Recent widespread warming has caused many terrestrial mammals to change when, how, and where they move, with cascading effects on individuals' fitness and habitat selection at the population, community, and ecosystem levels. Previous research has quantified the effects of temperature on mammalian movement behaviour, but few have quantified the effects of future climate change on mammalian movement. We address this gap by using Continuous-Time Movement Models and Hierarchical Generalized Additive Models to quantify the effects of temperature the probability of moving, the speed when moving, and the habitat selection of six species throughout British Columbia, Canada. We show that temperature is a strong determinant of when, how, and where mammals move, and that climate change will impact mammals' movement rates and habitat selection throughout the 21st century. We found no common effects of temperature on the species’ movement rates, so we suggest that estimated responses be considered jointly when making inferences about how climate change will impact ecological communities. However, habitat selection strength decreased for all species within their current ranges, suggesting that all six species will likely shift their range in the coming decades. Our findings are particularly concerning as increasingly common “climate weirding” pushes species to atypical ranges and behaviors. We conclude by placing our findings within a holistic and collaborative framework while providing suggestions for conservation and future research.