Abstract

Oak savanna is imperiled across its entire global range, including the Midwestern United States. Once a dominant land cover, Midwestern oak savanna has been reduced to less than 0.02% of its pre-European settlement extent. Sand Dunes State Forest in the Anoka Sand Plain subsection of Minnesota contains some of the last high-quality remnants of oak savanna in the state, and efforts are underway to restore additional areas of the state forest to pre-settlement habitat types. To inform management within Sand Dunes, we described relationships between habitat characteristics and rare wildlife species that are associated with oak savanna in the area. We surveyed for six habitat specialist species between 2014 and 2016 and used N-mixture abundance models to describe relationships between abundance and occupancy and habitat charactistics related to management. We found that species’ predicted abundance and occupancy probability were affected by habitat features and management disturbances, with at least one variable per species receiving statistical support. Lark sparrow (*Chondestes grammacus)* and Leonard’s skipper (*Hesperia leonardus leonardus*) exhibited disparate relationships with management disturbance, with lark sparrow responding positively and Leonard’s skipper responding negatively. Species abundance also exhibited disparate responses to canopy cover, with northern barrens tiger beetle (*Cicindela patruela)* responding positively and lark sparrow responding negatively. These results highlight the importance of careful planning when undertaking habitat restoration. Plans should consider habitat needs of individual species as well as their responses to active habitat management to achieve balance between maintenance of local populations and habitat restoration on a landscape scale.