N15/B

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3 December 1994

RE: AERIAL CENSUS OF THE BLACK NOSSOB CONSERVANCY.

1. INTRODUCTION:

An aerial census was conducted from the 5 Nov - 9 Nov on the Black Nossob Conservancy in the Gobabis district near the town of Steinhausen. The area counted is approximately 150 000 ha and took 17 hours to fly. The aircraft used was a Cessna 172 belonging to the NNF. Flying speed was 160 - 180 Km/h while a constant flying height of 100 m was maintained. A GPS was also used for precise navigational purposes and flown according to predetermined map co-ordinates from map transects. Transect width was 1 km and the area was divided into three blocks. Transects were flown from east to west and visa versa.

The pilot was Dr. Nad Brain, navigator J. de Jager and counters were M. Brits and H. Altman. Counting forms were drawn up beforehand and aspects like numbers, sex ratios, number of juveniles per specie were noted down per farm. I must however mention that transects were flown absolutely accurately throughout the census and that the GPS is a necessary tool concerning any census work.

2. ANIMAL NUMBERS:

The total actual number of animals counted are the following:

Springbok	163
Zebra	41
Duiker	7
Ostrich	100
Steenbok	11
Jackal	10
Baboon	45
White Tailed Gnu	6
Blue Gnu	140
Blesbok	16
Eland	23
Warthog	160
Kudu	276
Hartebeest	796

Gemsbok	1543
TOTAL	3337

3. CARRYING CAPACITY AND LSU NUMBERS.

The LSU for every specie were determined as to give the landowners an indication what their game carrying capacity is on the conservancy. The conversion tables of Meissner was used, but it must be remembered that the feeding and habitat requirements of game is different than domesticated stock and this method purely serves as an indication of what the carrying capacity could be.

The officially defined Large Stock Unit (LSU) is the equivalent of one head of cattle with a mass of 450 kg which increases with 500 g in mass per day on grazing with a average energy digestion of 55%. (To maintain this condition, 75% metabolic energy (ME) is required per day).

ANIMAL	NUMBER / LSU	LSU
Gemsbok	2.5	617.2
Hartebeest	2.0	395
Springbok	9.6	16.9
Zebra	1.3	31.5
Ostrich	2.9	34.5
Steenbok	17.6	0.63
Duiker	16.3	0.43
White Tailed Gnu	3.0	3.00
Blue Gnu	2.0	70.0
Blesbok	4.9	3.27
Eland	0.8	28.8
Kudu	2.2	125.4
TOTAL		**1326.63 LSU**

Conservancy size = 150 000 ha
Therefore 150 000/1326.63 = 1 LSU / 113 ha.
This would therefore represent the lowest LSU value.

4. ESTIMATED ANIMAL NUMBERS.

A count was also done of a 2000 ha game camp with a known amount of animals present and this was used to determine a more appropriate number of animals for the conservancy. Although the vegetation differs slightly to the surrounding areas it was possible to use this game camp as a benchmark.

Game Counted in Game Camp:

Counted:	Actual Numbers:
Gemsbok - 28	60
Eland - 20	40
Hartebeest - 41	35
Kudu - 2	0
Blesbok - 16	25
Warthog - 1	?
Ostrich - 0	?

WT Gnu -	6	6
Blue gnu -	9	11
Zebra -	7	9

Known Numbers of One Species Related To Other Species:

In cases where the population number of at least one animal species in the area is known, the density (or number) of this species can be used in relation to those of other species to calculate the number of the unknown species. A game camp of 2000 ha were used as a benchmark for known numbers of gemsbok to determine the density of unknown numbers of hartebeest, gemsbok and springbok - the most abundant species on the conservancy. These calculations only give an indication of how many game of the three species mentioned could be on the conservancy area.

The following equation was used.

$$N_x = \frac{(N_y)(n_x)}{n_y}$$

Where:
N_x = The number of unknown game
N_y = the number of known game
n_x = the number of unknown game counted
n_y = the number of known game counted

Therefore gemsbok = (60)(1543)/28
= 3306

and hartebeest = (60)(796)/28
= 1705

and springbok = (60)(163)/28
= 349

New Adapted Figures:

SPECIES:	NUMBER/LSU	LSU
Gemsbok	2.5	1322.4
Hartebeest	2.0	852.0
Springbok	9.6	36.4
Zebra	1.3	31.5
Ostrich	2.9	34.5
Steenbok	17.6	0.63
Duiker	16.3	0.43
White Tailed Gnu	3.0	3.00
Blue Gnu	2.0	70.0
Blesbok	4.9	3.27
Eland	0.8	28.8
Kudu	2.2	125.4
TOTAL		2508.33 LSU

Conservancy size = 150 000 ha
Therefore 150 000/2508.33 = 1 LSU / 59 ha

The official carrying capacity for the Steinhausen / Black Nossob area is 1 LSU / 9 ha (0.11 LSU / ha), but the farmers reckon it is more likely to be between 1 LSU / 15 - 20 ha. Working on 1 LSU / 15 ha means that the conservancy area can carry up to 10 000 LSU. Taking the game into consideration it will decrease the conservancies carrying capacity to approximately 7 491.7 LSU. This the farmers can work out for themselves to see if game or stock numbers have to be reduced or not.

4. CONCLUSIONS AND RECOMMENDATIONS:

4.1. Aerial censusing on large commercial farmland areas has to be done with a GPS, because of the flatness, long transects and wind effect on the aircraft. The GPS has the ability to steer the aircraft directly above the transect as predetermined on a 1:50 000 map.

4.2. I would like to recommend that the MET assist all present and future conservancies with aerial counts under the condition that the landowners pay for the aircraft and fuel while the ministry could supply the personal. Information collected on these counts are valuable to the landowners and the MET.

4.3. The total cost involved in this operation for the landowners was approximately 0.05 cents / ha.
Flying costs = N$ 270.00 / hour x 22 hours = N$ 5 940.00
Fuel costs = N$ 323.33 / 200 L x 4 = 1292.80

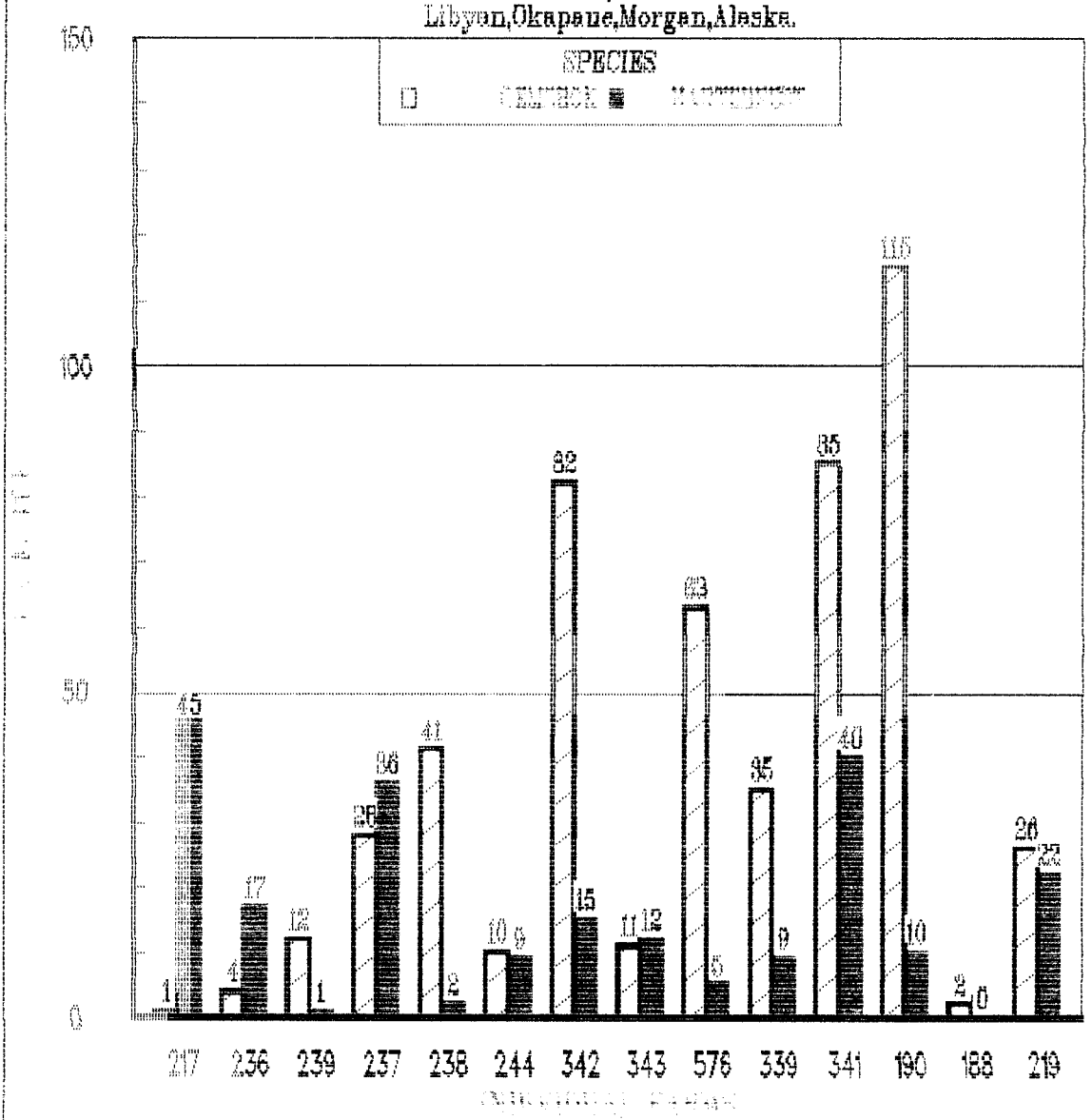
Ministerial costs:
Pilot: N$ 24.00 / day x 4.5 = N$ 108.00 (no overtime)
Navigator: N$ 16.75 /day x 4.5 = N$ 75.45 (no overtime)
Observer: with overtime = approximately N$ 600.00

4.3. Graphs are included for the sole purpose of record keeping for the individual farms for conservacy members. There ar;e two graphs for two individual specie (a A and B graph).

4.4. I would furthermore like to recommend that landowners take note of carrying capacity and determine their stock numbers to determine their overall carrying capacity for both stock and game to derive management dicisions.

GEMSBOK AND HARTEBEEST NUMBERS ON INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994.

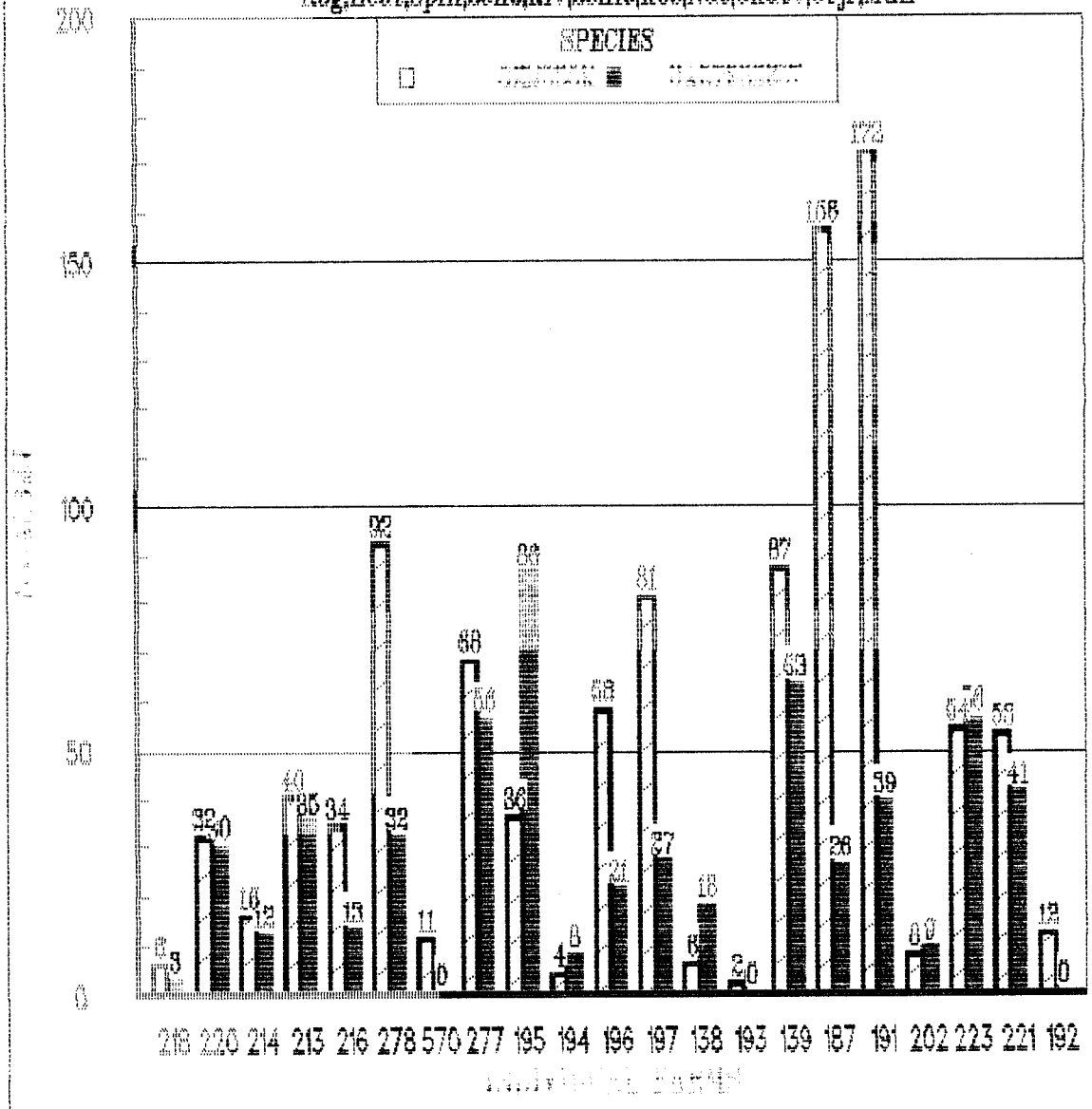
Cor,Okat,Cook,Stel,com,VZyl,Timor,Tokat,Okos,Wilhr,
Libyon,Okapaue,Morgan,Aleska.



FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 1A

GEMSBOK AND HARTEBEEST NUMBERS ON INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994.

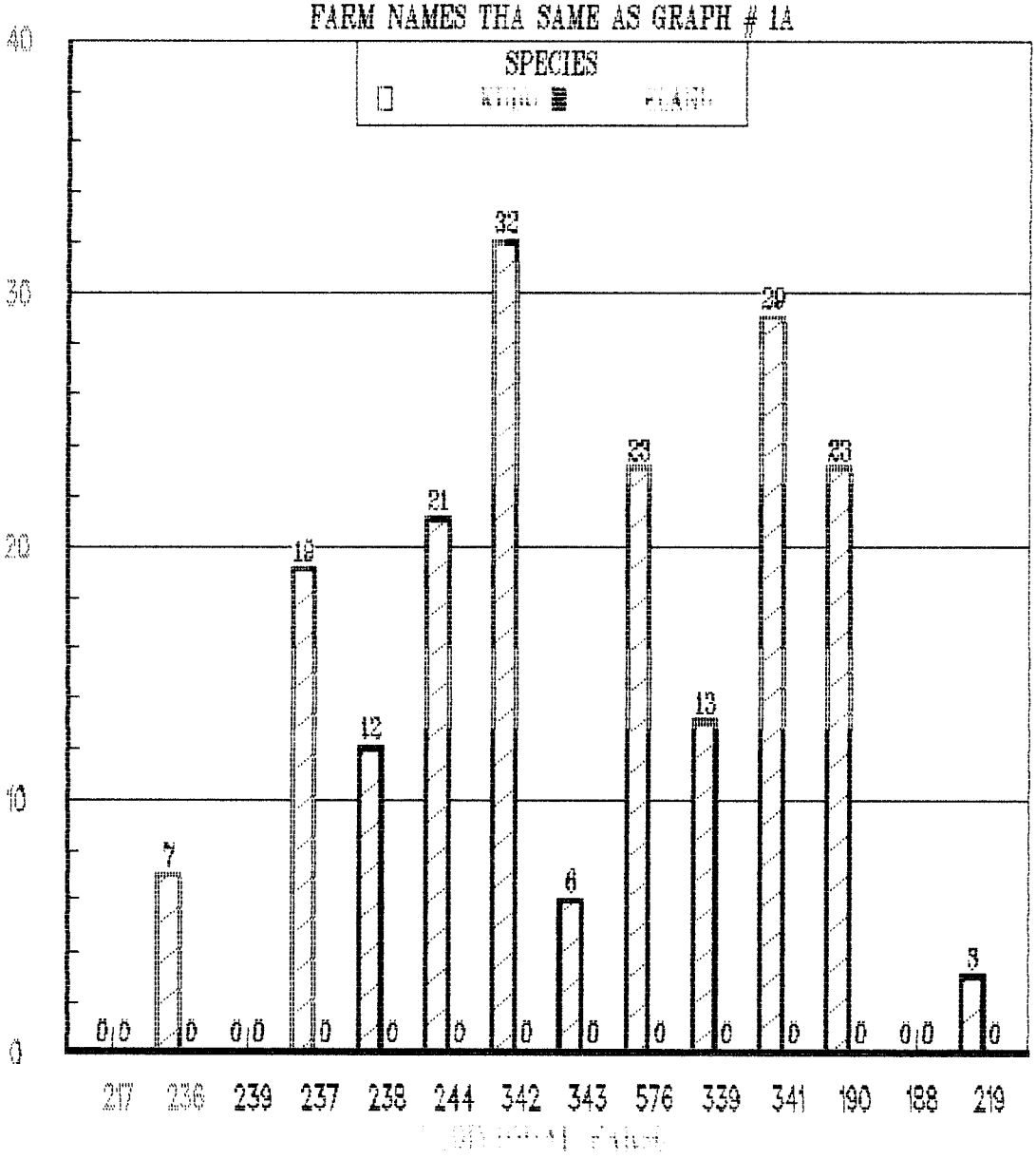
Oka,Lau,Pam,Otj,Ada,Mpun,Wilhh,Okah,Stoe,Okapw,
Rog,Heat,Spin,Scho,Riv,Schie,Koe,Nat,Okatv,Otjr,Mun



FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 1B

KUDU AND ELAND NUMBERS ON INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994.

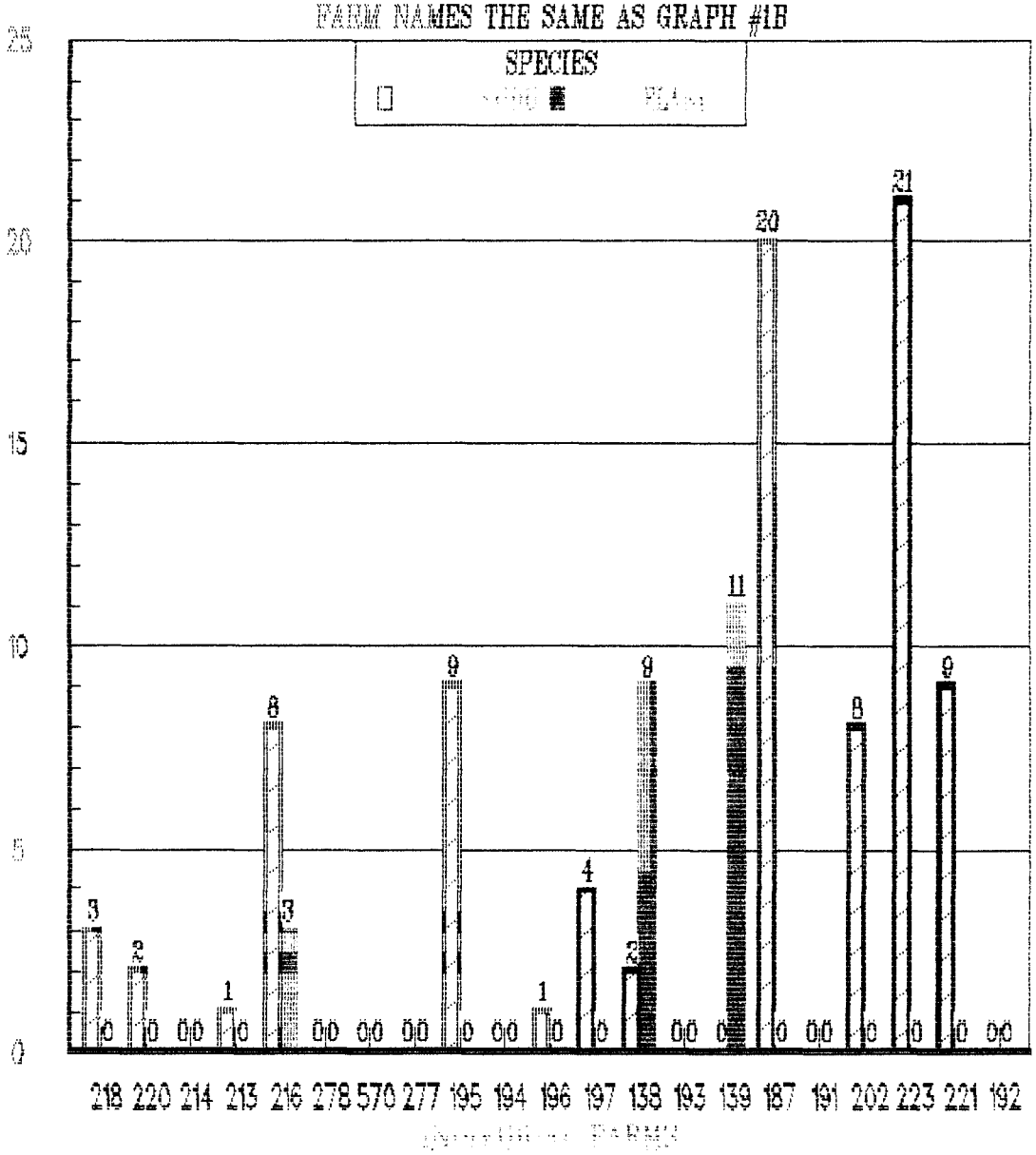
FARM NAMES THA SAME AS GRAPH # 1A



FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 2A

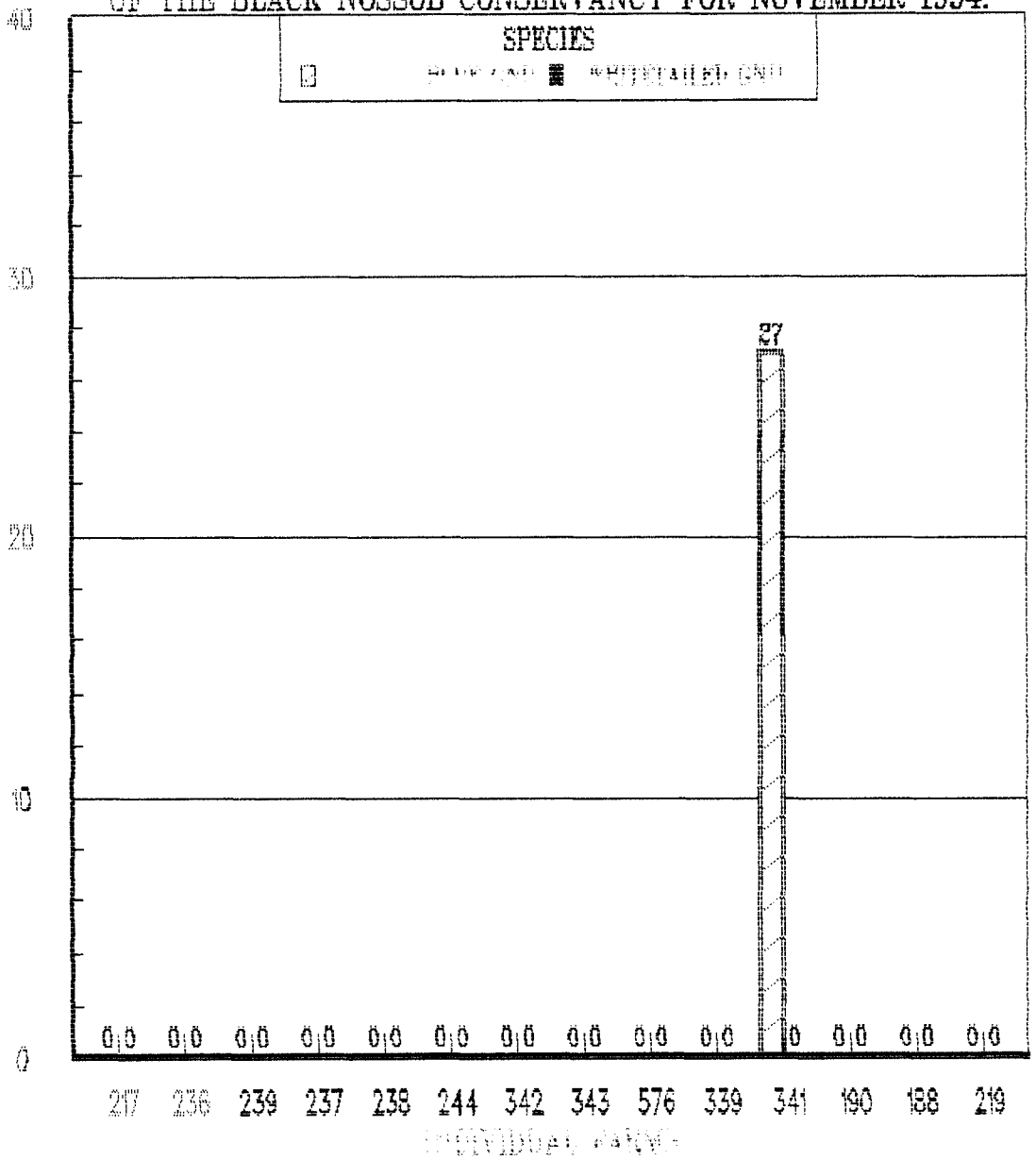
KUDU AND ELAND NUMBERS ON INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994.

FARM NAMES THE SAME AS GRAPH #1B



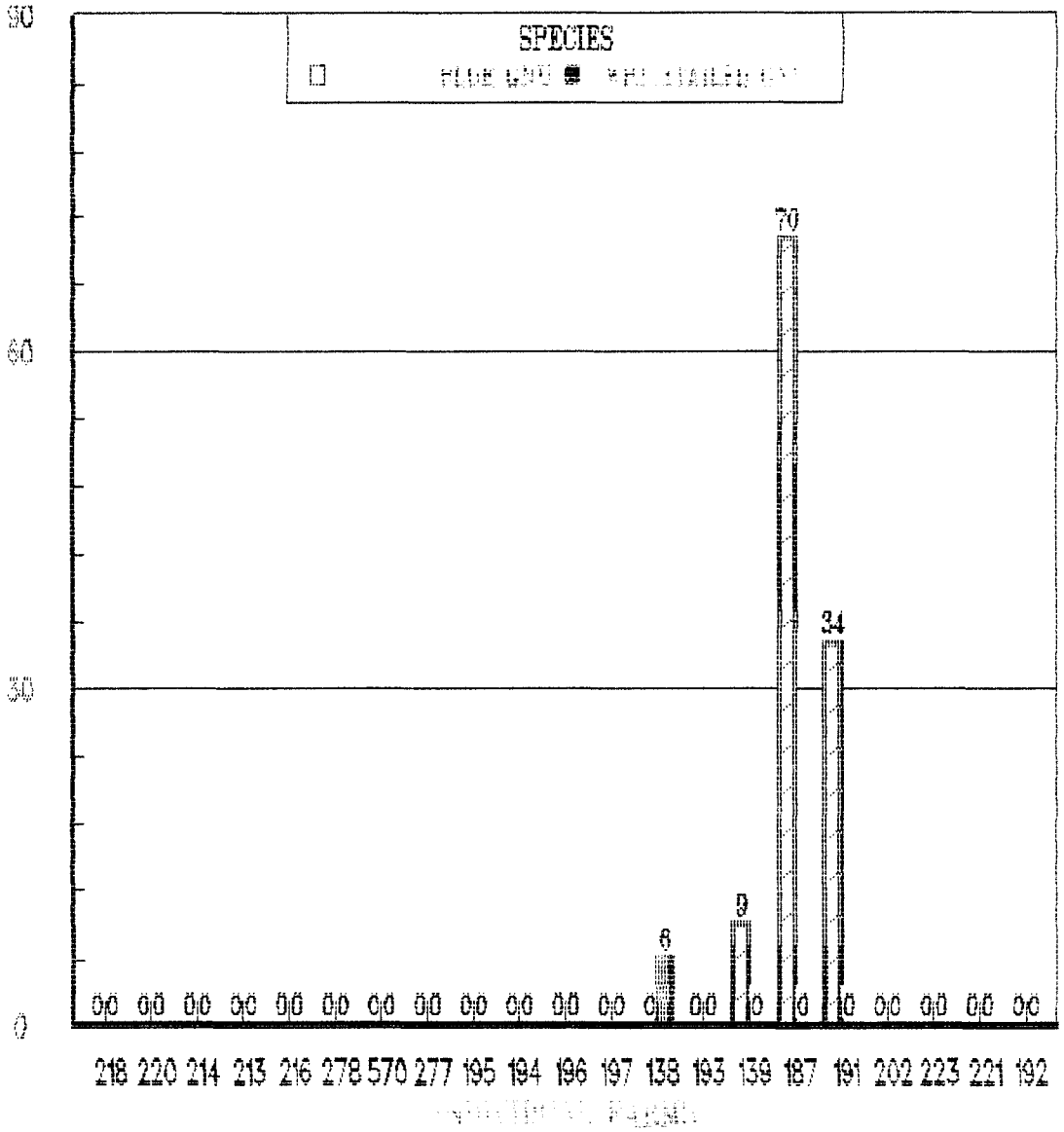
FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 2B

BLUE GNU AND WHITETAILED GNU ON INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994.



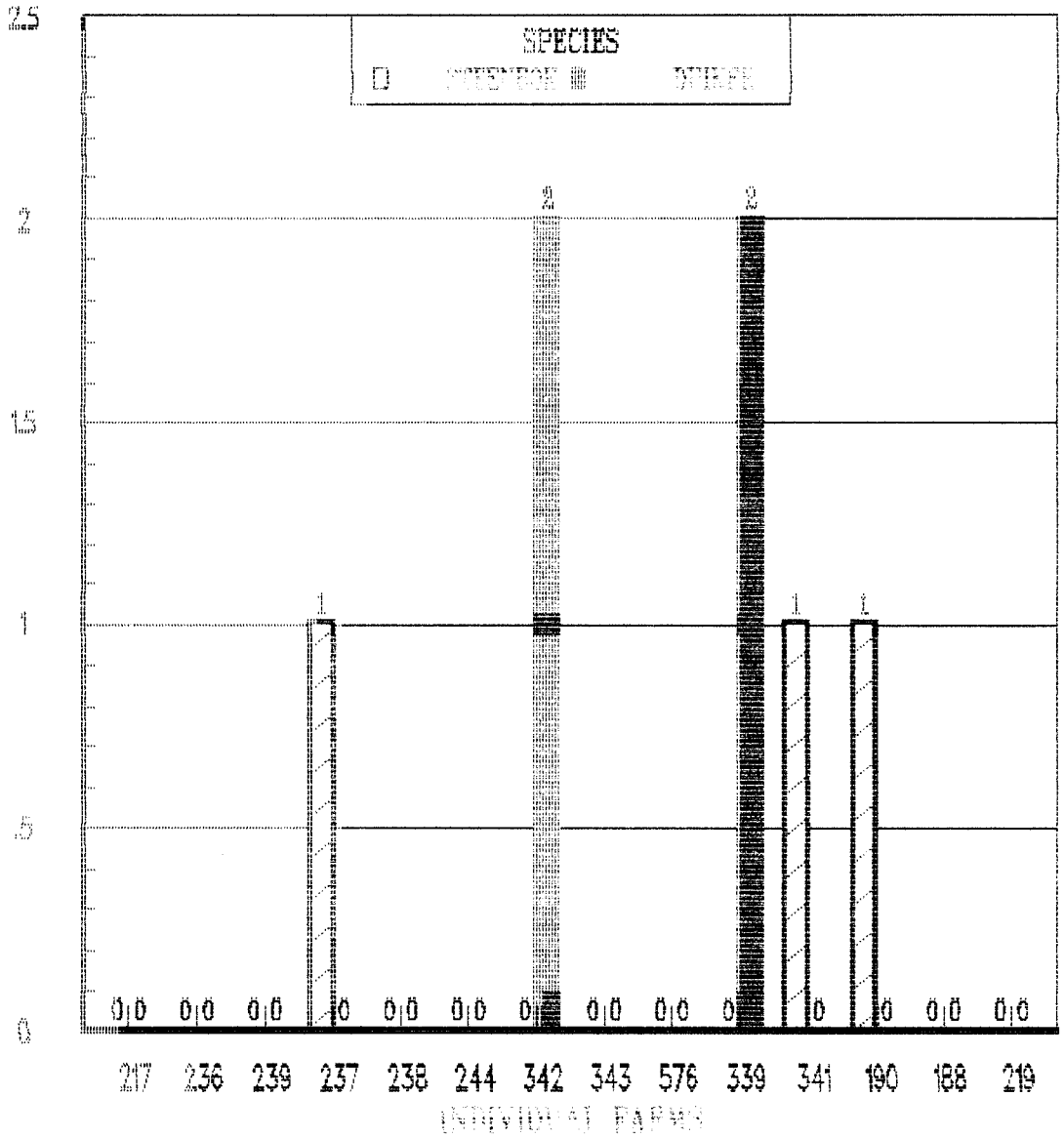
FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 3A

BLUE GNU AND WHITETAILED GNU ON INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994. FARM NAMES THE SAME AS GRAPH # 1B



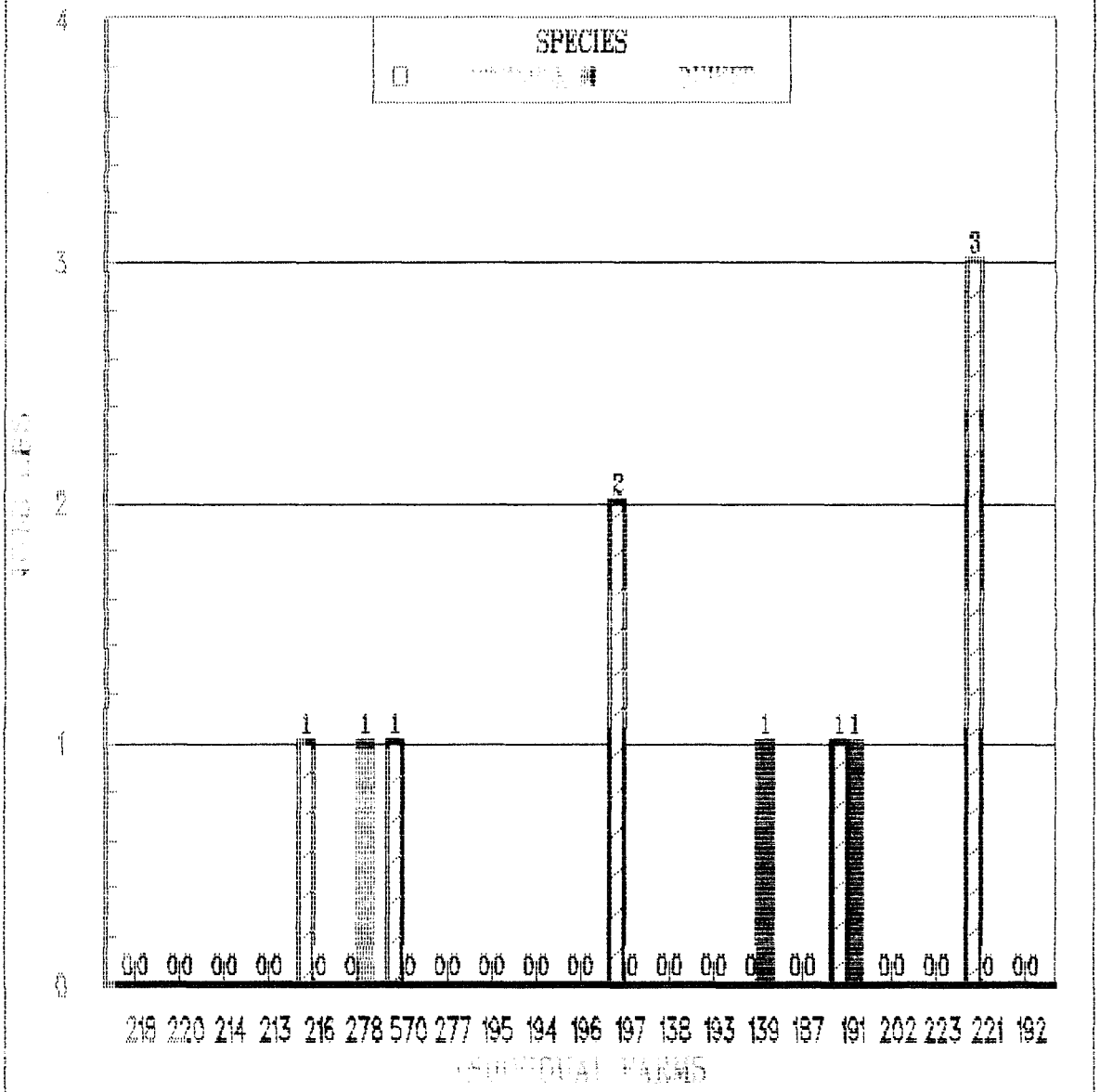
FARM NUMBERS APPEAR ON X-AXIS
GRAPH #3B

STEENBOK AND DUIKER NUMBERS OF INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994. FARM NAMES THE SAME AS GRAPH # 1A



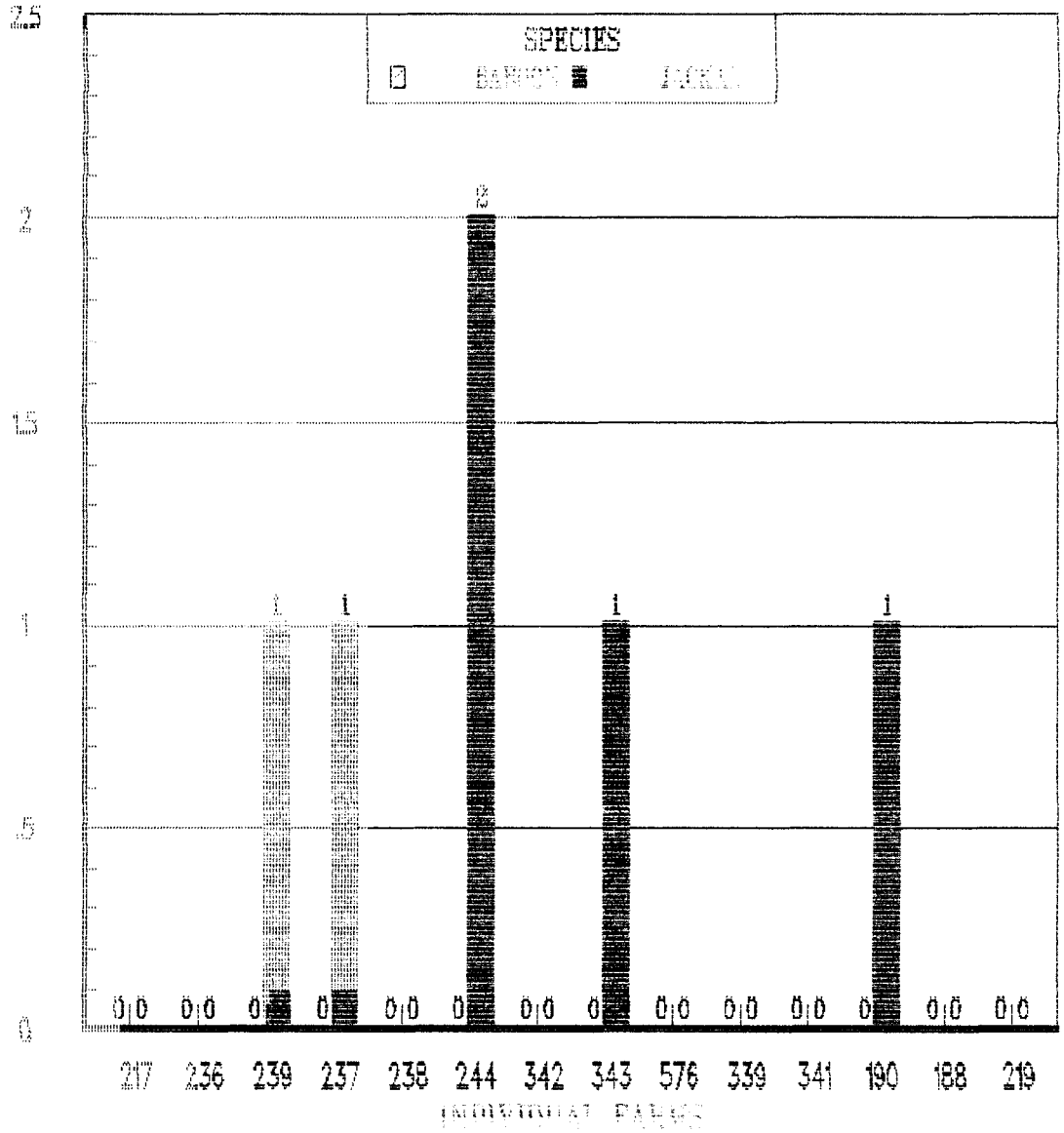
FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 4A

STEENBOK AND DUIKER NUMBERS OF INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994. FARM NAMES THE SAME AS GRAPH # 1B



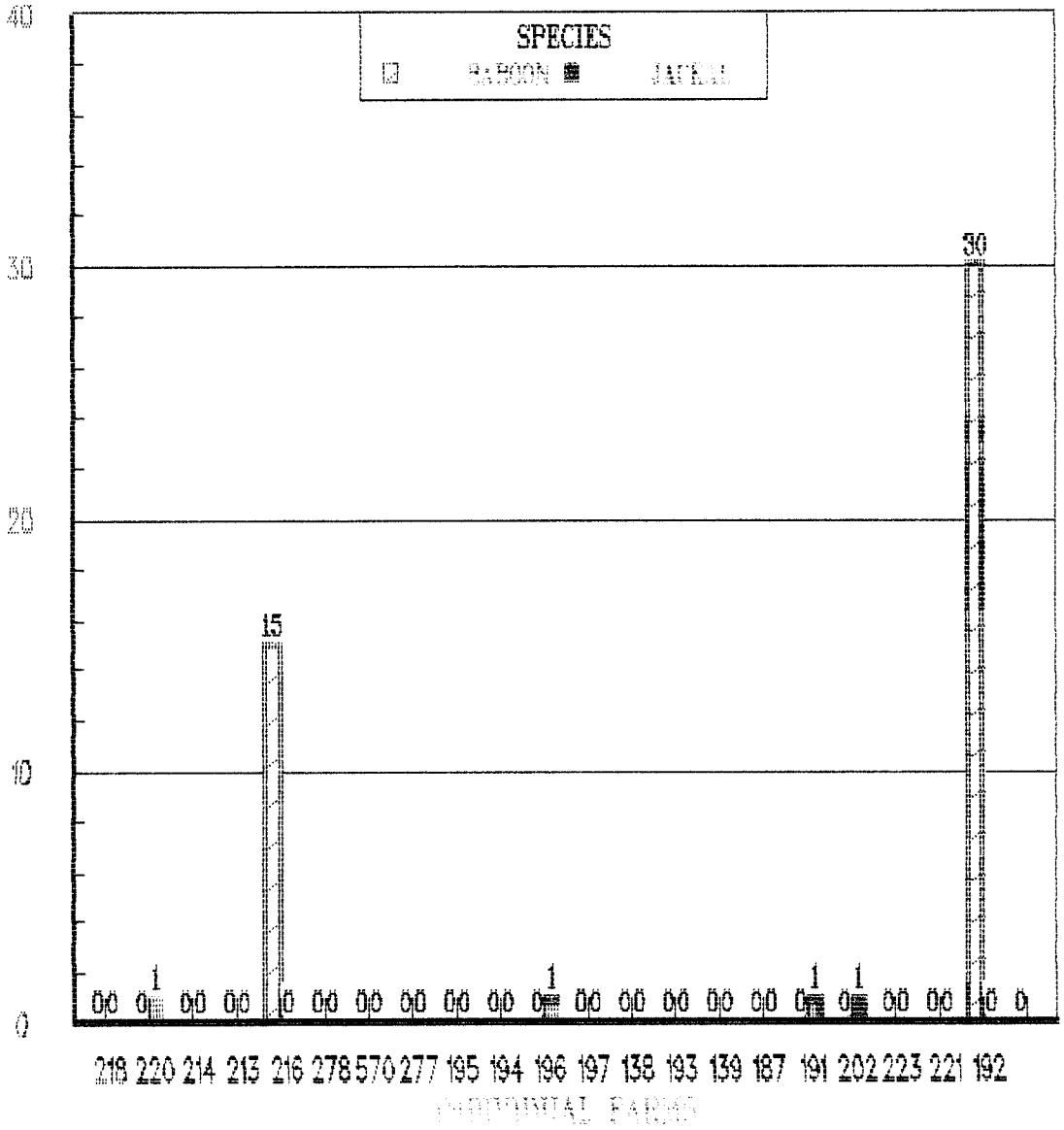
FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 4B

BABOON AND JACKAL NUMBERS ON INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994. FARM NAMES THE SAME AS GRAPH #1A



FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 5A

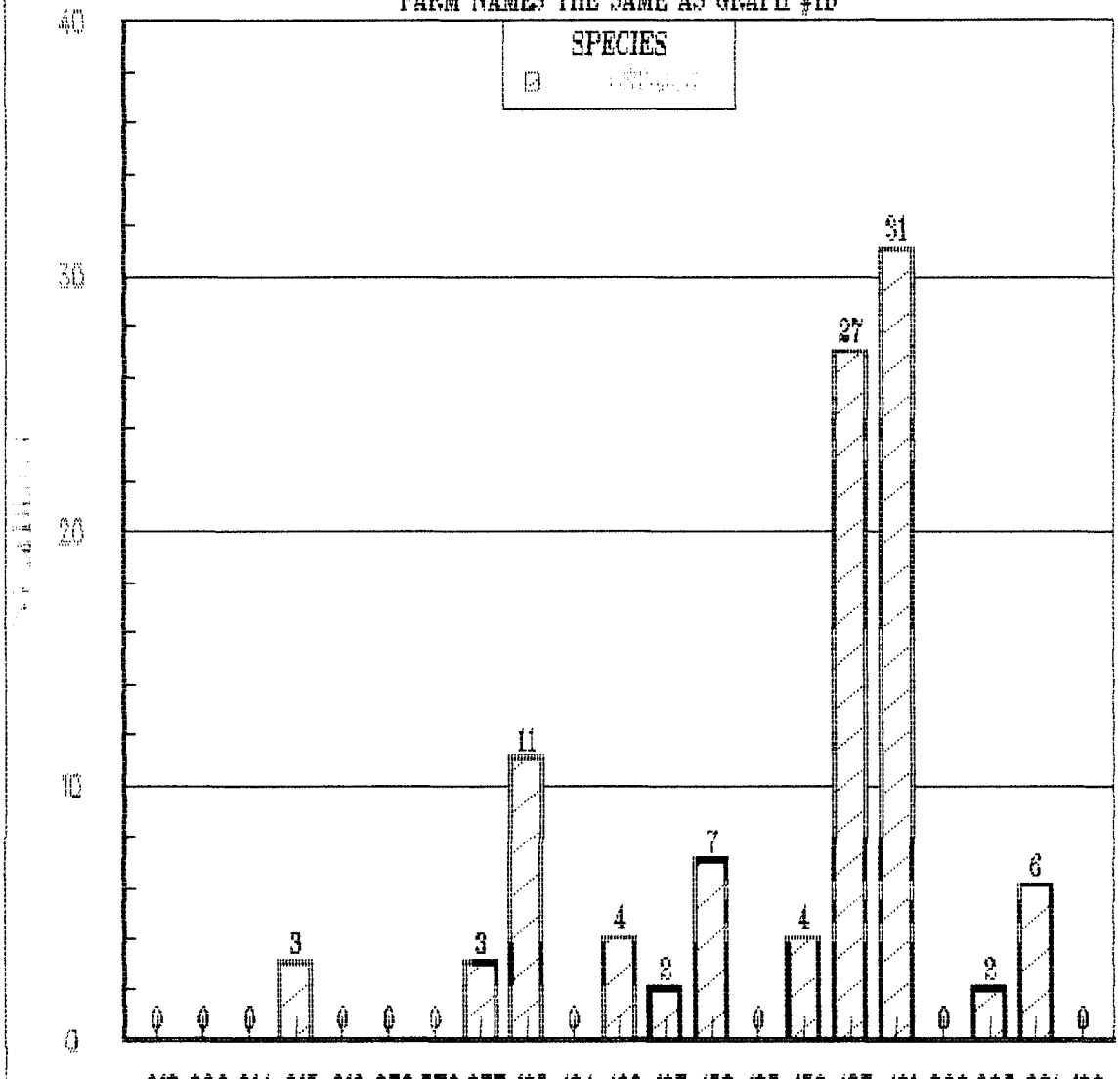
BABOON AND JACKAL NUMBERS ON INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994. FARM NAMES THE SAME AS GRAPH # 1B



FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 5B

OSTRICH NUMBERS ON INDIVIDUAL FARMS
OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994.

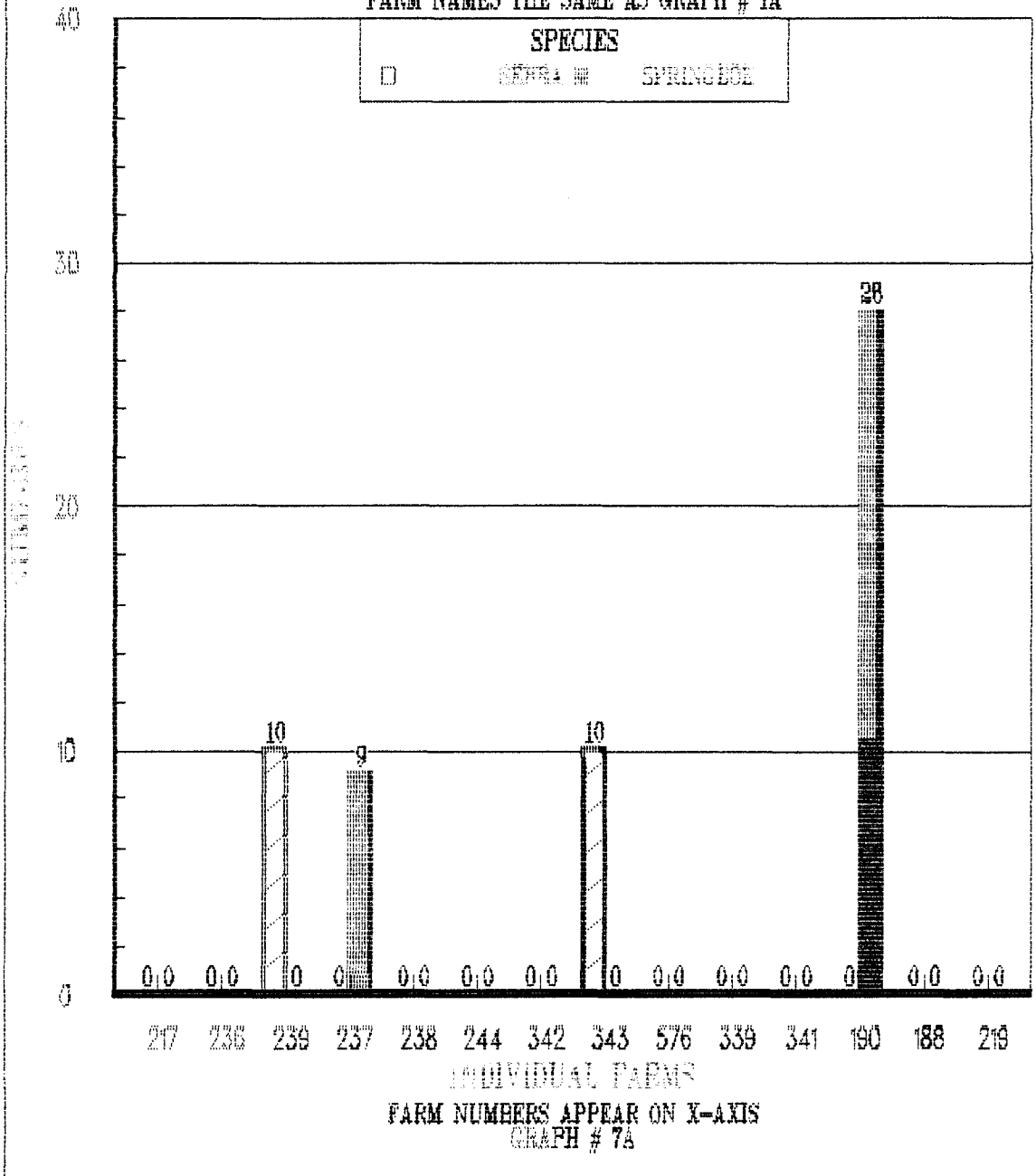
FARM NAMES THE SAME AS GRAPH #1B



FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 6B
NO OSTRICH COUNTED FOR GRAPH # 6A

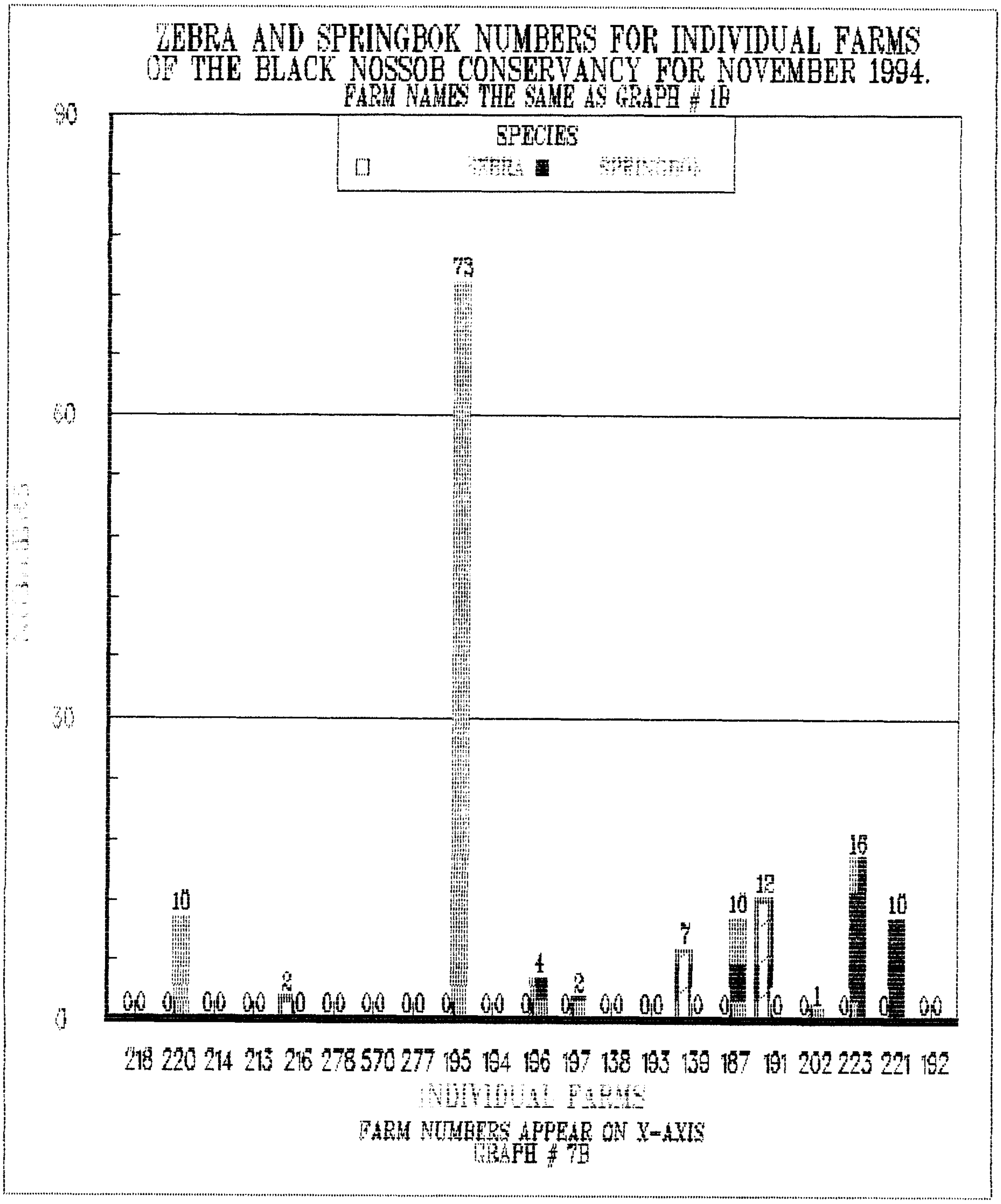
ZEBRA AND SPRINGBOK NUMBERS FOR INDIVIDUAL FARMS OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994.

FARM NAMES THE SAME AS GRAPH # 1A

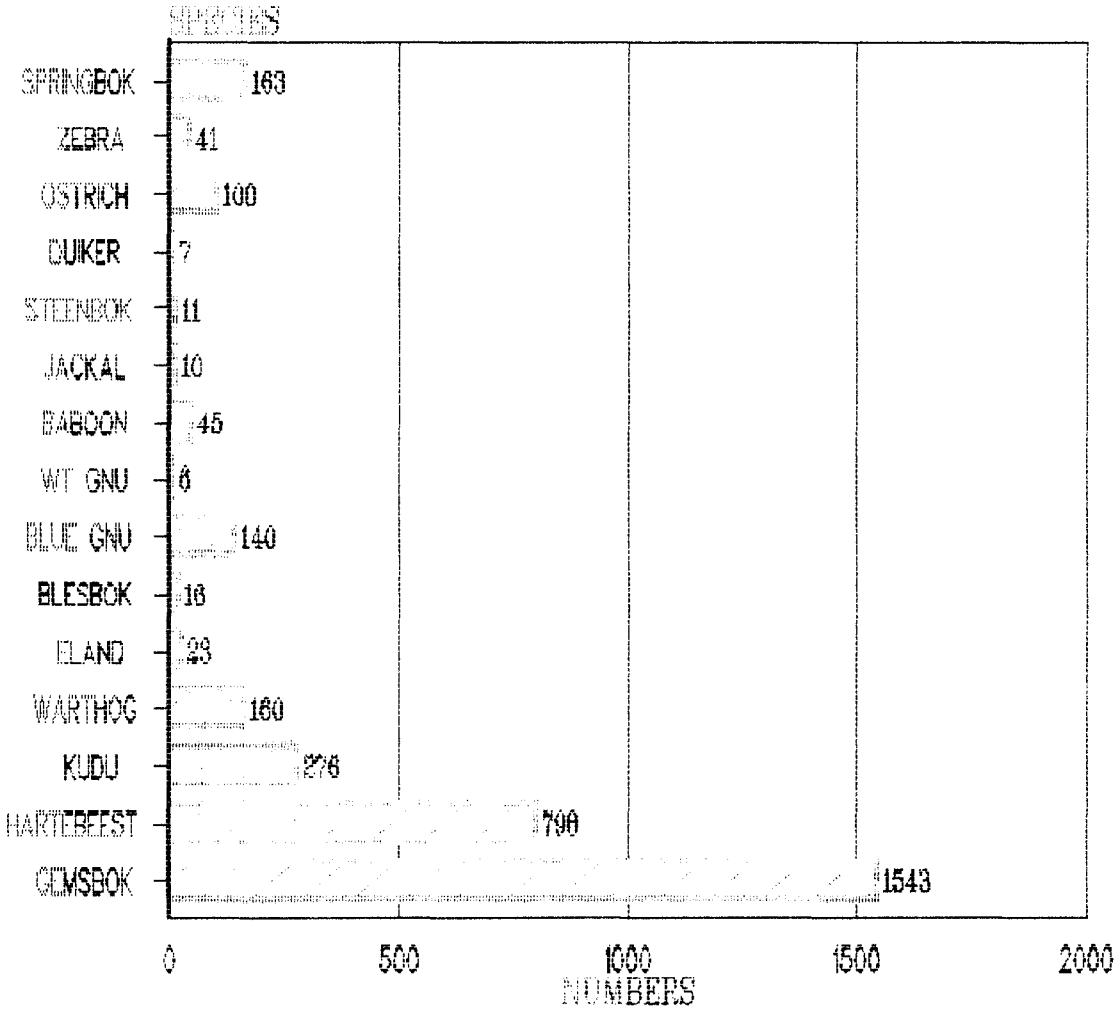


FARM NUMBERS APPEAR ON X-AXIS

GRAPH # 7A

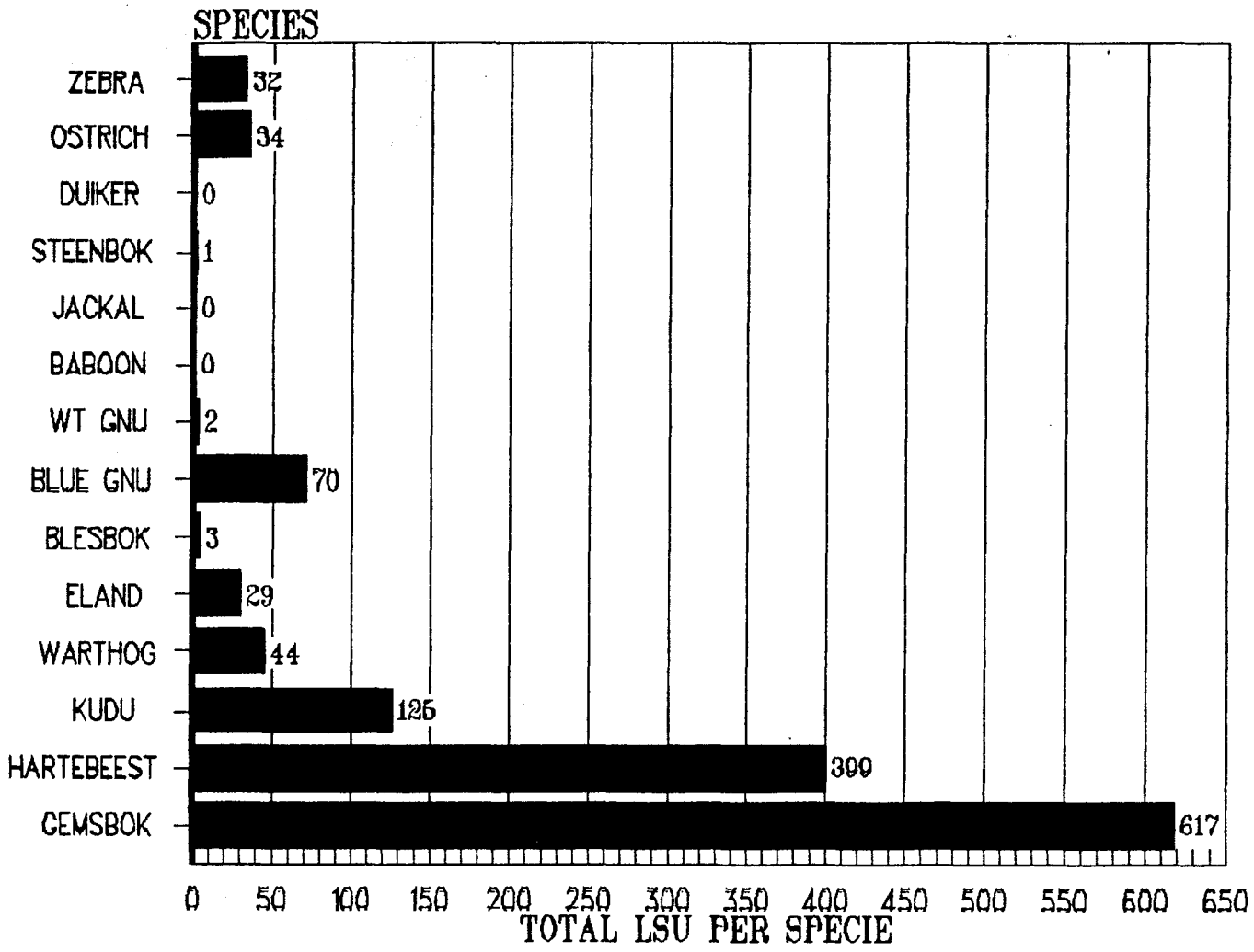

ZEBRA AND SPRINGBOK NUMBERS FOR INDIVIDUAL FARMS
OF THE BLACK NOSSOB CONSERVANCY FOR NOVEMBER 1994.
FARM NAMES THE SAME AS GRAPH # 1B
SPECIES
ZEBRA
SPRINGBOK
90
60
30
0
73
10
2
4
2
7
10
12
1
16
10
218 220 214 213 216 278 570 277 195 194 196 197 138 193 139 187 191 202 223 221 192
INDIVIDUAL FARMS
FARM NUMBERS APPEAR ON X-AXIS
GRAPH # 7B

TOTAL NUMBER OF ANIMALS PER SPECIES ON THE BLACK NOSSOB CONSERVANCY DURING NOVEMBER 1994.



GRAPH # 5

GAME NUMBERS PER SPECIE CONVERTED TO LARGE STOCK UNITS (LSU) FOR THE ENTIRE CONSERVANCY (MENTIS & MEISNER).



GRAPH #9