**Table 2.** Results of five different mitigation scenarios for two study areas, and one averaged area, of Woodland Boreal Caribou in Northeastern British Columbia, Canada, under the presented BRAT framework. The target frequency is the 60% threshold of a normally distributed range of lambda (λ) values, with a standard deviation of 0.1. Bolded values represent frequencies under which each scenario has a positive effect on each study area. Italicized costs represent the most cost effective strategy for each study area.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Scenario | Study Areaa | Target lambda\* | Top Event lambda\* | Consequence lambda\* | Cost (CDN) |
| Combined mitigations | 1 | 1.025 | 0.956 | **1.233** | **$20,037 + $724,000/ year** |
|  | 3 | 1.025 | 0.966 | **1.240** | **$18,025 + $724,000/ year** |
|  | A | 1.025 | 0.966 | **1.240** | **$14,909 + $724,000/ year** |
| Total predator control | 1 | 1.025 | 0.956 | **1.151** | ***$224,000/ year*** |
|  | 3 | 1.025 | 0.966 | **1.158** | ***$224,000/ year*** |
|  | A | 1.025 | 0.966 | **1.158** | ***$224,000/ year*** |
| Maternity penning | 1 | 1.025 | 0.956 | 1.008 | $500,000/ year |
|  | 3 | 1.025 | 0.966 | 1.017 | $500,000/ year |
|  | A | 0.975 | 0.966 | 1.017 | $500,000/ year |
| Linear feature restoration | 1 | 1.025 | 0.956 | 1.008 | $20,037 |
|  | 3 | 1.025 | 0.966 | 1.017 | $18,025 |
|  | A | 1.025 | 0.966 | 1.017 | $14,909 |
| Linear feature and maternal penning | 1 | 1.025 | 0.956 | **1.066** | **$20,037 + $500,000/year** |
|  | 3 | 1.025 | 0.966 | **1.066** | **$18,025 + $500,000/year** |
|  | A | 1.025 | 0.966 | **1.066** | **$14,909 + $500,000/year** |

aBoreal caribou population data used for each study area:

1. Chinchaga herd (N = 250, recruitment = 0.13, adult female survival = 0.87; ECCC 2008; Appendix 6.5 Table 1),
2. Snake-Sahtahneh herd (N = 360, recruitment = 0.072, adult female survival = 0.94; ECCC 2008; Appendix 6.5 Table 1).

A - Average of Chinchaga and Snake-Sahtahneh herd demography (N = 305, recruitment = 0.105, adult female survival = 0.905)

1Cost estimates obtained from Schneider et al. 2010 - estimated as 35/km^2. Threshold estimates obtained from BC grey wolf management plan – 80% of area (as a proxy for 80% of the population) needs to be targeted to effectively reduce wolf densities.

2Maternity penning cost estimates were obtained from both S. McNay and R. Serroya pers. coms – both of which centered around $500,000 to $550,000 per year. The costs of exclosures are implicitly included in a maternal penning cost, and maintenance of a fence is of minimal expense (S. McNay pers. com).

3Cost estimates obtained from Pyper et al. (2014) as $12,500/km. An effective threshold for these populations was considered to be 70%, as this is similar reflects Environment and Climate Change Canada’s 2012 threshold of only having 35% of a local population unit having disturbance. Each of our study areas also contains 70% herd range, so the values presented here assumes 70% of seismic lines are restored within the herd range of a study area. Calculated density of seismic lines for the herd area within each study area were obtained from Table 1, and the efficacy of this treatment is assumed to be similar to maternity penning in terms of a lambda response.

**Table 4.** Input values for two study areas, and one averaged area, of Woodland Boreal Caribou in Northeastern British Columbia, Canada, under the presented BRAT framework.Bolded values are calculated using the BRAT framework. All other values are either derived from literature, data, and assumed constants between populations, or are unknown and assumed to be 1 (unknown effect on lambda), > 1 (positive effect on lambda), or < 1 (negative effect on lambda).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Study areaa | Threat1 | Threat2 | Threat3 | Threat4 |
| Initial/current frequency | 1 | **0.005**/0.117 | 0.374/0.820 | **0.050**/0.053 | **0.046**/0.053 |
| Barrier frequency | 1 | **1.716**,  1.4, 0.65, 1.5, 1.00, 0.90, 1.00 | 2.19 | 1.05, 1.00, 1.00 | 1.05, 1.05, 1.05, 1.00, 1.00 |
| Barrier lambda | 1 | **0.039** (**0.019** due to avoidance of wolves, **0.0310** due to avoidance of other/compensatory predators),  0.022, -0.019, 0.027, 0.00, -0.006, 0.00 | 0.447 (0.16 due to avoidance of wolves, 0.27 due to avoidance of other/compensatory predators), | 0.003, 0.00, 0.00 | 0.002, 0.002, 0.002, 0.00, 0.00 |
| Initial/current frequency | 3 | **0.005**/0.054 | 0.323/0.867 | **0.054**/0.056 | **0.049**/0.056 |
| Barrier frequency | 3 | **0.792**,  1.40, 0.65, 1.5, 1.00, 0.90, 1.00 | 2.68 | 1.05, 1.00, 1.00 | 1.05, 1.05, 1.05, 1.00, 1.00 |
| Barrier lambda | 3 | **-0.011** (**0.019** due to avoidance of wolves, **0.042** due to avoidance of other/compensatory predators)  0.022, -0.019, 0.028, 0.00, -0.006, 0.00 | 0.544 (0.167 due to avoidance of wolves, and 0.377 due to avoidance of other/compensatory predators) | 0.003, 0.00, 0.00 | 0.002, 0.002, 0.002, 0.00, 0.00 |
| Initial/current frequency | A | **0.055**/0.086 | 0.348/0.839 | **0.052**/0.054 | **0.047**/0.054 |
| Barrier frequency | A | **1.25,**  1.40, 0.65, 1.5, 1.00, 0.90, 1.00 | 2.41 | 1.05, 1.00, 1.00 | 1.05, 1.05, 1.05, 1.00, 1.00 |
| Barrier lambda | A | **0.014** (**0.019** due to avoidance of wolves, **0.036** due to avoidance of other/compensatory predators)  0.022, -0.019, 0.028, 0.00, -0.006, 0.00 | 0.491 (0.167 due to avoidance of wolves, and 0.324 due to avoidance of other/compensatory predators) | 0.003, 0.00, 0.00 | 0.002, 0.002, 0.002, 0.00, 0.00 |

aBoreal caribou population data used for each study area:

1. Chinchaga herd (N = 250, recruitment = 0.13, adult female survival = 0.87; ECCC 2008; Appendix 6.5 Table 1),
2. Snake-Sahtahneh herd (N = 360, recruitment = 0.072, adult female survival = 0.94; ECCC 2008; Appendix 6.5 Table 1).

A - Average of Chinchaga and Snake-Sahtahneh herd demography (N = 305, recruitment = 0.105, adult female survival = 0.905)