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Turkey Vulture responses to approach by two unmanned aerial systems in a landfill: A preliminary study

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Abstract. Unmanned aerial system (UAS) technology has been applied for wildlife management to disperse animals from select areas. Some new UAS have been developed to look and fly like a predatory bird (ornithopters), but little is known about their efficacy relative to other UAS (e.g. fixed wing). We conducted a preliminary study recording turkey vulture (*Cathartes aura*) responses to an ornithopter and a fixed-wing UAS performing targeted and overhead flights. Turkey vultures are considered a hazard to aviation safety and can congregate in large numbers, which warrants a need for deterring them around airports. In lieu of using an airport, our experimental site was a municipal landfill. We recorded the reduction in vulture numbers (i.e. number of vultures present after a flight/number of vultures present before a flight; with lower values indicating a higher proportion of vultures dispersed). We ran 14 total trials over a 5-day period, of which turkey vultures were present for 12 trials. Fixed-wing UAS flights led to more vultures dispersed (mean = 0.74) compared to ornithopter flights (mean = 1.87). Overhead approaches led to more vultures dispersed (mean = 1.17) compared to targeted approaches (mean = 1.44). The effect size of UAS type (Cohen's $d = 1.54$) was higher than direction of approach (Cohen's $d = 0.28$). Given these preliminary results, we predict that a fixed-wing UAS would disperse more vultures than an ornithopter possibly because of the fixed-wing's larger size and higher speed might increase the perceived risk to turkey vultures and subsequent dispersal behavior. We plan on testing this prediction empirically in the near future.
