Gunson

FISH AND WILDLIFE DIVISION

ALBERTA DEPARTMENT OF LANDS AND FORESTS

WILDLIFE INVESTIGATIONS

PROGRESS REPORT

ACTIVITY: Bear Management

SECTION: Fur and Problem Wildlife

JOB NO.:

TITLE: Evaluation of Black Bear Damage to Apiaries in the Peace River Area: 1973.

PERIOD COVERED: May to September, 1973

Abstract

Serious damage to apiaries by black bears continued during 1973. A damage survey and bear control program was established to provide comprehensive data on the extent and distribution of damage and to remove individual problem bears. Three hundred and thirty-seven damage complaints were investigated. Estimates of loss are 150,000 dollars for the May to August summer period and about 200,000 dollars for the entire season. Loss per bear attack during the summer months was 289 dollars. One hundred and eighty-two bears were removed by leg-snaring, culvert-trapping and shooting. In addition approximately 200 bears were removed by beekeepers. Only two of 20 experimental electric fences were penetrated by bears throughout the summer.

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PREFACE

In recent years property owners and farmers of all descriptions have experienced increasing depredations and serious livestock losses from large predators including cougar, bear, coyote and wolves. One of the most serious areas of conflict is the Peace River block in northwestern Alberta. During the summer months of 1973 a comprehensive program was conducted as part of a study of the continuing bear-bee conflict. In addition to bear control at beeyards, some nuisance bears were removed from public campgrounds and ranches. This report includes only the beeyard-related aspects of the work; the remaining control activities and results of other bear studies will be reported elsewhere.

Acknowledgements

The 1973 Peace River bear program was the result of the co-operation and work of a great many individuals and agencies. The writer wishes to thank the beekeepers of the Peace block for their co-operation. Special thanks are extended to the apicultural and field services of the Alberta Department of Agriculture, especially Dr. Jerry Awram and Mr. Gary Miller for assistance in providing background information and in helping to organize the program; and to the Municipal District of Smoky River, especially agriculture fieldman, John Guerin, for their participation. Don Caldwell, regional supervisor and Ken Lungle, wildlife biologist, Alberta Fish and Wildlife Division, assisted in the planning and administration of the program. Wildlife Officers Gordon Lee, Chuck Shipley, Ron Martel, Ed Schaber, Gerry Labrie, Glen Rowan and Steve Henderson helped to organize the field operation. The field activities were capably supervised by wildlife technician Grant Gunderson and carried out by Wayne Norstrom, Walter Conibear, Gavin Craig, Dwayne Pipella, Clint Nichols, Gerry Gallanger, Peter McGuire, Marvin Stephen and Albert Guerin.

INTRODUCTION

Commercial beekeeping is an important industry in the province of Alberta. In 1973, 1700 Alberta beekeepers farmed approximately 145,000 colonies and accounted for 40 percent of the total Canadian honey production. The value of the 1973 crop in Alberta is estimated at just ~~under~~ ten million dollars. Production in 1971 and 1972 has been estimated at 4.5 million and 6.5 million dollars, respectively. Honey value has increased from 14 cents per pound in 1970, 21 cents per pound in 1971, 30 cents per pound in 1972 to 50 cents per pound in 1973. Beekeepers in the Peace River block farmed about 75,000 hives in 1973 and produced about 55 percent of the province's honey.

A number of factors contribute to production losses, one of which is the black bear. Bears are attracted to the beeyard in search of food, especially the bee broods. Considerable damage often results from the bear-beehive encounter. Production losses of 18 beekeepers from bears in 1971 were estimated at 63,000 dollars; and in 1972 18 beekeepers claimed 99,830 dollars. The result is that a serious bear-beekeeper conflict has arisen in many areas of the province.

The Fish and Wildlife Division has been involved in this conflict for many years. Wildlife officers of the Division have participated by issuing bear damage permits and assisting in problem bear removal. During the late 1960's and early 1970's beekeepers in the Peace block attempted to resolve the problem by organizing bear hunts, poisoning and trapping bears, constructing electric fences, experimenting with a variety of other preventative devices and by appealing to the government for assistance.

During 1970 and 1971 some assistance in control was provided by the Fish and Wildlife Division in the form of one trapper and the loan of leg snares and culvert traps. In more recent years the problem has intensified suggesting that past remedial measures have not provided a long-term solution to the conflict. Many hundreds of bears have been killed in beekeeping areas with the worst year being 1971 when estimates of bears killed range from 400 to 1000.

In 1972 the wildlife management section became involved by establishing a pilot fact-finding project in one of the most serious areas, the MD of Smoky River, #130. In this program bear damage was documented, offending bears were removed and related data were collected. The fieldwork was well received by beekeepers and was summarized in a report entitled "A Study of the Beekeeper-Black Bear Conflict". The report recommended upgrading both beekeeping practices and bear removal programs. Strong emphasis was placed on wiser selection of yard locations and the use of electric fences. In addition, the report suggested that damage estimates of beekeepers were exaggerated and that bears were being used as scapegoats to cover up production losses from other sources. The report was strongly criticized by both beekeepers and the Alberta Department of Agriculture's apicultural service.

In 1973 a more comprehensive study was established involving all beekeeping areas of the Peace block. Again, the emphasis was placed on recording damage from bears, removal of problem bears, and the collection of bear biological data. In addition, a number of electric fences were constructed and their effectiveness documented. This report summarizes the 1973 program.

METHODS

The Peace River block was divided into four bear management zones (Figure 1; see Figure 2 for distribution of crown lands versus private lands). One two-man crew as established in each of Peace River, Grande Prairie and Valleyview and two crews were placed in Falher to handle the fencing experiments and anticipated extra control activities. An experienced wildlife technician supervised the field operation throughout the summer.

The crews assembled in the Peace country on about May 1 and attended a bear seminar on May 3 in Peace River when they were instructed on objectives and techniques in the program. Actual field activities commenced about May 4 in most areas. Field activities were conducted to about August 29. A post-summer seminar was held in Peace River on August 30 where crews summarized their work and made recommendations for subsequent programs.

The Municipal District of Smoky River #130 participated in the program by establishing one of the two crews at Falher, by supervising the construction of the experimental electric fences and by handling all billings to beekeepers for bear removal and fence construction throughout the entire Peace block.

All beekeepers in the Peace block were informed of the program by an initial letter and questionnaire on April 12 (Appendix 1) and a follow-up letter on May 22 (Appendix 2). Each beekeeper was given the opportunity to participate in the program, and informed that a charge of 25 dollars would be made for each bear removed in response to their complaints.

Each crew was provided with a vehicle equipped with radio-telephones so that they could be contacted directly by beekeepers when bear damage was discovered. In addition, local wildlife offices and the MD #130 office in Falher served as co-ordinating centers and officers assisted in some of the field work.

The work assignments were divided into three major areas of activity; estimates of bear damages in beeyards, removal of individual bears causing the damage and collection of biological data from the bears removed. To facilitate this work data cards (Appendix 3) and damage and action record sheets (Appendix 4) were provided. In addition, an instruction sheet (Appendix 5) was provided to assist crews in collecting and handling specimens and biological information.

Records were kept of the number of frames, supers, hives and other equipment destroyed and the estimated amount of honey lost. In many cases it was difficult to place a dollar value on the loss to the beekeeper because it was often a week or two or more before the full effect of the bear attack on the bee colony was known. For this reason dollar loss estimates were obtained from beekeepers in addition to crew estimates. For hives that were completely destroyed losses in this report are based on current dollar values of equipment and honey provided by the apicultural service of the Alberta Department of Agriculture. For those hives that were partially destroyed beekeeper and crew estimates of average damage were used.

Normally the crew arrived at the site of damage within a few hours of receiving the complaint. The general areas was inspected for bear sign and either a leg-hold snare (Aldrich type) or a culvert-trap was placed in

the immediate vicinity. About 100 snares and 30 culvert-traps were supplied by the Division. In addition a few culvert-traps owned by beekeepers were checked by the crews. These sets were then checked each day, in most zones, until a bear was caught. In large zone 1 this was not possible because of distances involved. In that area beekeepers and other farmers assisted by checking sets and reporting bear catches to the crew. When a bear was captured it was shot and removed with the exception of cubs which were donated to zoos and animal farms. A number of bears were shot by crews and by beekeepers in or near yards that had recent damage.

Captured bears were weighed and measured, including total length, girth, zygomatic width, neck circumference and shoulder height. Sex and colour were recorded and age was estimated from size. One-half of the mandible was collected and preserved for subsequent age determination. In addition, collections of muscle tissue for trichinois examinations, reproductive tracts for productivity estimates, and stomach contents for food habits analysis were made from some bears.

Those bears with reasonably good fur were skinned and the hides were stretched and dried. These were subsequently collected and sold on the fur market with the proceeds returned to the provincial treasury. Some bear carcasses were delivered to local people for consumption. Other carcasses were either burned, limed or removed to more remote areas.

A number of electric fences were built around yards with chronic bear damage. All such experimental fences were constructed with seven-foot T-bar steel posts, plastic insulators, angle-iron strengtheners in corners and six-volt dry cell chargers. Either smooth or barbed

wire was used in varying combinations of numbers and heights. These fences were checked as often as possible during the summer. Signs of bear activity around the fences and bear penetrations were recorded.

RESULTS

Participation and Protection Coverage

Of 66 major beekeeping companies in the Peace block, 36 participated in the 1973 bear program. These 36 companies placed out approximately 50,000 of the 75,000 hives in the entire areas that summer (see Table 1 for details and explanations and Figure 3 for yard locations). Some of the major beekeepers did not participate fully throughout the entire summer. Reasons for this include:

1. some requested assistance only when unsuccessful in removing their problem bears;
2. others joined the program only after observing it for some time; and,
3. others handled some bear problems in one areas while crews were directed to others.

For these reasons actual protection coverage was less than two-thirds of the hives placed out as was suggested in Table 1. For the purpose of this report damage protection by this program was estimated at about 60 percent of the total hives placed out.

Complaints and Periods of Damage

Three hundred and thirty-seven complaints were received from 42 beekeepers in all four bear management zones (Appendix 6). The number of

complaints received from individual beekeepers ranged from one to 30 and damage was reported at 326 of the 337 summer complaints. Damage was reported as occurring as early as April 12, three weeks before the control program commenced, throughout the entire summer and into September and October. Although damage was relatively evenly spaced over the four-month period on a total area basis (Table 2), there were some major regional variations. For example complaints were most numerous in June in the Grande Prairie zone and in August in the Falher zone.

Distribution and Extent of Damage

Bear damage was recorded in virtually all areas of beekeeping activity in the Peace block (Figure 4), but there were major areas with few complaints. These were primarily areas used by non-participants. As observed in 1972 damage occurred at bee yards placed close to drainage systems or patches of forests that bears use for travel and shelter. However, there were about as many bear complaints and hives damaged in the Falher zone as the rest of the three zones combined. Although much of that zone is cleared farm land it also had the greatest concentration of hives (Figure 3).

Damage was reported at 230 different yards. The following provides the frequency of attacks at specific bee yards.

1 attack	172 yards
2 attacks	39 yards
3 attacks	9 yards
4 attacks	6 yards
5 attacks	2 yards
6 attacks	1 yard
9 attacks	1 yard

If all beekeepers had participated in the 1973 program and if all damage had been reported, the number of yards where bear damage occurred

would have, in all likelihood, approximated 400. This would represent about one-quarter of all bee yards in the Peace block.

Extent of damage was recorded at 310 of the 326 summer complaints where damage was reported. In some cases only beekeepers' loss estimates were available as the damages had been cleaned up before the arrival of the control crew. This was necessary as bees are temperamental and, reportedly, react to such interferences with slower production. In the 310 cases of recorded losses 1,493 hives were affected by bears of which 1,118 were partially damaged and 375 were completely destroyed. Damage at one yard in one night ranged from one hive to 41 hives affected (Table 3). Monthly hive losses per management zone (Table 4) reflect the monthly distribution of complaints with damage being relatively evenly spaced throughout the summer, but with some regional variations.

Bear damage, as expected, continued as long as some honey or bees were left out in yards. Honey production depends, in part, on flower availability. In a normal year in the Peace block most flowers are usually frost-killed by August 25 and honey production after that date becomes negligeable. The bees are then removed and the honey extracted. This process takes considerable time if a large operation is involved. Estimates of damage after August 31, when the control program terminated, have been provided by a sample of beekeepers who were contacted specifically for that information (Table 5). Harvest completion dates varied considerably as did occurrence of damage. Two of these beekeepers reported more damage in one yard in one attack in September than in all their yards combined during the four-month period of the summer control program.

Calculation of Dollar Losses

When a hive is totally destroyed by a bear the beekeeper's economic losses result from the expenses of labour and travel to clean up the damage and losses of bees, honey and materials. Bees have increased in price from about six dollars to about 15 dollars per package (hive) and continued to rise in price. Average honey production in the Peace block in 1973 was estimated at 125 pounds per hive. At the current sale value of 50 cents per pound, about 60 dollars worth of honey is lost for each hive completely destroyed. Production in 1973 was below the long-term average.

The value of materials in a hive is variable depending on whether the beekeeper constructs his own hives or purchases them. A used hive has more value than a new hive since the bees alter it in ways that result in increased honey production. Although such used hives can apparently be sold for as much as 100 dollars per hive the average value of materials is estimated at about 45 dollars per hive. There is, therefore, a minimum of 120 dollars of direct loss to the beekeeper each time a hive is totally destroyed. This does not include the additional expenses of damage clean-up and inspection.

Loss when a hive is only partially damaged is more difficult to calculate. First, the effect of the bear attack on the morale and subsequent work of the bees is apparently real. Generally bear-attacked colonies do not produce as much honey as those that have been undisturbed. Second, if the queen bee is destroyed, and if that destruction is not noted quickly and remedied, the colony will disperse and most production ceases. Estimates of partial loss ranged from one dollar when a bear

merely lifted out one frame from the top super to about 100 dollars when most of the honey was unuseable following a bear attack late in the season. Beekeeper and crew estimates of losses due to partial damage were grouped and a mean of 40 dollars per hive was calculated.

Dollar Loss During the 1973 Season

The following calculations provide an estimate of economic loss to the Peace River area beekeepers from bear depredations in 1973.

Summer

Recorded loss on 310 complaints

1118 partially destroyed hives @ 40.00	=	44,700.
375 totally destroyed hives @ 120.00	=	45,000.
		89,700.
Estimated loss of all beekeepers (survey = 60%)	=	149,500.

Fall

Reported loss of beekeepers (Table 6)	=	21,000.
Estimated loss of all beekeepers	30,000. to	60,000.

Total Loss $180,000. to 210,000.

The mean loss per bear attack was 289 dollars.

Control Action and Bear Removal

One hundred and eighty-two bears were taken and/or handled by leg-snaring, culvert-trapping and shooting (Table 6 and Appendix 7). Of these 127 were captured in snares, 37 in culvert-traps and 18 were shot. Of the 182 bears, 17 were either captured with the beekeepers' equipment or had been shot by beekeepers prior to the arrival of the crew. In total

2,287 snare-nights and 1,212 culvert-nights were employed. Capture efficiency was 56 bears per 1000 snare-night and 10 bears per 1000 trap-night. Time between initial action and capture ranged from less than one day to 37 days. Each of forty bears were captured in one or less days; and about two-thirds of all bears captured were taken in five days or less.

The distribution of bear captures (Figure 5) reflects the distribution of damage (Figure 4). Many bears were taken close to major or minor drainage systems or forested areas.

The number of bears removed per beekeeper ranged from one to 25 (Table 6) and bears were removed for 34 of 42 beekeepers who submitted complaints.

Beekeepers removed an additional 200 bears without assistance (Table 7). Some of these bears were removed by participants before joining the program or because they could be taken without much effort. Many of the bears were taken by beekeepers who did not participate in the program. Therefore, an estimated total of 382 bears were removed because of damage to the beekeeping industry in the Peace block during the summer period, 1973. Some additional bears were removed by beekeepers during the harvest season in September after the termination of the summer control program.

Bear Biology

Of 181 bears sexed 69.6 percent were males ($P < 0.01$; Chi-square = 27.8) (Appendix 8). The bias towards males was not specific to any age-group; that is, sex ratios were relatively equal in both young and old bears as shown on the following page:

Ages 1 to 4 yrs.; 69.5% males
Ages 5 to 9 yrs.; 67.3% males
Ages 10 + yrs.; 60.0% males

Ages of bears captured ranged from cubs to 22 years of age with two and three year-olds being captured most frequently (Appendix 8 and Figure 6). A total of 83 cubs were observed with 33 sows by the five crews over the entire summer (Table 8). This represents a mean of 2.5 cubs per sow. Of 150 bears sexed and aged, not including cubs, 31.4 percent were males, two and three-years of age. The four-year age-group was under-represented in both sexes. The mean age of all captured bears, excluding cubs, was 4.7 years.

The sex and age ratios of captured bears were obviously not representative of the bear population. Various studies have suggested that an unbiased sample of a bear population would include about 50 percent males; and cubs and yearlings would be more represented. The high proportion of two and three-year old males was undoubtedly related to the normal dispersal of young males searching for unoccupied territories.

Hide and Meat Disposition

A total of 79 hides were salvaged of which 67 were subsequently sold on the fur market (Table 9). Most of the remaining hides were not salvageable because of the summer moult. In addition, parts of 58 bears were donated to various individuals for either dog food or human consumption.

Experimental Electric Fences

The 20 experimental electric fences were in operation between 53 and 113 days during the summer period (Table 10). During that period,

41 checks resulted in the observation of fresh bear sign at 15 yards on 23 occasions. Due to rains and plant growth fresh bear sign lasted only about one week. Since each fence was inspected only about twice during the entire summer period, many additional bear visits probably were not detected. Only two bear penetrations were reported at the 20 experimental fences during the summer period.

At fence #6 a bear dug under the bottom wire without damaging the fence, entered the yard and damaged three hives. At fence #10 an adult male bear went over the fence without damaging it. The top wire was only 24 inches from the ground. Eleven hives were damaged. That bear was caught in a foot-snare as he left the yard area.

The cost of fence construction was 110 dollars for materials and one-man day of labour for each fence.

Beekeeper's Electric Fences

Of 230 separate yards entered by bears in this study 44 (19.1%) had been fenced by beekeepers at one time (Table 11). Only 32 of the 44 were considered operable which meant that some electrical current was detectable. In addition, many of those "operable" fences were not adequate. That is, some were of insufficient height; others were constructed with only one wire; others had insufficient charge present for effective performance.

Expenditures and Revenues

Sources of funds for the bear program included special warrant, the 1973 STEP and the 1972 - 73 PEP allocations, the Agricultureal Services Board, the Municipal District of Smoky River and others (Table 12).

Expenditures, not including salaries and travel of permanent staff, totalled $53,650.00. Revenues of the program included $4,125.00 collected from beekeepers for bear removal, $1,000.00 for 20 electric fences and an estimated $2,675.00 from the sale of bear hides. The MD of Smoky River was reimbursed for their entire expenses by beekeepers' payments and special grants which are included in the above expenditures. Net cost of the program was $45,850.00.

DISCUSSION

Effectiveness of the Control Program

The major purpose of bear removal was the reduction of additional damage. Since two-thirds of the bears were taken within five days of the initial damage, forty within one day, it is obvious that they were returning rapidly to damaged yards. This was expected as bears appear to habituate very quickly to learned sources of food. The problem of bears returning to bee yards is similar to the well-known problem of bears at garbage disposal sites in campgrounds and parks. The beehive, with its protein-rich larvae and sugar-rich honey is obviously a strong attractant to bears, especially if they have experienced it once.

Under the control regime which resulted in the removal of about 380 bears at damaged yards during the summer months of 1973 the estimated loss to the honey industry was about 150,000 dollars. Had there not been a control program losses would have been sufficiently high as to eliminate much of the profit of many beekeepers. If bears had not been removed direct losses from bear damage would have probably reached 500,000 dollars.

This does not include the losses of the areas' seed producers. It has been estimated that for every one dollar of honey produced in world-wide beekeeping operations, there is ten dollars of pollination accomplished. That is, the bees are not only producing honey, but higher yields in various types of seed crops because of the pollination they effect. Discussion with various seed crop experts suggested that for every dollar of honey produced in the Peace block there is at least one dollar of extra seed yield. Obviously the destruction of hives by bears reduces the extent of pollination and adds to the economic loss of the farmers of that area. I suggest that seed growers of the Peace block did lose an amount equal to that lost by the beekeepers, but would have suffered extra losses under a non-control regime. It is possible, therefore, that the control program resulted in a reduction of additional losses of as high as $600,000.00 to the two industries in 1973.

Although some individual beekeepers may have exaggerated losses on occasion, this investigator believes that over-all losses are not exaggerated, and, if anything, may be underestimated. The writer does not believe that beekeepers have used bears as scapegoats as suggested in the 1972 report.

Although the control program had an obvious effect of reducing subsequent damage during the summer, the history of the conflict strongly suggests that bear removal does not reduce the extent of the problem in succeeding years.

Effect of Bear Removal on the Bear Population

The strong representation of two and three-year old males in the sample of damage-causing bears was expected. Bears are territorial and

a dominant boar defends his area to the exclusion of other males. Sub-dominants, mostly young males, are normally driven out of occupied habitat. In fringe areas these sub-dominants soon appear on farmland and often become the source of damage to property and crops. The fate of such bears in wild habitat is not fully understood, but in a situation of continuously occupied territories, many of these young bears must succumb to predation or injury and die. It can be hypothesized that the bear removal merely replaced a natural death at least for some of the male bears and points out that bear removal, by itself, is not the long-term solution to the problem.

Research in the Cold Lake area of Alberta has indicated a bear density of about one bear per square mile. Density depends on habitat. The Peace River block contains about 12,000 square miles of which two-thirds if forested. Bears, in that area, may number in excess of 4,000. The combined kill from all causes related to agriculture damage could, therefore, not be limiting population size, especially when we consider that many of the bears removed appear to belong to the dispersing surplus of the population. In fact, the very opposite of extermination is probably the case. The observation of 33 sows with 83 cubs in the area this past summer represents good reproduction and attests to the fact that the population remains in excellent shape. The kill appears to merely reduce the age of the population and not the numbers.

Alternative Solutions to the Conflict

1. Capture and Transportation of Bears Elsewhere

This procedure would involve the bear's capture (an effort equal to this summer's program), immobilization, caging and transportation. The

bears would have to be moved great distances to ensure that they wouldn't merely return to the damage areas. The cost of this operation would be phenomenal and repetitive, each and every year. We have to assume that other areas have their full compliment of bears. Dumping the damage bears into occupied habitat would simply result in territorial defense, rejection, dispersal and finally the appearance is settled areas again or death in the process. This route is not recommended.

2. Compensation

Compensation programs for predator kills have been implemented in many areas of North America; and in many cases, abandoned. The reasons for that is simply that the payments do not reduce the extent of damage and payments continue year after year. In addition, claims are often difficult to evaluate. In the situation here, the beekeeper must clean up the bear damages as soon as possible. He cannot wait for the arrival of a government-appointed adjustor. His claims, therefore, would be most difficult to evaluate.

The current Livestock Indemnity Program in Alberta provides for 80 percent compensation for proven livestock losses to predators. In its present form this program could not be applied satisfactorily to bear-caused losses in the beekeeping industry. Since the bulk of losses are materials and honey he would not be adequately compensated.

If compensation was applied to replace the present program of bear removal, I believe that full compensation to both beekeepers and seed growers would be justified. It is conceivable that such losses to both industries could approach one million dollars per annum in the Peace River

area. This route is not recommended.

3. Preventative Measures

A preventative measure is one that prevents the damage from occurring, as opposed to measures such as bear removal after the fact of damage. Preventative measures appear to hold the greatest potential for reducing the bear-bee conflict.

a) Electric Fences:

This study recorded a bear penetration rate of ten percent at 20 experimental fences over an approximate three month period. One of the penetrated fences was considered to be a more inferior model since the top wire was only 24 inches from the ground. About 80 percent of the current damage would be eliminated if bee yards were enclosed in properly erected and maintained electric fences. Some beekeepers have come to the same conclusion (for example see letter from Van Han Apiaries, Appendix 9).

b) Yard Selection

Again, as in 1972, most yards penetrated by bears were near patches of forest. Most yards in open areas remained undamaged. Selection of open-area sites would undoubtedly reduce bear damage, but would introduce other problems. The exposure of hives to wind apparently results in lower honey production and hives in fields interfere with farming operations. Suitable sites for bee yards are difficult to find and, understandably, are guarded possessively by beekeepers. If bee yard locations near forested areas are utilized, electric fences should be employed.

c) Population Reduction through Hunting and Trapping

Hunters currently do not appear to be taking advantage of the numerous bears and the four-month bear season each year in the Peace block. An increase in hunting of bears in that area might assist somewhat in reducing the conflict. Sport bear hunting could be encouraged in that area. Similarily, registered trappers are allowed only one bear, and only if they have a bear hunting license. Bear hides are currently bringing prices from 50 to 200 dollars on the fur market. I believe that such trappers should be allowed to harvest bears on their lines each year; and that such harvests would assist in reducing the annual bear damages.

CONCLUSIONS

1. Bear damages to apiaries in the Peace block during 1973 occurred during all months of beekeeping activity creating a loss of about 200,000 dollars, despite the removal of about 400 bears.

2. Without bear control during 1973 losses to the beekeeping industry would have approximated 500,000 dollars, or about 10 percent of the total honey production in that area. About equal losses to the seed industry would also have resulted.

3. As concluded in the 1972 studies, bear control, while effecting immediate relief, does not appear to provide a satisfactory long-term solution to the conflict, since such control does not effectively reduce bear numbers.

4. Prevention before damage, including the use of electric fences and the harvest of bears by hunters and trappers appears to hold the most promise.

RECOMMENDATIONS

Alternatives:

a) No assistance.

This route would probably result in damage of a few hundred thousand dollars a year and continuation of indiscriminate bear killing.

b) Government-sponsored bear control as in 1973.

This route would reduce damage to about 200,000 dollars annually at a cost of between 50,000 and 100,000 dollars and with a kill of 200 - 400 bears annually.

c) Subsidy of Electric Fence Construction.

Cost-sharing (50 percent government/beekeeper - $100.00 grant per fence). If 500 fences were erected damage and bear killing would be reduced by about 80 percent.

d) Encouragement of Electric Fence Construction.

Government-sponsored bear control only at yards fenced by beekeepers. This route would probably result in indiscriminate bear control as in a).

e) Liberalization of Bear Hunting and Trapping.

Increase in bag limit to two bears per hunter in the area and establishment of a quota on black bears for trappers.

Specific Recommendations:

Since damage is occurring on private land by bears originating on public land, I believe that the government has a definite responsibility to assist beekeepers and I recommend that alternatives c) and e) be instituted.

Table 1. Lists of major beekeepers[1] who did and did not participate in the 1973 Peace bear program.[2]

Participants[3]		Non-participants[4]	
Anctil, P.	Loiselle, R.	Begin, J.	Park Apiaries
Artic Honey	Martens, E.	Belzile, F.	Rouleau, L.
Aubin, H.	McFadyen, G.	Berghs, M.	Savard, R.
Barton, R.	Mercier, G.	Bessette, J.	Simoneau, G.
Bergeron & Laberge	Olivier, P.	Bolster, D.	Smith Apiaries
Bessette, R. & L.	Paetkau, P.	Carrell & Carrell	Smith, R.
Cage, J.	Paradis & Son Apiaries	Didow & Lloyd Apiaries	Spring Flow Farms
Cote, P. & R.	(Paradis) Gerry's Apiaries	Dzaman's Honeycomb	Stewart, L.
Dechambre, C.	Rideau Honey	Foldi, B.	Tetrault, A.
Dechambre, P.	Roy Apiaries	Hale, A.	Upshall, C.
Doucette, N.	Sanford Apiaries	Halliday & Sons	Van Wechel, C.
Francis, T.	Schmidt, D.	Janzen, J.	Woodburn, J.
Guerin, D.	Smith, F.	Kemp, R.	
Guerin, G.	Smith, J.	Lee, E.	
Guerin, J.	Stone, D.	Mathews, K.	
Hachey, G. & L.	Tanguay, A.	McFarlane Agencies	
Hotchkiss Honey	Tegert Apiaries	Ouellette, L.	
Limoges, L.	Wood, R.	Paradis, G.	

Summary:
36 participants; approximately 50,000 hives
30 non-participants; approximately 18,000 hives
Other beekeepers < 200 hives; approximately 7,000 hives

[1] a major beekeeper (company) is defined as having 200 or more hives in operation

[2] In addition, about 10 beekeepers with less than 200 hives participated

[3] some participants did not participate throughout the entire summer

[4] some non-participants probably did not have significant bear damage

Table 2. Monthly distribution of bear damage complaints in the Peace River area, 1973.

Zone	Month				Total
	May	June	July	August	
Peace River	19	24	15	19	77
Grande Prairie	6	31	9	5	51
Valleyview	17	12	18	5	52
Falher	32	36	39	50	157
Total	74	103	81	79	337

Table 3. Frequency distribution of bear damage to bee hives in the Peace River area, 1973.

Hives Damaged	Number of Attacks	Hives Damaged	Number of Attacks	Hives Damaged	Number of Attacks
1	60	9	2	20	4
2	69	10	8	21	1
3	37	11	9	24	1
4	38	12	3	25	1
5	29	13	5	29	1
6	15	14	4	30	1
7	13	15	1	31	1
8	5	16	1	41	1
Hives damaged/attack = 4.8			Total:	1493	310[1]

[1] extent of damage was recorded on 310 of 337 complaints.

Table 4. Monthly summary of hive losses and estimates of dollar loss to beekeepers by bear management zone in the Peace River area, 1973 (survey only).

Zone	May		June		July		August		Total	
	Hives	$	Hives	$	Hives	$	Hives	$	Hives	$
Peace River	104[1]	4,160[3]	27	1,080	34	1,360	52	2,080	217	8,680
	22[2]	2,640[4]	24	2,880	18	2,160	27	3,240	91	10,920
Grande Prairie	19	760	221	8,840	52	2,080	17	680	309	12,360
	6	720	29	3,420	12	1,440	0	0	47	5,640
Valleyview	57	2,280	28	1,120	33	1,320	6	240	124	4,960
	4	480	2	240	2	240	6	720	14	1,680
Falher	117	4,680	114	4,560	73	2,920	164	6,560	468	18,720
	26	3,120	36	4,320	73	8,760	88	10,560	223	26,760
Total	297	11,880	390	15,600	192	7,680	239	9,560	1,118	44,720
	58	6,960	91	10,920	105	12,600	121	14,520	375	45,000

[1] first row indicates hives that were partially damaged

[2] second row indicates hives that were totally damaged

[3] a mean of $40 loss was calculated per partially damaged hive

[4] a value of $120 was used for a totally damaged hive; includes material, bee and honey values.

Table 5. Incidence of bear damage to apiaries after August 31 in the Peace River area, 1973.

Beekeeper	Date Harvest Completed	Number of Attacks	Hive Losses	
			Partial	Total
Hotchkiss Honey	8/26	0	0	0
Barton, R.	9/ 3	1	5	5
Stone, D.	9/ 6	1	5	3
North Star Honey	9/ 9	6	-[2]	-
Gerry's Apiairies	9/12[3]	11	49	7
Martens, E.	9/15	14	73	13[4]
Mercier, G.	9/20	12	[5]	55
Paetkau, P.	10/ 5	8	[5]	48
Total		53	132	131

[1] all 8 beekeepers interviewed as to damage after August 31 are included

[2] damage occurred, but was not recorded

[3] damage recorded to 9/12, although harvest not completed

[4] calculated from number of supers reported damaged

[5] included in total damage

Table 6. Summary of complaints, action and bears removed for participating beekeepers: 1973 Peace bear program.

Zone	Beekeeper	Complaints	Trap/Snare-Nights	Bears Removed
Peace River	Francis, T.	1	0	1
	Guerin, D.	18	167	6
	Rideau Honey	13	170	7
	Smith F.	5	37	2
	Smith J.	7	83	4
	Stone, D. & G.	6	55	3
	Tegart, D.	13	101	5
	Turner, R.	13	100	5
	Wood, R.	1	6	1
Grande Prairie	Arctic Honey	10	109	7
	Beaverlodge R.S.	1	1	1
	Guerin, J.	5	80	5
	Lefebvre, P.	4	22	3
	Martens, E.	14	196	13
	McFadyen, G.	8	40	8
	Paradis, J.	8	54	4
	Pitman, J.	1	2	0
Valleyview	Barton, D.	27	252	10
	Cage, E.	3	76	1
	Mathews, K.	1	40	0
	McRae, D.	3	22	2
	Paetkau, P.	12	210	8
	Sanford, O.	2	104	0
	Schmidt, D.	4	35	2
Falher	Anctil, P.	1	24	0
	Aubin, H.	4	56	0
	Bergeron, B.	7	94	4
	Bessette, L.	4	33	0
	Cote, P.	2	17	2
	Dechambre, C.	5	75	2
	Dechambre, P.	20	165	14
	Doucet, N.[1]	1	16	1
	Guerin, D.[1]	7	106	1
	Guerin, G.	10	76	9
	Hachey, G.	13	78	9
	Limoges, L.	7	72	5
	Loiselle, R.	5	27	2
	Mercier, G.	1	4	0
	Olivier, P.	3	29	1
	Paradis, G.[1]	11	170	4
	Paradis, J.[1]	6	67	2
Falher	Roschuk, W.	3	17	3
	Roy, L.	4	38	0
	Sanford, O.[1]	2	12	0
	Tanguay, A.	11	79	1
	Wood, R.	29	289	24
Totals		337	3499	182

[1] these beekeepers assisted by two crews and therefore appear twice.

Table 7. Number of bears removed by Fish and Wildlife and by beekeepers in the 1973 bear program.

Zone	Fish and Wildlife	Beekeepers[1]	Total
Peace River	34	75	109
Grande Prairie	41	34	75
Valleyview	23	3	26
Falher	84	88	172
Total	182	200	382

[1] these estimates were obtained by interviews with beekeepers

Table 8. Frequency distribution of observed litter size in black bears in the Peace River area, 1973.

Zone	Number of Sows With 1 Cub	2	3	4	Mean Cubs/Sow
Peace River		1	9		2.9
Grande Prairie		3	3	1	2.7
Valleyview		2	3		2.3
Falher	2	8	2	1	2.2
Total	2	14	17	2	2.5

[1] total of 33 sows with 83 cubs

Table 9. Summary of bear hide and meat disposition: 1973 Peace bear program.

Zone	Hides Salvaged[1]		Carcasses[2]
	F&W	Others	Utilized
Peace River	16	2	12
Grande Prairie	13	2	3
Valleyview	14	2	19
Falher	24	6	24
Total	67	12	58

[1] during the mid-summer moult, hides were discarded.

[2] or parts thereof.

Table 10. Specifics of 20 experimental electric fences; 1973 Peace bear program.

Fence No.	Beekeeper	Location	Construction Date	Days in Service	Fence Design				Bear	
					Wire type	# strands	height[1]	hangers	Sign	Penetration
01	Hachey G.	WE26-76-22-W5	5/10	113	Barbed	5	30	-	+	-
02	Paradis J.	NW23-77-23-W5	5/15	108	Barbed	5	30	-	+	-
03	Paradis J.	SW23-77-23-W5	5/15	108	Barbed	5	30	-	-	-
04	Guerin G.	NW8-80-20-W5	5/16	107	Barbed	5	30	-	+	-
05	Guerin G.	SE17-79-20-W5	5/16	107	Barbed	5	30	-	+	-
06	Guerin G.	NE35-78-20-W5	5/17	106	Barbed	5	30	-	+	+
07	Bessette J.	NE8-80-22-W5	5/18	105	Barbed	5	30	-	+	-
08	Anctil P.	SE26-78-23-W5	5/18	105	Barbed	5	30	-	+	-
09	Hachey G.	SW29-78-22-W5	5/20	103	Barbed	5	30	-	+	-
10	Paradis J.	SW4-78-23-W5	5/21	102	Smooth	4	24	+	+	+
11	Loiselle R.	SE6-80-22-W5	5/26	97	Smooth	4	24	+	+	-
12	Guerin G.	NE13-79-20-W5	5/26	97	Smooth	5	30	-	+	-
13	Paradis G.	SE10-75-21-W5	5/28	95	Smooth	4	24	-	+	-
14	Paradis G.	SW30-75-22-W5	6/22	70	Smooth	5	30	+	-	-
15	Limoges L.	NW19-77-23-W5	6/23	69	Smooth	4	24	-	-	-
16	Limoges L.	SW18-76-22-W5	6/29	63	Smooth	4	24	+	+	-
17	Limoges L.	SW13-80-20-W5	6/30	62	Smooth	3	18	-	+	-
18	Paradis G.	SW9-21-74-W5	7/3	59	Smooth	4	24	-	-	-
19	Paradis G.	NW36-74-22-W5	7/6	56	Smooth	3	20	-	+	-
20	Paradis G.	SE30-74-20-W5	7/9	53	Smooth	3	20	-	-	-

Summary:

Number of fences constructed	20
Mean number of days in service (to Aug. 31)	90
Number of checks for bear sign	41
Number of times when fresh bear sign was discovered	23
Number of yards with observed bear activity	15
Number of yards penetrated	2

[1] Height from ground to top wire in inches; some fences were probably up to 3 or 4 inches higher in places, depending on the distance from the ground to the first wire.

Table 11. Summary of beekeepers' electric fences at penetrated yards: 1973 Peace bear program.

Zone	Yards Penetrated	Fenced No.	Fenced %	"Operable" Fences[1] No.	"Operable" Fences[1] %
Peace River	58	14	24.1	12	20.7
Grande Prairie	45	4	8.9	1	2.2
Valleyview	30	4	13.3	3	10.0
Falher	97	22	22.7	16	16.5
Total	230	44	19.1	32	13.9

[1] fences were judged to be operable if some current was present, however, many of these "operable" fences were far from adequate.

Table 12. Summary of expenditures and revenues: 1973 Peace bear program.[1]

Source	Category	Expenditures $	Revenue $
Special Warrant	Wages	6,050.[2]	
	Subsistence	6,750.	
	Vehicle Rental	7,850.	
	Vehicle Operation	4,150.	
	Communications	2,750.	
	Materials and Equipment	1,200.	
	Others	1,700.	
	Grant to MD, 130	3,100.	
		33,550.	
Peace River L270P	Wages	2,000.	
STEP '73 P091K	Wages	7,450.	
PEP '72 - 73	Culvert Traps	2,750.	
ASB (ADA)	Grant to MD, 130	3,000.	
MD 130	General Expenses	4,900.	
Beekeepers	20 Electric Fences		1,000.
Beekeepers	Payments for Bear Removal		4,125.[3]
Fur Market	Sale of 67 Hides		2,675.[3]
Totals		53,650.	7,800.
Net Cost		45,850.	

[1] does not include other expenditures such as salaries of permanent employees who participated in field work, supervision and data analysis.

[2] to the nearest $50.

[3] estimated.

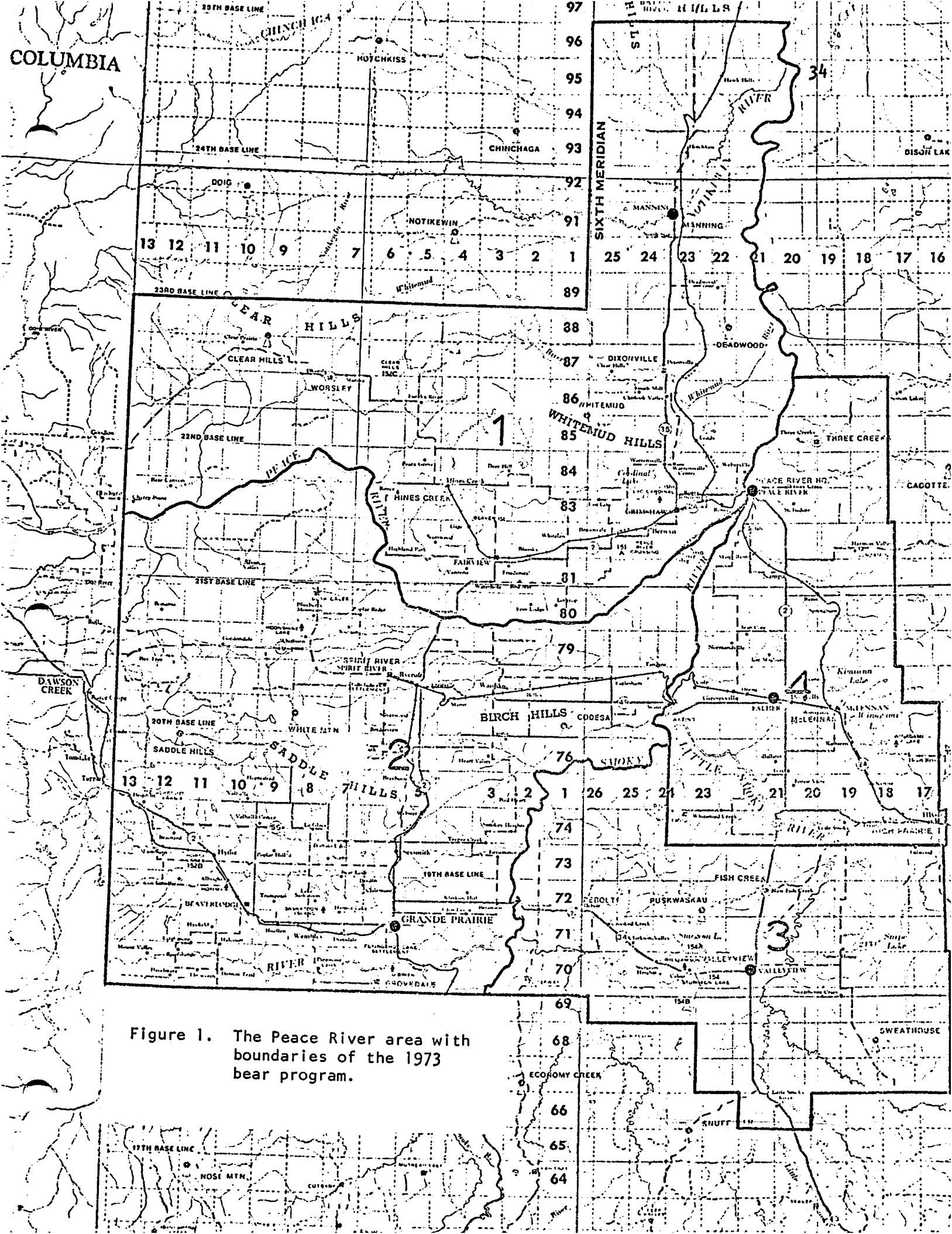


Figure 1. The Peace River area with boundaries of the 1973 bear program.

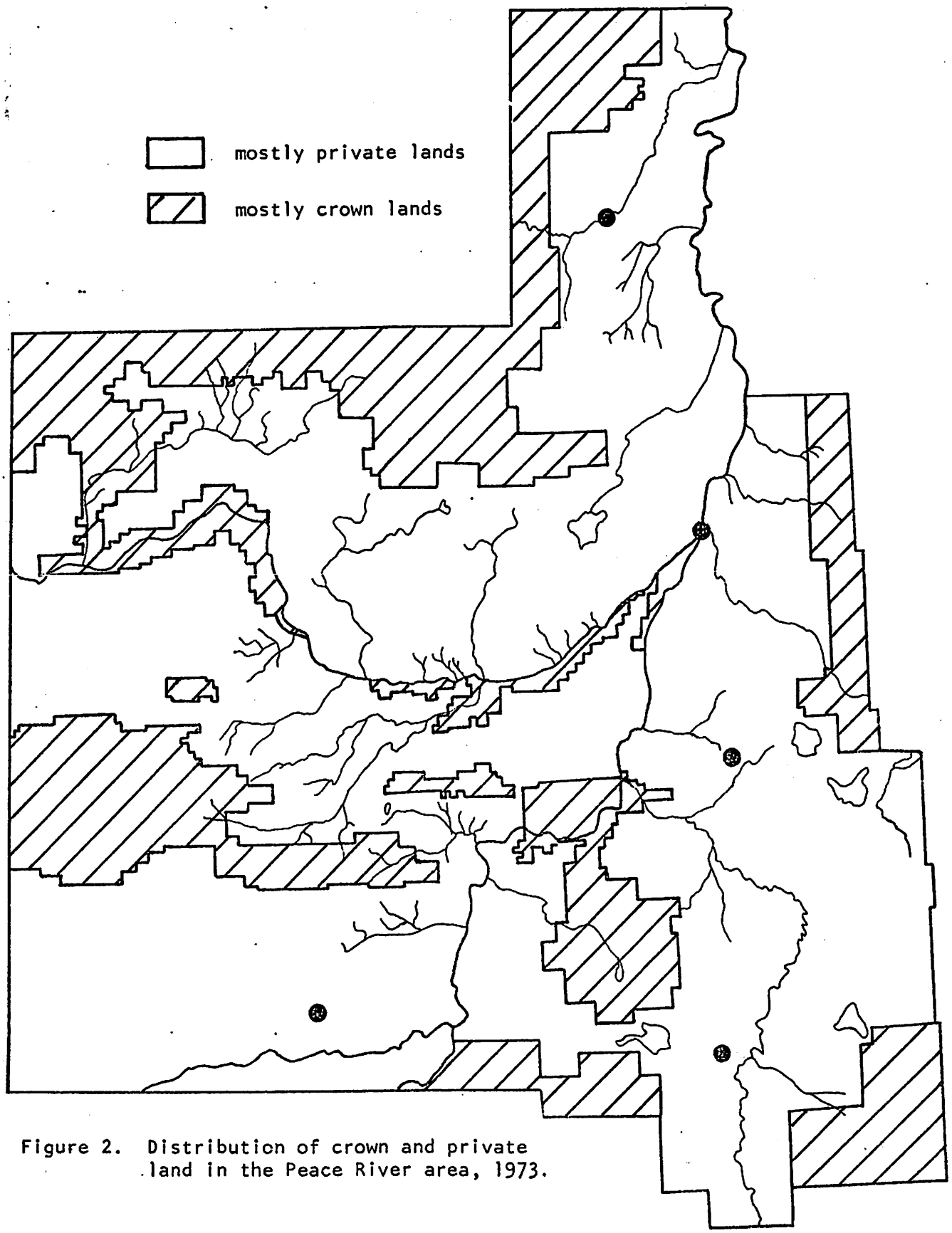


Figure 2. Distribution of crown and private land in the Peace River area, 1973.

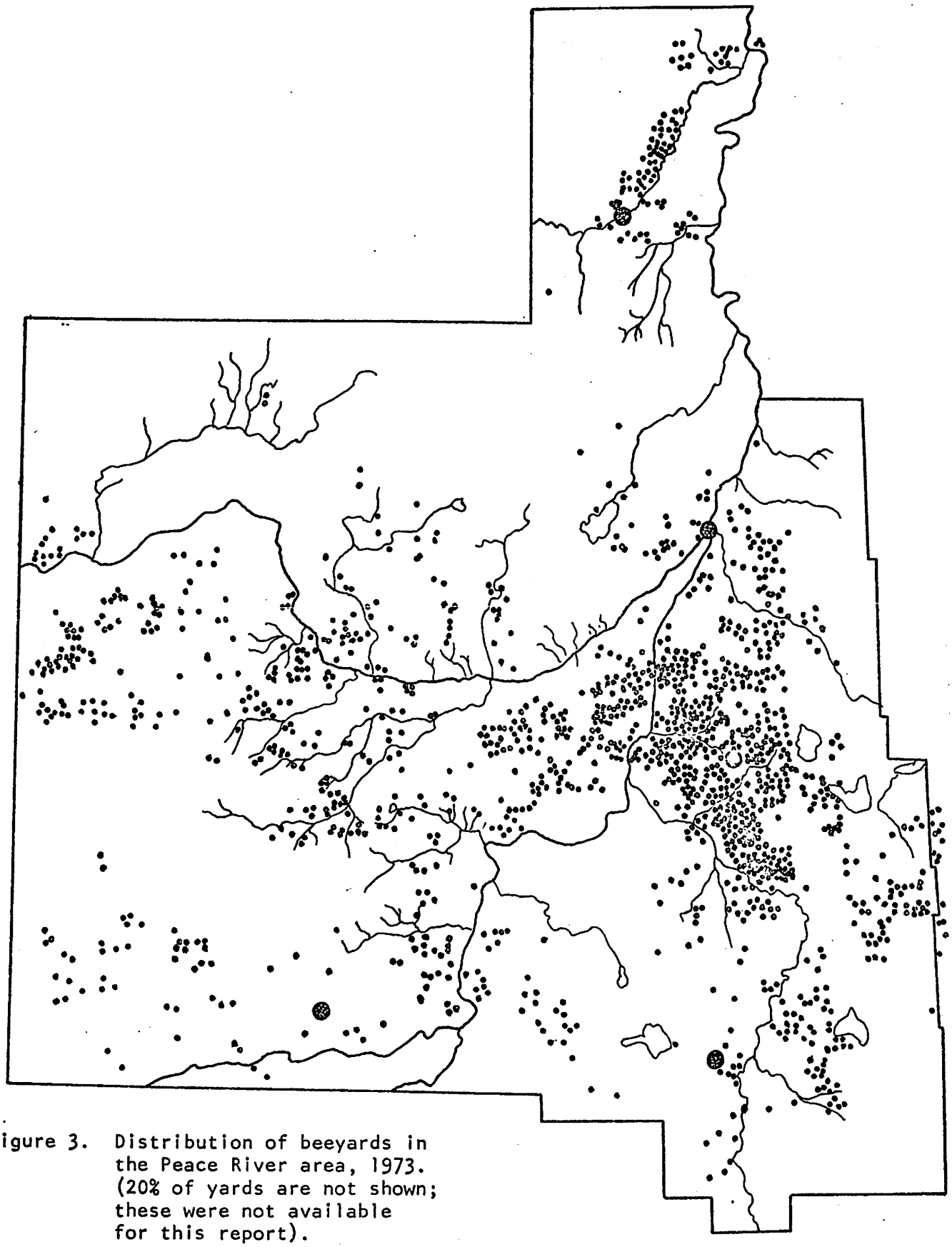


Figure 3. Distribution of beeyards in the Peace River area, 1973. (20% of yards are not shown; these were not available for this report).

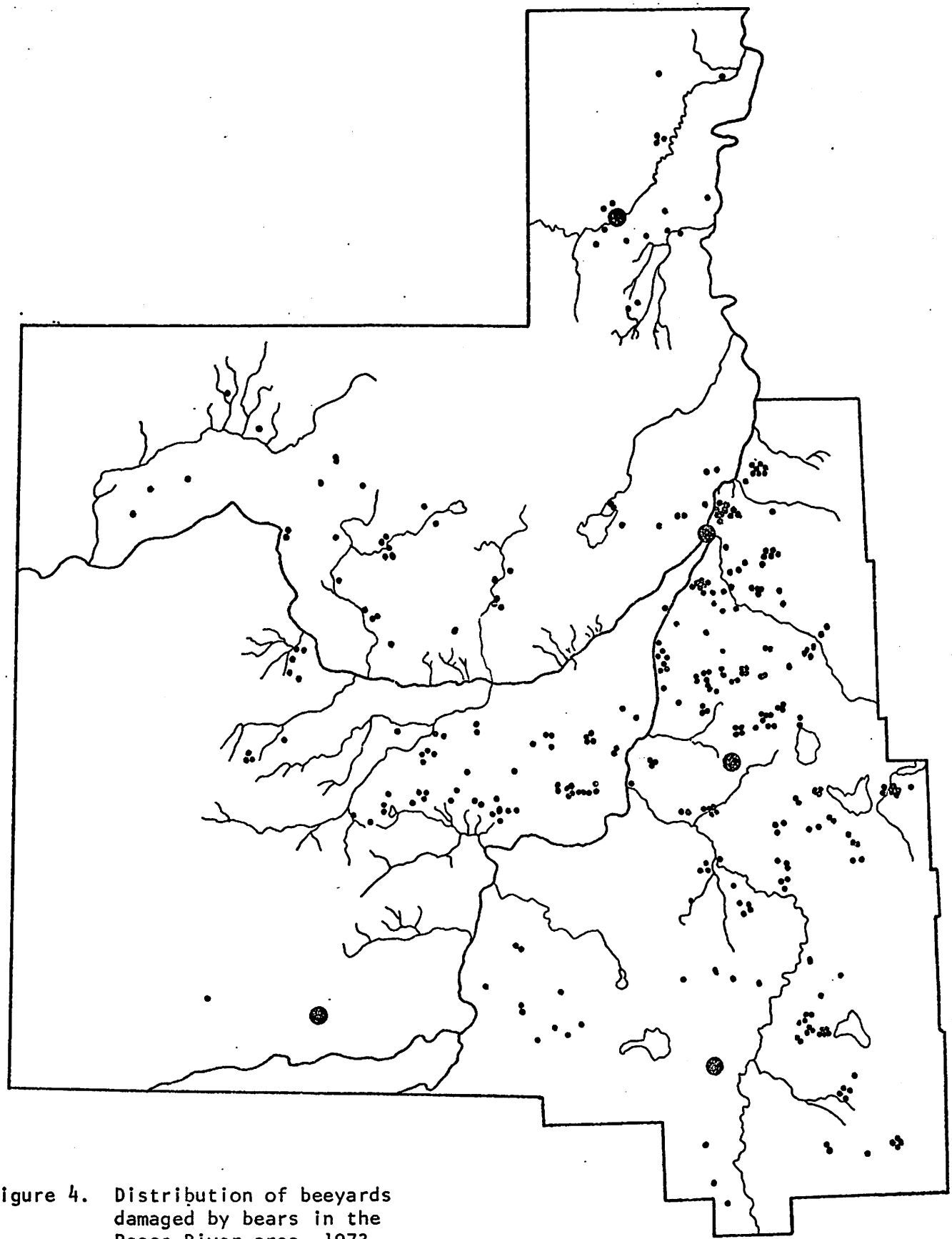


Figure 4. Distribution of beeyards damaged by bears in the Peace River area, 1973.

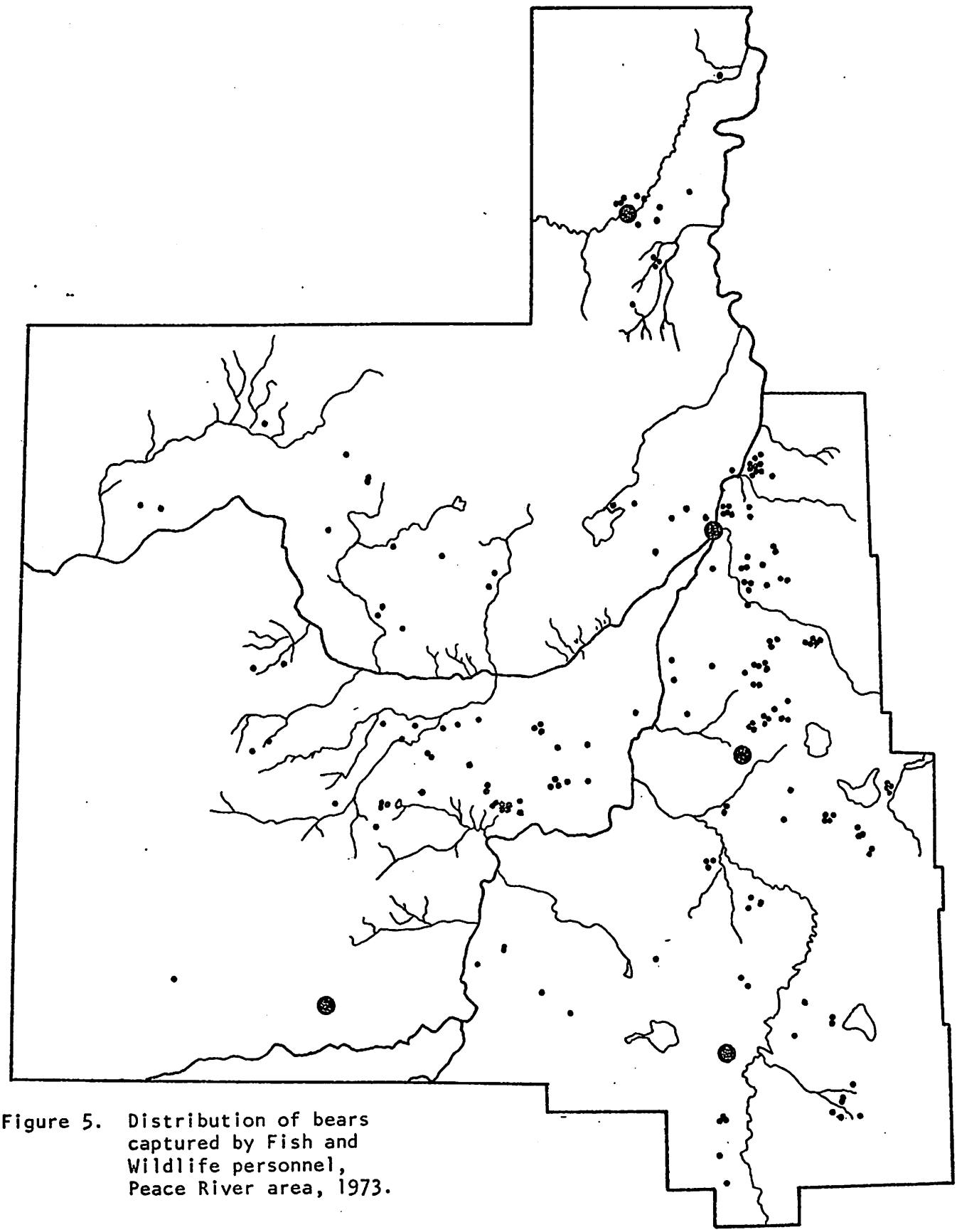


Figure 5. Distribution of bears captured by Fish and Wildlife personnel, Peace River area, 1973.

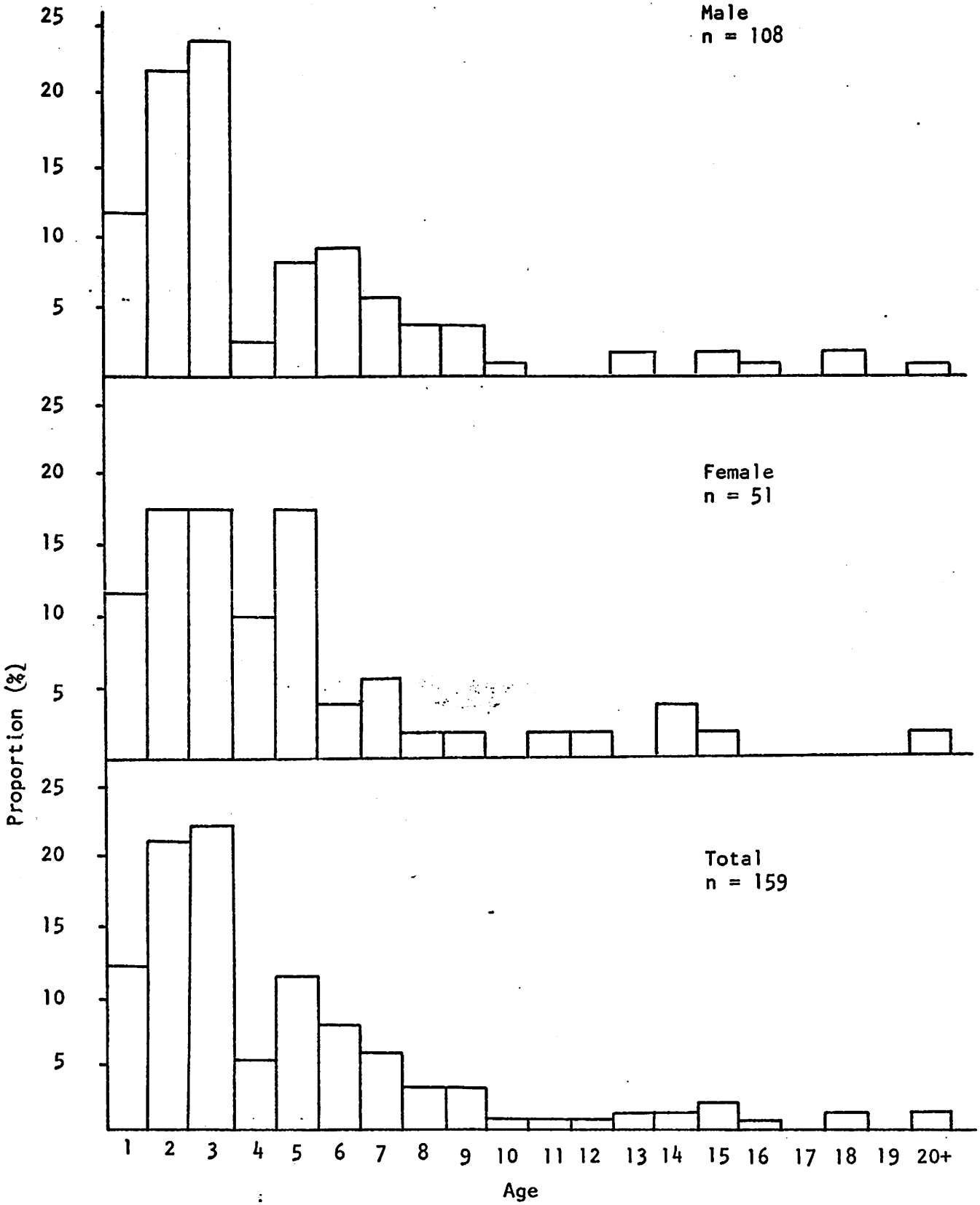


Figure 6. Age distribution of captured bears in the 1973 Peace bear program.

GOVERNMENT OF THE PROVINCE OF ALBERTA
DEPARTMENT OF LANDS AND FORESTS

April 12, 1973

To All Beekeepers in the Peace River - Grande Prairie Area

Dear Beekeeper:

The Alberta Fish and Wildlife Division in co-operation with the Alberta Department of Agriculture and the Municipal District of Smoky River #130 is planning a comprehensive problem bear control program in the entire Peace River - Grande Prairie region during summer, 1973. I am writing to outline our plans to you and to determine to what extent you would be prepared to be involved in the program.

Five 2-man crews will be established on about May 1 to record bear damage in beeyards and to remove problem bears. Control devices used would include leg-hold snares and culvert traps. Some experimental work on prevention devices such as electric fencing will also be conducted.

Wildlife Officers of the Fish and Wildlife Division will serve as co-ordinators of the work in their districts. Beekeepers would be asked to forward complaints of bear damage to their local Officer who would then forward all complaints to the nearest bear crew. A list of Wildlife Offices including telephone numbers will be forwarded prior to May 1. You should be contacted by your local Officer in the next few days concerning this program.

Beekeepers will be asked to contribute to this program by paying twenty-five dollars ($25.00) for each problem bear removed by the bear crews.

Attached you will find a questionnaire which I ask you to fill out and return to me as soon as possible as we anticipate starting the program about May 1, 1973.

Yours truly,

John R. Gunson

John R. Gunson,
Wildlife Biologist

JRG/bjm

Att'd

Appendix 1a. Initial letter to beekeepers.

Alberta Fish and Wildlife Division

BEEKEEPER QUESTIONNAIRE

Please fill in the appropriate sections and return in the enclosed envelope as soon as possible.

	YES	NO	
1. Have bears been a problem in your bee operation?	☐	☐	
2. Would you be prepared to participate in the 1973 problem bear program?	☐	☐	
3. Are you prepared to pay $25.00 per bear removed?	☐	☐	
4. What would you be prepared to pay for the construction of an electric fence around a beeyard?	☐ $50.00	☐ $75.00	☐ $100.00

Return to: John R. Gunson,
Fish and Wildlife Division
O. S. Longman Building
6909 116 Street
EDMONTON, ALBERTA

Appendix 1b. Questionnaire which accompanied initial letter.

GOVERNMENT OF THE PROVINCE OF ALBERTA
DEPARTMENT OF LANDS AND FORESTS

May 22, 1973

To All Beekeepers in the Peace River - Grande Prairie Area

Dear BeeKeeper:

The problem bear program in the Peace River - Grande Prairie honey production area is now underway. Four crews are equipped to remove problem bears from beeyards. When you suffer bear damage contact your Fish and Wildlife Division office as soon as possible and the staff there will alert one of the bear crews who will investigate within 24 hours. Following is a list of Fish and Wildlife office telephone numbers. Offices are open between 8:15 a.m. and 4:30 p.m., Monday to Friday.

Peace River	624-4080	Valleyview	524-3605
Grande Prairie	532-2002	High Prairie	523-3405

After hours and on weekends you may call directly to one of the bear crews as their vehicles are equipped with radio telephones. Ask for the mobile operator and give her the mobile number of the crew in your area. Following is a list of the crew mobile numbers.

Falher	YJ26209 or YJ26097	Grande Prairie	YJ26099
Peace River	YJ26200	Valleyview	YJ26098

Those beekeepers within MD 130 may also submit complaints directly to MD 130 headquarters in Fahler. The telephone number there is 837-2221.

We ask that you supply the legal land description of the yard to the office when reporting; and inform the land owner that a bear crew will be at work in the area. For each bear removed you will be charged $25.00 payable on receipt of a bill from the MD 130 office.

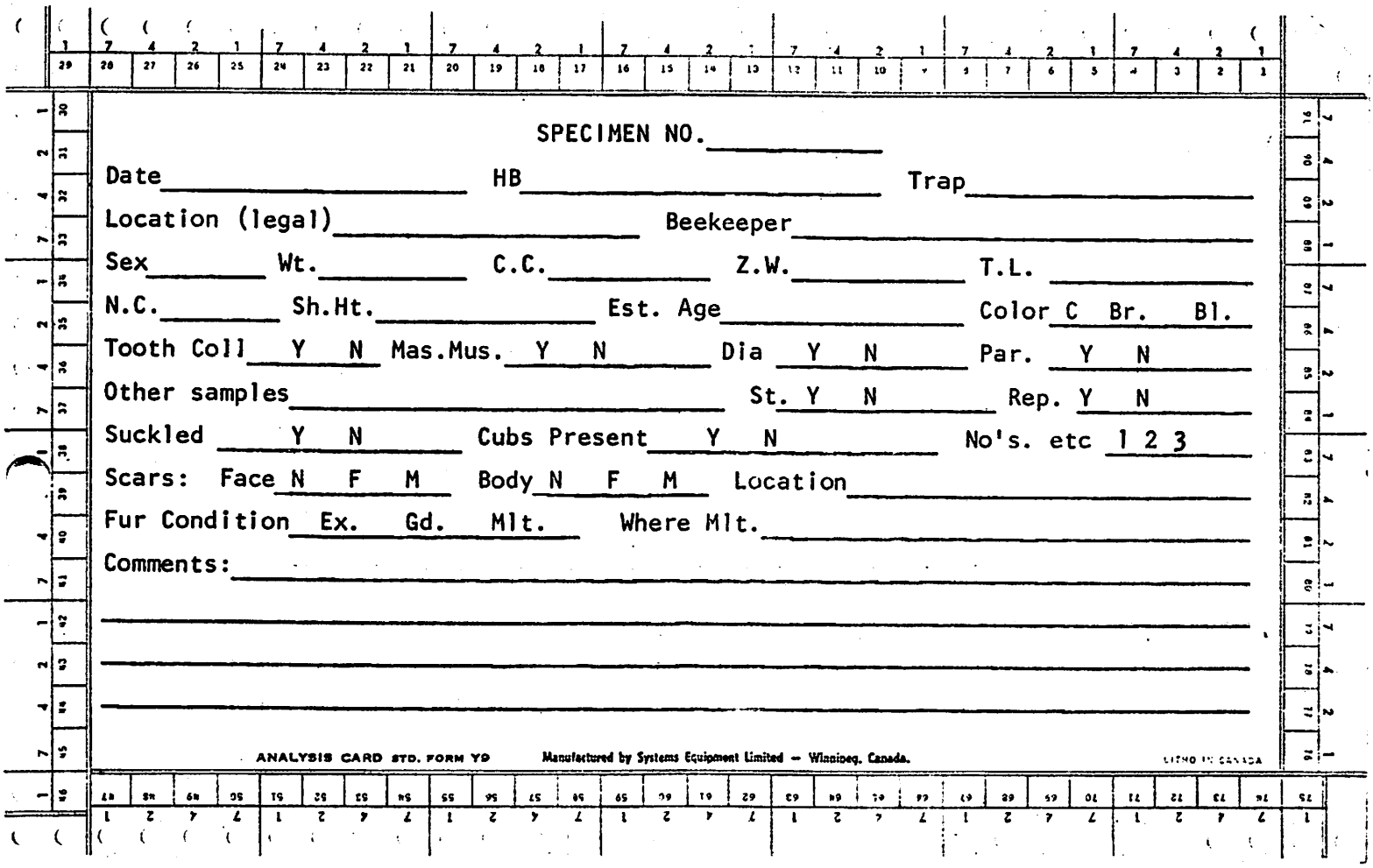
Yours truly,

John R Gunson

John R. Gunson,
Wildlife Biologist

JRG/bjm

Appendix 2. Follow-up letter to beekeepers.



SPECIMEN NO._____

Date_____ HB_____ Trap_____

Location (legal)_____ Beekeeper_____

Sex_____ Wt._____ C.C._____ Z.W._____ T.L. _____

N.C._____ Sh.Ht._____ Est. Age_____ Color C Br. Bl.

Tooth Coll Y N Mas.Mus. Y N Dia Y N Par. Y N

Other samples_____ St. Y N Rep. Y N

Suckled Y N Cubs Present Y N No's. etc 1 2 3

Scars: Face N F M Body N F M Location_____

Fur Condition Ex. Gd. Mlt. Where Mlt._____

Comments:_____

ANALYSIS CARD STD. FORM YD Manufactured by Systems Equipment Limited — Winnipeg, Canada. LITHO IN CANADA

Appendix 3. Specimen card for recording biological data.

Bear Management Zone: _____ Crew Identification: _____

Damage Record

Complaint No.: _____ Beekeeper's Name: _____

Date Received: _____ Address: _____

Legal Location of Beeyard: _____

Area Description: _____

_____

Number of Hives: _____ Number Damaged: _____

Details of Damage: _____

_____

$ Estimate of Damage: Crew _____ Beekeeper _____

Details of Damage Estimate: _____

_____

Beeyard Fenced: Yes No Operational: Yes No

General Condition of Fence: _____

_____

Other Preventative Devices: Yes No Describe _____

_____

Trap Record

Trap-type	Date Set	Date Removed	No. of Checks	Successful
Leg Snare	_____	_____	_____	_____
Culvert Trap	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Bear No.: _____ Date of Autopsy: _____

Bear Card No.: _____ Beekeeper Charged: Yes No

Hide Disposition: _____

Meat Disposition: _____

Remarks: _____

_____

_____

Appendix 4. Bear data sheet used for recording damages and action.

Instructions for Collecting Bear Specimens and Recording Biological Data

1. Numbering: Give each bear a number. Use the cattle tag number series. Tags can be affixed to the hide, if saved; or to a specimen. All specimens from one bear should be identified with a shipping tag with the bear number.

2. Skinning: All bears that have salvageable hides are to be skinned and turned over to a local trapper designated by your Wildlife Officer for fleshing, stretching and drying. This should apply to most bears taken prior to June 1 and perhaps, to some bears in late summer.

3. Measuring: Scales for weighing and tapes and calipers for measuring have been supplied to each crew. Body weight should be recorded to the nearest 0.1 pound. Total length (TL), girth (CC), shoulder height (Sh. Ht.) and neck circumference (NC) to the nearest 0.1 inch; and zygomatic breadth (ZW) to the nearest 0.1 cm.

4. Collecting: Collect the following from each bear and number accordingly.
   a) Lower right jaw (½ mandible).
   b) Masseter (jaw muscle) and Diaphragm - about 2 square inches of each.
   c) Reproductive Tract with ovaries - from all females.
   d) Stomach sample - about one pint from every other bear.
   e) Parasites, if any. Label as to location in or on bear.
   f) Scats - some scats from trap site or general area should be collected.

Card Symbol Explanations

Specimen No.	Same number on damage sheet and card
HB.	Handled By (initials of crew)
Trap	Snare, culvert trap or other
Wt.	Weight (including hide)
CC.	Chest circumference: girth (immediately behind front legs)
ZW.	Zygomatic Breadth (greatest width across skinned skull).
TL.	Total Length (from tip of nose to last tail vertebrae)
NC.	Neck circumference
Sh. Ht.	Shoulder Height (length of front leg held out with foot flat - from palm to tip of shoulder blade)
Est. Age	Cub, Yearling, Two-year old or Adult
Colour	Cinammon, Brown, Black
Y. N.	Yes, No
Fur Condition	Excellent, Good, Moulting

Appendix 5. Instruction sheet providing details of biological techniques.