Appendix

Fig. S1. An overview of range generation for a theoretical species using Genetic Algorithm for Rule Set Production (GARP).

Step 1: 50% of observation points for a given species are removed and set aside as testing points. The remaining training points are used to generate a theoretical environmental niche (i.e. range) for that species.

Step 2: The GARP generates between 100 and 1200 theoretical ranges for each species based on the environmental characteristics of the habitat at each training point and at background or pseudo-absence points. In this example we show only two theoretical ranges generated for one species.

Step 3: The testing points are inserted back into the model and the omission errors and commission index (discussed in methods) are calculated. Based on these parameters, a best-subset of ten maps are manually selected for each species.

Step 4: When the ten best-subset maps are identified, they are super-imposed and the area where at least eight of ten agree is used for generating the final range map for the given species.

Step 5: If the agreed upon area for a final range extends into an ecozone where the given species has never been observed, it is clipped out. Once the final ranges have been produced for all 102 species the ranges are overlaid to produce a Canada-wide butterfly species richness gradient.