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EXPERIMENTAL TREE TRIMMING TO CONTROL AN URBAN WINTER BLACKBIRD ROOST

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Every fall millions of blackbirds come down the Mississippi Flyway to return to their winter roosts in Arkansas, Louisiana, and East Texas. When these roosts are located in urban areas, public pressure makes the more common chemical means of control impractical. A less destructive and more permanent method of control was sought.

At Rice University, in Houston, Texas, there has been a blackbird roost of various sizes and durations since 1956. For the past two years we have had the opportunity both to study roosting blackbird biology and experiment with habitat alteration as a control method. This particular report concentrates on the results and interpretation of the tree-trimming program initiated in August 1974. The birds involved are primarily Brown-headed Cowbirds (*Molothrus* ater), along with Starlings (*sturnus vulgaris*), Common and Great-tailed Grackles (*Quiscalus quiscula* and *Cassidix mexicanus)*, Red-winged Blackbirds (*Agelaius phoenicus)* and Robins *(Turdus migratorius)*. The campus comprises 121 ha and was planted with live oaks (*Quercus virginiana)* in 1912. These trees retain their foliage throughout the winter and now form a closed canopy over some 5-6 ha.

In the 60s and early 70s most of the birds that came *to* Houston for the winter roosted in a 64-ha woodlot 10 km north of campus. In January 1970, the U.S. Fish and Wildlife Roosting Survey reported one million birds at this site we call the North Loop. Fifteen-thousand birds were estimated at Rice.

In 1972, much of the North Loop roost area was developed into apartments. This coincided with a dramatic increase in the number of birds and the duration of the roost on campus.

The first year roosting activity on campus was studied was 1973-74. The distribution of birds on campus is shown on Figure 1. The large shaded areas are buildings; the dark lines indicate the tree outline. Almost every available tree was utilized from the wooded section to the individual groves between the buildings. Observers watching the birds leave the roost on campus in the morning and arrive in the evening reported a consistent and predictable pattern of arrivals and departures. Furthermore, birds in individual groves or groups of groves appeared to act as a unit. This suggested the possibility of an organization or social structure within the roost.

Because of the nuisance of bird droppings on campus, especially on walkways, parking lots, and the president's house, the university asked us to develop a management program. The comment of George Abraham of the Fish and Wildlife Service (Baton Rouge, La.) that "Cowbirds just don't roost in properly pruned live oaks" led us to consider tree trimming as a management technique. As University records indicated that the trees had not been regularly trimmed since 1966, we selected a few to determine what effect trimming of trees in the campus roost would have on the roosting behavior of the birds.

Initially we chose five groves, labeled A, B, C, D and G in Figure 1. These were paired based on similarity of size, location, and past usage patterns. A was paired with D, C with B. One member of each pair was trimmed (A and C); the other, left alone (D and B). One-half of the fifth grove G was trimmed; the remainder was untouched. These groves occupy about 1 ha; this left about 4-5 ha of untrimmed trees in the wooded part of the campus for the main body of the roost.

The trimming consisted of removing one-third of the canopy, slightly more than would be done on a residential tree. This is what professional tree trimmers call a "heavy" trim. An untrimmed and trimmed tree are shown in Figures 2 and 3, respectively.

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To evaluate the response to trimming, a way was needed to estimate the bird population grove by grove. A modification of P. A. Stewart's (1973) technique of estimating roost population from weight of bird droppings was adopted. Droppings were collected on filter papers mounted on pizza boards elevated 15 cm above the ground. The papers were dried for 4 days at 60°C. Dropping weight was converted to net dropping density measurements of g/m^2. From these data, maps of dropping density distribution were constructed. Such maps are called isopach maps; these are normally used to measure thicknesses of geological formations. The volume contained within isopach lines gives an estimate of the total weight of droppings, and ultimately of the total bird population (Johnson and Good, MS). Data published by Stewart (1973) indicate that a male Cowbird deposits one gram of fecal material on a dry weight basis per night. Since the Rice roost is mainly composed of male Cowbirds, there is an approximate equivalence between number of grams dry fecal material and number of birds. Isopach maps not only can be used to estimate the number of birds roosting above the study area but also to document their distribution with the area.

As the birds arrived in Houston in late September, their build-up at the North Loop was followed with isopach maps, as shown in Figure 4. The birds arrived and settled first in the "front section." Dropping weight in this section gradually built up from 25 kg to 177 kg on 13 November, with dropping-density concentrations as high as 47 g/m^2 being measured. By 9 December this focal point shifted; and birds occupied a "back" section as well, with 240 kg in front, 37 kg in back. On 18 December the front part had been abandoned; and the back had 352 kg, with a maximum density of 80 g/m^2. On the 31 December, the entire roost was abandoned, and birds began to roost on campus. This roost shift, showing the deposits per night as a function of time at the two roosts, is documented in Figure 5. Figure 6 shows the overall distribution of the birds that winter of 74-75. One million birds were at the roost. This is twice as many as the previous winter (Johnson and Good, MS).

The response to our trimming was clear-cut. Trimmed groves were not occupied, while the untrimmed pair-member was occupied as usual. The most interesting result came from grove G, which was half-trimmed. The birds avoided that grove altogether, occupying neither trimmed nor untrimmed areas. Combined groves A and L show a similar pattern. This suggested a response by large social groups and led us to speculate that only a certain proportion of roosting space in a grove needs to be eliminated for adequate control. This idea was incorporated into our management program for the following year.

In the summer of 1975, grove A was allowed to regrow. Its pair D, that had not been trimmed, was partially trimmed. Grove D consists of three rows of trees; and the row overhanging a parking lot, which happened to Include some trees that were *very* heavily occupied the previous winter, was trimmed. Grove C was retrimmed and its pair B trimmed. Grove G that was half-trimmed the previous summer was partially retrimmed but with very little removal in the canopy. To determine which canopy branches were essential to roosting, only the sucker growth was removed in previously untouched grove K. The wooded part of campus remained essentially untrimmed. In the meantime the developers of the North Loop built a restaurant in an unoccupied section of the roost, and a parking lot on one side of the roost was expanded, eliminating a small portion of the front section (Figure 7). While only about 1/8 of the front section was paved over, it did include the favored roosting area or focus of activity.

In the fall of 1975 blackbirds were first noted in the city and its environs in mid-September. They did not come to the North Loop to roost. A small roost of 50 thousand did form 1 km west of this site in November, but this roost was abandoned within the month.

On campus, the response to our new trimming effort is summarized in Figure 8, where the occupation in mid-February at the peak population of about 1/2 million is shown. The trimmed trees remained unoccupied. Grove A, the one grove allowed to regrow, also remained unoccupied. All the groves around it were trimmed, perhaps the reason for its disuse. Grove G, partially regrown, was heavily used. Unlike the other grove that was allowed to regrow, this one is located near the untrimmed wooded portion of campus. The grove with only sucker growth removed was used. As before, the untrimmed trees in the woods were heavily occupied. The build-up of the population was followed with isopach maps. The observed pattern and distribution of the birds leads to some interesting speculation on their social structure.

Figure 9 shows the January build-up. On 9 January, 32 kg of droppings covered the campus in small discrete groups. The next night, the weight of droppings tripled, and some of the groups became larger, especially in the wooded portions. On 11 January, the weight of droppings was half-again as large, and the discrete groups began to run together. The heavily used areas or foci of activity tended to stay in the same areas and become more

concentrated. On 12 January a new section became occupied, although the total dropping deposits stayed the same. Many of the birds seem to have moved from the area that had received the greatest increase the previous night (36 kg, 41 kg, 34 kg on the 10th, 11th and 12th, respectively). It appeared that some type of crowding threshold had been reached. The birds spilled over into adjacent areas rather than attempting to crowd into the same space as the night before. This is similar to the pattern observed at the North Loop prior to its abandonment.

Figure 10 shows the distribution of the birds at their peak population of about 1/2 million in mid-February. The distribution is similar for all three nights: the foci of activity of January were still present in February with dropping densities of 60-90 g/m^2. A new focus of activity can be seen with densities reaching as high as 110 g/m^2. The birds occupying this area were observed to arrive and leave the roost as one distinct flock. The area first occupied on January 12 had become heavily populated with the focus close to the originally occupied site. In addition, the southeast section of the woods became occupied.

Figure 10 shows the dropping distribution after the birds began leaving in mid-March. Most of the foci still remain, but at a much lower density. The very heavy 100 g/m^2 spot disappeared, as if these birds came late and left early. Only the section last occupied still showed the February densities. Isopach maps available for the distribution of the birds in the previous winter show the foci of activity in approximately the same places in the wooded sections of campus.

The way the roost tends to build up around these first-occupied foci suggests that some group of birds selects the best roosting spot, and the others follow suit. This behavior has been observed before in mixed roosts (Gadgil, 1972 and Stewart, 1975). The foci appear to be permanent throughout the season and have a miximum or threshold level of occupation. Additional birds have to find other places to roost, as indicated by roost shifts and spillovers on both the North Loop and campus isopach maps.

When these foci were inadvertently eliminated at the North Loop or in trimmed-grove A, the birds chose to roost elsewhere. This suggests a social structure that determines the roosting place of birds within a roost (Johnson et al., MS. and Johnson et al., 1976). It should be possible to exploit such a structure to induce the birds *to* move the roost. For the 1976-77 roosting season, some trees will be trimmed and/or removed at some of these foci of activity to test this possibility.

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DISCUSSION

Lustlck: Have you tried to relate your observations to wind velocity or radiation loss from the birds to the sky?

Good: We tried to look at that; but most of our equipment was stolen, so I’m afraid we don’t have any results.

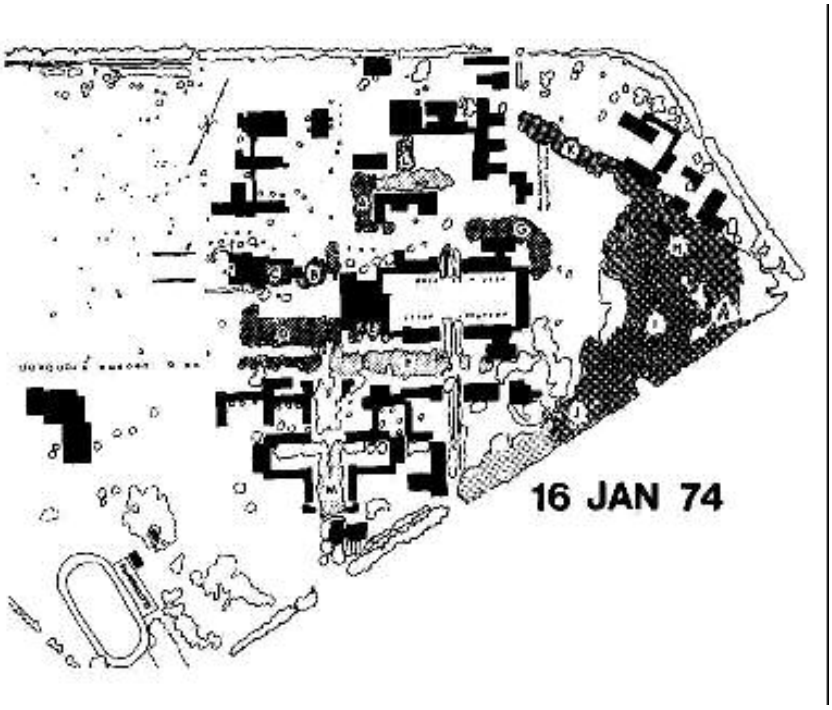

Figure 1 - Distribution of birds on Rice University Campus, January 1974. Heavy stippling indicates heavy roosting activity.

Figure 3 - A trimmed tree.

Figure 2 - An untrimmed tree.

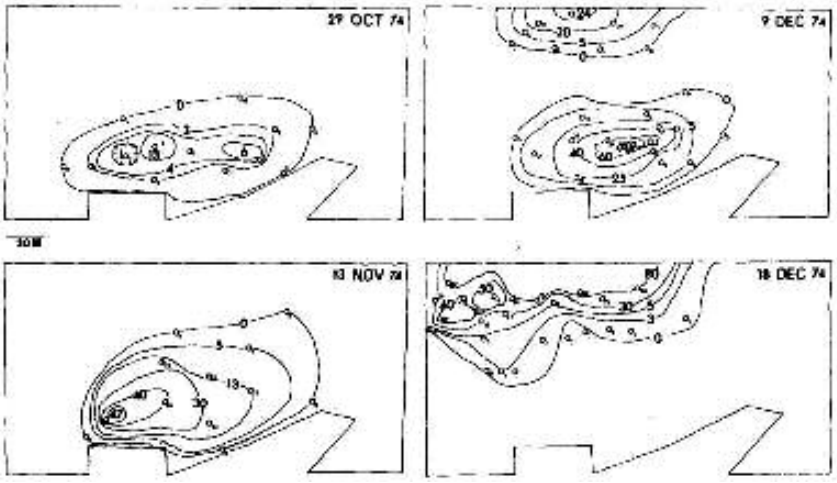

Figure 4 - Isopach maps of dropping densities (g/m^2) at North Loop Roost, showing roost build up and abandonment (see text).

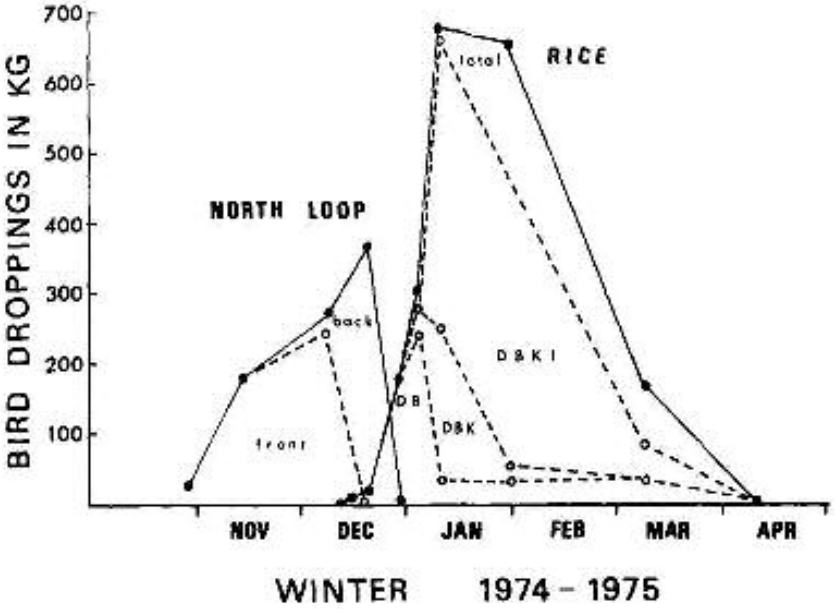

Figure 5 - Total droppings deposited nightly at the North Loop and Rice Roosts. Broken lines refer to depositions in discrete sections or groves within each roost. Solid line indicates total of each roost.

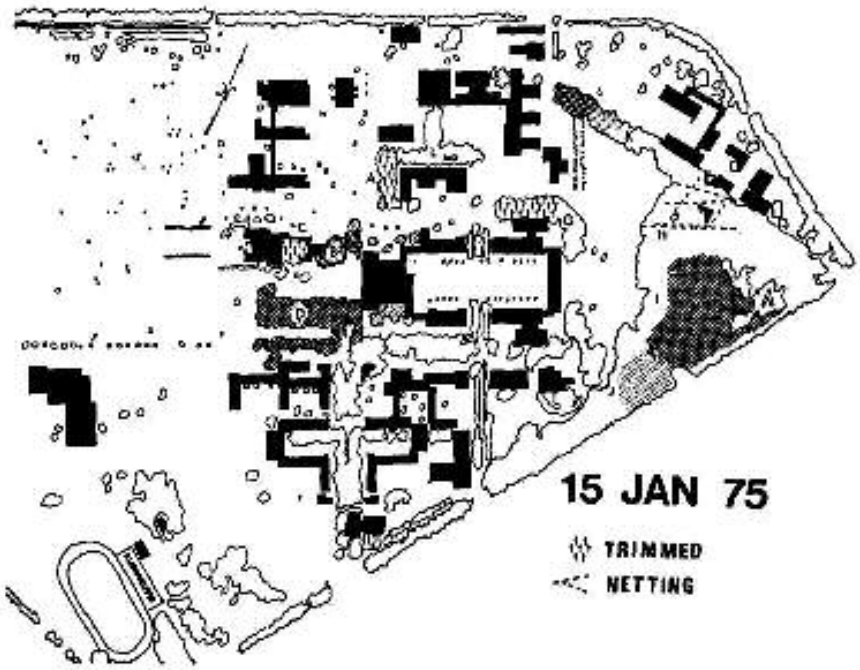

Figure 6 - Distribution of birds on Rice University campus at January, 1975 peak of ½ million. Another 1/2 million roosted just outside campus boundaries. Plastic netting was unsuccessfully installed over trees in area H. Heavy stippling indicates heavy roosting activity.

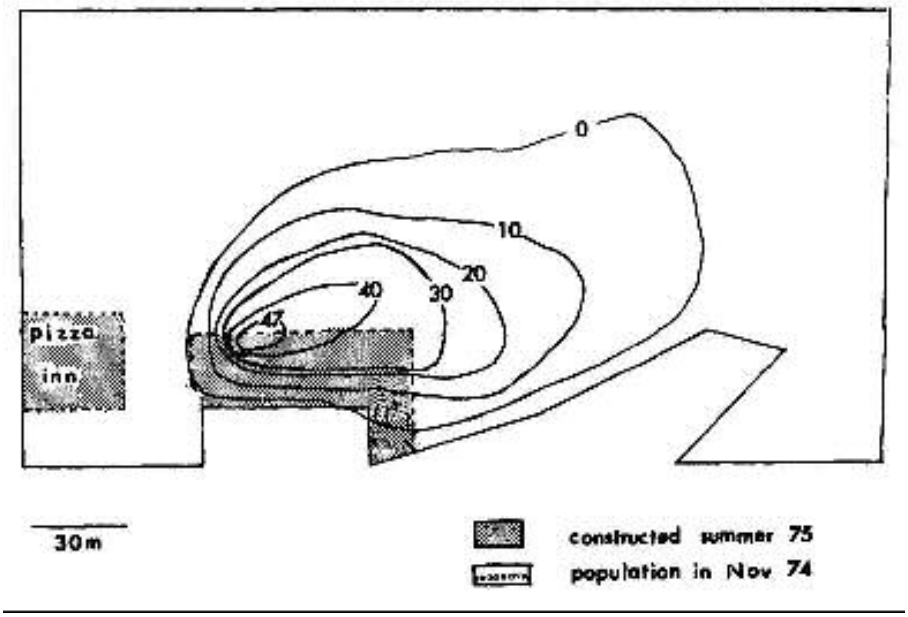

Figure 7 - Isopach map of bird-dropping density (g/m^2) at North Loop roost in November 1974, with new construction of summer 1975 super-imposed. Parking lot expansion eliminated 12% of available “front section” roosting space.

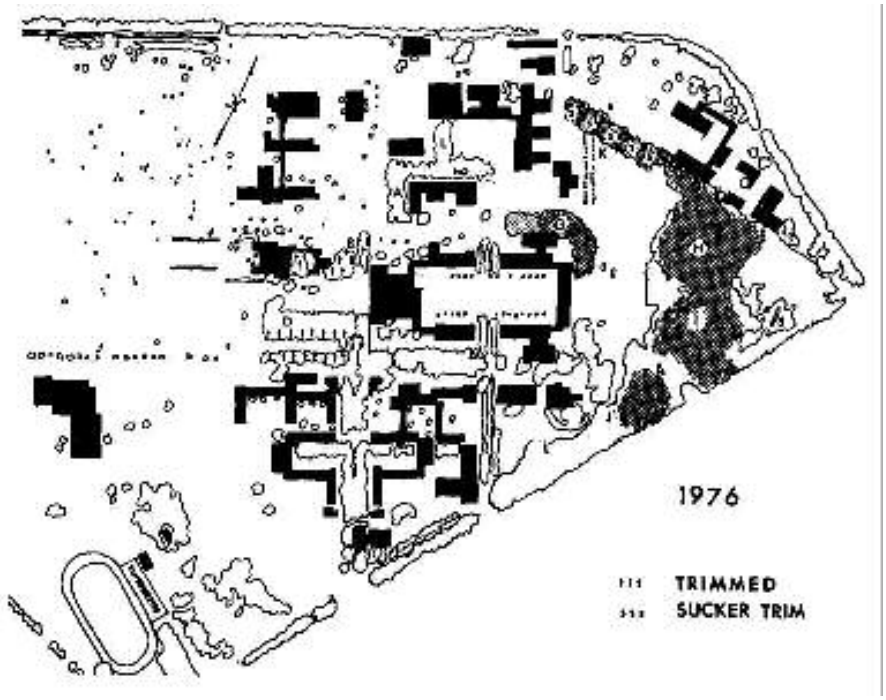

Figure 8 - Distribution of birds on Rice campus in mid-February, 1976 at peak population of 1/2 million.

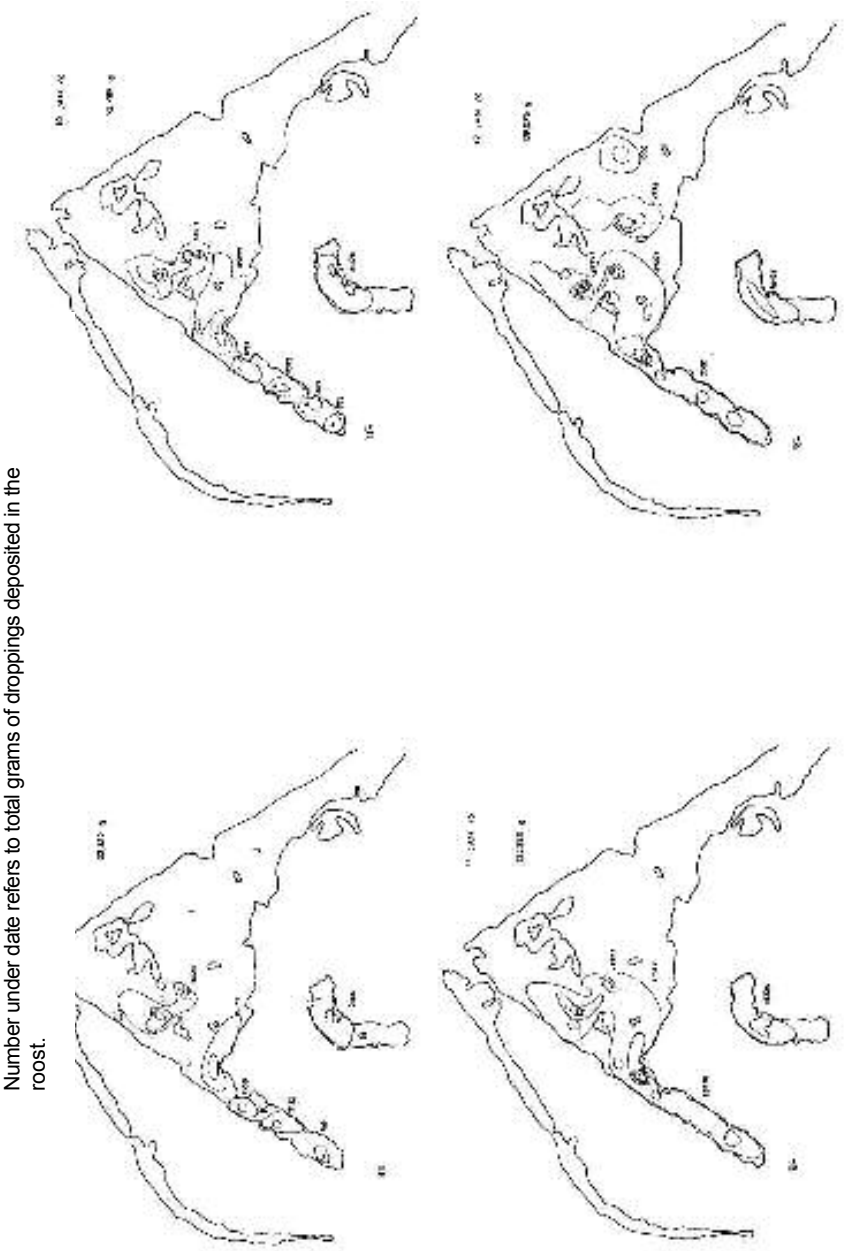

Figure 9 - Isopach maps of dropping densities (g/m^2) during roost build-up in January, 1976. Numbers next to groves indicate grams of droppings deposited within grove. Number under date refers to total grams of droppings deposited in the roost.

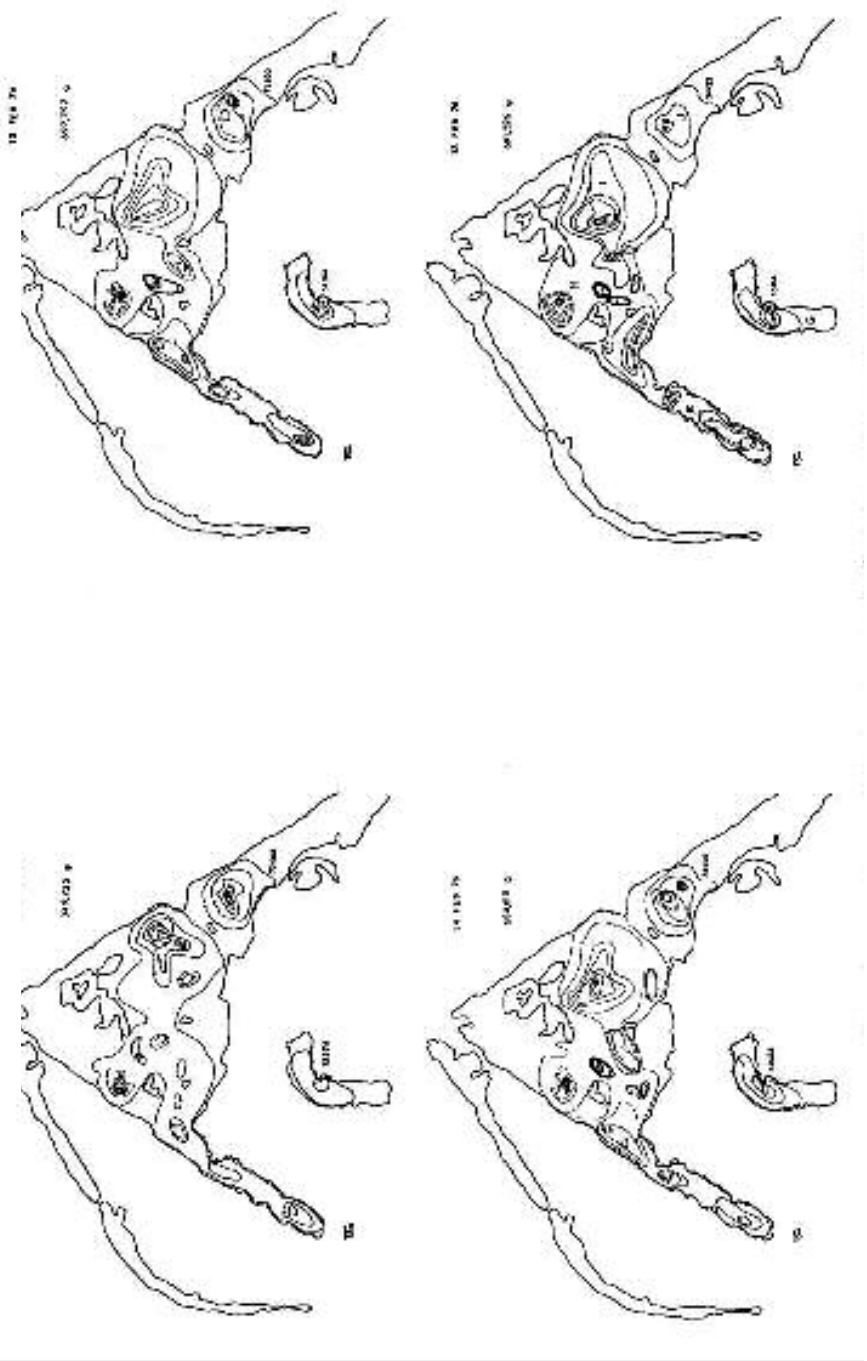

Figure 10 - Isopach maps of dropping densities (g/m^2) during maximum roost population in mid-February 1976 and during roost abandonment in mid-March 1976.