

## USE OF SNOW AS A WATER SOURCE BY GOLDEN EAGLES IN THE GREAT BASIN

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**Abstract.**—Golden Eagles (*Aquila chrysaetos*) were observed ingesting snow from large snowbanks near or above treeline in four high mountain ranges in Nevada during summer. Birds typically faced downslope, apparently to facilitate quick flight to escape danger. Persistent snow may be an important source of water for this species in arid regions if surface water is lacking.

### UTILIZACIÓN DE LA NIEVE COMO FUENTE DE AGUA POR PARTE DE *AGUILA CHRYSAETOS*

**Síntesis.**—Se observaron, durante el verano, a individuos de *Aguila chrysaetos* ingerir nieve de grandes bancos de ésta, en la región montañosa de Nevada. Las aves siempre se colocaron mirando hacia abajo, aparentemente para facilitar un vuelo rápido en caso de algún peligro. La nieve que persiste durante todo el año en lugares altos, como el indicado, puede ser una importante fuente de agua para esta especie cuando habita en lugares áridos.

There are few published observations of large raptors drinking in the wild, and available data suggest that drinking is unnecessary under most conditions because the water obtained in their food is usually sufficient to offset water loss (Bartholomew and Cade 1963, Brown and Amadon 1968, Duke et al. 1987). Recently, however, Charlet and Rust (1991) reported that Golden Eagles (*Aquila chrysaetos*) may drink more often than previously thought and suggested that presence of water sources may be an important habitat requirement for this species in arid regions such as the Great Basin. They found that Golden Eagles often used, and even congregated at, bogs containing springs and shallow pools located in subalpine forests in two of the higher mountain ranges in this region. No mention was made of the use of snow as a water source, nor could I find reference to it for this or other raptor species in the literature.

In the summers of 1974-1979, while engaged in studies of alpine plants and passerine birds in the Great Basin mountain ranges, I observed Golden Eagles ingesting snow from large snowbanks located near or above treeline in four of these ranges. The first observation was on 7 Jul. 1974 when I saw a bird in immature plumage make a skidding landing on a large snowbank at about 3300 m elevation on the northeast slope of South Schell Peak in the Schell Creek Range in eastcentral Nevada. Over the next 3 min, while facing downslope on the steep snow surface, it bent forward to obtain snow 14 times. On the first such occasion it lost its balance and turned a complete forward somersault while flailing its wings, before regaining its footing. Subsequent attempts were successful, though it continued to face downslope and to slip on the slick surface. Subsequently it flew off downslope.

On 1 Aug. 1974 I saw an adult land on a snowbank at 3150 m on the east slope of McAfee Peak in the Independence Mountains in northeastern

Nevada, but it quickly took flight, apparently upon noticing my presence nearby. Four years later on 5 Jul. about 3 km south in the same mountain range I observed two immatures and one adult ingesting snow on a large drift on an open slope just below treeline at 2900 m at the head of Pratt Creek. Other observations include an adult feeding on a large snowbank at 3300 m at the head of Big Sawmill Creek in the Toiyabe Range in central Nevada on 14 Jul. 1976, and another on a snowbank at 3300 m on the east slope of Currant Peak in the White Pine Range in eastcentral Nevada on 5 Sep. 1979. On all occasions the birds faced downslope and on all but the one brief encounter on McAfee Peak I observed them ingesting snow. The only individual to have difficulties with footing was the one on South Schell Peak described above. This bird was attempting to feed on the steepest snowbank (about 45° angle) and, given its immature plumage, was probably inexperienced.

Charlet and Rust (1991) noted that bogs used for drinking (and in some cases also for bathing) usually shared two important characteristics besides the presence of water, whereas similar bogs lacking these traits showed no evidence of eagle use. These characteristics were the presence of cover on three sides provided by cliffs or forest at least 10 m away from the water, which presumably decreased the chance of long distance detection of the eagles by ground predators, and a narrow opening through the cover downslope from the water, with a drop of at least 30 m per 200 m (8.5°), providing a ready escape route for the birds to take flight.

The snow feeding sites noted in this paper differed appreciably in that they had no cover whatsoever, yet several factors probably made them equally safe for the eagles. In all five locations the slope greatly exceeded the minimum at the bogs and in all cases the direction of escape was not restricted to a narrow corridor, but usually approached 180°. Under these circumstances flight could be attained quickly and the direction adjusted to maximize likelihood of escape. It may also be significant that all birds faced downslope as if ready for instant takeoff. This idea is reinforced by the fact that the bird on the steepest snowbank persisted in this downslope orientation in spite of the problems it presented.

As snow remains in protected sites in most of the higher ranges throughout the summer, it may provide an important source of water for this species, especially in areas where there is no surface water.

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