5-YEAR RESEARCH PLAN

My long-term goal is to understand how the internal states of organisms (e.g., energy state, disease) change and are changed by organism distributions. Within my first five years, I will make progress toward this goal by modelling: (1) dynamics between short-term energy states and individual habitat selection, and the effects of those dynamics on collective animal movements, and (2) the influence of disease on individual habitat selection and population distributions. Within this time, I expect to graduate at least three MSc and seven BSc Honours students who will collect and use data from the tall-grass prairie elk project and synthesize publicly available data from literature and online databases. Our applied contributions will include (1) building an "epigenetic clock" for early detection of chronic wasting disease from cervid feces, and (2) providing basic information about the structure and movements of the southeast Manitoba elk population.

	Year 1 2024–2025	Year 2 2025–2026	Year 3 2026–2027	Year 4 2027–2028	Year 5 2028–2029
Theme 1: Energy state-habitat selection dynamics and collective movements	**Actions:** • NSERC DG and other local and external funding applications • Build and nurture existing collaborations **Existing relationships:** • Nature Conservancy of Canada (MB region) • MB Fish & Wildlife • Travis Seaborn (NDSU) • North Dakota Fish & Game • Minnesota DNR **New and future relationships:** • MB Hydro • MB Métis Federation • Standing Rock Sioux Tribe • AB cervid researchers	Recruit: 1–2 BSc, 3–4 MSc	Recruit: 1–2 BSc	Recruit: 1 BSc, 3–4 MSc	Recruit: 1 BSc
		Possible projects: • Individual-based models of cortisol-habitat selection feedback • Global cortisol-biogeochemical cycle relationships		• Effects of cortisol-habitat selection feedback on collective movements • Relationships between infection dynamics and collective movements	
		Potential funding sources: Fish and Wildlife Enhancement Fund, NSERC RTI, NSERC Alliance International, Research Manitoba New Investigator Operating Grant			
Theme 2: Influence of disease on habitat selection and population distributions			Recruit: 1 BSc, 1–2 MSc	Recruit: 1 BSc	Recruit: 1–2 BSc, 2–3 MSc
			Possible projects: Building an epigenetic clock for chronic wasting disease		• Disease-population distribution feedback • Relationships between disease and age acceleration
			Potential funding sources: Alberta Innovates, Minnesota Centre for Prion Research, MB Sustainable Canadian Agricultural Partnership		