

# Vultures in the southeastern United States ingest more plastic in landscapes with more developed landcover

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## Abstract

Plastics are found in ecosystems worldwide and can have widespread impacts on organisms and the environment. Cathartid vultures, including the black vulture (*Coragyps atratus*) and the turkey vulture (*Cathartes aura*), have adapted to urbanized environments, making frequent use of human-made structures and anthropogenic resources. Thus, urban vultures are likely exposed to more plastic materials than rural vultures, which they intentionally or unintentionally ingest when foraging or loafing. Our objective was to determine the extent and type of plastic ingested by black and turkey vultures in an urban environment by (1) measuring the plastic content of regurgitated pellets collected along an urban-to-rural gradient, and (2) identifying the plastics within pellets. We dissected 1,087 pellets collected at eight vulture congregation sites in the Charlotte Metropolitan Area, USA between January 2021 and July 2022. Sixty percent of pellets contained plastic materials, with an average plastic composition by weight of  $2.66 \pm 8.76\%$ . Repeated measures linear mixed models of the proportion of pellets that were plastic suggested that black and turkey vultures are ingesting more plastic materials when congregation sites are surrounded by more developed landcover and a greater density of commercial food providers, such as food stores and restaurants, within 20km. Fourier transform infrared (FTIR) spectroscopy of a subset of pellets indicated that the most common types of plastic ingested by vultures were silicone rubber (used in tires and automobile/boat seals) and polyethylene (used in plastic bags and food packages). Future research should investigate the relative importance of plastic sources in vulture diets, vulture behavioral changes associated with plastic ingestion, and the consequences of plastic pollution on species health and urban ecosystem functioning.

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