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A Participatory Mapping and Agent-Based Approach to Promote Coexistence Between Idaho Ranchers and Gray Wolves

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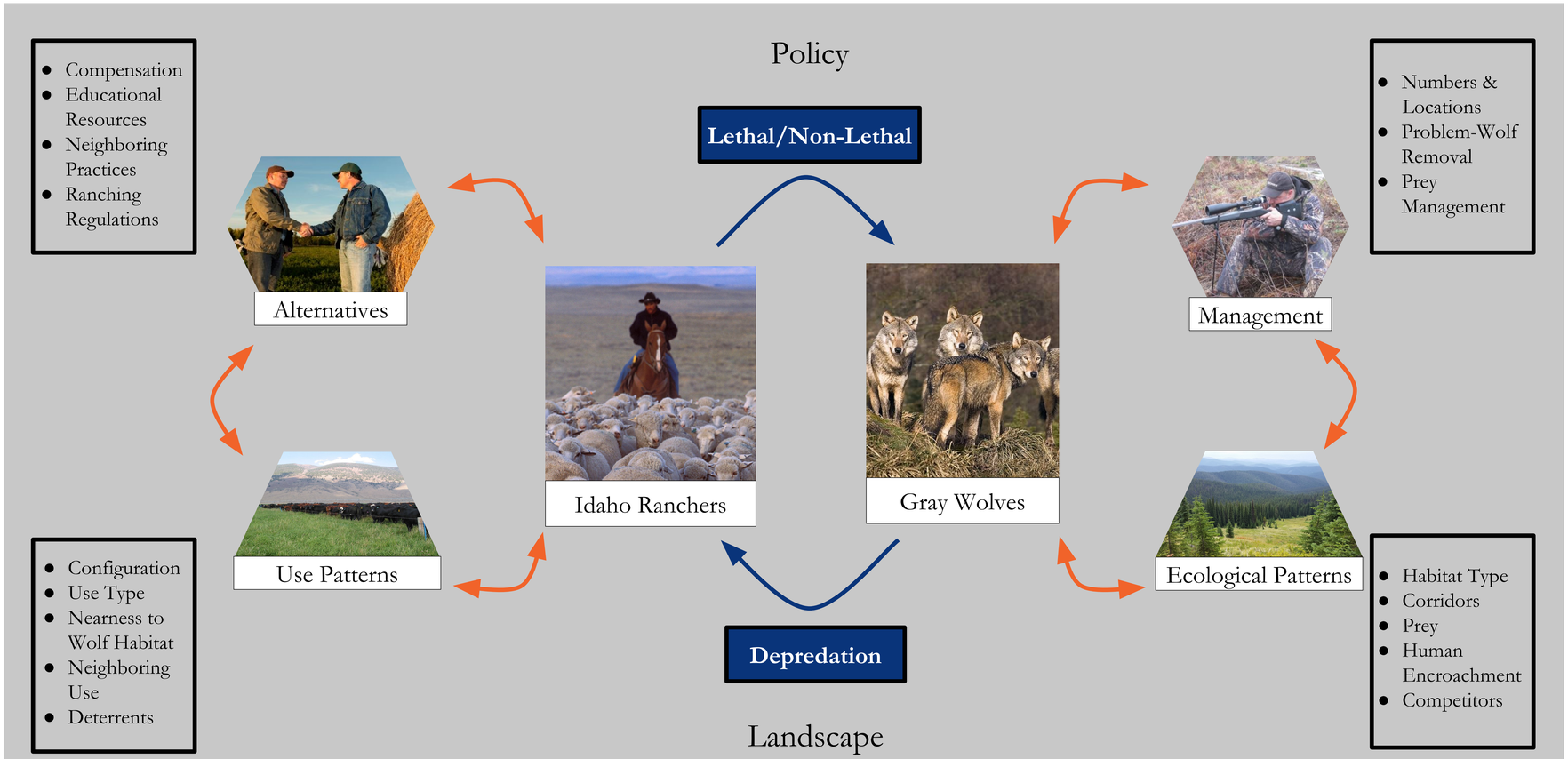
Abstract

Recent work has shown that managing for coexistence between humans and wildlife requires greater knowledge about both human-human interactions and human-wildlife interactions. This is particularly so for shared landscapes in Idaho, where interactions between human communities and large carnivore species, such as the gray wolf, have implications on ecosystems and livelihoods. On these landscapes, not only is land-cover and land-use important, but so is understanding the factors that influence human decision making, such as their underlying beliefs and norms. Evidence suggests that differences in community values can result in a variety of outcomes in response to carnivore risk. Yet, ranchers make decisions that are driven by factors other than personal or community values. Landscape characteristics may make a rancher more or less susceptible to risk and thus likely to use certain non-lethal alternatives under certain sociopolitical scenarios. These fine-scale decisions in turn influence large-scale landscape processes. Such cross-scale and cross-discipline interactions contribute to complexity and are not well understood in human-wildlife systems. By utilizing a participatory mapping exercise under a variety of likely policy, landscape, and wolf-risk scenarios we hope to better understand how and why certain actors make decisions. Also, identifying the mechanisms that drive human-human interactions may better inform and predict changes in ecological patterns. Thus, understanding important feedbacks between the human and environmental systems can improve intervention strategies that work to minimize depredation and ensure wolf sustainability in Idaho.



Methodological Tools

- Participatory Scenario Mapping
- LIDAR/GLAS Habitat Structure Modeling
- Fine-Scale Human-Predation Risk
- Cross-Scale Transdisciplinary Approach
- Agent-Based & Game-Theoretic Structure

Proposed Methods

Neighboring ranchers will be brought together to participate in a spatial mapping exercise where they will be given likely policy, landscape, and wolf-risk scenarios defined by experts and other stakeholders. In response to these scenarios, participants will be asked to make decisions as to which management practices they would use in a specific place and time. Mapping exercises will be conducted in a variety of study sites in Idaho to ensure a diversity of social and landscape characteristics. Landscape patterns will likely vary among sites, making these locations more or less susceptible to wolf presence. To quantify how fine-scale landscape characteristics influence wolf presence and behavior, habitat and vegetation structure will be measured using aerial light detection and ranging (LIDAR) techniques and products from NASA's Geoscience Laser Altimeter System (GLAS) resulting in a wolf risk surface model surrounding ranching properties. A modeling framework which allows for simultaneous interactions between fine-scale spatiotemporal processes with that of larger-scale processes while utilizing both social and environmental variables will be used to better understand interactions and feedbacks that occur in Idaho and other similar systems.

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