** Bioacoustic Detection and Multi-Scale Habitat Assessment of Breeding Great Gray Owls in Southwest Montana

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Great Gray Owls (*Strix nebulosa*), the largest owl species in North America, are one of the most understudied raptors on the continent. While the use of autonomous recording units (ARUs) has proven effective for assessing occupancy, there remains a need to evaluate how ARUs can be used to locate and monitor Great Gray Owls beyond the pre-nesting period. Additionally, the nesting habitat characteristics of Great Gray Owls have not been empirically evaluated across much of the Rocky Mountain portion of their range. In 2015, the Montana State Wildlife Action Plan designated Great Gray Owls as a species of greatest inventory need, prompting Montana Fish, Wildlife & Parks (MT FWP) to conduct a statewide Great Gray Owl occupancy survey effort. This study builds on MT FWP's occupancy findings, quantifying the habitat characteristics of Great Gray Owl nest sites in southwest Montana and evaluating a novel method to detect and monitor active nests. Here, I will present findings from the 2025 field season on the efficacy of using ARUs to locate and monitor active nests and determine nest outcomes versus ground-based survey methods, as well as a multi-scale nest site habitat selection analysis with both field-based and remote sensing data. This research aims to develop our understanding of Great Gray Owl nesting ecology and improve our ability to locate, manage, and conserve this elusive species. These findings can directly inform ongoing and future forest management actions to better target surveys before treatments and protect active nests.