PROCEEDING OF THE GREAT LAKES DEER GROUP MEETING

September 16-19, 1974

Parry Sound, Ontario.

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17 September Morning: Stan Munroe, Moderator

WELCOME: W.R. Peck, District Manager, Parry Sound Dist., OMNR.

Productivity of deer in Ontario, by Dan Mansell, OMNR.

Productivity Ontario deer examined with respect to:

a. deer killed by means other than legal hunting
b. Bruce Peninsula deer range

Bruce Peninsula a limestone landform, with white cedar and elm principal tree species. Receives 79 cm. precipitation/year, mean annual temp. = 6° C, and 147 frost-free days.

Fetal rates for Bruce Peninsula:

fawns	-	1.11	1.39; compared to 1.92 in Michigan
yearlings	-	1.44	
young adults	-	1.67	
adults 4½+	-	1.87	

Examination fetal rates from 1954-1970 revealed temporal changes in productivity:

- low rates in 1959-60
- hypothesis that these severe winters caused young to suffer physiologically, and lower productivity resulted when this group reached adult age
- correlation apparent between strong age class and higher productivity.

Estimate (pellet survey) of 5000 deer on Bruce Peninsula in 1972; legal harvest about 7% of herd, at which time herd was using 80% of available browse and browse nutrition was considered borderline.

From examination of Corpora lutea of estrous:

		Ovulation Rate
October	- early first ovulators	1.42
November	- late " "	1.63
November	- second ovulators	1.81

Testing the hypothesis that females that did not carry young the year before were in better condition at the onset of the next breeding season:

No. of fawns carried year before	Ovulation Rate
0	1.29
1	1.00
2	1.41
3	2.00

Current CL of pregnancy was 1.58, compared to 1.54 live fetuses. No significant difference found between estimates of CL of pregnancy and CL degenerating at parturition. Fawns survival endangered when femur fat level falls below 50% (from Verme) - occurs at 85 days in yards.

At Parturition:	Fetal Rate	% Pregnant
Fawns -	1.00	10.5
Yearlings -	1.29	63.6
Young Adults -	1.41	74.1
Old Adults -	1.56	100.0

3 of 39 fawns pre-pubertial
1 of 38 yearlings pre-pubertial

Winter mortality on Bruce Penincula not great. Sex ratio 50:50. Herd balanced primarily by hunt. Net productivity 21 percent. Considering browse available and management effort, harvest should increase to more than 10 percent of herd.

Ontario deer range is the Northern fringe of the species' range in North America, and spans 10^{o} latitude and 20^{o} longitude. Analysis of embryo counts of deer killed by other-than-legal means by areas of Province revealed:

Northwest Ontario	-	1.62 fawns/doe
Northeast "	-	1.65 "
Central "	-	1.79 "
Southern "	-	1.75 "

Higher productivity in central and southern areas likely explained by higher land capability.

Ovarian analysis has been conducted for five sites in Ontario:

Algonquin Park	-	1.25 fawns/doe
South Canonto	-	1.27 "
Bruce Peninsula	-	1.39 "
Manitoulin Island	-	1.40 "
Parry Sound	-	1.66 "

Note added by S. Munroe that the harvest had recently been raised to 15 percent of the herd.

Moderator Munroe asked for comments from the states as to whether and how they are looking at productivity.

D. Arnold, Michigan: Michigan has been looking at deer from February to June and relating age and condition of doe to pregnancy rates and condition of fetuses:

- fawn losses can be as high as 90% for does in poor condition
- last month pregnancy most important for fetal survival
- 50% and below femur fat level effects productivity
- necessary to use lab analysis of femur fat content
- in the U.P. fawn losses have been estimated as high as 75%
- found CL scars have not changed year-to-year although productivity does due to fawn losses
- possible that loss just after parturition could be extremely high.

P. Karns, Minnesota: We have been looking at size and weight of doe and relating data to winter conditions.

Arnold: With respect to dip in productivity curve during 1960-61 on Bruce Peninsula, Michigan experienced a high year, reflected in productivity and harvest data.

A. Bubenik, Ontario: Summer range could be of major importance to survival of fawns. Very dry conditions, e.g., can reduce survival 40-50% in some species.

F. Svoboda, Minnesota Dept. Highways: The Minnesota Dept. of Highways is investigating relationships of highways and wildlife, particularly deer. I would appreciate information on, and discussions with a number of you during these meetings about:

- what is the deer's tolerance to roads?
- what are the effects of highways on big game?
- what is the value of game species lost to road kills?
- what is the value of meat loss, and how does the meat rate for use?
- what protective techniques exist and/or can be tried?

PANEL: 1973 HUNT REPORTS AND 1974 PROSPECTS, PROBLEMS

WISCONSIN - F. Haberland: Most of the northern one-third of Wisconsin remained open only to buck hunting, and quotas were eliminated from several west central management units. With a mild winter prior to 1973 season, a 50% increase in variable quota permit deer was proposed, for a deer kill of 85-90,000 (but not accepted). The projected kill for 1973 season was 80,000 deer and the registered kill was 82,000. 1973 was a record year for archers with 8,456 deer taken with the bow.

With a mild winter again last year, we predicted a 10% increase in buck kill, and proposed 100% increase in antlerless permit kill. The Conservation Council proposed only a 22% increase. A compromise of a 63% increase was not accepted. As a result the 1974 deer seasons are very conservative. We predict a gun kill of 85-90,000 and bow kill of ±9,000.
100,405 12,000

Next year we have to start having seasons approved by Legislature. A 90-day advance notice is required for establishing regulations and the Legislature may change deer quotas; however, no surveys need be run by this group.

In 1973, 14,018 deer roadkills were recorded, giving a projected roadkill total of 20,000. DNR receives many requests for salvageable deer meat - we estimate 20 percent of roadkills are salvageable at 30¢/pound. We are attempting to ease chore of picking up dead animals by contracting with rendering plants. There are two peaks in number of roadkills - spring and fall; October appears to be month of greatest number of roadkills. Deer roadkills continued to rise even during years of low population levels. Fawns show up in disproportionately high numbers compared with fawns in hunter kill. Reduction in speed limit to 55 mph. because of energy crisis has resulted in deer roadkill decrease. / No

MICHIGAN - D. Arnold: In 1969-70 we had a severe winter in Michigan after which the population was down; the deer harvest is still not back up from this time.

Since 1970, in the Upper Peninsula
- 1971: 3000 antlerless deer harvested
- 1972: nil
- 1973: requested a 2000 antlerless deer harvest, leading to much political argument; we finally did have the antlerless season as well as a buck season.
- 1974: Decided because of political hassles not to harvest doe deer in U.P. unless it was a biological crime not to. For this reason we recommended an antlerless season for part of U.P. in 1974, but the political powers decided we would have a bucks only season in the U.P.

The Northern Lower Peninsula has a healthy deer herd. After the severe 1969-70 winter the estimated population figure fell to 160,000 deer. Since 1970 a deer range management program has been conducted, in conjunction with a reduction in the antlerless harvest. Approximately 400,000 deer was the 1974 projected population. It was also predicted that the carrying capacity of

the area for deer will be taxed if the seasons are not more liberal than in the past. The buck harvest in the N.L.P. rose from 28,590 in 1972 to 36,810 in 1973.

In the Southern Lower Peninsula deer are scattered all around urban centers. There was a slight increase in 1973 in buck kill from 12,110 in 1972. Road kills number about 10,000 in the state, mostly distributed in the south.

In 1973 the gun kill was 66,280 for the entire state. Interest in bow hunting remained at a high level during 1973, 80,050 archers claiming a record 4,620 deer. The total kill was 70,990 deer. Before the severe 1969-70 winter, 100,000 deer were harvested in the 1969 season - the harvest has not been as high since but is climbing.

In 1973 during the regular firearms season, 42 areas permitted any-deer hunting by hunters receiving any-deer permits. A total of 7,400 antlerless deer were taken by 46,040 permit hunters in 1973, compared to 7,580 by 37,420 permittees in 1972. Regular firearms season remained traditional Nov. 15-30 in 1973 with bag limit of 1 antlered buck. The bow and arrow season was split into two periods, Oct. 1 to Nov. 14 and Dec. 1-31; archers could take any deer. Camp permits permitted taking of one antlered buck and could be purchased for either firearm or archery seasons. The total kill from this means amounted to ±90 bucks.

The deer range improvement program is being continued and has been a well-accepted program. We may not meet our goal of 1 million deer by 1980, but do expect to reach at least 800,000 deer.

MINNESOTA - P. Karns: Minnesota instituted a bucks-only season in 1973 in some areas. For 1974, deer hunters will have 3 options during the firearms season:

I - May choose to hunt deer of either sex in Zones 1 and 3 (N.C. and S.E.) and make a choice of dates; either 3 consecutive days from Nov. 1-5 or 6 consecutive days from Nov. 6-30.

II - May hunt bucks only in Zone 2 (N.E.) for the first 17 days in November.

III - May choose to hunt deer of either sex in Zones 4 or 5 (.W.C.) on November 9 only.

Zone 6 (S.W.) will be bow and arrow only; bucks only.

In the 1973 season hunters were offered either 2 days early, 3 days mid-season, or 5 consecutive days Nov.15-30. We found that this system led to a large amount of illegal activity; with the 2 or 3-day choice found that hunters would extend their stay in the woods.

Since the late 1960's hunting seasons have changed from a 9-day season to 5-day to 2-day to 1-day, and in 1971 we had no season. In 1972 we sold 285,000 licences and 296,000 in 1973. The deer population in some areas is not able to tolerate a high hunting pressure.

Minnesota experienced a mild winter in 1972-73 and the 1973 harvest was greater than 1972. In the bucks-only areas in 1973 the harvest was approximately one-half of the 1972 any-deer harvest. During the bucks-only season there were 17 days to hunt deer, and it required approximately 50 man-days to harvest a deer compared to 12 days/deer in the 30 day any-deer framework. After season surveys indicated that the buck season did not increase losses due to deer shot and left in the woods. Losses were about 50% legal harvest in both types season.

Field checks determined that under the 1972 season-choice options 94 % of the hunters were legal and that these were predominantly city dwellers, whereas the 6% illegal hunters were 88% local hunters. Minnesota has a deer registration system now. For 1974 we are predicting 300,000 deer hunters. We will also have another bucks-only season in 1974. We hope to go to an antlerless quota system in the future.

Road kills took about 5-6,000 deer in Minnesota during 1973. The past winter conditions were comparatively mild, however a cold wet spring caused some deer losses. This may have been related to a nutritional deficiency which has been showing up in cattle. Present density is about 8-10 deer/sq.mi.

ONTARIO - J. Ludwig: A mild winter in 1972-73 allowed higher fawn survival than in the past few years, except in the northwest. A number of areas reported improved hunts (e.g. Parry Sound, Blind River, Bruce Peninsula); in terms of percent success and percent fawns in the kill it was the best hunt since 1967 in these areas. Last winter was again mild and we expect another improved season this year in the central and southern areas. Northwest Ontario had another tough winter. Because of the two consecutive hard winters Manitoba has closed their deer season entirely. We have not, and may get an influx of Manitoba hunters.

Our mail survey indicated 87,300 deer hunters (up 1% from 1972) killed 16,200 deer (down 6% from 1972). There seems to be some disagreement between our field reports and mail survey. Part of the problem may be due to our recent reorganization, with new district boundaries, and trying to relate old to new data.

As to changes for 1974:

- in the N.W. the non-resident season will open a week later to ease the problem of moose hunters jumping the gun by hunting on a deer licence.

- will have a split season on Manitoulin Island, 3 days on the east end and 5 days on the west end to reduce an overpopulation in the latter.
- herd seems to be coming back on St. Joseph's Island and season reduced to one week to reduce kill.
- in the Tweed area the season has been reduced to one week from two with the objective of reducing the harvest (F. Gilbert commented that reduction of season length is not necessarily a viable means to reduce harvest).
- archery-only seasons in S.W. Ontario have been expanded. We have no special archery licence and thus no handle on our archery hunters or their kill.
- we have a new gun season in Huron County - first in S.W. agricultural areas for a number of years.

We hope to institute a zone-quota system for gun seasons in S.W. Ontario in the next year or two. This was tried and rejected in 1972, partly because it was approached incorrectly and because we had no enabling legislation for a lottery system. We have had several archery seasons since 1972, and are now hearing requests from landowners wanting gun seasons. We have had some recent problems with the Humane Society on archery hunting, but they seem to be quieting down.

We still have any-sex seasons everywhere we have seasons, although many hunters are calling for a buck law. There has been some talk of bulls-only moose seasons, but these have been rejected. If bulls-only seasons were instituted, we would probably be forced into a bucks-only season. The fear is that once we had them we would not be able to get rid of them (our seasons always have to go through the Cabinet).

In a brief discussion on bucks-only vs. any-sex deer hunts, P. Karns commented that he felt we have been hung-up too long on an any-deer season, and that we should have more flexibility. Flexibility was agreed to as desirable by all, but Michigan's experience indicates that bucks-only seasons may lead to a lack of flexibility.

A discussion followed on registration vs. hunter sample survey methods of determining kill:

Karns: Compulsory kill registration has been introduced in Minnesota only recently and is handled at 400 locations (e.g. gas stations) with a maximum travel distance of 30 miles to check in. We are satisfied with it.

Arnold: In Michigan, with about 600,000 hunters and a kill near 100,000, it would be too difficult to enforce mandatory registration once hunters are on a freeway heading south, and hunters would not comply with registration. We are happy with the present hunter pressure survey and are interested in unsuccessful as well as successful hunters. The dollar requirement for a sampling system is minimal compared to a registration system. Our mail survey samples 25 percent of the hunters, with a 90 percent response (3 mailings). B.S.

Haberland: In Wisconsin mandatory registration has been used for 21 years and we are obtaining 99 percent of the kill by this method. We have excellent hunter acceptance. We also have a hunter poll mailed questionnaire from which we can determine hunting pressure by management unit.

Ludwig: In Ontario we sample 1 of 6 or 7 hunters by mail survey. We used to have a number of voluntary check stations, but most have been discontinued as access increased. Still have field and camp checks. The questionnaire return for 1973 fell to 79% with 2 mailings compared to ±90% in previous years with 3 mailings.

TOOTH-WEAR VS. CEMENTUM AGING IN ONTARIO - G. WINTERTON, OMNR.

Deer jaws were collected from four areas in Province:

Parry Sound District	-	1970 and 1971
Linday "	-	1971
Kenora "	-	1971
Manitoulin Island	-	1971

Kenora was a total collection; all other collections were a sample of deer that were field aged. Teeth were aged by 3 people; seldom with the cementum aging did the results differ by more than one year.

Wear-class aging stopped at 6½+ but cementum aging produced ages up to 15½ years. We found a great deal of variation and individual error in wear class aging. Thus this method is not satisfactory for following a particular year class through its life. Most of the errors, however, were made in the age classes representing a small proportion of the herd. The majority (>75%) of the deer are 3½ or younger and the differences in aging in these age classes was not that great. No mistakes were encounted in fawns or yearlings, and the errors were partly compensatory in the older age classes. Most errors were underaging, particularly in the older age classes; the exception

to this was the tendency to overage those called 3½ by wear class aging in all areas. In the total samples, the percent of deer 2½+ aged correctly by wear class ranged from 43-60.

Regression equations, as well as survival and mortality rates, were calculated for each set of data from each location. Mortality rates were lower for cementum aging than either the wear class samples or total field aging, and lower for the wear-class samples than the total field aging. Reasons for this would be the tailing-out of the age distribution by cementum aging, and an apparent bias in the wear-class samples as compared to total field aging. For all locations there was no significant difference between the slopes of regressions of the cementum aging and the wear-class samples. There was a significant difference between cementum aging and total field aging for the Manitoulin and Parry Sound samples, and not for Lindsay or Kenora.

It is felt that the Kenora (total sample) situtation best represents what would occur if we changed from wear-class aging to cementum aging. We do not believe at this point that it is worth the extra expense involved to section teeth to age deer, except in conjunction with other studies where necessary to know the age of each individual deer.

C. MacInnes: The animals 3½ years and older make up the majority of those in the high productivity class - we should not overlook the portion of the sample. We should define what level of change we would like to detect. Regression not appropriate analysis to apply to this data.

F. Gilbert: Perhaps we can obtain age distribution from tooth wear, but we cannot assign biological information from wear-class data.

A. Bubenik: In a stressed or overpopulated herd that is undernourished replacement of milk teeth may be postponed up to 5-6 months, confusing wear-class information.

G. Burgoyne: Males and females cannot be combined in looking at mortality and survival rates. Age structure in the females is determined by age-specific reproductive rates, while age structure in the males is determined by exploitation or mortality rate.

A pro and con discussion on this point ensued, and then was deferred until the evening when it could be tested on the computer.

A discussion as to the method of aging used by the states revealed Michigan uses wear-class aging. Minnesota presently uses cementum aging because they found a significant difference between field aging and cementum aging. Wisconsin uses the wear-class method and aged 14,000 deer in 1973. A comparison of the two methods in Wisconsin revealed similar curves.

EXPERIMENTAL 3-YEAR DEER SEASON CLOSURE - R. CAMPBELL, OMNR.

Deer populations in much of northeastern Ontario have been declining steadily over the past 15 to 20 years. Today deer are practically non-existent in the Temagami area, and are becoming scarce in the areas north of Lake Nipissing and the Mattawa River. Some deer yards have ceased to exist because of logging, and there have been declines in other yards still being used. In the Mattawan yard logging operations the 1960's resulted in abundant winter food supplies in close association with what appears to be suitable cover. This has not appeared to influence the declining deer herd.

In 1970 we decided to test the effects of hunting on a deer population at the northern fringe of its range. The season was closed in 1971, 1972 and 1973. Deer winter concentrations were mapped from the air, and the unit (697 sq. mi.) was stratified into high, medium and low areas of deer concentration. Population estimates were obtained by pellet surveys in spring of 1971, 1972 and 1974. Concurrent dead deer surveys of 10% of the area provided estimates of winter mortality.

RESULTS:

	1970	1971	1972	1973	1974
Fall Population	811±251	706±237	-	747±315	
Change from previous		-13.0%		+5.8%	
Legal Kill	78(9.6%)	-	-	-	
Winter Mortality (Predation)	93(11.5%)	118(16.7%)		104(13.9%)	
Spring Population		640±198	589±197	-	643±271
Change from previous			-8.0%		+9.2%

Change over three-year period was an 8% decline in the fall population and no change in the spring population. Average winter mortality was 14%; all dead deer found were a result of wolf predation. The winters of 1972-73 and 1973-74 were two of the easiest winters in recent times. Deer appeared in excellent condition when seen and marrow from wolf kills indicated deer were in fine shape.

It is rather hard to understand why the deer herd did not increase. With average winter mortality of 14%, and with the deer in good shape, their recruitment potential should have more than

compensated for this loss. Unfortunately, with a deer population hovering around 1 per sq. mi., there are few road kills or other opportunities to gather data on productivity.

The lack of any significant increase in the deer population would indicate that factors other than hunting and predation are involved in limiting this population. Winter range appears to be adequate and the problem may be with summer range. Range treatments may have to be on a much larger scale in order to have an effect on the deer population. The 1974 survey revealed for the first time a considerable amount of moose sign - another indication of a declining deer population in habitat still favorable for moose. In management planning in this area we thus need to consider the possibility that this unit should be treated as moose range rather than deer range in the future.

Of further interest is the support from local residents and hunters we received for the experimental closure. Everyone seemed to feel the "Department was doing something". Some behavioral changes in the deer herd have resulted in part of the wintering population moving to an area of the yard closer to the highway and thus becoming more visible to people. It would be very hard to convince these people that there were not more deer in the area.

Wilton: With an original declining population the results of this study may well indicate that the population has stabilized through hunting control, and if predation had been held down it may have allowed a population increase.

17 September Afternoon:

John MacFie presented a slide talk on the history of the deer herd and habitat changes in Parry Sound, including range management programs conducted in the area. This was followed by a tour through the deer wintering areas in Killbear Park conducted by MacFie and Lloyd Thurston. On the field trip discussion centered on the hemlock shelter and its regeneration and potential for management, and on the habitat work accomplished to provide an adequate supply of winter browse in close proximity to adequate shelter. The difficulty in managing wildlife or its habitat in Parks also was discussed.

17 September Evening: Charlie MacInnes, Moderator.

SOCIAL WELL-BEING AND ECOLOGICAL BALANCE AS FUNCTIONS OF THE INFRA STRUCTURE IN UNGULATE POPULATIONS - A BUBENIK, OMNR.

Mechanisms have developed in ungulate evolution for allowing intra-societal competition with minimal social strife and for resolving strife quickly when it does occur. When strife is minimal the society is said to be

in a state of "well-being". One mechanism has been the differentiation of societies into relatively distinct social classes based on levels of social maturity. Five such classes may be recognized in ungulate populations: Kids, Pre Teens (some species), Teens, Prime Adults, and Post-Prime/Senior Adults. Primes are in optimum reproductive condition - Seniors have passed it.

When Primes outnumber the Teens the latters' maturation rate is slowed and their breeding inhibited. When Primes are in an abnormally small proportion juveniles mature more quickly and attempt breeding even before their sexual displays have reached full development. Early (age) breeding has disadvantages to the society leading to poorer development and condition of individuals.

If we are to maintain game animals in prime condition and optimal densities we must regulate hunting and predation so as to maintain a balanced social structure for each population. That is, we must maintain the optimum ratios between social classes and other conditions necessary for these populations to exist as societies with a minimum of dangerous social friction.

We have traditionally dealt with wildlife populations in terms of age-sex classes. It is not the age of the individual, so much as his level of maturation that is crucial. Age-maturity relationships can be quite variable between populations and from one period to the next in any given population. Individuals at different maturity levels play different roles in the society; each individual graduates from one step to the next or from one role to the next as it matures.

Imbalance is seen particularly in the effects of over-harvesting prime males in ungulate populations. When the proportion of juveniles is abnormally high the maturation rate is accelerated; the maximum age attained in the population is lowered. In a heavily hunted population prime males become chronically rare. The population is characterized by a large proportion of juveniles and is disorganized. Animals tend towards relatively poor physical condition and in extreme cases density crashes have occurred.

To prevent ecological imbalance we must maintain the ratios between classes within the optimum range. Hunting emphasis on largest available trophies and meat animals is biologically unsound. Hunting should be regulated so as to hold each maturity-sex class in a balanced ratio

to the others. We must have biologists trained to analyze social composition; we must alert the public and redesign our hunting practices and regulations.

Following this, Tony Bubenik discussed the analysis of population dynamics, and demonstrated a mechanical simulator which he developed for the analysis of population dynamics while working on a World Wildlife Fund project. Meanwhile Charlie MacInnes discussed briefly population analysis with the aid of a computer, and outlined the analyses that could be performed on the available portable hook-up to the central Toronto computer. Practical demonstrations and exercises then followed with both types of simulation. Plugging values into the computer revealed George Burgoyne to be correct in the need to analyze male and female mortality and survival data separately.

18 September Morning: J. Ludwig, Moderator

HABITAT CAPABILITY AND SUITABILITY FOR DEER IN ONTARIO - A. HOUSER AND R. BAKER, OMNR:

Houser: To date, wildlife has been a very difficult commodity upon which to place an economic value. This became all too apparent when trade-offs for different land uses had to be made and it became necessary to convince others of the wildlife value of an area. The "user-day" or "recreation opportunity" concept will make it possible to place a more tangible and easily understood value on wildlife.

However, in order to provide an estimate of the existing or potential supply of wildlife-oriented recreation, an inventory of the present resources is necessary. An inventory of present animal populations might seem to form the best basis for estimating the existing user-day supply; but past censuses of populations are of questionnable value and there is simply not enough time at present to carry out censuses of all the desired wildlife species over large areas of the Province while giving detail at the small area level. However, it may be possible to provide an estimate of population size, and thereby user-day supply, using wildlife land-use suitability maps. Land-use suitability to produce wildlife is in simple terms a measure of how good the present habitat is for wildlife production. As such, it is a function of the nutritional quality of available food and the overall condition of the existing habitat. To provide suitability maps it is therefore necessary to carry out an inventory of the land resources and of present habitat conditions. Similarly an inventory is necessary to determine potential production. Fortunately, in a large part of Ontario such inventories have already been carried out by the Ontario Land Inventory.

(a) Capability and Degree of Effort: There have been a number of studies showing that reproductive success, physiological well being, and total animal numbers are dependent upon the quantity and nutrient quality of available food. Therefore, in assessing land capability to produce wildlife the assumption has been made that wildlife capability depends upon the ability of land to produce food and cover, and that in turn this land capability for food and cover production is dependent upon soil and water characteristics. Within each land unit soils were rated as to their potential for the quantitative production of nutritious food, their

potential production of a variety of wildlife food and cover species, and their ability to respond to management. From this a general wildlife production rating for each unit is obtained.

However, in the Ontario system of classifying land for wildlife up to 13 different species are rated separately. Each species has specific habitat requirements which must be met if an area is to support a self-sustaining population.

Therefore, for each land unit the general wildlife rating is modified for each species according to the ability of that land to produce the required habitat. In addition, each species also received a degree of effort rating. The present condition of the habitat is the basis for determining effort. The degree of effort rating indicates the relative amount of time and energy required to provide optimum habitat.

(b) Suitability: The capability and degree of effort information were combined to produce a suitability classification. As with the capability system, each species has been rated separately. However, unlike the capability ratings, suitability ratings because they are an indication of present habitat conditions change with time and therefore, like the degree of effort ratings, must be revised periodically.

A number of assumptions were involved in developing the capability and suitability ratings. The end product has not been field-tested except through some preliminary studies by Bob Baker and myself. The following presentation by Baker is an attempt to determine whether suitability ratings do in fact provide a relative indication of the quality of habitat conditions for deer by comparing suitability ratings and deer populations in a number of districts.

Baker: Fall 1971 deer density estimates for the Bruce Peninsula and the old Districts of Parry Sound and Lindsay were obtained from 1972 pellet group and dead deer survey reports. Amounts of land in suitability classes III-IV and V-VI in these areas were then determined using Ontario Land Inventory Suitability maps.

The following relationship was used to estimate fall deer populations from suitability data:

> proportion of District which is class III-IV x fall deer density in class III-IV land and proportion of District which is class V-VI x deer density on class V-VI = fall deer density estimate for the District.

Various deer densities were specified for class III-IV and class V-VI land in an effort to obtain suitability based density estimates which agreed with the pellet group based estimates in the Bruce Penisula and the old Districts of Parry Sound and Lindsay. The proposed deer densities for class III-IV and class V-VI lands were then applied to the old District of Tweed and the now Districts of Parry Sound, Bracebridge, Bancroft, Minden and Pembroke. Suitability based deer density estimates were obtained from the data and compared with pellet group based density estimates.

Good agreement between suitability and pellet group based deer density estimates in the Bruce Peninsula and the old Districts of Parry Sound and Lindsay was obtained when the following deer densities were specified on class III-IV and class V-VI lands:

> Class III-IV = 5-11 deer/mi^2 fall population
> Class V - VI = 2-5 deer/mi^2 fall population

When the deer densities specified for class III-IV and V-VI lands were then applied to six other Districts, good agreement was obtained between pellet group and suitability based deer density estimates in all except the Districts of Bracebridge and Minden:

	Deer/mi^2 from Habitat Suitability	Mid-Point	Deer/mi^2 from Pellet Group Count	Mid-Point
Bruce Peninsula	4.0 - 9.0	6.5	3.3 - 10.0	6.7
Parry Sound (old District)	2.2 - 5.4	3.8	2.5 - 4.7	3.6
Parry Sound (new District)	2.2 - 5.2	3.7	2.4 - 5.2	3.8
Bracebridge	2.3 - 5.6	3.9	0.5 - 2.5	1.5
Lindsay (old District)	2.8 - 6.6	4.7	2.5 - 4.7	3.6
Minden	2.3 - 5.6	3.9	1.0 - 3.7	2.4
Bancroft	2.3 - 5.7	4.0	2.7 - 6.0	4.3
Pembroke	2.9 - 6.9	4.9	1.7 - 5.2	3.4
Tweed	2.5 - 6.0	4.3	3.5 - 6.5	5.0

Deer/mi^2 mid-points were higher in the Bruce Peninsula for both suitability and pellet group data - 6.5 and 6.8 deer/mi^2 respectively. In other words habitat quality, as measured by suitability ratings, was better in the Bruce Peninsula than in any of the other 7 districts studied, and the number of deer/mi^2 (sample mean) based on pellet group count, was higher in the Bruce Peninsula than in any of the other 7 districts. The number of deer/mi^2 (sample mean) based on pellet group count was lower in Bracebridge and Minden than in any of the other Districts. Habitat quality in Bracebridge and Minden was comparable with that in surrounding Districts, however, and as a result, suitability based deer density estimations (mid-points) were similar i.e. they all fall within the range 3.5-5.0 deer/mi^2.

Alternate sources of evidence are required to effectively support or refute the contention that population size and health are reflected in habitat suitability ratings.

Given that deer population size, productivity and health are dependant on a finite set of environmental characteristics it may be that the complete set or at least the most important characteristics in the set are unaccounted for in habitat suitability ratings. Two ways of correcting this situation are (i) hypothesize as to those characteristics which ought to be added to the ones already used in habitat suitability ratings, e.g. quantity and quality of winter range and snow depth, and use them in future. (ii) Determine where significant differences in deer population size, health and productivity exist in this Province, assume that these difference are the result of significant differences in a finite set of environmental characteristics, then set out to identify and measure these characteristics.

A discussion followed in which it was stressed that the method of solving an equation for values (fixed agreement), and then using the same area to test whether they agree, is circular reasoning, and therefore agreement was evident for only 2 of 5 units; that the capability-suitability rating system is over-simplified and too subjective and ignores too many factors of importance to deer; that the assumption "better soils = higher deer populations" does not necessarily hold; and that even if this system was a valid rating of habitat suitability it would be prohibitively expensive to keep it up to date. In general, little value was seen in the system as presently constituted.

BEAR RESEARCH IN ONTARIO - G. KOLENOSKY, OMNR

The black bear received game animal status in Ontario after the bounty was dropped in 1961. The present study was initiated in the North Bay area in 1969, principally to answer questions on whether bear population fluctuations are rhythmic, the density of bears in various habitat types, and the factors controlling both the preceeding; whether bear "outbreaks" in certain autumns are related to population increases or other factors and whether they can be predicted; whether fall bear hunting success can be predicted, and its relationship to early freeze-up and denning; the effect of spring hunting on orphaning of cubs, and whether they frequently become nuisance bears; the range of various age-sex classes of bears; and the feasibility of live-trapping and transport of nuisance bears.

Methods included use of leg snares and anectine (1 mg/5 lbs). Fatality rate from drugs was 4 percent. Injuries from snares rated as none for 76% captures, slight for 19%, and severe for 1.3%. Loss of one ear tag over the years 4 percent - none lost both ear tags.

During six years 140 different bears captured 296 times. Males capture significantly ($P < .05$, $x^2 = 4.9$, $df = 1$) more frequently than females; however, for different bears no sig. difference. Recaptures decreased in later years.

Population density calculated from "cumulative Lincoln index" using capture-recapture ratios and adjusting for known mortality. Calculated based on study area boundaries, and also for slightly larger area based on cruising radius as determined from telemetry of bears using study area:

	Study Area	Cruising Radius
1970	0.8/sq.mi.	0.70-0.80/sq.mi.
1971	0.8	0.70-0.80
1972	1.01	0.72-0.81
1973	1.4	0.97-1.12
1974	1.94	1.29-1.55

Trapping bias against younger age classes in 1970 and 1971 caused by cubby sets. Correction for this yields density of about one bear per sq.mi. in 1970 and 1971.

There was little relationship between the number of bears sighted and the calculated population size. Better relationship existed between sightings and poor or good berry crops.

Hunting annually removed 17 percent of the tagged males and 5 percent of the tagged females, or an average removal of 11 percent. Maximum annual mortality, based on unaccounted for bears, due to causes other than hunting, was 26 percent. However, true natural mortality probably lower.

Only two females were in estrous at age of 3, and none were recorded with cubs before 5. As they reproduce only every other year, the potential for increase is quite low. The percentage of females over 4 lactating ranged from a low of 9 in 1969 to a high of 50 in 1972 (sample size only 6 in 1972). In the 6 years of study 21 percent of 66 adult females were lactating. In 1974 only 3 of 16 were lactating, but the other 13 were in estrous indicating potential for a high cub year in 1975. During early years of study observed litter sizes were 2.0, but in 1973 at least one female had three cubs and in 1974 evidence indicates that all the lactating females had 3 cubs. Captured cubs were smaller during the last two years, but whether this will affect survival rate is unknown. Survival of cubs for at least the first year appears to be high. Incidence of yearling has increased markedly during last two years. Trapping bias against younger age classes disappeared after 1970 when trail sets used instead of cubbies.

Male black bears showed a steady but highly variable weight increase up to 7 years, females showed little increase after 4 years. Weight increases were noticeably less between 1 and 2 years of age than between other age classes, probably due to stress on yearlings after dispersal. Great variation in weights precluded determination of age based on weight. However we considered males mature when 200 pounds or more, and females mature over 100 pounds. Bears above average weight for their age class when initially captured retained this advantage and grew at a faster rate than individuals of subpar weights. Some spectacular weight increases (e.g. 100 lbs. in 3 weeks) were noted. Bears 10 years and older showed gradual downward trends in weight.

Scat analysis revealed following food habits:

- grasses and sedges major food items early spring
- poplar leaves important mid-June to mid-July
- fruits and seeds important late summer and early fall; juneberry, blueberry, raspberries, sarsaparilla
- insects in 20% scats from early June on
- browsing of bush honeysuckle and honeysuckles until early October.

Telemetry studies hampered somewhat by removal of radio collars by adult males, and failure to function more than one year. Minimum summer ranges for females varied from 4 to 15 sq. miles and averaged 10. There seemed to be some overlap, but difficult to verify. More limited data on males indicated ranges in the order of 40-60 sq.miles, encompassing several female ranges. Greater propensity of males to travel farther also demonstrated by hunter kills beyond study area. Movements in 1972 much greater than other years. In 1970 and 1971 mean distance travelled by males taken by hunters was 11.8 miles; in 1972 this more than doubled to 25 miles. Felt that greater 1972 movements due to failure of berry crop that year, necessitating increase in foraging ranges.

Eight sessions of continuous 5-day monitoring of four different adult bears (2 male, 2 female) revealed daily activity is bimodal. Bears generally become active about sunrise, rested for a few hours in the afternoon, and resumed activity until 3-4 hours after sunset. Bears active from 60-80 percent of a 24-hour day. Multiple linear regression analysis of the effect of weather factors on bear activity revealed only 24 percent variation in bear activity could be accounted for by combined effects of weather factors. Wind depressed activity and increased temperatures tended to increase activity.

Tentative Conclusions:

1) Bear numbers appear higher every 4 to 5 years, but much of apparent increase may be due to changes in food supply causing changes in behavior rather than actual population increases.
2) No indication at present that residents will substitute bear hunting for deer hunting. Most bears killed in fall are shot incidentally to deer and moose hunting. Popularity spring bear hunting on increase, but most hunters non-residents.
3) A delayed freeze-up causes a delay in denning and hence more bears should be available to hunters. It also appears that males are the last group to den and therefore should be available to hunters for the greatest period of time.
4) The fate of cubs orphaned in spring remains largely unknown. However, it appears that displaced subadults, rather than orphaned cubs, are likely to become nuisance bears. During the spring adult males seem to emerge first and readily utilize openings or clearings for foraging. In contrast, females with cubs seem to be one of the last groups to emerge and appear very reluctant to expose themselves in clearings. Therefore, if

desirable for management purposes, it seems feasible to reduce the kill of family groups during the spring by either 1) reducing the season or 2) permitting hunting only over baits that are at least 50-60 yds. from the edge of cover.

5) The technique of live-trapping and transplanting nuisance bears appears a feasible method of control if numbers involved are fairly small and transport distances are a minimum of 40-60 miles and if a large number are not deposited in an area already fully occupied.

PANEL: BEAR MANAGEMENT AND HUNTING

MINNESOTA - L. Rutske: The black bear has been a neglected game species in Minnesota, and had a bounty on it from 1945-1965. It was designated a game animal in 1971. An average of 550 bears / year were bountied in the late 1950's but by the last years of the bounty only about 5 were claimed per year.

From 1957 to 1964 the kill of bears during deer season varied from 155 to 240 and averaged 188/year. Since 1964 an average of 111 bears/year have been taken during deer season. In 1971 a bear season was set from the 1st of September to the beginning of deer seasons. Since:

1971 season:	43	bears	taken	in	bear	season (no deer season)
1972 season:	125	"	"	"	"	"
	53	"	"	"	deer	"
1973 season:	315	"	"	"	bear	"
	137	"	"	"	deer	"

Bear hunting pressure survey in 1973 revealed a 10% success rate for bear hunters and about 46 man-days/bear harvested, In 1974 there have been many more reports of bears, and 5000 bear licenses have already been sold.

Gale Rogers has been conducting a research study since 1969 on 100 sq. miles in northern Minnesota. He has captured 94 bears, radio-equipped most, and has more than 7,000 locations. The results have not yet been written up but should be highly informative.

WISCONSIN - B. ~~Collins~~ KOHN: From 1969-1973 Wisconsin has had a 23 day bear season with an annual kill of 500-600 bears. In addition about 200 have been taken during the deer season. Last year there was a 37% decline in the bear kill, perhaps due to an abundance of natural food. Of the bears taken, 45% has resulted from baiting, 15% from baits and dogs, and 10% from hunting with dogs.

There is considerable conflict between bear hunters using dogs and those hunting over bait. Both baiting and the use of dogs have been restricted in recent years. In 1973 bait had to be in biodegradable containers and contain no large bones. The dog hunters and baiters have each been attempting to get legislation to limit the other group. As a result both dogs and bait were outlawed in a bill subsequently vetoed. But stricter regulations were imposed:

- season reduced to 16 days and a $7.25 license for first time
- baits reduced to sprays or scents; allow only 2 bait stations per person and must be registered
- dogs have to be tattoed or collared and the area reduced where dogs allowed
- can no longer shoot bears during deer season

Expect to kill 100 bears in 1974.

Research effort directed towards developing an index for population estimates based on tracks. To livetrap bears we use two 55 gal. barrels welded end to end to make traps.

MICHIGAN - D. Arnold: Michigan has an abundance of bears. The main problem is to keep them alive until hunting season as many people consider them varmints. Only recently has the bear been considered a game animal. We had one spring bear season but there were so many nursing cubs we never had another.

The hunt used to be Sept.10 - Nov.10 but deer hunters complained that it made deer too spooky, so we now close bear season Oct.30. Number bear hunters difficult to estimate, as a bear can be shot under a variety of licenses. Reporting of kill required; 450 were registered in 1972, and 473 in 1973. Bear hunt appears to be increasing in popularity. For 1974 about 2000 bear permits have been issued. The Michigan Bear Hunters Assoc. initiated the bear permit.

We have found a strong homing instinct in transplanted bears, with one returning more than 100 miles in a couple days. We move them as a P-R program.

ONTARIO - K. Newell: Ontario had a bounty on bears until 1961, with about 840 bears claimed per year. Bounty eliminated in 1961 but bears still not considered game animal by many residents. Number of licenses sold has risen steadily during the 1960's. In 1973 about 15,000 non-resident and 1,500 resident licenses sold.

Very difficult to evaluate number of bear hunters, success rate, or other factors with present licensing system where bears may be hunted on deer, moose and bear licenses. There are more than 200,000 "potential" bear hunters under this set-up. Moose and deer hunt questionnaire surveys have included questions on bear since 1972, and in 1973 a bear hunt questionnaire was initiated. For the 1972-73 season estimated kill:

bear hunt report	-	2333 (2056 by non-residents)
deer hunt report	-	3454
moose hunt report	-	3156
Total Harvest	-	8943

Obviously the majority of bears are taken during the deer and moose seasons.

We have little data on age and sex ratios. A population estimate based on district reports and a very rough density scheme indicates about 90,000 bears in the Province, and about 56,000 in accessible areas.

Nuisance complaints remain high in many areas. We have no evidence that we are overharvesting bears, although it may occur in some local situations. These have been requests to eliminate the spring hunt, but in some areas this may help to reduce the number of nuisance animals. We may evolve towards a variable scheme of spring hunts where not harmful to do so.

Baiting is a controversial issue - considered ethically and aesthetically unacceptable to many. Nevertheless, spring bear hunting difficult without bait. Spring bear hunt economically important in some areas and may help to reduce complaints in places. We may eventually move towards some restrictions on baiting.

18 September Afternoon:

MacFie and Thurston led a fieldtrip to the Shawanaga Deer yard where range management practices were observed and discussed. Patch cutting in and around this yard has been done every year, and the population using this large yarding complex has increased, while the overwintering population in Killbear Park, where work has been done at 5-year intervals, has remained stable. Also explained was a modified timber stand improvement project involving patch cutting which should improve the deer habitat conducted with wildlife funds and for which a 2/3 return was realized by sale of the timber.

18 September Evening:

Simulation exercises were continued by interested individuals. Also George Wilson, wildlife photographer from Marquette, Michigan, showed films for comment of deer and wolves. Comments indicated a bit too much anthropomorphism and unsubstantiated relationships inferred by the juxtaposition of film sequences, which were occasionally too obviously of penned animals in unnatural situations.

19 September Morning: J. Ludwig, moderator

DYNAMICS OF THE PARRY SOUND DEER POPULATION - S. MUNROE, OMNR.

In Parry Sound generally mild winters obtained from 1945-58 (about 90" snowfall/year), with an estimated population of 14 deer/sq.mi. During this period an average of 18,000 deer hunters enjoyed high success rates of 50-60%. In 1955, the success rate was 67%. Unfortunately, hunter success is the only parameter that has been measured long enough to allow comparisons.

The percent fawns in the kill has fluctuated over the years. There appears to be strong relationship between weather parameters and deer populations. In recent years the Parry Sound deer population has recovered from a severe winter, or set of severe winters, only to be hit in a few years by another. Following good winters productivity has been 1.4 fawns/doe; after severe winters it has been less than 1 fawn/doe. Average age in the early 1950's during the "mild winter period" was 2.5 years after a series of severe winters this rose to more than 3 years and has never returned all the way down to 2.5. The present low population and range management work has probably helped

reduce winter mortality and allow greater productivity in recent years. The range has deteriorated since the 1945-58 period and the densities of the 1940-50's will not likely be regained.

SUSTAINED YIELD FOREST MANAGEMENT AND DEER RANGE, TWEED FOREST DISTRICT - F. CHESHIRE, OMNR.

It was pointed out that a comparison of deer kill figures with habitat components revealed a positive relationship of deer harvest with the amount of shelter on a township basis. Forest management plans indicate that shelter will be in short supply in the future. Deer management plans should be geared to achieving the most return from the deer herd under declining range conditions.

BUSINESS MEETING

Tony Bubenik suggested that all jurisdictions should adopt the use of an internationally standardized big game hunt check form with which he has been involved in developing, and agreed to provide a sample to all.

John Ludwig raised the question of whether it was time to revise the publication Research for deer management in the Great Lakes Region, which is now 10 years old. Some questions have been answered and others raised. There was agreement for such a need, and Pat Karns and Robin Hepburn accepted the job of designing, instituting and editing such a revision.

Byelich and Ludwig attented the Northeast Deer Group Meeting the previous week. Their brief resumes indicated that the N.E. Group is more dominated by University researchers, with an emphasis on nutrition studies. The jurisdictions involved have done very little in habitat management work, and have only recently initiated efforts at such things as mapping wintering concentrations. Very few make any population estimates.

The 1975 meeting will be in Minnesota, perhaps in conjunction with the grouse workshop. All inquiries, and a list of mailing addresses, should be addressed to Pat Karns.

Tony Bubenik noted that this time of year was unsuitable for the GLDG meeting because it coincided with the moose rut.

And on that note the meeting was adjourned.

ATTENDANCE LIST

1974 Great Lakes Deer Group Meeting

MICHIGAN

Dave Arnold	-	Michigan DNR
George Burgoyne	-	" "
John Byelich	-	" "
Doug Whitcomb	-	" "
Scott Stewart	-	Marquette
George Wilson	-	"

MINNESOTA

J. Janecek	-	Minnesota DNR
Pat Karns	-	" "
LeRoy Rutske	-	" "
Frank Svoboda	-	Minnesota Dept. of Highways

WISCONSIN

Burt Dahlberg	-	Wisconsin DNR
Frank Haberland	-	" "
Bruce Kohn	-	" "
Arlyn Loomans	-	" "

ONTARIO

Fred Gilbert	-	University of Guelph
Al Armstrong	-	Ontario MNR
Dave Atkinson	-	" "
Ernie Bain	-	" "
Bob Baker	-	" "
John Barbowski	-	" "
E. Borezon	-	" "
Tony Bubenik	-	" "
Ron Campbell	-	" "
Gord Carswell	-	" "
Ken Chambers	-	" "
Frank Cheshire	-	" "
Bruce Collins	-	" "
Tom Corbett	-	" "
Robin Craig	-	" "
Bernie Curtis	-	" "
Alec Denys	-	" "
Carmen Douglas	-	" "
Dave Euler	-	" "
Aubrey Gostlin	-	" "
Colin Haxell	-	" "
Robin Hepburn	-	" "
Andy Houser	-	" "
Ken Jackson	-	" "
Don Johnston	-	" "
George Kolenosky	-	" "

ONTARIO (Cont'd)

Harry Kujula	-	Ontario MNR
Syl Lorbetskie	-	" "
John Ludwig	-	" "
John MacFie	-	" "
Charlie MacInnes	-	" "
Dan Mansell	-	" "
Doug Marshall	-	" "
Harry McLeod	-	" "
Ken Morrison	-	" "
Stan Munroe	-	" "
Kathy Newell	-	" "
Jim Poirier	-	" "
Peter Purych	-	" "
Tom Regan	-	" "
Hank Reitveldt	-	" "
Alec Rettie	-	" "
Murray Rush	-	" "
Pete Smith	-	" "
Bill Straight	-	" "
Midge Strickland	-	" "
Jack Thibadeau	-	" "
Lloyd Thurston	-	" "
Dave Watton	-	" "
Owen Williams	-	" "
John Williamson	-	" "
Mike Wilton	-	" "
Guy Winterton	-	" "