Validity ranges

Generally

The calibration domains of the different software are indicated below (physical characteristics), by software. Statistical habitat models do not apply in highly altered morphologies (e.g. channelized, recalibrated). It is generally possible to apply the software outside of their calibration domain, particularly in rivers whose width or mean flow deviates reasonably from the calibration domain, because the approach is based on the existence of very general statistical properties of rivers (shape of velocity and depth distributions). Nevertheless, we recommend discussing these points with the technical experts involved in the studies, and in any case, applications should be limited to rivers with diversified geomorphic units. Thus, avoid using the models in reaches with more than 40% of the surface area under the hydraulic influence of weirs, riprap, groynes or other developments.

The domains of validity of HABBY's biological models are now documented in the HABBY software itself, which also serves as a library of numerous biological models. Only a few elements concerning Estimhab will be described below.

WARNING. All units for statistical models are in m, m/s, m3/s.

Specificities

Estimhab

Biological validity rangeUnlike other statistical software, the list of modeled taxa is fixed. Estimhab allows habitat simulations by species/stages or by groups of species/stages (guilds).

The European species currently taken into account are: TRF = adult and juvenile Fario trout (the simulations for juvenile trout remain valid for fry); BAF = adult river barbel; CHA = adult sculpin; GOU = adult gudgeon; LOF = adult stone loach; VAI = adult minnow; SAT = Atlantic salmon (alevin and juvenile); OMB = grayling (fry, juvenile, adult).

Guilds are groups of species/stages with comparable habitat preferences. The guilds used for Estimhab are:

- Guild 'riffle': loach, sculpin, barbel <9cm
- Guild ‘midstream’: barbel >9cm, blageon >8cm (this guild is considered appropriate for nase, toxostome, dace, grayling)
- Guild ‘pool’: eel, pumpkinseed, perch, roach, chub >17cm
- Guild ‘bank’: gudgeon, blageon <8cm, chub <17cm, minnow

The 'channel' guild corresponds to midstream species; it is the guild most favoured by increases in flow (and historically the most affected by reduced flows in regulated rivers). The general slowdown in runoff linked to developments also reduces the proportion of species in the 'riffle' guild.

All the biological models that were used to build Estimhab are now documented in HABBY

HABBY\biology\models\France\fish\Irstea Former Cemagref

Physical range of validity

Estimhab can be used in rivers with temperate climates with a natural or slightly modified morphology (the flow rate can be modified), with a slope < 5%.

Simulations by species (except those of SAT and OMB) are quite comparable to those of EVHA (>80% variance in explained habitat value) in a range of rivers whose hydrological and hydraulic characteristics are below:

Reach characteristics	Minimum	Maximum
Median discharge Q50 (m3/s)	0.20	13.10
Width at Q50 (m)	5.15	39.05
Depth at Q50 (m)	0.18	1.45
Substrate D50 (m)	0.02	0.64

Simulations by guilds, (plus those for SAT and OMB) were comparable to those of EVHA in a wider range of rivers :

Reach characteristics	Minimum	Maximum
Median discharge Q50 (m3/s)	1.00	152.00
Width at Q50 (m)	7.00	139.00
Depth at Q50 (m)	0.25	2.25
Substrate D50 (m)	0.01	0.33

Stathab

Stathab was calibrated in the same rivers as Estimhab.

Stathab_steep

Stathab_steep was calibrated in alpine and tropical rivers with the following characteristics:

Reach characteristics	Minimum	Maximum
Slope(%)	1	24
Substrate, average Dm (m)	0.001	0.40
Substrate, percentile D84 (m)	0.276	2.56
Wetted width (m)	1.24	19.5
Mean annual discharge (m3/s)	0.047	2.27

FSTress

FSTress was calibrated in small to medium streams, with low particle size and the following characteristics:

Reach characteristics	Minimum	Maximum
Slope (%)	0.07	3.4
Substrate, mean size (m)	0.01	0.03
Wetted width (m)	1	30
Mean annual discharge (m3/s)	0.003	12