A New Method for Dealing with Apiary-Raiding Black Bears

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Abstract: Depredating black bears (*Ursus americanus*) were trapped and tagged at beeyards in an attempt to create aversion to those beeyards. Of the 9 bears trapped and released, only 1 bear was known to return to a beeyard during the study period. Electric fences were also shown to be effective for protecting beeyards from depredating bears. There was a 70% greater probability of bear damage among unfenced beeyards than among fenced beeyards. A combined, electric fence, trap-and-release program is described.

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Florida is the leading honey producing state in the nation (Sanford 1982), and much of the important bee pasture within the state coincides with good bear range. The resulting conflict between apiarists and black bears has been a difficult problem for the Florida Game and Fresh Water Fish Commission for many years. Beekeepers have suffered losses amounting to many thousands of dollars (Maehr and Brady 1982) and the concomitant illegal killing of bears is generally agreed to be great (Harlow 1961, McDaniel 1974). The Commission's legal protection of the bear and its inability to offer effective protection for the beekeeper's interests have generated an undesirable attitude among apiarists toward the Commission as well as toward the black bear.

Relocation of offending bears has been used occasionally in Florida. Although this method can halt the damage by a particular nuisance bear at a particular apiary, relocation is an expensive and possibly recurring activity (Payne 1975, Rutherglen and Herbison 1977). Also, inherent in the reloca-

tion approach is the problem of finding release sites where the bear can survive without becoming a nuisance to someone else. Furthermore, the removal of bears from currently identified bear range is contrary to the general objectives of the Florida Game and Fresh Water Fish Commission.

Several studies have reported attempts to create apiary avoidance behavior in black bears (Colvin 1975, Gilbert and Roy 1977, Gunson 1977). However, the results reported were inconclusive. Recently, experiments with handling nuisance black bears by Commission field personnel have suggested that it may be possible to stop repeated damage at a beeyard without lithium chloride, electroshock, or relocating the bear. The objective of this study was to test the effectiveness of trapping and handling as aversive conditioning for depredating black bears.

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Methods

This study was conducted in Liberty and Wakulla counties primarily within the Apalachicola National Forest from December 1980 through September 1981. The Apalachicola National Forest supports an abundant bear population and is highly esteemed for its bee pasture. Important nectar sources include gallberry (*Ilex glabra*), saw palmetto (*Serenoa repens*), and ogeechee gum (*Nyssa ogeechee*).

Local beekeepers were requested to report to Commission personnel any bear activity at apiaries. Upon notification of bear activity, Aldrich spring activated snares were set according to Johnson and Pelton (1980). Trapped bears were immobilized using ketamine hydrochloride as described by Hugie et al. (1976). Bears were measured, tagged, and released at the capture site. Subsequently, beeyard capture sites were inspected occasionally for any recurrence of bear damage.

Results and Discussion

During the period of December 1980 through June 1981, 24 beeyards within the study area were visited and damaged by bears 69 times. Seven fenced beeyards were visited 21 times, and 17 unfenced beeyards were visited 48 times. Snares were set at 19 of the damaged beeyards and 9 bears were captured (Table 1). At 5 other beeyards the beekeepers chose to move their hives to avoid further damage.

Although there were depredations as early as December (2), the great-

Table 1. Capture Data from the Nuisance Bear Capture and Release Program, Apalachicola National Forest 1980–81

Capture Date	Location	Sex	Weight (kg)	Age (years)
12– 8–80	Wood Lake	F	61.7	Tooth not collected
3–26–81	Gaskin WMA	M	65.3	2
5–20–81	Lanark Village	M	54.4	2
5–28–81	Rd. 314	M	136.0	4
6– 2–81	St. James	F	63.5	4
6– 5–81	314 middle yard	M	136+	5
6– 7–81	Rd. 345	M	15.0	<1
6–12–81	Hayes Place	F	59.9	2
6–23–81	Bloody Bluff	M	37.2	1

est incidence of depredations occurred during April (13), May (24), and June (28). No depredations were reported after 23 June. Statewide in Florida, beeyard depredations occur in all months, but the months of highest frequency of beeyard depredation are also April, May and June (Maehr and Brady 1982). In North Carolina, Lord and Ambrose (1981*a*) reported depredations in all months except January and July. The highest incidence of depredation there occurred in May and June.

It has been our experience with apiary depredations that bears usually return during consecutive nights to feed at the same beeyard. In this study, the mean number of consecutive nightly depredations of a beeyard was 2.9. However, in every instance, once the bear was trapped, the depredations ceased, and there was no recurrence of bear damage at that beeyard. Only 1 recapture of a nuisance bear occurred. This bear was snared at another beeyard 8 miles from and 9 days after its original capture.

It is apparent, therefore, that aversion to a particular beeyard can be instilled in black bears by trapping and handling them at the beeyard. This behavioral trait may have considerable significance for dealing with the bear-beekeeper conflict. The traditional approach was to trap and relocate nuisance bears. This was often undesirable because the removal of the bears from suitable habitat is generally contrary to the Commission's desire to maximize bear distribution. Hunters and other groups often object to the removal of bears while beekeepers and local residents often object to having bears released in their vicinity. Finally, relocation is expensive and time consuming. The practice of trapping and releasing at the same site does not have these disadvantages yet may provide an effective means of responding to apiarists who are experiencing bear damage.

Another positive aspect of this procedure is the opportunity it affords to gather useful information about bears in the project area. The tagging and

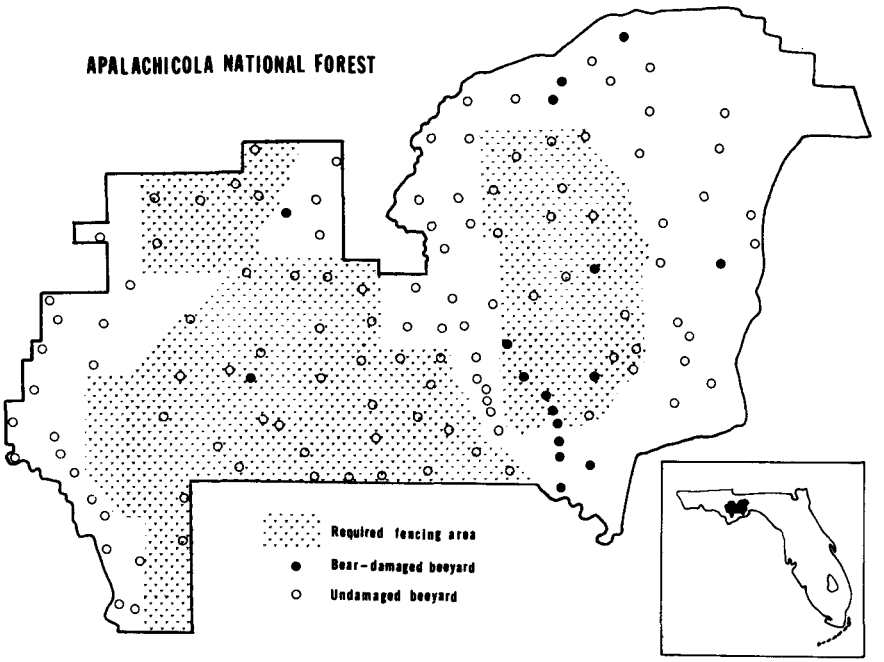

Figure 1. Locations of beeyards and required fencing areas in the Apalachicola National Forest.

release of live bears facilitates population estimates, delineation of some aspects of movement patterns, and analysis of age and mortality. This is particularly true where bear hunting is legal and kills are checked. The trapping program and hunting harvest provide a double opportunity to recover tagged bears. Furthermore, since the recovery of tagged bears by hunting is totally independent of the initial tagging process, the credibility of population estimates is greatly enhanced.

The duration of the aversion created by trapping and handling was not determined in the present study. However, it is recognized that aversion need not be permanent or even of particularly long duration to be effective. Most of the important nectar plants are productive only a few months or less each year causing beekeepers to periodically move their hives to new locations. Therefore, even a short-term aversion may be adequate to prevent depredations.

Beekeepers in certain designated areas of the Apalachicola National Forest (Fig. 1) are required to erect electric fences around their beeyards. In other areas, fences are not required. This situation provided an opportunity

to evaluate the effectiveness of electric fences for preventing damage by bears under Florida conditions. Of the estimated 131 beeyards in the Apalachicola National Forest, 61 are located within the required-fencing zone. In addition, it is estimated that another 10–15 beeyards outside the required-fencing zone are fenced voluntarily bringing the total of fenced beeyards in the National Forest to at least 71. Of the 17 beeyards within the National Forest which were damaged by bears, 7 (9.8% of the total fenced beeyards) were fenced and 10 (16.7% of the total unfenced beeyards) were unfenced. These data show a 70% greater probability of bear damage among unfenced beeyards than among fenced beeyards. Lord (1979) concluded that electric fences provide the best protection available with an 80–85% effectiveness.

Although the effectiveness of electric fencing was shown to be considerable, electric fencing may actually be more effective than our analysis indicated. Inherent in this study were biases which may have diminished the apparent effectiveness of electric fencing. One bias resulted from the distribution of fenced and unfenced beeyards. The required-fencing zones coincide with areas traditionally recognized as having higher bear population densities than the rest of the Forest. Therefore, bear depredation is more likely to occur where the most fenced beeyards are located. Another bias relates to the quality of electric fence construction and maintenance. Lord (1979) states that proper construction and maintenance are keys to effectiveness. Among fenced beeyards on our study area there was notable variation in the way fences were designed and maintained. Poorly designed or unmaintained fences appear to offer little protection from bears, yet, project personnel reported that during the course of the study bear depredations ceased whenever a properly designed electric fence was constructed. Had these biases been eliminated from the present experiment, the difference in the depredation rates between fenced and unfenced beeyards would probably have been much greater and thus a more accurate portrayal of the effectiveness of electric fencing for controlling bear depredation.

Recommendations

This study, substantiating earlier reports (Lord 1979, Lord and Ambrose 1981*b*), showed that electric fences can be effective at reducing depredation on beehives by black bears. Therefore, land managers, especially government agencies, that lease bee locations in bear range should require beekeeper lessees to construct electric fences. Also, because maintenance of an electric fence (keeping weeds off the wires and recharging the battery) is so important to insure effectiveness, beeyard leases should include a clause requiring regular maintenance for lease renewal. Many fence designs are readily available (Storer

et al. 1938, Robinson 1965, Nelson 1974, Thurber 1975, Maehr 1982) to meet the needs of most situations.

Some bears, however, are particularly persistent and resourceful and can penetrate an electric fence. In instances where bears penetrate well-constructed fences, a trap-and-release procedure should be implemented as a secondary approach on an experimental basis. The sample size in this study is small, and further evaluation of the trap-and-release procedure is needed. Success with the trap-and-release procedure is dependent upon cooperation by beekeepers. Therefore, liaison with beekeepers prior to project initiation will be required.

Inherent in this approach is that the primary responsibility for protecting the apiary is assigned to the beekeeper since he is required to construct and maintain electric fences. The trap-and-release procedure implemented by Commission personnel is an important adjunct which responds to the beekeeper's needs yet does not sacrifice the bear resource. Further, we feel that an improved attitude toward the Commission among local beekeepers has resulted from implementing this procedure. Therefore, we recommend that other land use and wildlife agencies consider this approach for dealing with apiary depredations elsewhere in the black bear's range.

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