Appendix 2. An example: Calculating a LOPA barrier and lambda value

A) An example from known data

Threat 1, Barrier 3: Wolf trapping and hunting

References: Management Plan for Grey Wolf in British Columbia (BCMFLNRO 2014), and Hervieux et al. 2014

Data from reference: 350 wolves removed via hunting and trapping in 2014, of an estimated population of 1,300 - 3,000 wolves (BCMFLNRO 2014)

a) Calculated LOPA factor:

350 wolves/1,300 wolves = 27% of wolves removed

For wolf removal to be effective 80% of the population

needs to be removed (BCMFLNRO 2014; Hervieux et al. 2014)

Effectiveness of wolves that were removed = 0.27/0.8 = 34 % effective

Barrier = 1 - effectiveness = 1 - 0.34 = **0.66**

We rounded this number to **0.65**

b) Translating LOPA factor values to lambda values:

Lambda (λ) is a relative measure between the Threat's initial frequency units

and the barrier's units.

$$Lambda = (ThreatInitialFrequency * \mathbf{BarrierFrequency}) - ThreatInitialFrequency$$

$$= (0.055 * \mathbf{0.65}) - 0.055$$

$$= \mathbf{-0.019}\ \lambda$$

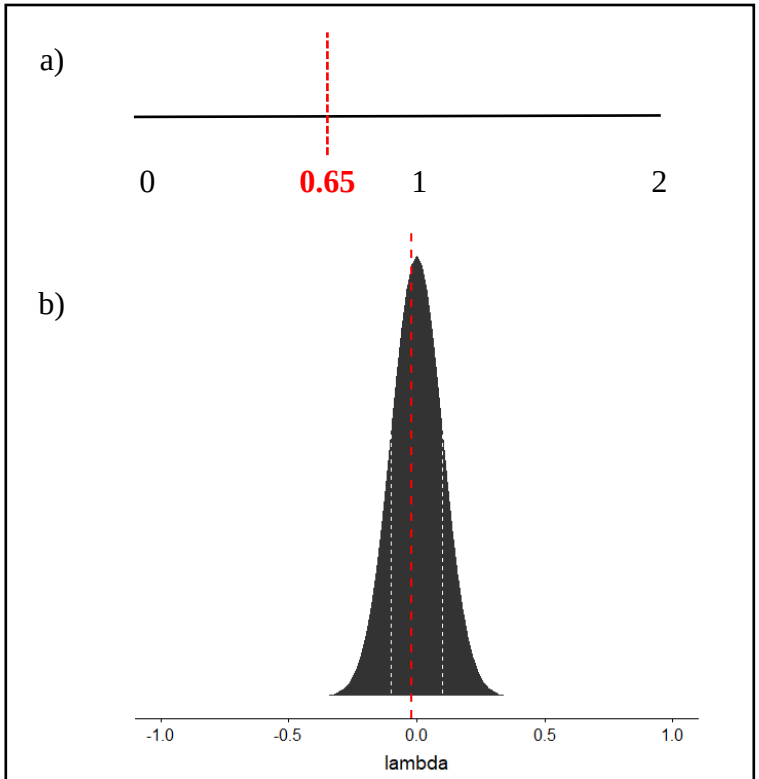

Figure A1. Calculations of barrier LOPA factor (a), and translation to the lambda scale (b) to quantify a barrier's contribution to the rate of population growth. White lines in b indicate the 1st standard deviations. Red lines in a and b represent calculated values.

Source code: https://github.com/StewartResearch/BRAT_CaribouCalculations.git

B) An example from inference

Section 2.6.1.4 Threat 1, Barrier 4: Management of early seral stage forests for cover to reduce access

References: Wittmer *et al.* 2007, Serrouya *et al.* 2015, 2019, Sorensen *et al.* 2008, Environment Canada 2012

Data from references: No exact numbers were used from the above references, but generally all references acknowledge that habitat disturbances exacerbate predation levels as forest clearings (e.g. forestry, wildfire) can facilitate predator mobility and access to prey. In our study areas (Figure 1), minor to trace amounts of deforestation, fire disturbance, and timber harvest continue to add to the major amount of disturbed habitat (such as seismic lines).

a) Inferred LOPA factor:

Considering the massive scope of this disturbance, and its ongoing accumulation, we estimated the overall LOPA factor to be 1.5 for this barrier (i.e. worse than neutral (1.0), but less than Threat 1, Barrier 1 (Section 2.6.1.1; 1.716), which was calculated from data).

Barrier = **1.5**

b) Translating LOPA values to lambda values:

Lambda (λ) is a relative measure between the Threat's initial frequency units and the barrier's units.

$$Lambda = (ThreatInitialFrequency * \mathbf{BarrierFrequency}) - ThreatInitialFrequency$$

$$= (0.055 * \mathbf{1.5}) - 0.055$$

$$= \mathbf{0.027}\ \lambda$$

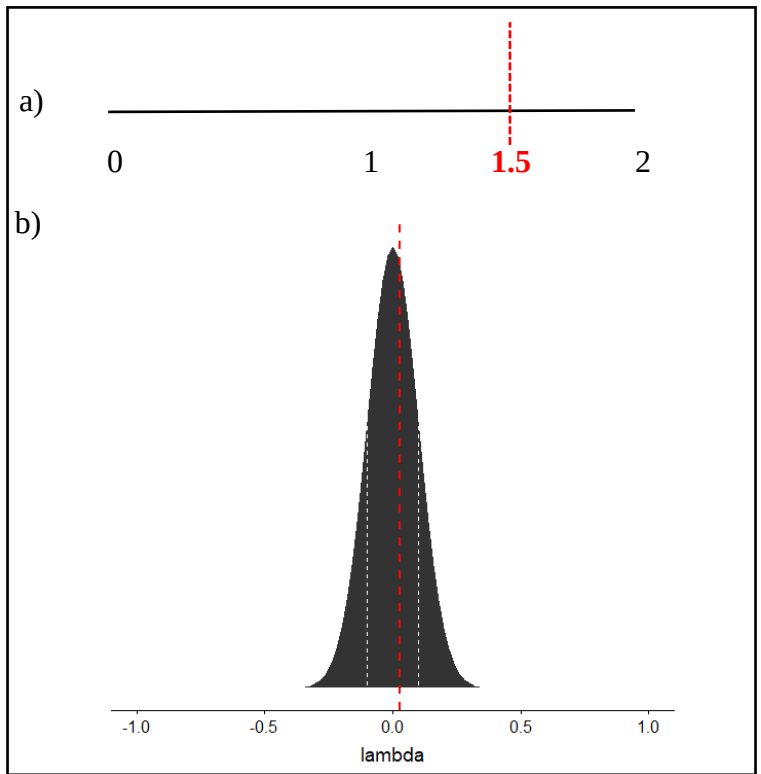

Figure A2. Inferred barrier LOPA factor (a), and translation to the lambda scale (b) to quantify a barrier's contribution to the rate of population growth.

Source code: https://github.com/StewartResearch/BRAT_CaribouCalculations.git