TABLE 1. Rough-legged Hawk prey items from the Seward Peninsula, Alaska.

	1971		1972	
MAMMALS				
Microtus oeconomus	65		34	
Microtus miurus	43		17	
Dicrostonyx groenlandicus	16		7	
Lemmus trimucronatus	12		7	
Clethrionomys rutilus	8		2	
Microtus sp.	6		2	
TOTAL MICROTINES		150		69
Citellus parryi	9		5	
Lepus sp.	2			
Mustela rixosa	1			
Mustela erminea	1		1	
TOTAL		13		6
BIRDS				
Lagopus sp.	12		2	
Pluvialis dominica	2			
Turdus migratorius	1			
Moticilla flava	1			
Anthus spinoletta	1			
Passerella iliaca	1			
Unidentified passerines	11		32	
TOTAL BIRDS		29		34
TOTAL PREY		192		111

that bones do not occur regularly in buteo pellets. Mammalian prey were easily identified, however, from teeth, which were common in the pellets. Enamel patterns on the occlusal surfaces of microtine teeth are species-specific (Bee and Hall 1956) and identification of microtine species from teeth is routine. Error, which might be introduced by recording either one or two items after finding complementary jaw halves in two pellets, was reduced because of size differences between individual prey.

Pellets that contained avian remains were easily recognizable from the feathers found within. Although these feathers did not survive digestion well enough to distinguish species (except in the case of white ptarmigan feathers) they could be used to indicate the relative size of the prey. Because of this loss of feather integrity, the total number of birds identified from pellets may be less than the actual number of individual bird remains contained in the pellets.

Table 1 lists the numbers of birds and mammals of each species identified. Although microtine rodents comprised the largest group of prey, 78% in 1971 and 62% in 1972, ptarmigan (*Lagopus sp.*) and small birds were also of major importance. Together, these two groups represent 17% of the total food items in 1971 and 33% in 1972. Arctic Ground Squirrels (*Citellus parryi*) contributed 5% to the total each year and were the only mammalian species besides microtines that should be considered important in the Rough-legged Hawk's diet.

The number of each microtine in the sample probably represents the relative abundance of these animals within the hunting territories of the hawks, rather than specific dietary preferences. The greater number of birds identified in 1972 may suggest generally low numbers of microtines on the peninsula during that summer.

Most remains of small birds were of fledglings; however, all but one ptarmigan were adults. A 3–4-day-old passerine nestling was found in one nest. Because very young birds have incompletely ossified bones and because they do not yet have contour feathers, their remains could easily be missed in a food habits study. This age class of birds, therefore, may also contribute significantly to the Rough-legged Hawk's summer diet and the total avian contribution to this diet may be even larger than reported.

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DUCK NEST PREDATION BY GULLS IN RELATION TO WATER DEPTH

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At Farmington Bay Waterfowl Management Area, Farmington, Utah, two adjacent marshes received different degrees of nest predation by the California Gull (*Larus californicus*). Predation by the California Gull on waterfowl eggs has been noted by Greenhalgh (1952), Odin (1957), and Behle (1958) and the pattern is similar to that of several other larids (Vermeer 1968, Bourget 1973).

Marsh A, 52.6 ha, was bordered on the south and east by a gravel dike and on the north and west by the Great Salt Lake. Water depth in this marsh averaged 15 cm during May and June 1973, with maximum depths of 35 cm encountered during periods of flooding. Marsh B, 20.2 ha, was located within the

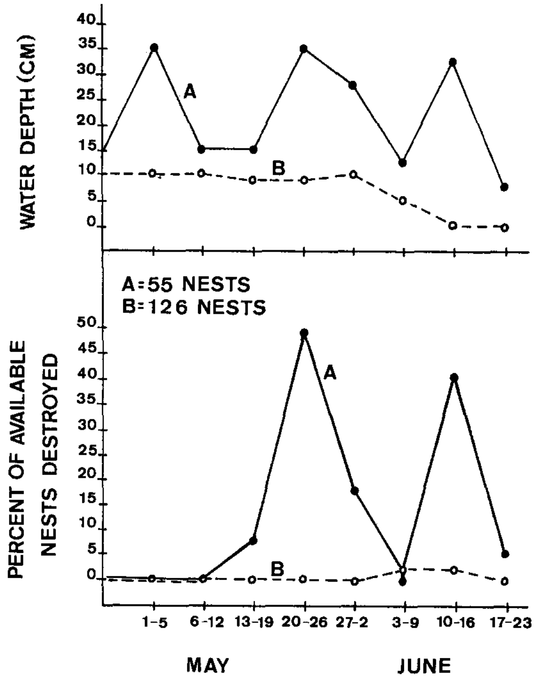

FIGURE 1. Weekly changes in marsh depths and associated predation on duck nests by California Gulls.

diked Turpin Unit and had a mean water depth of 10 cm. This marsh was isolated from marsh A on the north by the gravel dike that prevented flood waters from inundating marsh B. A shallow unit lake bordered the western edge of marsh B but caused minimal flooding. Water levels on marsh B rarely fluctuated more than 5 cm even during severe storms.

During May and June 1973, relatively heavy concentrations of gulls were seen feeding on marsh A, while generally ignoring marsh B. During the same period, marsh A was inundated by water from the Great Salt Lake (fig. 1). Flooding occurred during the week of 1–5 May and increased the water depth on marsh A to 35 cm, whereas marsh B remained unaffected by the flooding. This first flooding had little effect on nest predation since few ducks were nesting on either area at that time. A second storm occurred during the week of 20–26 May and again increased the water depth on marsh A to approximately 35 cm. By this time, 63% of the total duck nests on marsh A and 46% of the nests on marsh B had already been started. Gull predation, which had been low before 24 May (only on one nest), increased substantially over a 2-day period on marsh A but none occurred on marsh B.

Four species of ducks (Mallard, *Anas platyhrynchos*; Cinnamon Teal, *Anas cyanoptera*; Redhead, *Aythya americana*; and Ruddy Duck, *Oxyura jamaicensis*) had begun a total of 55 nests on marsh A prior to 22 June 1973, of which 95% were considered as "over-water nests" as defined by McKnight (1974). Of these, 37 (67%) were destroyed by California Gulls as judged on the basis of evidence suggested by Rearden (1951). An additional six nests (11%) were destroyed by mammalian predators, probably the striped skunk (*Mephitis mephitis*). Seven (13%) other nests were flooded and subsequently abandoned but were not preyed upon. Of the 37 nests destroyed by gulls, 35 (95%) were preyed upon during periods of high water. On marsh B, 75% of 126 nests were considered as "over-water nests," with only four (4%) destroyed during the same period. Of the four, only one had been flooded prior to predation.

Nests on both marshes were examined during flooding and again after flood waters receded. It was difficult to ascertain if nest predation occurred before or after nest abandonment, since ducks commonly were seen loafing near abandoned nest sites both before and after predation had occurred. Unattended nests were more susceptible to predation than attended ones, a circumstance also noted by Dwernychuk and Boag (1972).

California Gulls evidently reacted to the flooding by modifying their routine feeding behavior (feeding at a refuse dump located on the eastern edge of the refuge) so as to exploit the available food supply. The increased loss of nests on marsh A compared to the lack of predation on marsh B suggests that the gulls were responding visually to the flooding, perhaps because of the marsh's increased water depth which resulted in the exposure and eventual abandonment of most nests, or to the resulting increase in water surface area. The behavior of hen ducks displaced from flooded nests may have also instigated some nest predation (Hammond and Forward 1956).

Prior to the establishment of gull control measures in 1962, Farmington Bay W.M.A. supported a breeding population of approximately 23,000 California Gulls. During 1962–66, measures were enacted to displace the gulls and discourage them from nesting on the refuge (Dietz 1967). Gull predation had been listed as moderate to heavy by Odin (1957), who concluded that the increased number of gulls constituted a serious threat to the production of those species that nested near the gull colony. Nest predation decreased appreciably from 1964 in which 28% of 1280 eggs were destroyed as compared to 2% of 1037 eggs in 1966 (Dietz 1967).

The relative stability of marsh B with the resulting lack of avian predation as compared to the heavy predation occurring on marsh A suggests the desirability of constructing a dike system that would prevent future flooding from the Great Salt Lake.

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EXTERNAL DIFFERENCES BETWEEN NEWLY HATCHED CUCKOOS (*COCCYZUS AMERICANUS* AND *C. ERYTHROPTHALMUS*)

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Yellow-billed Cuckoos (*Coccyzus americanus*) and Black-billed Cuckoos (*C. erythropthalmus*), although nonparasitic, do from time to time lay their eggs in the nests of each other and of various passerines (Bent, U.S. Natl. Mus. Bull., No. 176, 1940; Todd, Birds of Western Pennsylvania, Univ. Pittsburgh Press, 1940; many others). In view of the widespread occurrence of obligate brood parasitism in cuckoos, the occasional anomalous egg-laying behavior of these two cuckoos merits investigation. One prerequisite of such an investigation is the ability to distinguish between nestlings of the species, but the literature is almost silent on that subject. Long ago, Herrick (J. Exp. Zool. 9:198, 1910) published a description of the newly hatched Black-billed Cuckoo and also made cursory reference (p. 207) to an oral, and accurate, report he had received about the neonatal plumage of the Yellow-billed Cuckoo. Herrick's descriptions do not appear in standard works of reference and for practical purposes seem to have become lost.

This paper describes characters by which nestling Yellow-billed and Black-billed Cuckoos can be distinguished. It is based on a small collection that I made at Bloomington, Indiana, before I discovered Herrick's paper. The nests from which I took the birds presented no anomalies. The eggs in each were substantially uniform, and their shapes, colors, and sizes were typical for the species of the adults that were incubating (Bent, U.S. Natl. Mus. Bull., No. 176:57, 73–74, 1940). When the eggs hatched, the nestlings within each clutch looked alike. I have examined many eggs and young of both cuckoos in the field and think it safe to attribute my specimens to the species of the adults associated with them.

Young Black-billed Cuckoos have snow-white, hair-like, sheathed down feathers on the dorsal surface and thighs. This white down contrasts strongly with the blackish skin and readily distinguishes Black-billed from Yellow-billed Cuckoos, whose sheathed down is dusky gray, so similar to the color of the skin that it might pass unnoticed. Most of Herrick's description of other aspects of the plumage of young Black-billed Cuckoos is confirmed by my specimens and will not be repeated, but I would modify or supplement his statements as follows: Ventrally, birds about 12 hr old bear no down on the cervical region and the regions anterior to it. There is a little whitish down on the posterior segment of the abdominal region, but the down on the remainder of the ventral tract is gray rather than white and is somewhat shorter than 3 mm. Dorsally, the capital tract bears down only on the coronal, superciliary, and occipital regions. Turning to the Yellow-billed Cuckoo, the down is distributed about as on its congener, but my specimens have less of it on the ventral tract and hand.

As for other interspecific differences, the frontal apterium of my Yellow-billed Cuckoo nestlings is of a paler color than either the bill or the surrounding skin and down and therefore stands out as a light gray spot. In the Black-billed Cuckoo that apterium is as dark as the bill, and its color shades imperceptibly into the color of the skin. The complex patterns of the creamy white structures on the palate and tongue are alike in both species, and I detect no interspecific differences in their shapes or sizes. The preserved birds reveal no difference in the color of the spots; the background color is somewhat variable, but not as between species. In the field I have noted no differences in mouth colors but have not compared live nestlings side by side. Herrick's figure (p. 201) does not adequately depict the markings in the mouths of any nestlings that I have examined. The spots are not round disks, as he showed all except those deep in the throat to be; rather they are somewhat asymmetrical, as suggested by the picture of the right-hand bird in Allen's photograph in Bent (1940: pl. 10).

I thank Richard L. Zusi for calling my attention to Herrick's paper. This is contribution no. 955 from the Department of Zoology, Indiana University.

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