN)} \times \text{Effects on flight (EOF)}$

Then let's calculate the **Risk Factor GSR** for each single functional group:

$$GSR = \left[\frac{\text{Group Factor } (GF)}{\sum_{i=1,N} GF} \right] \times \text{daily average abundance } (DB)$$

Where N is the total number of functional groups present at the airport and \sum is the summation notation of all group factors.

After having made the operations above for each functional group, let's calculate the BRI_2 for each month of the year, according to the last formula reported in the circular APT 01B

$$BRI_2 = \left(\frac{\sum_{i=1,N} GSR_i \cdot DF}{TFN} \right)$$

Practically one has to summarize all the risk factors of all groups and multiply this datum by the daily mean of monthly flights; then the result must be divided by the monthly mean of the considered year flights.

The annual BRI_2 is the arithmetic mean of the BRI_2 values of each month