

MORNING AND EVENING ROOSTS OF TURKEY VULTURES AT MALHEUR REFUGE, OREGON

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The tendency of Turkey Vultures (*Cathartes aura*) to perch at some particular site other than the overnight roost, both in morning and evening, appears to be predictable and universal within the species. As with many components of Turkey Vulture behavior, very similar behavior is shown by the California Condor (*Gymnogyps californianus*; Koford 1953) and the Andean Condor (*Vultur gryphus*; McGahan 1972). At a large roost in southeastern Oregon, I observed the arrival and departure times of Turkey Vultures, and their movements to and from different perching sites.

STUDY AREA AND METHODS

The roost was located at the southern end of Malheur National Wildlife Refuge, Harney County, Oregon. The vultures roosted primarily in a row of cottonwoods (*Populus* sp.) at P Ranch Station. Before and after roosting, many perched about 100 m NW of the trees on a metal observation tower approximately 30 m high (Figure 1). North of P Ranch were the irrigated meadows of the Blitzen River Valley. Further north lay Malheur Lake, a vast marsh fluctuating from 200 to 20,000 ha and rich in avian and mammalian fauna. About 3 km SE of the roost were the lower slopes of Steens Mountain, characterized by Western Juniper (*Juniperus occidentalis*) and Quaking Aspen (*Populus tremuloides*). The general region was characterized by Great Basin sagebush (*Artemisia* sp.)—Greasewood (*Sarcobatus vermiculatus*) association.

I observed vultures for 330 hours during late spring and mid-summer 1973. I watched the birds from the time of their arrival until the cessation of activity in the evening, and in the morning from twilight until their departure. Every 15 minutes I recorded time, temperature, wind and precipitation.

Five Turkey Vultures were captured in a trap, such as that used by Coles (1938), baited with carrion, primarily carp (*Cyprinus carpio*). A captive vulture was left in the trap as a decoy. I marked each bird with a 3 cm × 18 cm colored leg-streamer of plasticized fabric (Safety Flag Company of America, Pawtucket, Rhode Island), riveted to a USFWS size 7b band.

RESULTS AND DISCUSSION

The number of Turkey Vultures roosting at P Ranch each night averaged 104 (68-151; $n = 28$). Although Nauman (1965) concluded that individual Turkey Vultures have specific preferred perching sites, marked vultures in this study showed no such preference. Further, data from sightings of marked birds suggest that at least some individual birds did not spend every night at the roost. For each of the four marked vultures that used the roost, I calculated the ratio of the number of days sighted to the total number of observation days. The mean percentage of the frequency of roost usage for the four vultures was 68% (58%-79%). Koford (1953) found that California Condors often did not roost at the same place each night, and that they were likely to roost near a carcass until the carcass was consumed.

The time at which vultures began arriving at the roosting area varied. In late spring, vultures might not arrive until 1.5 hours before sunset, while in early and mid-summer there were vultures on the tower by 2.5 hours before sunset. Arrival times also varied from day to day. When a storm front approached, the birds returned to the roost earlier than when the weather was clear and calm. In strong wind the birds formed a "wind-flock," all oriented at the same angle to the wind, their bodies parallel to one another. The flock glided laterally without making headway, so that it appeared to be "hanging" over the roost. Koford (1953) observed the same behavior in California Condors. On 12 June, when skies were completely overcast and the wind was strong and gusting, I saw a wind-flock near the roost about 6 hours before sunset. On the same day, 2.5 hours before sunset, 34 birds were at P Ranch.

Although many Turkey Vultures perched on the tower, the main roost at night was the trees. Nauman (1965) observed Turkey Vultures near Columbus, Ohio, coming into a roosting area and perching as early as 3 to 4 hours before sunset then moving to their final roost approximately 45 minutes before sunset. Koford (1953) found that California Condors first roosted high on a cliff or in trees high on the side of a mountain, and later, shortly before or after sunset, moved to lower elevations.

There are likely several advantages in this pre-roosting behavior. In Coles' (1938) study, Turkey Vultures pre-roosted in what he called "sunning trees." These were dead trees without foliage or shade, which allowed the vultures to arrive and depart with ease. He noted that after long periods of "preening, resting and wing-spreading," the birds moved from these trees to their final roost. At P Ranch, the tower played the same role as Coles' sunning trees. The tower, constructed of widely spaced bars and located in an open meadow, allowed unobstructed landing and departure. As with sunning trees,

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the tower was not shaded and thus provided good conditions for carrying out the preening, sunning and stretching activities characteristic of Turkey Vultures. The steel tower also provided stable perches for the sometimes vigorous movements required in

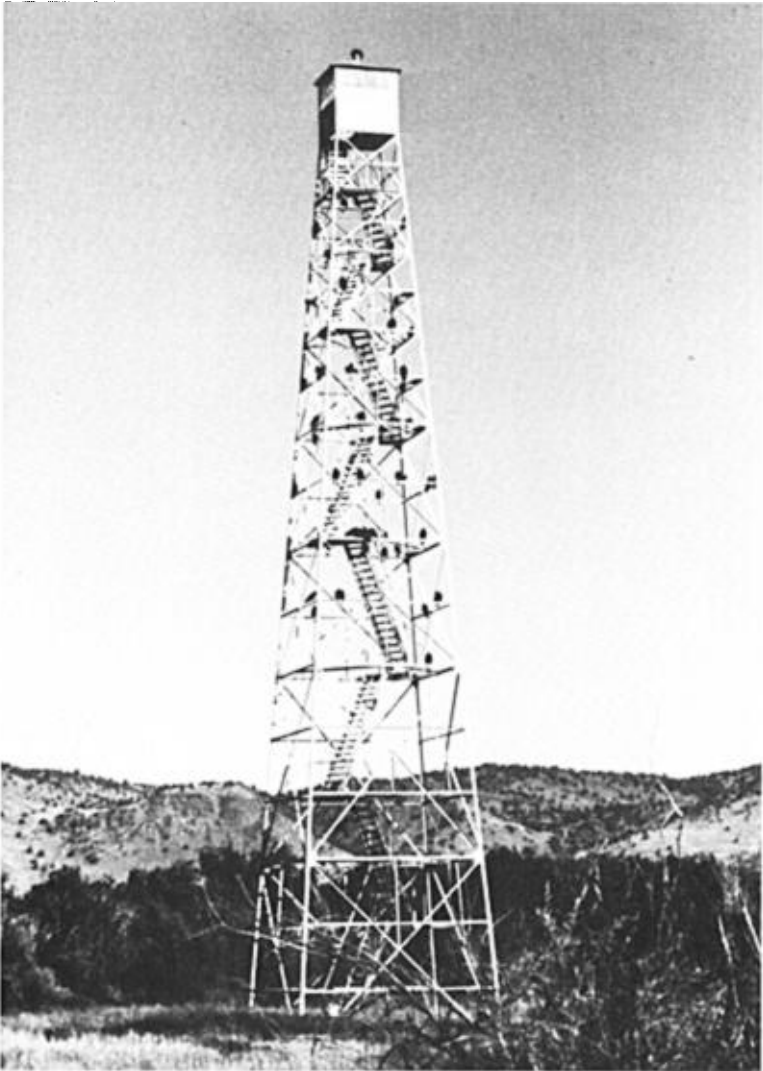


Figure 1. Tower at P Ranch, Malheur NWR, Harney County, Oregon, used by Turkey Vultures as a pre- and post-roost.

preening. Finally, the pre-roost served as a site for what were often intense agonistic encounters.

After sunset, the nature of activity at the pre-roost began to change. Preening ceased and many vultures flew, hopped or walked to new perching sites. Some movements were a result of agonistic encounters, while others appeared to be spontaneous. During this period of increased movement, many vultures left the tower for the trees. Those that stayed on the tower generally moved to the upper-most levels. By 45 minutes after sunset there was little or no visible movement on the tower. Those vultures that flew directly to the trees rather than the tower demonstrated a period of preening and agonistic encounters similar to that seen on the tower, with all visible activity ceasing shortly before darkness.

In the morning, many vultures returned from the trees to the tower, in this case using the tower as a post-roost. On 23 of 34 mornings (68%), over half of the birds to use the post-roost that day were at the tower by 15 minutes after sunrise. On the remaining 32% of the mornings, the vultures flew to the tower gradually, either singly or in small groups, the number on the tower reaching a peak shortly before the birds began to depart the roosting area. For each of the mornings when the birds were not disturbed at the roost, I used the peak number of birds on the tower just before departure as an estimate of the number of vultures using the tower that morning. Of those 35 mornings when the birds were not disturbed, the mean number of vultures post-roosting on the tower was 59. Thus, each day roughly half of the vultures roosting in the trees used the tower as a post-roost. Observation of marked vultures indicated that individual vultures did not use the pre-roost and post-roost every day. I assume that most vultures used the tower at least occasionally. Coles (1938) described Turkey Vultures in Ohio flying after sunrise to favorite sunning areas where they remained until soaring conditions developed. Koford (1953) reported that California Condors usually changed their perching sites at least once before departing in the morning. In McGahan's (1972) study, Andean Condors flew from shaded roosting ledges to sunny perches before they began foraging. These descriptions of cathartine behavior, together with my observations, indicate that preening, stretching and sunning are the primary activities of post-roosting vultures, and that the outstanding requirement of a post-roost is sunshine.

The vultures' departure time from the roosting area was taken to be that time (in minutes after sunrise) when the number of vultures on the tower had decreased to one half the peak number of vultures on the tower that morning. On over half (55%) of the mornings the vultures departed the roosting area between 3 and 4 hours after sunrise. When a breeze was blowing, the mean departure time (146

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minutes after sunrise) was significantly lower than the mean departure time when there was no breeze (191 minutes after sunrise; group comparison t-test, $p < 0.05$). On 3 mornings in April there were periods of rain, snow and persistent wind. Then, with skies generally overcast and temperatures below freezing, the vultures left earlier than in the summer. If rain or snow was falling, some vultures would not leave the roost all day. Generally, soaring conditions are poor during periods of rain (Pennycuick 1972). The Turkey Vulture is capable of surviving several days without food (Hatch 1970), probably as an adaptation to an opportunistic feeding niche. Thus, if flight conditions are poor, a vulture should be able to remain at the roost for 1 or 2 days or more, until flight conditions improve.

Presumably Turkey Vultures left the roost when there were sufficient thermals for soaring. But social facilitation apparently affected departure time. The first birds to depart usually flew directly off without circling. However, when one or more vultures began circling nearby after flying from the roost, other vultures often took off and joined the circle. Several birds in succession would then leave the roost or post-roost. This was likely a response to a visual cue, which is substantiated by the presence of vultures in the trees that would not join a circle formed by birds from the tower, presumably because the tree vultures did not see the circling behavior. When a bird circled in front of the trees, out of sight of birds on the tower, only vultures in the trees joined the flight.

SUMMARY

During spring and summer of 1973, I observed movements of roosting Turkey Vultures at a large roost in southeastern Oregon. About 100 vultures perched in a row of cottonwood trees each night, and used a tall observation tower as a pre- and post-roost. Daily variation in arrival times was related to fluctuations in weather. After sunset, most vultures on the tower flew to the trees to spend the night; about half of the roosting vultures returned to the tower after sunrise the following morning. The tower provided a sunny site for preening, sunning and agonism. The requirement for such sites is shared by other cathartine vultures, most notably condors. On over half of the mornings the Turkey Vultures left the roosting area between 3 and 4 hours after sunrise. The time of departure was most influenced by wind and perhaps social facilitation. The widespread occurrence of social roosting and the associated pre- and post-roosting phenomena among cathartine vultures suggests that these behaviors are a vital component of these species' survival strategies.

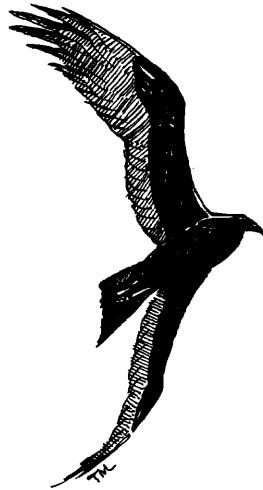
ACKNOWLEDGMENTS

I wish to thank the following persons: Charles H. Trost of Idaho State University, who was my advisor on this project and who reviewed the manuscript, John O. Sullivan, who suggested the topic of research and who helped design the study, and my parents, Frederic and Jean Managhan Davis, for their continued support. I am also grateful to Carl B. Koford and Sartor O. Williams, III, for their comments on an earlier draft.

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Accepted 18 October 1979



Sketch by Tim Manolis