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# Does Outdoor Recreation Decrease Stress? Investigating the Physiological Responses of Outdoor Recreation in Idaho

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Investigating the physiological responses of outdoor recreation in Idaho

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## Project Overview

Studies of outdoor recreation on human well-being have demonstrated decreased blood pressure, decreased heart rate, decreased stress levels, improved mood, and improved self esteem (Pretty et al., 2005; Song et al., 2016). Studies looking at the benefits of green exercise, however, have largely been conducted within forested landscapes, utilize self-reported stress, and often do not have physiological data to support the benefits of recreation as an ecosystem service (Panasen et al., 2014; Lee et al., 2011).

Our project proposes to begin filling in the gaps of outdoor recreational research by providing both social and biological data on stress, stress information by recreation type and spatial movement, as well as using a human-environmental approach in evaluating the effects of recreation on humans and wildlife alike. Additionally, conducting research in Idaho, a largely arid state, will contribute to the diversity of research on outdoor recreation across both culture and habitat.

We are especially interested in human perceptions of recreation and its function as an ecosystem service. We hope to provide further insight on the motivations behind outdoor recreation, the perceived role of wildlife to outdoor recreational experience, and how landscapes are perceived with respect to stress. Last, outdoor recreation is known to increase stress of wildlife populations and cause behavioral changes (Thlel et al., 2008; Taylor & Knight, 2003). By integrating the human and environment systems together, we hope to address conservation concerns of wildlife by studying the perceptions of recreational effect on wildlife, and the value of wildlife to outdoor recreational activity.

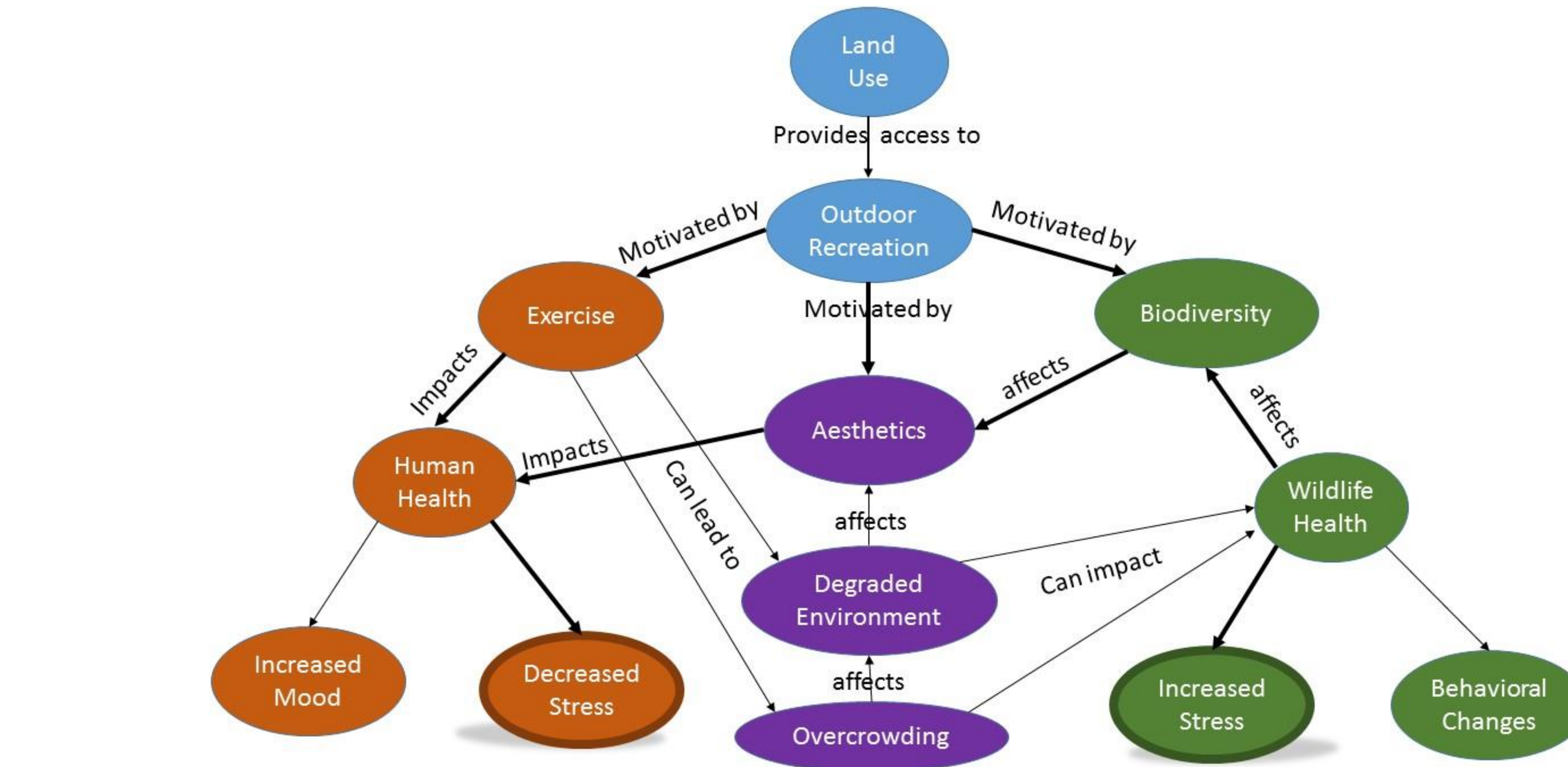
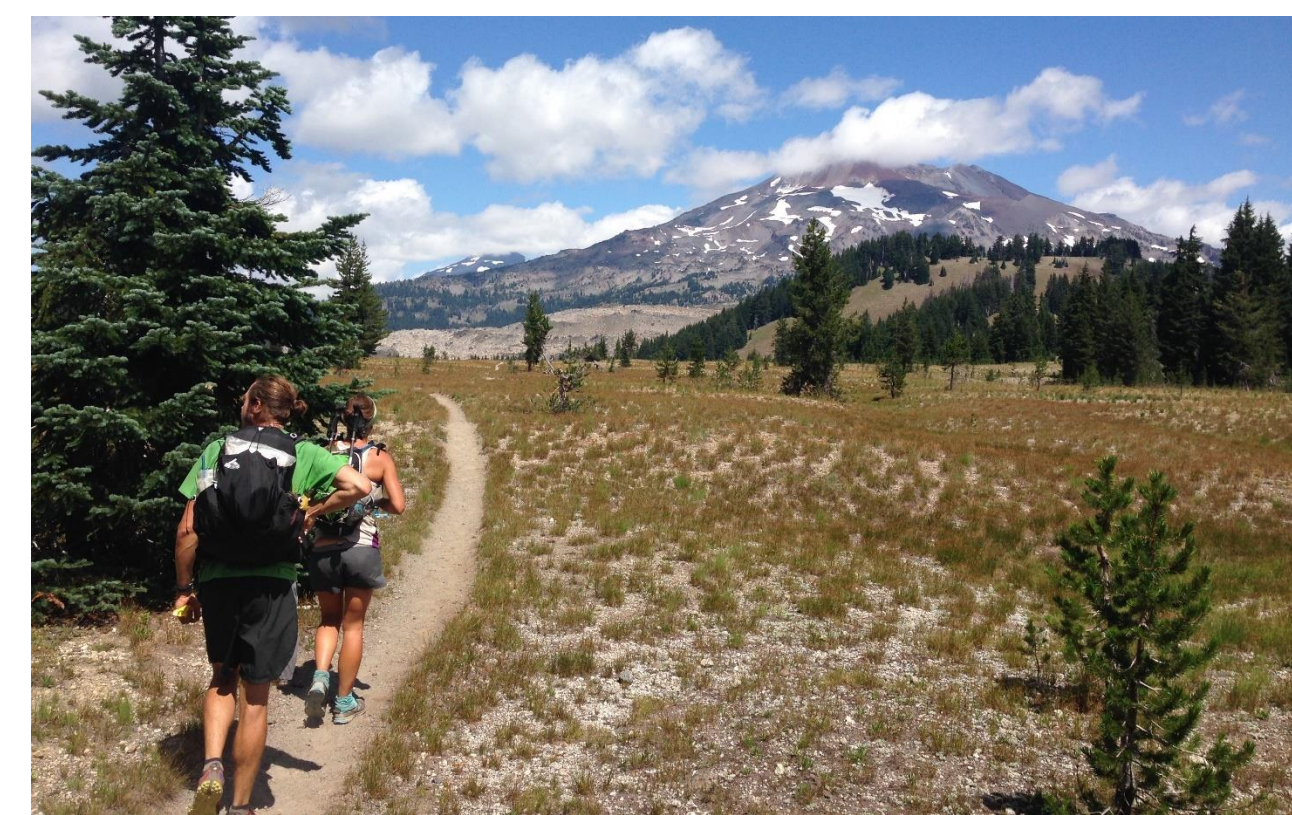


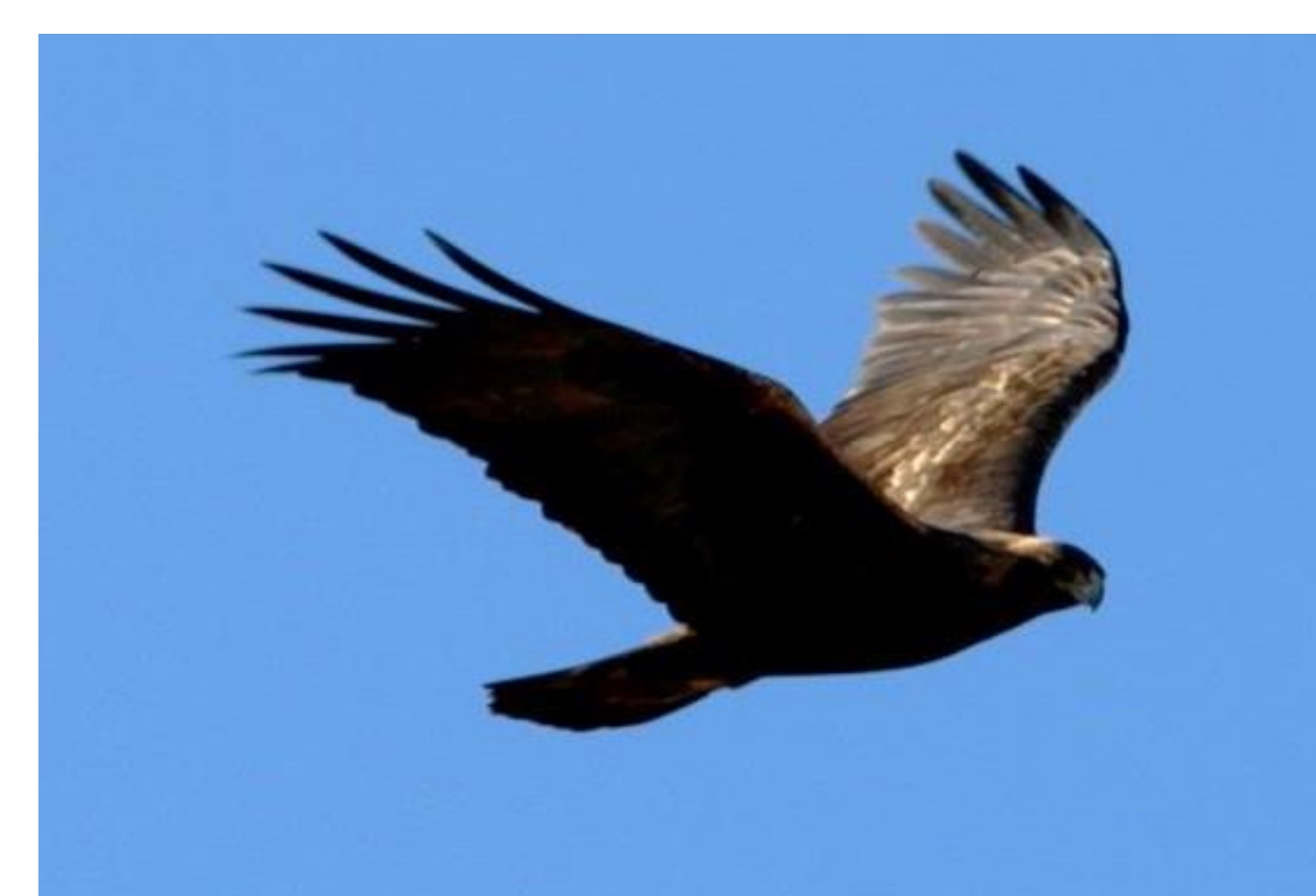
Fig 2: Flow chart of possible relationships between outdoor recreation, human health, and wildlife health. The orange color indicates human factors, purple indicates landscape factors, and green indicates wildlife factors. Bolded arrows refer to hypothesized relationships we hope to investigate.



## Objectives include:

- Measuring cortisol
- Measuring spatial use
- Collecting interpersonal differences and motivations
- Analyzing qualitative multi-species interactions

**The primary research objective of this proposal is to test whether physiological stress in humans is reduced in response to outdoor recreation by measuring salivary cortisol levels before and after a recreational activity. These stress responses will then be compared to analyses of stress responses of wildlife in areas of high recreational activity to begin creating a stress landscape across land use.**



## Projected Outcomes

We project that outdoor recreation is associated with a decrease in cortisol quantities irrespective of recreation type, spatial movement, and environmental values. We postulate that there will be differences in cortisol decreases based on duration of time spent recreating, group recreation, spatial movements, and recreation type. It is expected that change in cortisol will generally be greater with increased time spent in a green space (Barton et al., 2009) and greater when recreating in areas that are near water (Barton & Pretty, 2010). Additionally, we hypothesize that group recreation will contribute to decreases in cortisol in small groups (Barton et al., 2009), and that less vigorous recreation types (ie. hiking) will be associated with larger decreases in cortisol over vigorous and thrilling recreation (ie. mountain biking) (Coppes & Braunisch, 2013; Barton & Pretty, 2010).

With respect to human perception and ecosystem services, we hypothesize that recreationists will not be as aware of recreation as an ecosystem service compared to other services (Barton et al., 2009; Jim & Chen, 2006). We also expect that recreationists will not perceive their activities as having negative impacts on wildlife (Taylor & Knight, 2003), but will rate the possibility of viewing wildlife and interacting with nature as a motivation for recreating outdoors (Jim & Chen, 2006; Bird, 2004).

## Potential Impacts

This research will add to the ecosystem service framework and its ability to transcend the anthropocentric mentality by reintegrating wildlife. A more human-environment systems approach - especially one focusing on human perceptions of environmental issues - will be beneficial for future research in order to create management strategies that will be both effective and supported.

Investigating stress in both humans and wildlife simultaneously has not been done before, and will create a foundation for future research on outdoor recreation and field physiology to build upon.

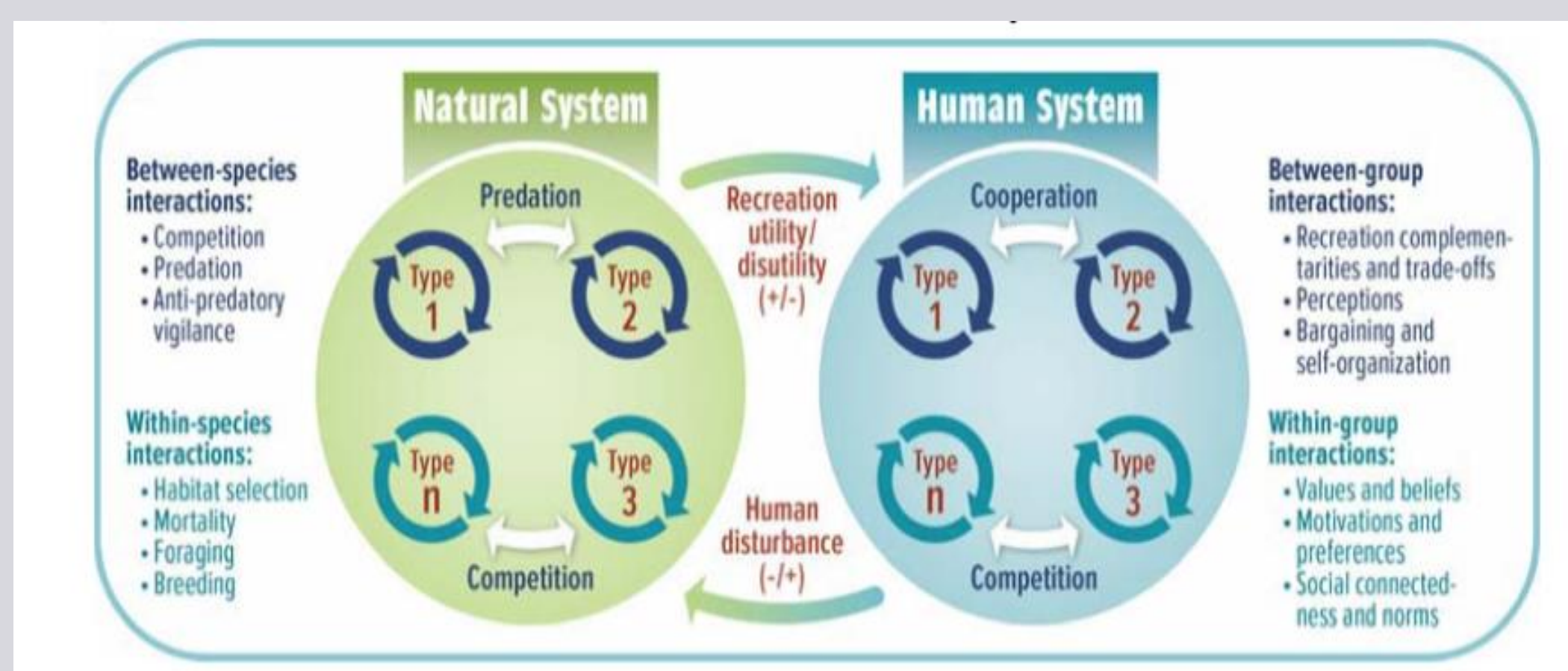


Fig 1: Coupled Human-Environment systems approach to interactions between recreationists and wildlife.