Literature Review for UREAP Application

**Evaluation of Radio Telemetry for Quantifying Home Ranges**

**and**

**Susceptibility of Road Encounters of 3 Snake Species**

 **in the White Lake Basin, BC**

By

Jollee Perrier

Bachelor of Natural Resource Science

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Wildlife populations globally are decreasing in size and largely driven by an unprecedented rate of anthropogenic threats including habitat loss, invasive species, and climate change. Among the groups most at risk are herpetofauna; globally 41% of amphibians and 21% of reptiles are listed as threatened under IUCN (2022), and over 50% of amphibian and reptile species in British Columbia are listed as species of conservation concern (MoE 2020). The most significant threat to reptiles is road mortality (CHS 2022) and therefore must be a priority action of mitigation for the recovery/stability of these species. British Columbia is only in preliminary development of roadside mitigation measures for amphibians and reptiles (MoE 2020). In addition to direct mortality, roads can also result in indirect effects such as barriers to gene flow, leading to lower genetic diversity and therefore higher risk of extinction (Frankham et al. 2002, Clark et al. 2010).

The road ecology of snakes is particularly relevant within the South Okanagan region of BC (Winton et al. 2020). Additional research in understanding the behaviours associated with road mitigation measures is essential in project planning (Rytwinski et al. 2016, Macpherson et al. 2021). Dynamic interactions of animals and the environment is understood to be linked to the extent of their home range and habitat selection (Van Moorter et al. 2015, Viana et al. 2018). The size of an animal's home range impacts the likeliness of encountering roads, therefore understanding a species behaviour and life history is required in creating mitigation strategies (Seilder et al. 2018). Andrews et al., (2005) saw that species differed in road avoidance, where smaller snakes had higher levels of road avoidance and venomous snakes crossed slower than nonvenomous. Snakes are thought to interact with roads due to attraction to road surfaces for thermoregulation and if roads intersect through their home range (MoE 2020). Studies done by Fortney et al., (2012) and Rouse et al., (2011), revealed that snakes hibernacula influenced the susceptibility of snakes on roads and additionally, Degregorio et al., (2010) concluded that road mortality was related to life history characteristics and activity patterns such as dispersal movements. Knowledge of species-specific behaviour on home range and movement patterns is still lacking in the South Okanagan region of British Columbia, specifically on species of conservation concern, e.g. Great Basin Gophersnake (Pituophis catenifer deserticola), and Western Yellow-bellied Racer (Coluber constrictor mormon).

The Okanagan Valley contains peripheral northern habitat for species such as the Western Rattlesnake (Kirk et al. 2021). Peripheral populations can be critical elements for conservation as they contain areas of speciation and genetic diversity (Fraser 1999). White Lake Grassland Protected Area is in the Southern Okanagan and is an acknowledged ‘hot spot' for conservation: it supports 57 species at risk (under SARA), 27 red- and blue-listed plant communities, and sacred cultural and traditional use sites by the Syilx people (NTBC 2021). Furthermore, the rattlesnake, gophersnake, and racer occupy the same habitat within this area, providing a significant opportunity for comparing home range and road encounter rates.