CENTRAL STATISTICAL AUTHORITY
Ministry of Finance and Economic Development
ETHIOPIA

LIVESTOCK AERIAL SURVEY IN THE SOMALI REGION

November 2003

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ECOSYSTEMS CONSULTANTS
London and Nairobi

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Addis Ababa

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1 Introduction

Livestock plays an important role in the economy of Ethiopia. Reliable statistical information on livestock numbers is essential to Government policy makers and other data users. Since 1980/81 the Central Statistical Authority (CSA) has been producing livestock estimates for the sedentary parts of the country based on annual agricultural sample surveys. Although pastoral areas contribute a significant portion of the livestock resources of the country, adequate statistical information is not available and no methodology was established to count the livestock in these areas.

In 2001/02 CSA conducted the first ever national agricultural census, of which a livestock census both in sedentary and pastoral areas of the country is a planned component. For Somali Region, the CSA decided to generate reliable figures of the livestock population (cattle, sheep, goats, camels, and equids) and their distribution by commissioning for the first time an aerial survey with financial support from USAID and the Ethiopian Government.

This report presents the results of the aerial survey of which took place in the period 5-23 November 2003.

2 The Survey Area

The designated survey area is made up of seven of the Somali Region's nine administrative zones as shown Fig.1, which have a combined area of some 242,000 km^2. Liben and Jijiga Zones were excluded, as they had been covered by conventional means.

Also excluded was a band 10km in width extending along all international borders, which was declared out of bounds for security reasons.

3 Approach and Methods

The survey was conducted according to a sampling method called the Systematic Reconnaissance Flight (usually known by its acronym, SRF), details of which may be found in Norton-Griffiths (1978). The present application required the survey area to be overlaid with a 10x10 km sampling frame or grid, as shown in Fig 2.

In order to cover such a large area within a reasonable time, three aircraft were deployed all of which were high-wing Cessnas. Details of these aircraft and their crews are given in Table 1, while the actual areas assigned to each are shown in Fig.2.

Table 1: Details of participating aircraft and crew

	5Y-AHZ	5Y-BIH	5Y-ATS
Type of aircraft	Cessna 206	Cessna 206	Cessna 182
Operational bases	Dire Dawa, Jijiga, Gode	Gode	Warder
Pilot	Dr R. Olivier	Capt. D. Seton	Capt. A. Lalani
FSO	Ato Melaku Begashaw	Ato Ayenew Legesse	Ato Tesfaye Gezahegn
RSO (L)	Mr C. Chelule	Mr H. Kamulla	Mr J. Waithaka
RSO (R)	Mr G. Muriuki	Mr B. Raburu	Mr P. Nguru

Figure 1: Zones of the Somali Region, Ethiopia

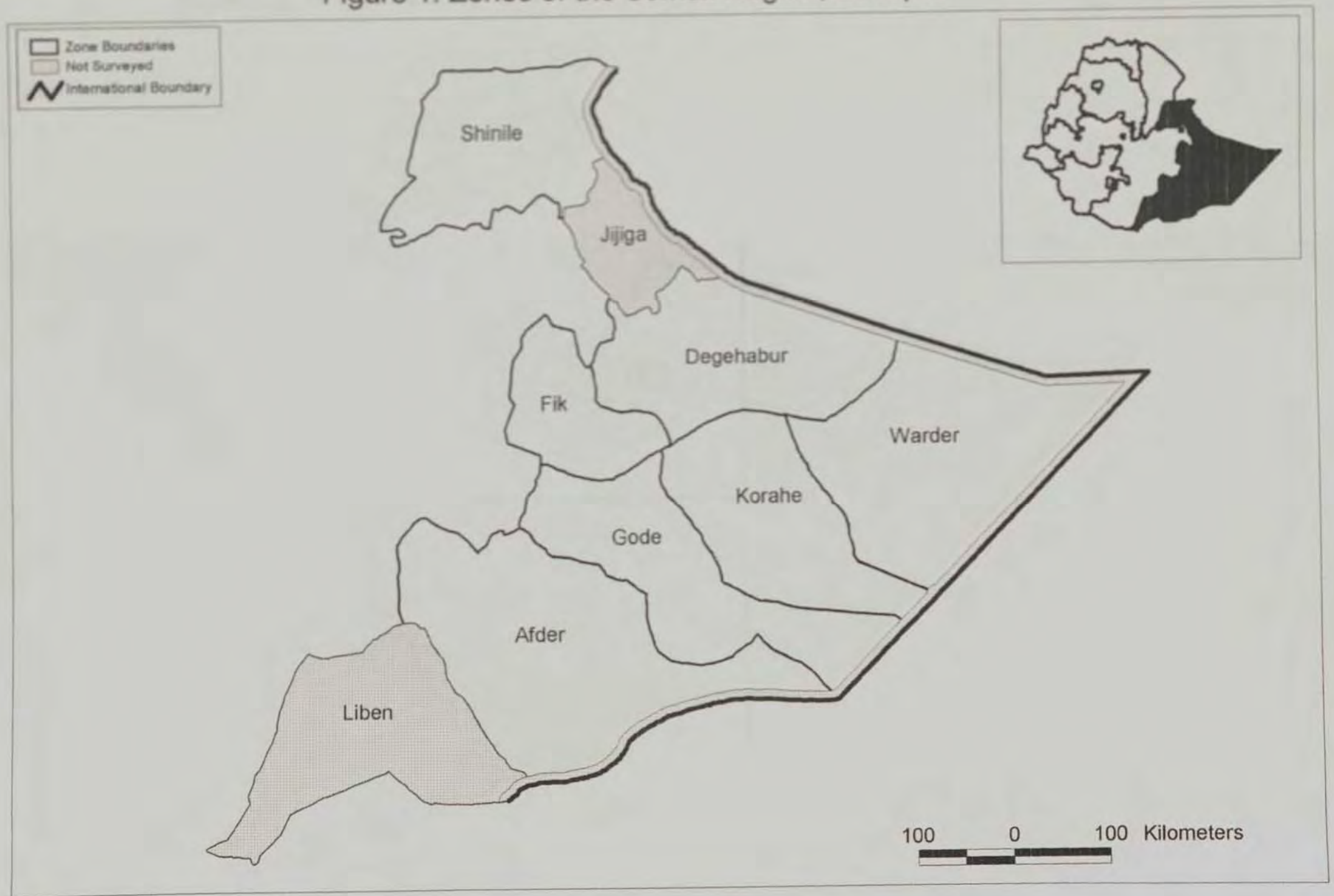
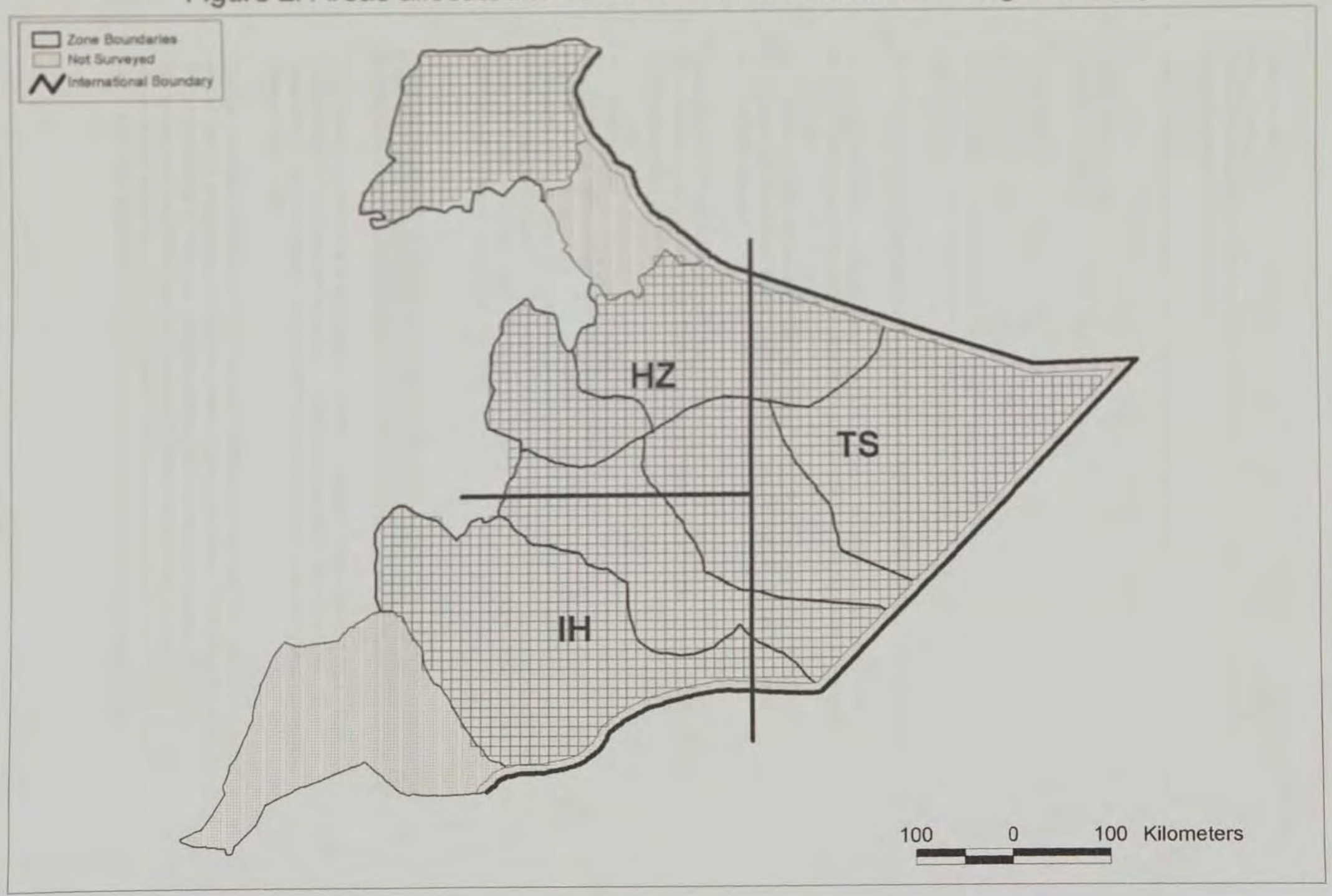


Figure 2: Areas allocated to each aircraft with 10x10km UTM grid overlay



The nominal sampling parameters for the present survey, together with those actually attained by each aircraft are shown in Table 2. Transects were flown north-south at a spacing of 10km across the entire survey area, save for a mountainous area of 700km^2 in Afder Zone that could not be covered because of persistent low cloud and rain.

Table 2: Nominal and actual sampling parameters by aircraft

	Nominal	5Y-AHZ	5Y-BIH	5Y-ATS
Transect spacing (km)	10	10	10	10
Sub-Unit length (km)	10	10	10	10
Height above ground (ft)	400	316	411	386
Ground speed (kph)	160	170	177	185
Combined strip width (m)	300	347	329	348
Sample fraction (%)	3.00	3.47	3.29	3.48
Area surveyed (km^2)		74,500	86,200	80,800

The variables counted by the Rear Seat Observers (RSOs) in their sampling strips were:

- Livestock: Cattle, Shoats (sheep and goats), Camels, Equids (horses, asses and mules)
- Dams and birkas: a composite variable for all manmade water retention and storage devices
- Traditional roofs: structures roofed with thatch, mud or plastic sheeting (usually round)
- Modern roofs: structures roofed with tin sheets, tiles, cement etc (usually square)
- All wildlife species

In addition to recording the aircraft's height above ground at least once in every 10km segment of transect (or sub-unit), the Front Seat Observers (FSOs) recorded the following on a simple presence or absence basis:

- Surface water
- Temporary wells (hand-dug wells in river beds)

Transects and sub-units were defined, and data have been mapped, according to the internationally recognised UTM system. Position, direction and ground speed were controlled using on-board GPS navigation computers configured to the UTM system. Height above ground was controlled using radar altimeters.

4 Analysis

Data collection, collation and analysis involved the creation of three separate databases, one for each aircraft. Each was constructed in such a way that every observation was geo-referenced to a given transect and sub-unit, each of which had unique attributes in terms of zone and strip width.

Counting bias was controlled through the use of oblique photography. Groups of individuals greater than 10 in number were photographed in flight using 35mm, 200ASA colour slide film. The actual number in the group was later counted off the photograph using a binocular microscope, and was edited into the database for analytical purposes. By comparing visual estimates with actual photo counts, a correction factor was obtained for each observer and each variable for which comparable data sets were available. Because visual estimates of

small groups generally are under-estimates while those of large groups are over-estimates, counting bias is best determined and described through regression analysis (see Appendix 1). The various formulae obtained were applied as appropriate to all groups greater than 10 for which no usable photograph had been obtained (either because the observer "missed", or due to poor quality).

Following the photo-correction process, the three primary databases were separated and re-aggregated by Zone to give seven secondary databases. Because the strip width for each sub-unit was known, this allowed the correct sampling fraction to be calculated even where the zonal data had been collected by more than one aircraft.

Population estimates were derived from each zonal database using the Jolly II Method for unequal sized sample units (Jolly 1969). Following the notation of Caughley (1977) this estimates the population Y as $Y=AD$ where A is the survey area and D is density. Density D is estimated as $D=\sum y / \sum a$ where y is the number of animals counted in a, the area sampled. The variance of Y is estimated as:

$$Var(Y)=N(N-n)\ \sum y^2+D^2\sum a^2-2D\sum ay\ /n(n-1)$$

where N is the total possible transects in the survey area and n the number of transects sampled. The standard error of Y is $SE(Y)=\sqrt{Var(Y)}$. The precision of Y may be expressed as the coefficient of variation (CV), which is calculated as $CV(Y)=SE(Y)/Y$ which may be conveniently expressed as a percentage. Alternatively, precision may be indicated by calculating confidence limits for Y at a given degree of probability. The 95% CL of $(Y) = \pm t \times$ SE (Y), where 't' = n-1 degrees of freedom. Student's t-values are obtained from tables.

In this method, a "sample unit" consists of all the individuals counted by both observers in a given transect. For any analytical stratum therefore, the number of samples equals the number of transects flown within it. The method converts the raw count to a density, based on the length and width of the observers' counting strip, its length being the same length as the transect, and its width dependent on the height above ground. The latter relationship was determined by calibration flights carried out by each aircraft before surveying commenced.

The relevant details for each reporting unit are given in Table 3 below

Table 3: Sampling parameters by analytical stratum

	Afder	Degehabur	Fik	Gode	Korahe	Shinile	Warder
Total area surveyed (km^2)	53,200	34,800	15,800	34,500	31,400	26,900	44,900
Aircraft involved	IH,TS	HZ,IH,TS	HZ	HZ,IH,TS	HZ,IH,TS	HZ	TS
Number of transects	43	31	17	39	27	23	34
Sample fraction (%)	3.37	3.38	3.70	3.32	3.34	3.42	3.49

5 Results

Detailed results are provided as seven Annexes to this report, each specific to a particular Zone as follows:

ZONE	ANNEX
Afder	1
Degehabur	2
Fik	3
Gode	4

ZONE	ANNEX
Korahe	5
Shinile	6
Warder	7

In each case estimates have been generated for the entire zone, including those parts not sampled, on the assumption that average species densities in the non-sampled parts of a zone equal, or at least do not differ significantly from, average densities in the sampled parts. The complete area of each zone was measured off its computer image using the GIS programme, *Arcview*.

The results given in the Annexes are in both tabular and mapped formats. The tables give the estimated population of each variable (Y), its Standard Error (SE) and Coefficent of Variation (CV), together with the upper and lower 95% Confidence Limits. The maps show either density distributions (for quantitative variables) or presence/absence (for qualitative variables).

Using the applicable ratios which the CSA has made available from its contemporary ground surveys, the zonal livestock data are further broken down by species (for shoats and equids), sex and age.

It is widely recognised that the Jolly II method returns very conservative estimates of precision. Despite this, there is a convincing body of evidence that the estimates obtained are relatively accurate. Any result with a CV equal to or less than 20% of the estimate would be considered good even from a 15% sample, let alone a 3% sample as in this survey. Confidence limits probably can most usefully be interpreted as an index of distribution pattern. Highly clumped distributions produce high CVs and wide confidence limits, and vice versa. Wildlife species that are extremely scarce or hard to see are always highly clumped. Such imprecise data are nonetheless useful in comparing different areas at the same time, or the same area at different times.

Summary tables for livestock and other major variables are provided in Tables 4 and 5 below:

Table 4: Summary of livestock estimates by Zone

	Afder	Degehabur	Fik	Gode	Korahe	Shinile	Warder
Cattle	166,471	51,536	17,072	165,277	26,301	207,472	36,146
Sheep	1,152,509	1,395,779	57,561	517,668	362,778	670,956	2,253,550
Goats	722,709	721,925	141,475	985,869	690,891	849,451	1,413,143
All sheep and goats	1,875,218	2,117,704	199,036	1,503,537	1,053,669	1,520,407	3,666,693
Camels	140,454	131,106	25,605	115,498	149,971	103,052	376,183
Horses	16	19	13	0	0	0	1
Asses	4,327	5,415	3,033	10,758	2,504	16,138	460
Mules	63	68	26	58	14	191	7
All equids	4,406	5,502	3,072	10,816	2,518	16,329	468
Livestock/dwelling ratio	41.0	50.9	21.7	51.4	85.8	49.0	199.3

Because the variable "traditional roof" can be equated with a pastoralist's dwelling, the ratio of total livestock to dwellings can be used an index of relative pastoral wealth and, by extension, of food security.

Table 5: Summary of estimates for dwellings, dams and birkas, and principal wildlife by Zone

	Afder	Degehabur	Fik	Gode	Korahe	Shinile	Warder
Traditional roofs	53,297	45,318	11,282	34,937	14,357	37,734	20,474
Modern roofs	3,104	1,622	196	651	31	5,911	1,840
Dams and birkas	668	8,332	279	341	768	835	5,286
Dikdik	-	636	168	155	154	-	-
Gazelle	-	-	-	-	369	11,454	-
Gerenuk / Dibatag	668	572	419	1,054	1,013	3,840	335
Lesser Kudu	167	-	56	-	184	234	-
Ostrich	-	-	279	341	737	468	34
Warthog	1,268	668	168	713	553	568	402

A full list of the wildlife species observed during the survey is given in Appendix 2.

Because the zones vary in size (see Annexes 1 to 7), a comparison between them based on total numbers can be deceptive. Densities provide a more meaningful comparison, as given for livestock in Table 6.

Table 6: Livestock densities by Zone (n/km^2)

	Afder	Degehabur	Fik	Gode	Korahe	Shinile	Warder
Cattle	2.8	1.4	1.0	4.7	0.8	6.8	0.7
Sheep & Goats	31.3	56.6	12.2	42.4	32.7	49.5	69.9
Camels	2.3	3.5	1.6	3.3	4.7	3.4	7.2
Equids	0.1	0.1	0.2	0.3	0.1	0.5	0.01
ALL	36.5	61.6	15.0	50.6	38.3	60.1	77.8

6 References

Caughley, G.C. 1977 Sampling in aerial survey. *Journal of Wildlife Management* 41(4): 605-614

Jolly, G. M. 1969 Sampling methods for aerial census of wildlife populations. *East African Agricultural and Forestry Journal* 34: 46-49

Norton-Griffiths, M. (1978) *Counting Animals*. Handbook No.1 in a series of handbooks on techniques currently used in African wildlife ecology (Ed: J. Grimsdell). African Wildlife Foundation, Nairobi.

Appendix 1

Correction of Counting Bias

Visual estimates of groups with more than 10 individuals for which there was no corresponding photograph were corrected according to the formula:

$$y = mx+b$$

Where y = corrected value
x = visual estimate

and m and b are constants derived from the regression analysis of visual estimate-photo count data pairs as shown in the table below.

Aircraft	Observer	Species	No of data pairs	m	b
5Y-AHZ	CC	Cattle	51	0.715	15.225
		Shoats	332	0.958	6.251
		Camel	14	1.226	-2.944
	GM	Cattle	39	0.548	8.280
		Shoats	383	0.514	21.950
		Camel	14	0.476	14.302
5Y-BIH	BR	Cattle	56	0.740	5.876
		Shoats	328	0.881	-1.862
		Camel	8	0.702	5.007
	HK	Cattle	74	0.742	6.977
		Shoats	265	0.802	15.914
		Camel	66	0.844	3.485
		Trad roof	10	0.593	12.422
5Y-ATS	PN	Cattle	9	1.075	6.178
		Shoats	364	1.033	11.237
		Camel	19	1.068	-1.143
	JW	Cattle	13	0.871	1.877
		Shoats	536	0.717	16.789
		Camel	45	0.817	3.916

Appendix 2

Wildlife species observed by Zone

		AD	DH	FK	GD	KR	SH	WD
Dibatag	*Ammodorcas clarkei*		✓					✓
Dikdik	*Madoqua* spp		✓	✓	✓	✓		
Gazelle	*Gazella soemmerringi*					✓	✓	
Gerenuk	*Litocranius walleri*	✓	✓	✓	✓	✓	✓	
Grevy's Zebra	*Equus grevyi*						✓	
Jackal	*Canis* spp		✓					
Leopard	*Panthera pardus*						✓	
Lesser Kudu	*Tragelaphus imberbis*	✓		✓		✓	✓	
Ostrich	*Struthio molibdophanus*			✓	✓	✓	✓	✓
Warthog	*Phacochoerus aethiopicus*	✓	✓	✓	✓	✓	✓	✓
Wild Dog	*Lycaon pictus*				✓			

AD Afder; DH Degehabur; FK Fik; GD Gode; KR Korahe; SH Shinile; WD Warder

ANNEX 1

AFDER ZONE

POPULATION ESTIMATES

and

DISTRIBUTION MAPS

Area: 59,845 km²

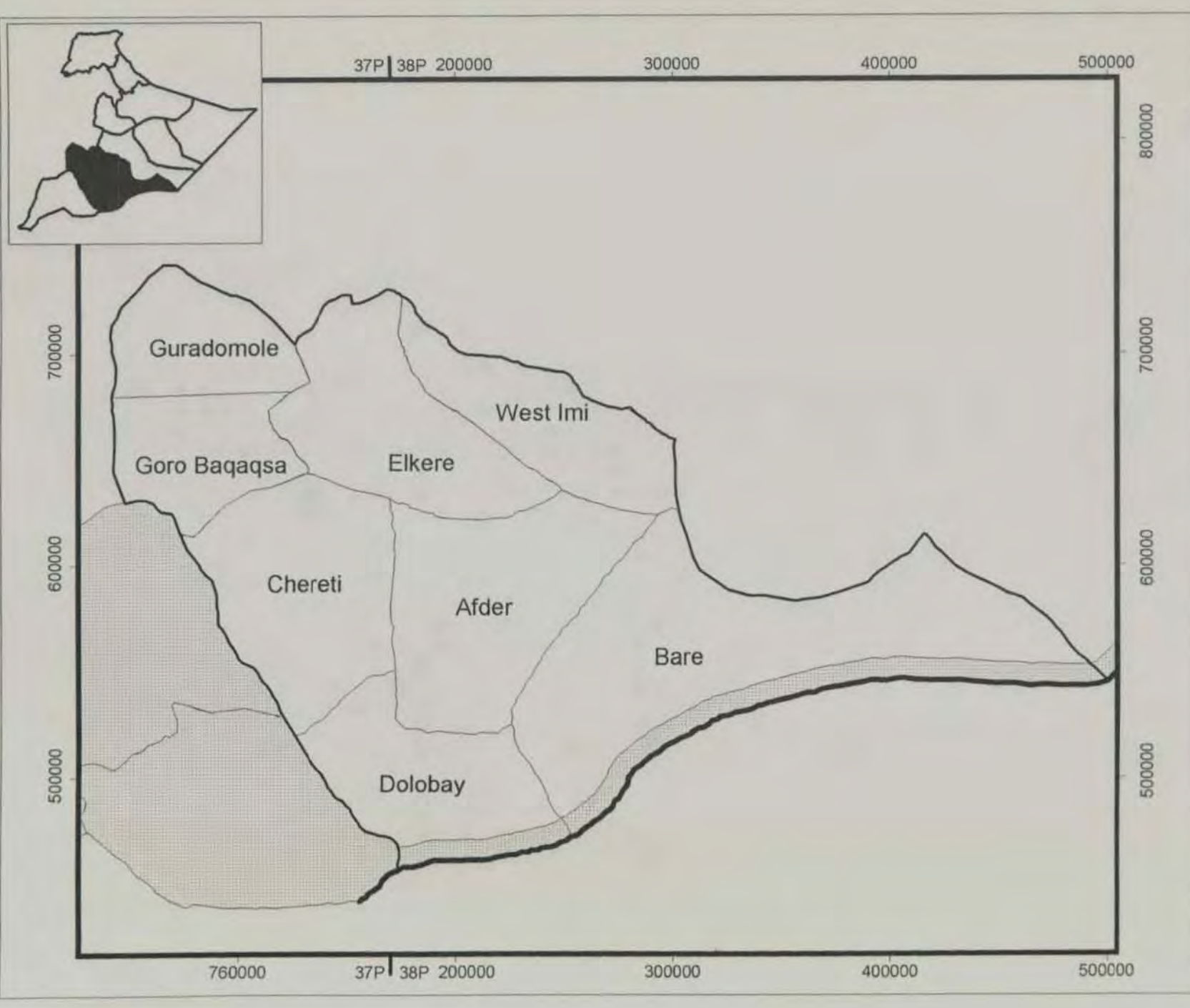
Variable name	Population estimate	SE	CV	95% CL	
				Upper limit	Lower limit
Cattle	166,471	26,285	16	218,077	114,865
Sheep and goats	1,875,218	224,908	12	2,325,270	1,425,166
Camels	140,454	18,003	13	175,568	105,341
Equids	4,406	1,319	30	7,006	1,806
Traditional roofs	53,297	9,857	18	72,484	34,110
Modern roofs	3,104	1,363	44	5,773	435
Dams and birkas	668	153	23	969	367
Gerenuk	668	284	43	1,229	107
Lesser Kudu	167	146	87	453	5
Warthog	1268	533	42	2,308	228
Livestock/roof ratio	41.0				

DISTRIBUTION OF CATTLE BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	166471	100	41152	24.72	125319	75.28
Under 6 month	29532	17.74	13567	8.15	15965	9.59
6 months - under 1 year	17396	10.45	7641	4.59	9755	5.86
1 year - under 2 years	28067	16.86	10454	6.28	17613	10.58
2 years and older	83935	50.42	8890	5.34	75045	45.08
10 years and above	7541	4.53	599	0.36	6942	4.17

DISTRIBUTIONS OF SHEEP AND GOATS BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Sheep and Goats	1875218	100	519810	27.72	1355408	72.28
Total Sheep	1152509	61.46	305848	16.31	846661	45.15
Under 6 month	243028	12.96	103700	5.53	139329	7.43
6 months - under 1 year	128452	6.85	48381	2.58	80072	4.27
1 year - under 2 years	173458	9.25	53256	2.84	120201	6.41
2 years and older	607383	32.39	100324	5.35	507059	27.04
Total Goats	722709	38.54	213962	11.41	508747	27.13
Under 6 month	139141	7.42	60945	3.25	78197	4.17
6 months - under 1 year	80072	4.27	30191	1.61	49881	2.66
1 year - under 2 years	103325	5.51	40130	2.14	63195	3.37
2 years and older	400172	21.34	82697	4.41	317474	16.93

DISTRIBUTION OF CAMELS BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	140454	100	31321	22.3	109133	77.7
Under 4 years	40647	28.94	14031	9.99	26616	18.95
4 years and older	99807	71.06	17290	12.31	82517	58.75

DISTRIBUTIONS OF HORSES, ASSES & MULES BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Equids	4406	100	1895	43	2511	57
Total Horses	16	0.36	12	0.27	4	0.09
Under 3 years	0	0	0	0	0	0
3 years and older	16	0.36	12	0.27	4	0.09
Total Asses	4327	98.2	1859	42.19	2468	56.01
Under 3 years	1289	29.26	724	16.43	565	12.83
3 years and older	3037	68.94	1135	25.76	1903	43.18
Total Mules	63	1.44	24	0.54	40	0.9
Under 3 years	20	0.45	16	0.36	4	0.09
3 years and older	44	0.99	8	0.18	36	0.81



Afder Zone

WOREDA MAP

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

Scale (km)
20 0 20

UTM WGS 84
Zones 37P/38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

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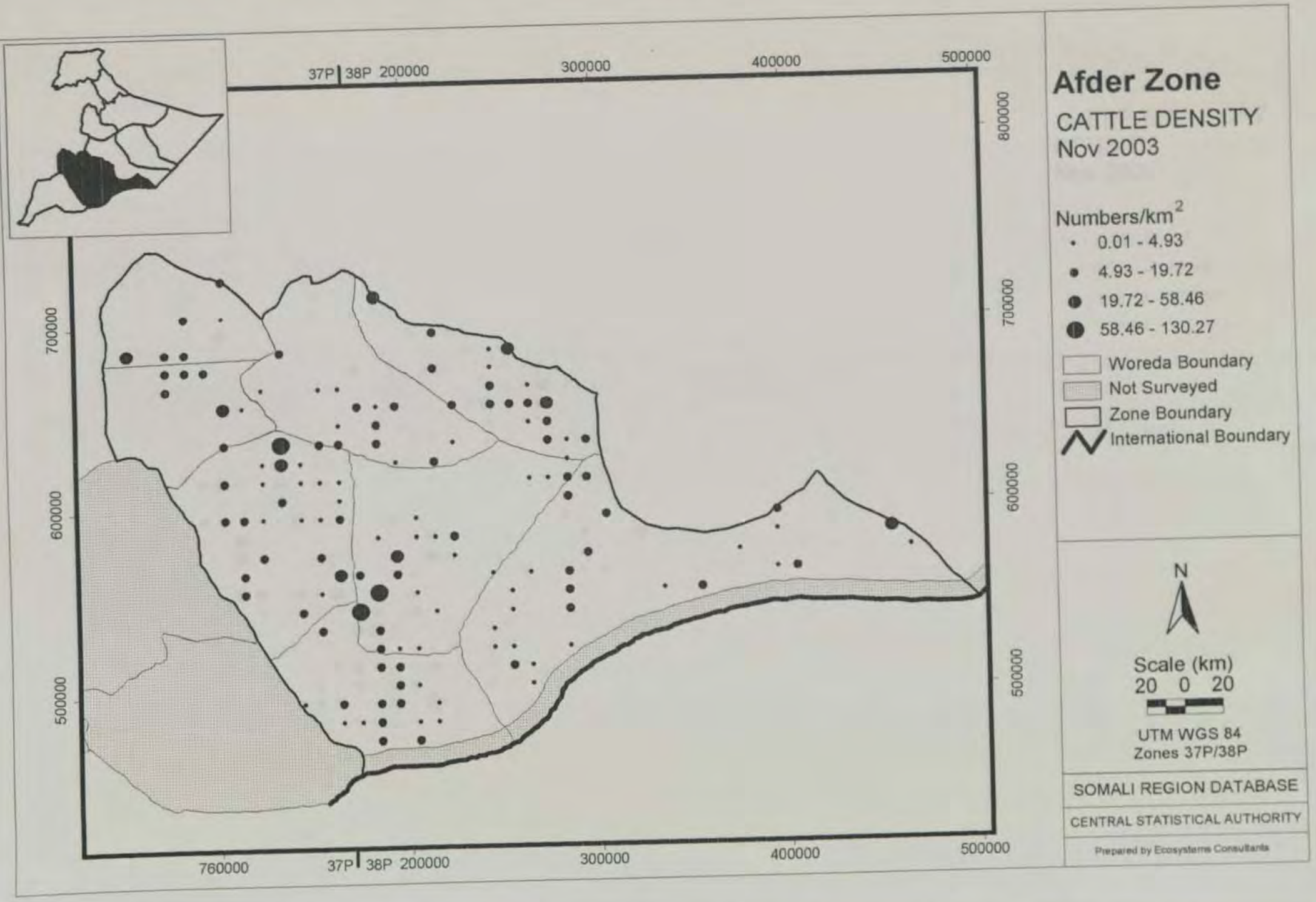

Afder Zone
CATTLE DENSITY
Nov 2003
Numbers/km2
0.01 - 4.93
4.93 - 19.72
19.72 - 58.46
58.46 - 130.27
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
37P 38P 200000
300000
400000
500000
760000
800000
700000
600000
500000

37P | 38P 200000 300000 400000 500000

800000 700000 600000 500000

700000 600000 500000

760000 37P | 38P 200000 300000 400000 500000

Afder Zone

SHEEP AND GOAT DENSITY
Nov 2003

Numbers/km^2

- 0.01 - 55.19
- 55.19 - 188.13
- 188.13 - 578.64
- 578.64 - 1371.51

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

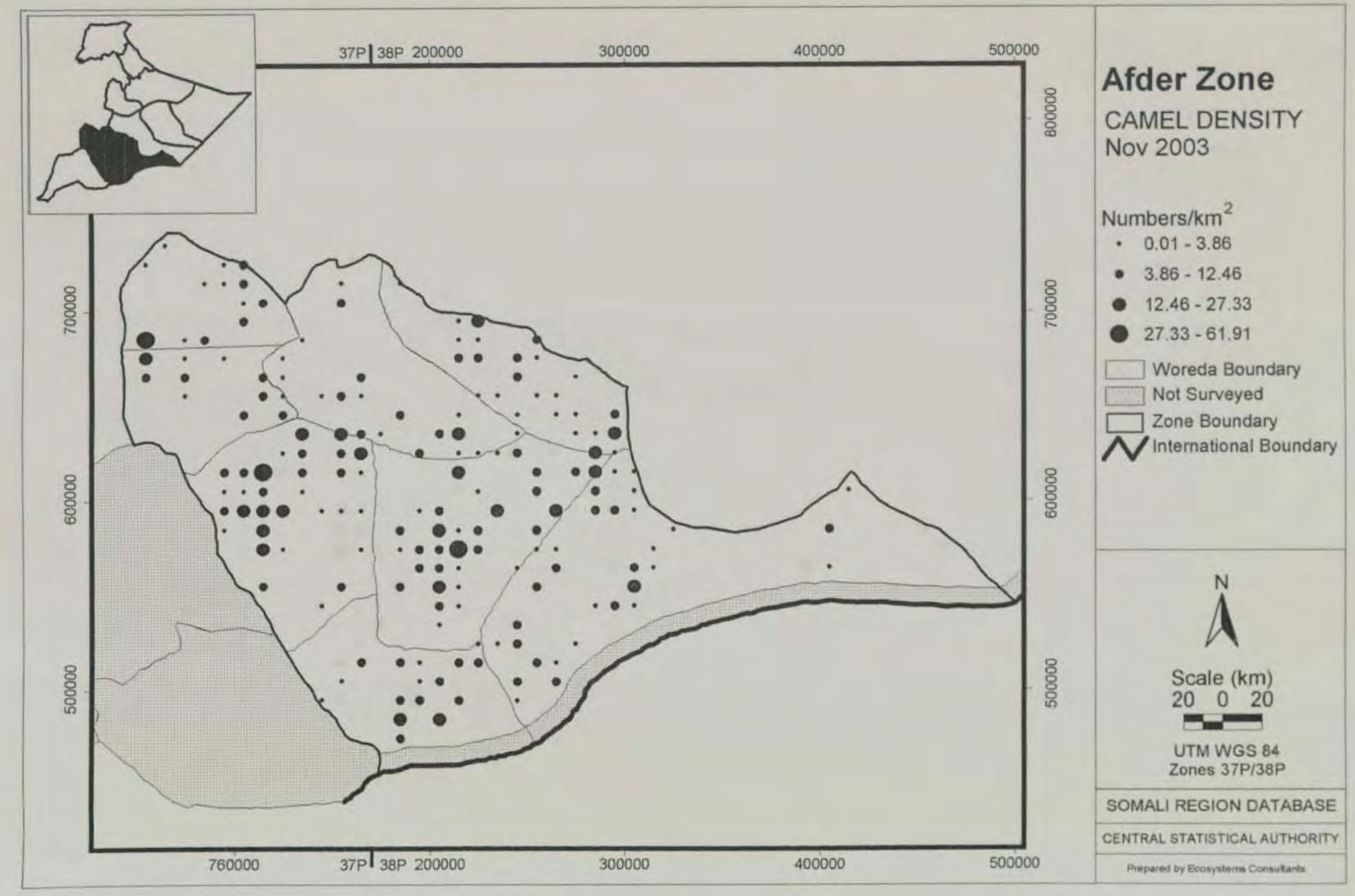
Scale (km)
20 0 20

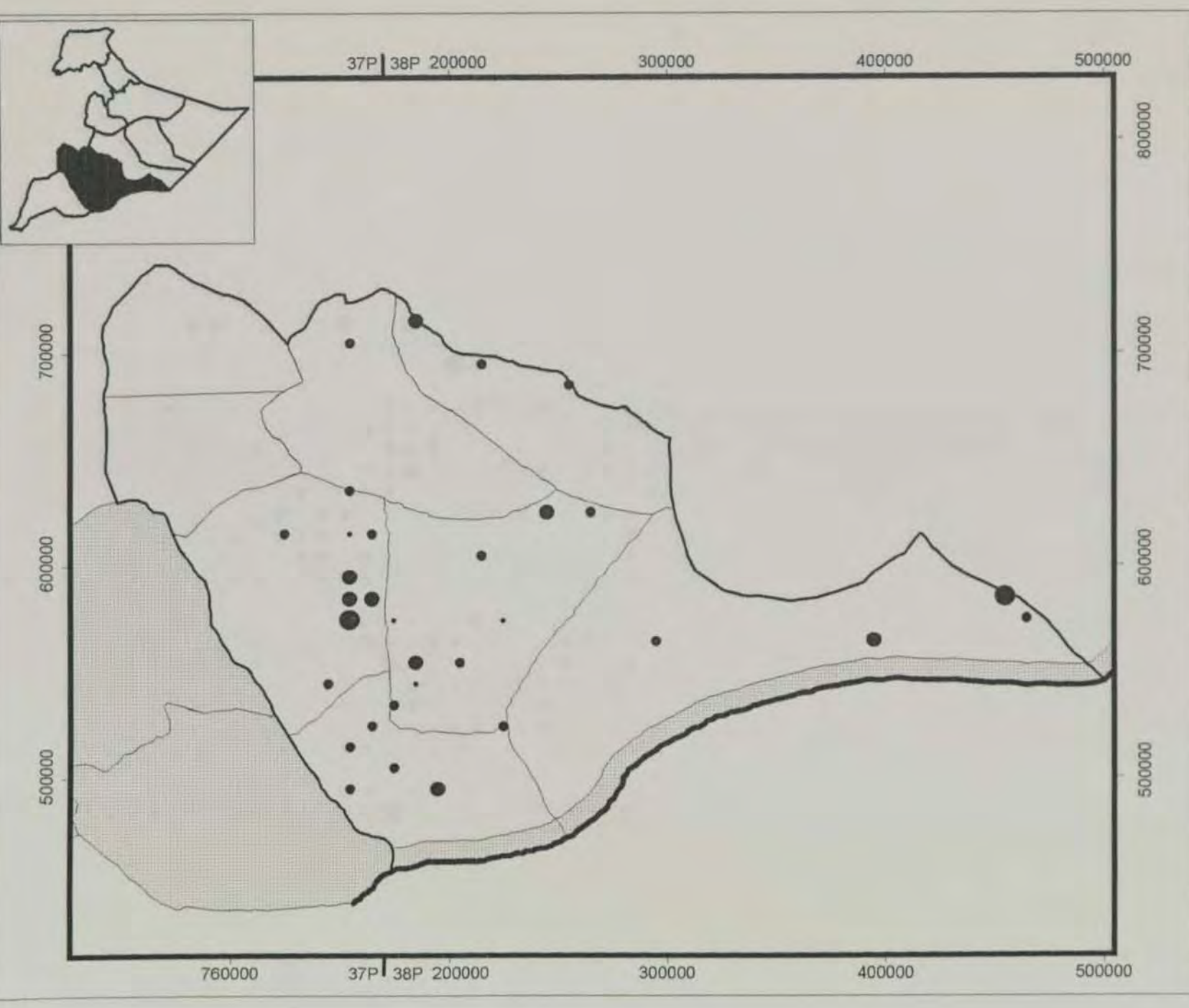
UTM WGS 84
Zones 37P/38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Afder Zone
CAMEL DENSITY
Nov 2003
Numbers/km2
0.01 - 3.86
3.86 - 12.46
12.46 - 27.33
27.33 - 61.91
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
37P 38P 200000
300000
400000
500000
800000
700000
600000
500000
760000



Afder Zone

EQUID DENSITY
Nov 2003

Numbers/km^2

- 0.01 - 0.3
- 0.3 - 1.19
- 1.19 - 2.37
- 2.37 - 4.75

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

Scale (km)
20 0 20

UTM WGS 84
Zones 37P/38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

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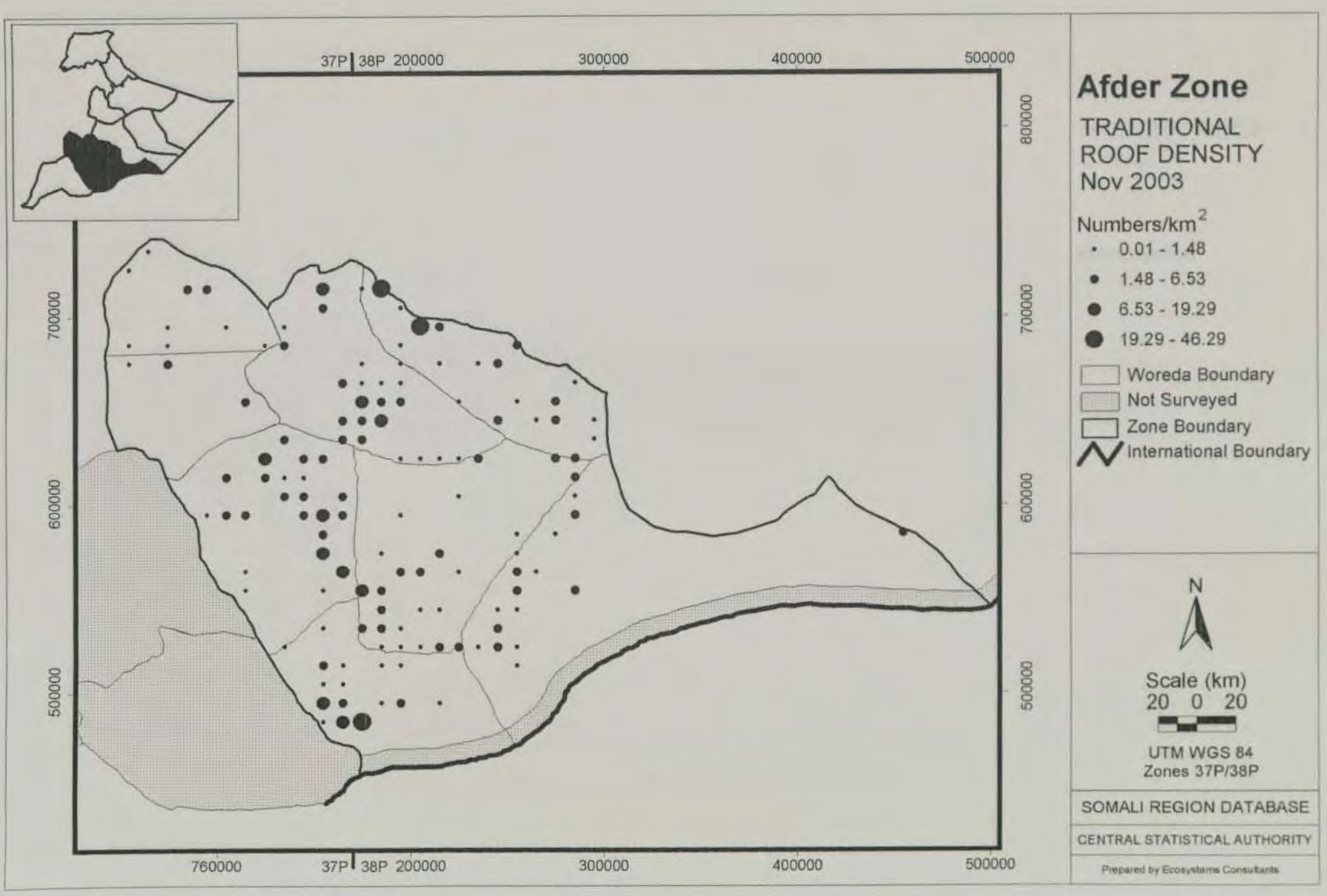
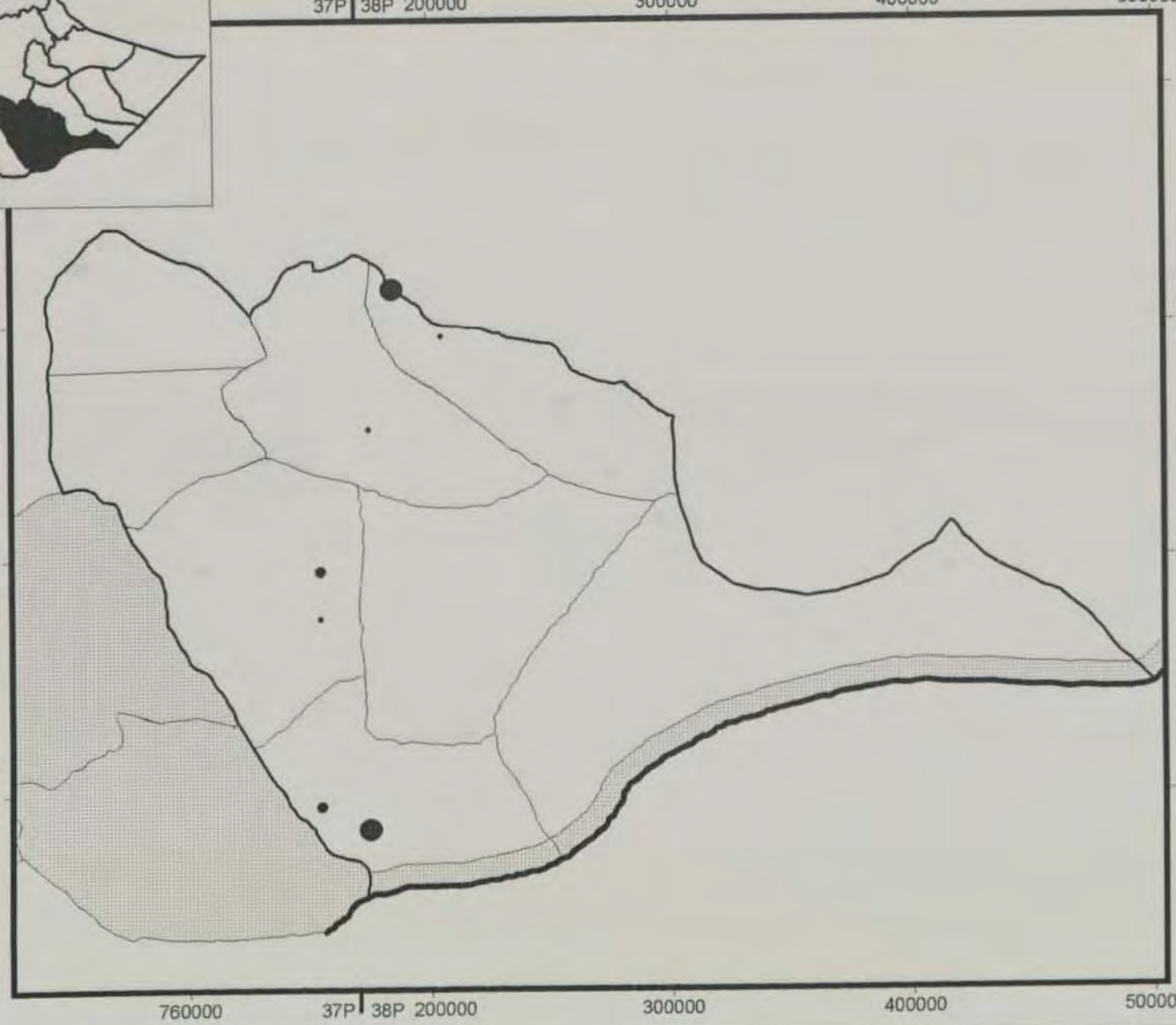

Afder Zone
TRADITIONAL
ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 1.48
1.48 - 6.53
6.53 - 19.29
19.29 - 46.29
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
37P 38P 200000
300000
400000
500000
800000
700000
600000
500000
760000



Afder Zone

MODERN ROOF DENSITY
Nov 2003

Numbers/km^2

- 0.01 - 1.48
- 1.48 - 4.75
- 4.75 - 8.31

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

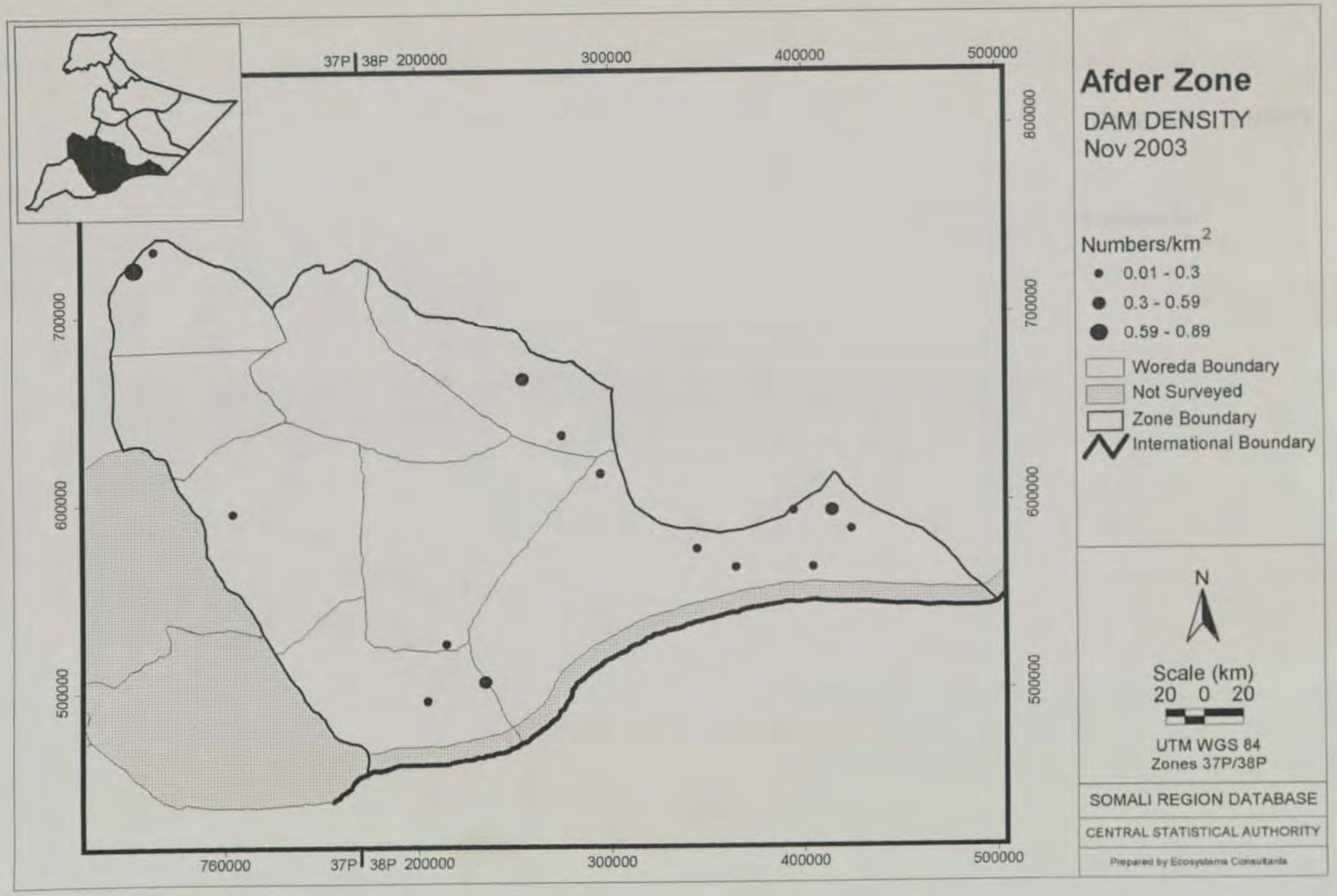
Scale (km)
20 0 20

UTM WGS 84
Zones 37P/38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Afder Zone
DAM DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.59
0.59 - 0.89
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
37P 38P 200000
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760000
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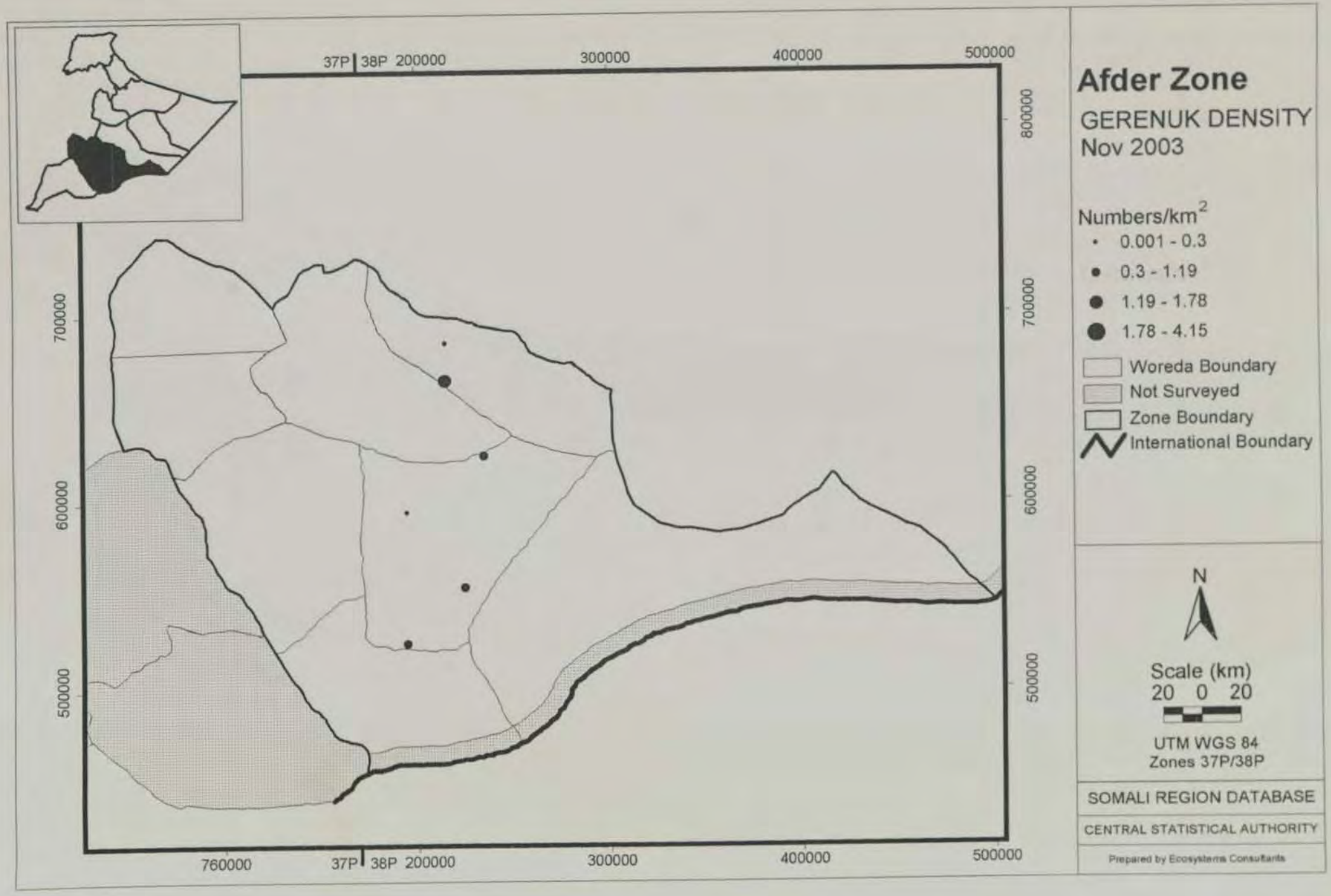
700000
600000
500000


Afder Zone
GERENUK DENSITY
Nov 2003
Numbers/km2
0.001 - 0.3
0.3 - 1.19
1.19 - 1.78
1.78 - 4.15
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
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Prepared by Ecosystems Consultants
37P 38P 200000
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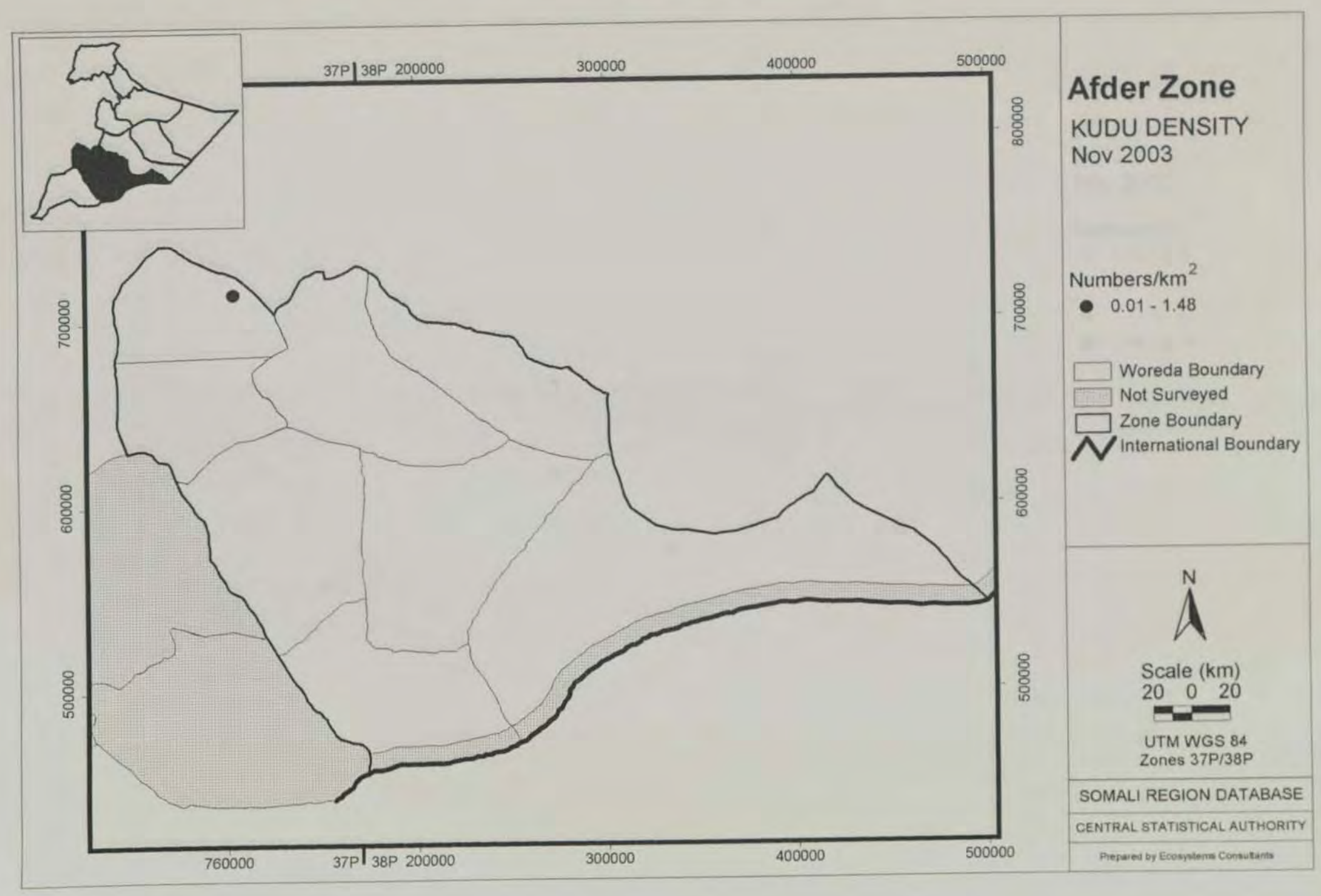
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KUDU DENSITY
Nov 2003
Numbers/km2
0.01 - 1.48
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
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Scale (km)
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UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
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Prepared by Ecosystems Consultants
37P 38P 200000
300000
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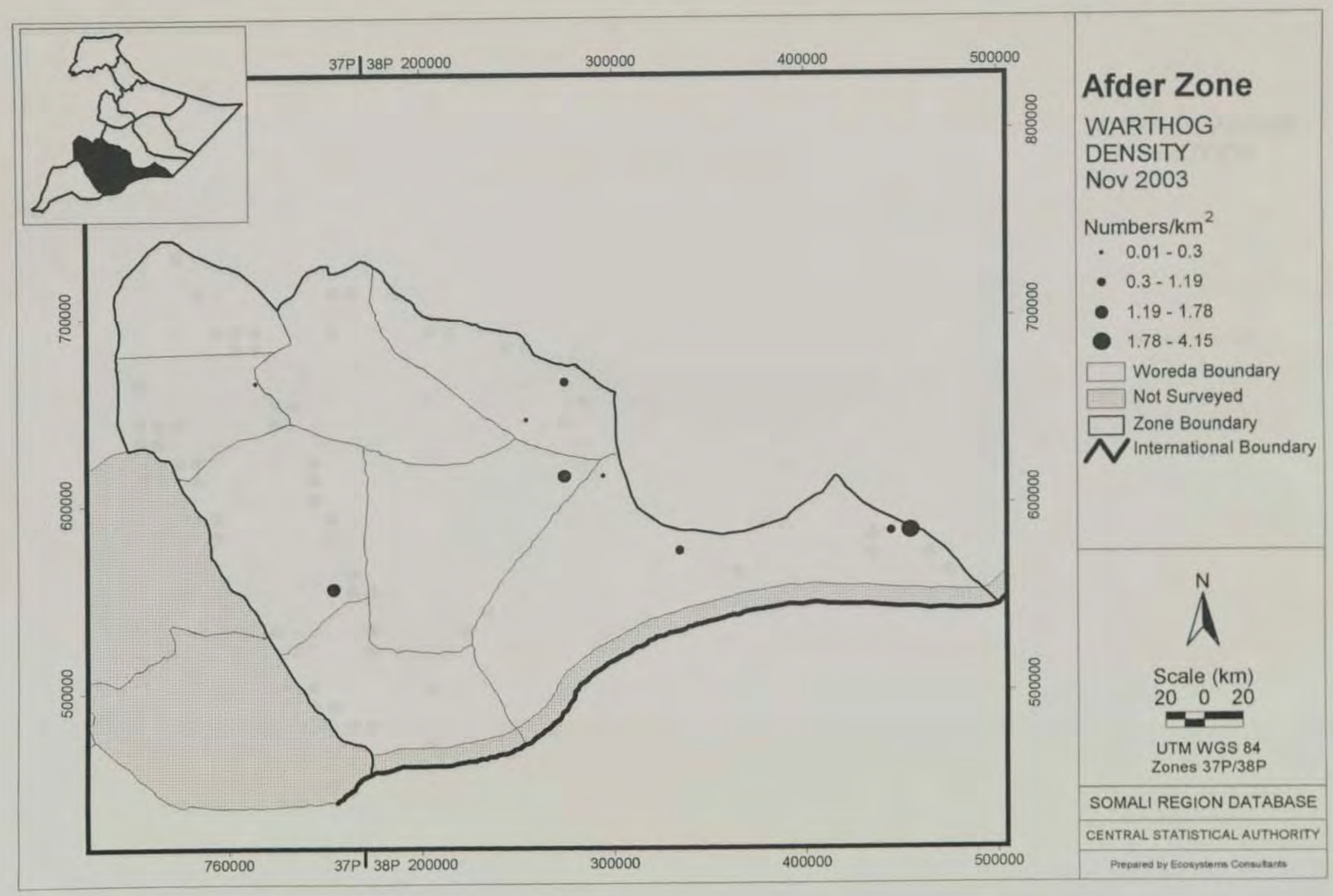
Afder Zone
WARTHOG
DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 1.19
1.19 - 1.78
1.78 - 4.15
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
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Prepared by Ecosystems Consultants
37P 38P 200000
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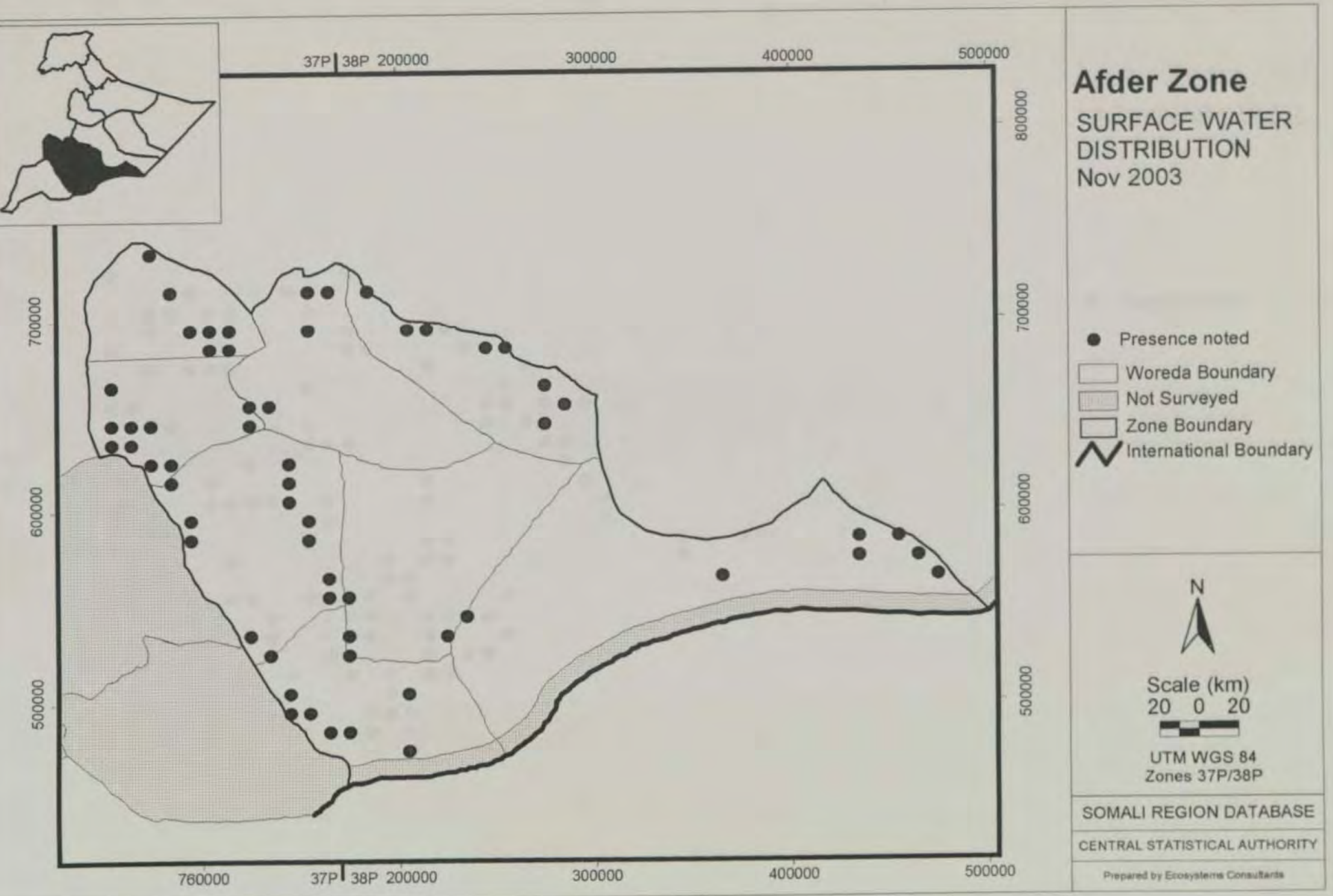
Afder Zone
SURFACE WATER DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
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UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
37P 38P 200000
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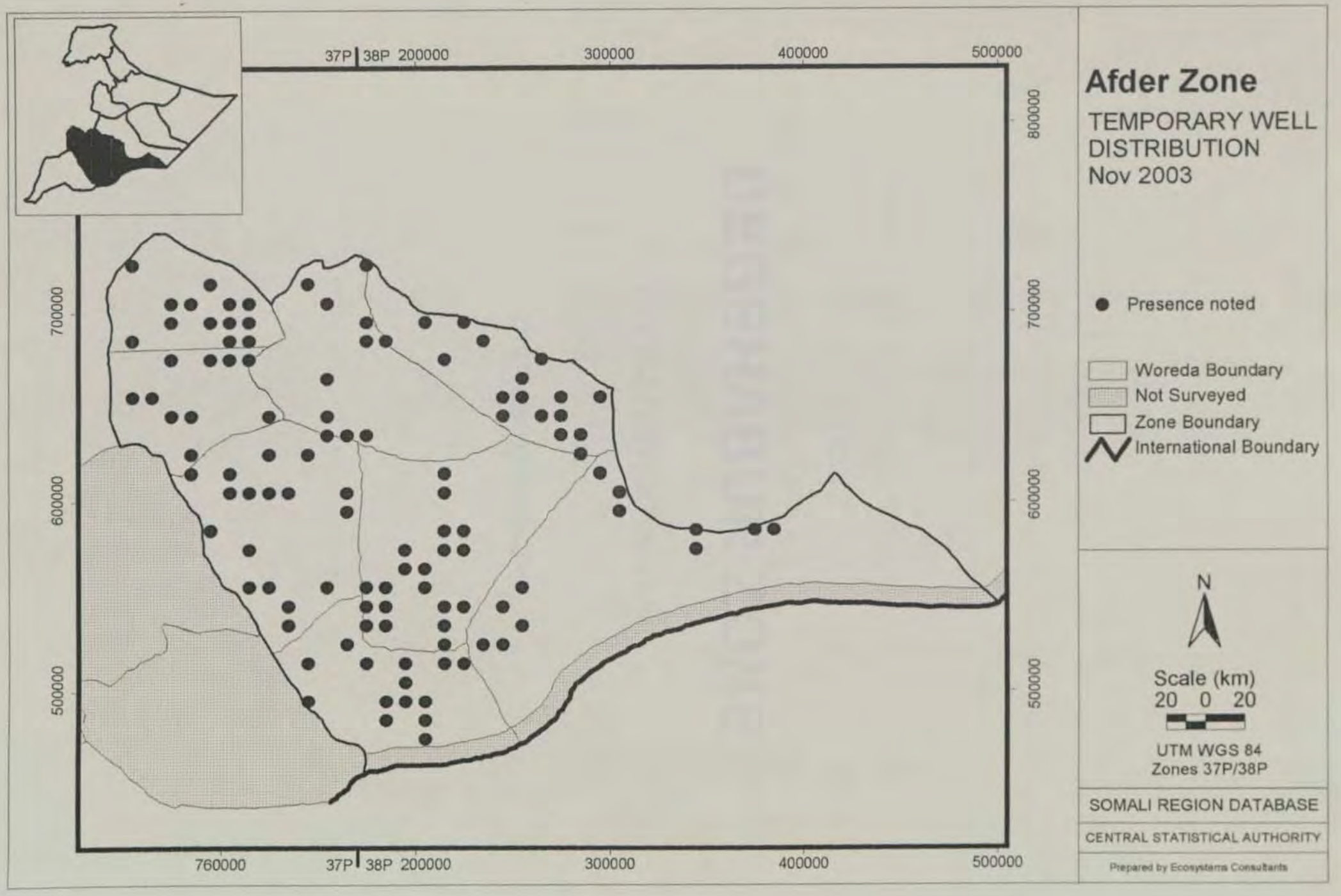
500000


Afder Zone
TEMPORARY WELL DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
37P 38P 200000
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400000
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600000
500000

ANNEX 2

DEGEHABUR ZONE

POPULATION ESTIMATES

and

DISTRIBUTION MAPS

Area: 37,407 km^2

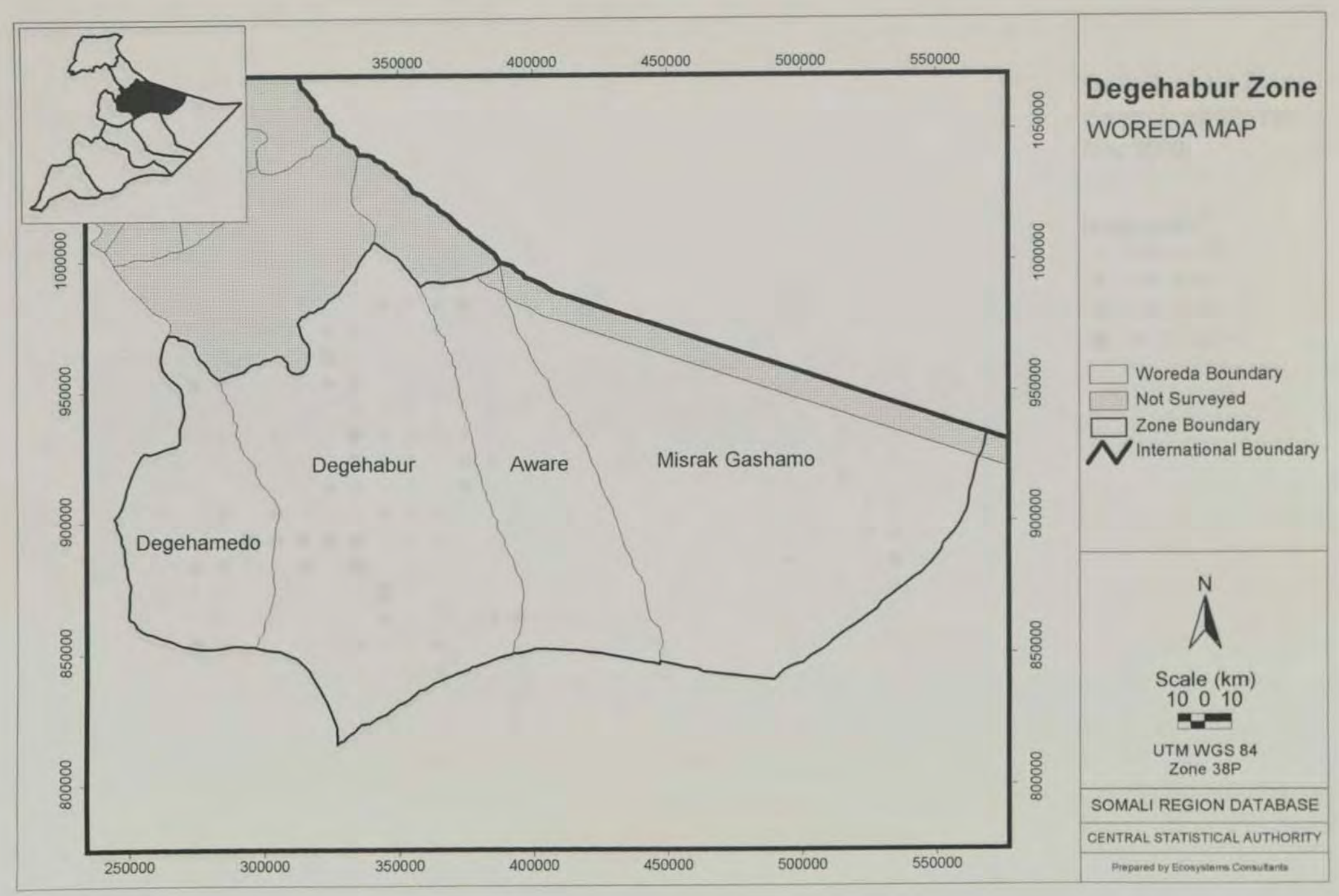
Variable name	Population estimate	SE	CV	95% CL	
				Upper limit	Lower limit
Cattle	51,536	12,349	24	75,758	27,314
Sheep and goats	2,117,704	247,685	12	2,604,776	1,630,632
Camels	131,106	12,246	9	154,705	107,507
Equids	5,502	1,224	22	7,923	3,081
Traditional roofs	45,318	5,733	13	56,648	33,989
Modern roofs	1,622	703	43	3,017	227
Dams and birkas	8,332	3551	43	15,331	1,333
Dik Dik	636	209	33	1,049	223
Gerenuk	572	231	40	1,030	114
Warthog	668	205	31	1,075	261
Livestock/roof ratio	50.9				

DISTRIBUTION OF CATTLE BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	51536	100	15966	30.98	35570	69.02
Under 6 month	6231	12.09	3030	5.88	3200	6.21
6 months - under 1 year	6251	12.13	2644	5.13	3608	7
1 year - under 2 years	8081	15.68	4113	7.98	3968	7.7
2 years and older	28159	54.64	5968	11.58	22191	43.06
10 years and above	2814	5.46	211	0.41	2603	5.05

DISTRIBUTIONS OF SHEEP AND GOATS BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Sheep and Goats	2117704	100	535991	25.31	1581713	74.69
Total Sheep	1395779	65.91	350056.5	16.53	1045722	49.38
Under 6 month	227018	10.72	88944	4.2	138074	6.52
6 months - under 1 year	248618	11.74	93391	4.41	155228	7.33
1 year - under 2 years	227018	10.72	75390	3.56	151628	7.16
2 years and older	693125	32.73	92332	4.36	600793	28.37
Total Goats	721925	34.09	185934	8.78	535991	25.31
Under 6 month	144216	6.81	58449	2.76	85767	4.05
6 months - under 1 year	108215	5.11	37060	1.75	71155	3.36
1 year - under 2 years	119227	5.63	35789	1.69	83438	3.94
2 years and older	350268.2	16.54	54637	2.58	295631	13.96

DISTRIBUTION OF CAMELS BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	131106	100	37273	28.43	93833	71.57
Under 4 years	38047	29.02	14330	10.93	23717	18.09
4 years and older	93059	70.98	22944	17.5	70115	53.48

DISTRIBUTIONS OF HORSES, ASSES & MULES BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Equids	5502	100	2779	50.5	2723	49.5
Total Horses	19	0.34	9	0.17	9	0.17
Under 3 years	9	0.17	9	0.17	0	0
3 years and older	9	0.17	0	0	9	0.17
Total Asses	5415	98.42	2729	49.6	2686	48.82
Under 3 years	1202	21.85	645	11.72	557	10.13
3 years and older	4213	76.57	2084	37.88	2129	38.69
Total Mules	68	1.24	40	0.73	28	0.51
Under 3 years	20	0.36	20	0.36	0	0
3 years and older	48	0.88	20	0.37	28	0.51


Degehabur Zone
WOREDA MAP
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
Degehamedo
Degehabur
Aware
Misrak Gashamo
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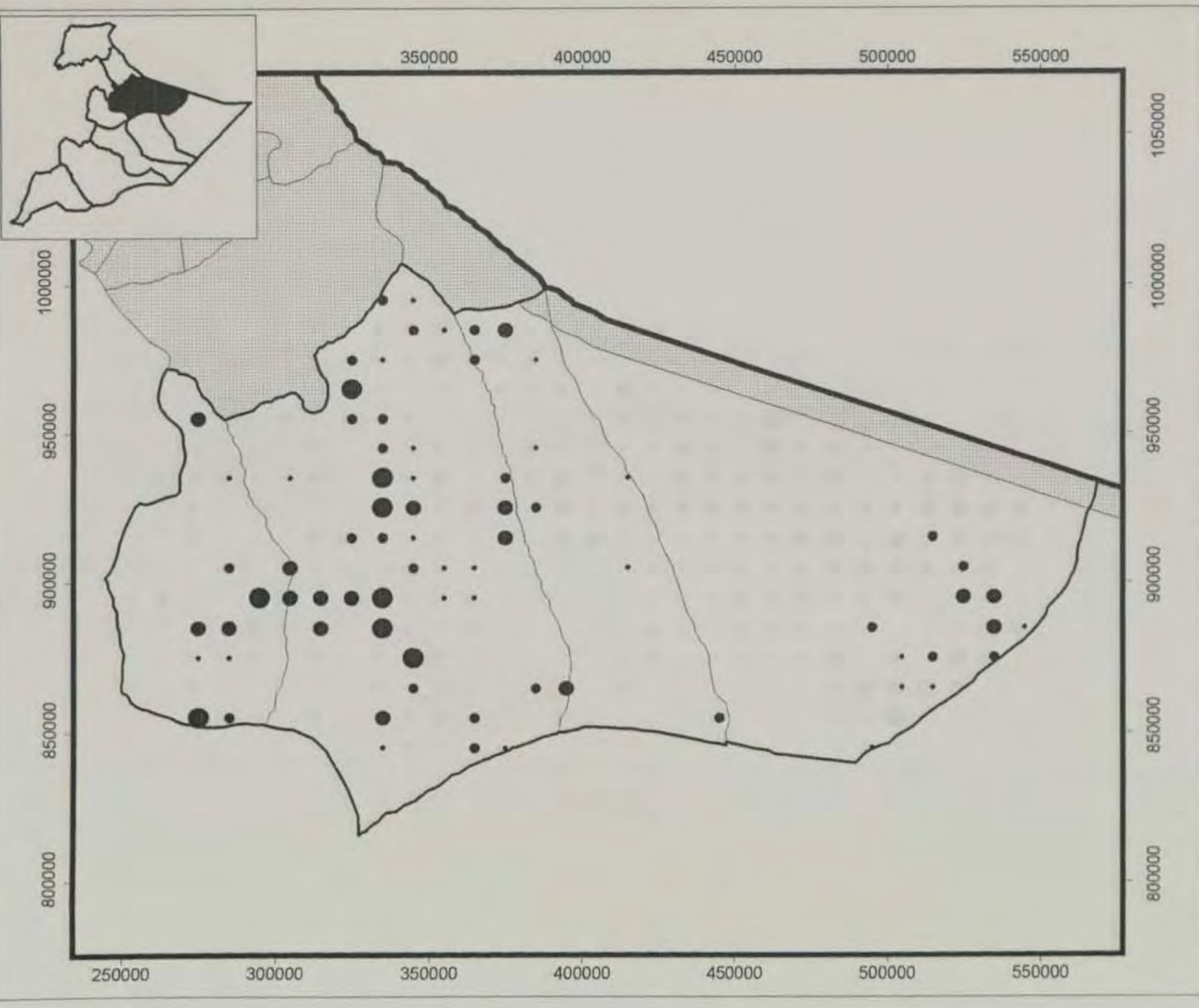
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants



Degehabur Zone

CATTLE DENSITY
Nov 2003

Numbers/km^2

- 0.001 - 1.78
- 1.78 - 6.28
- 6.28 - 13.31
- 13.31 - 32.01

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

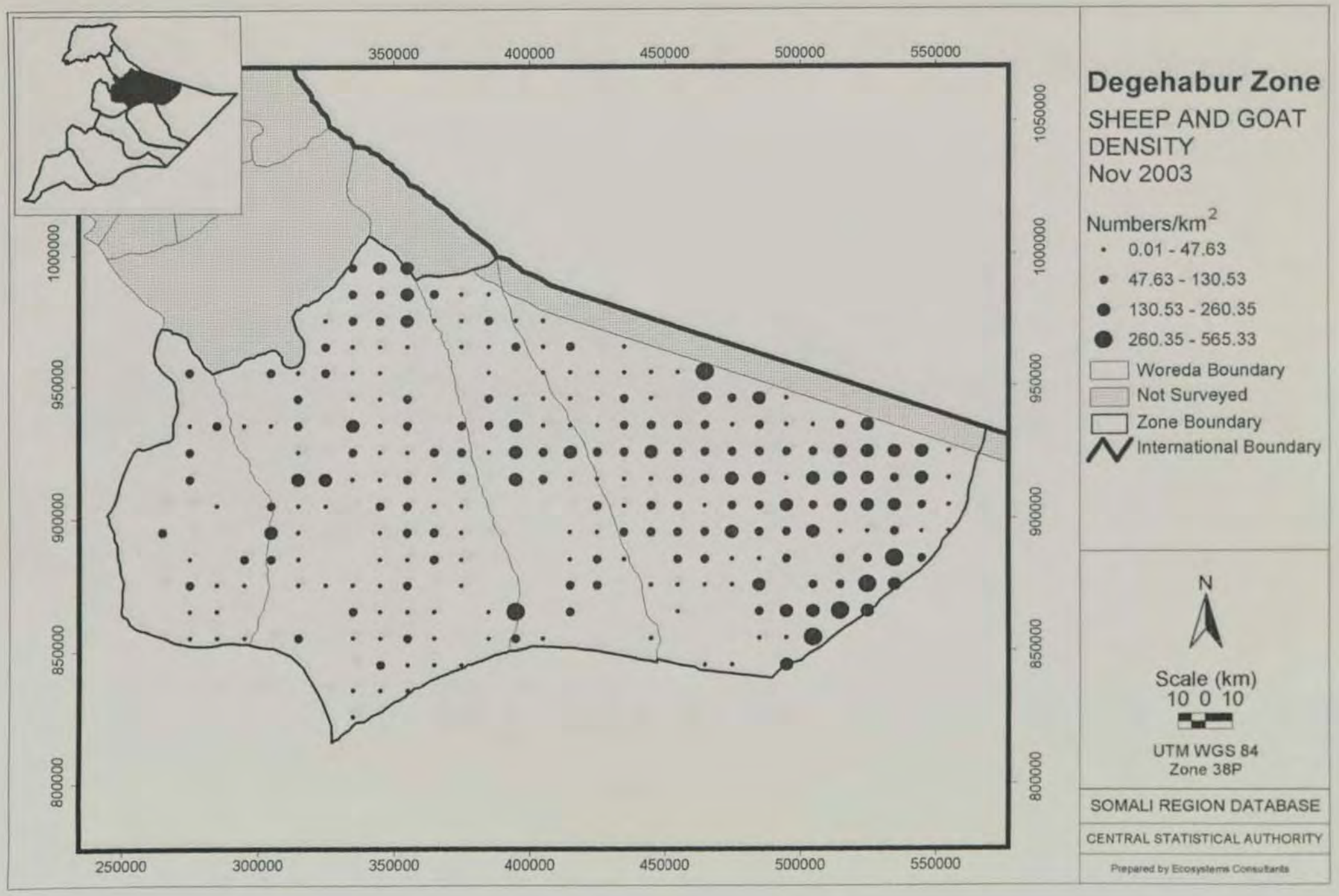
Scale (km)
10 0 10

UTM WGS 84
Zone 38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Degehabur Zone
SHEEP AND GOAT DENSITY
Nov 2003
Numbers/km2
0.01 - 47.63
47.63 - 130.53
130.53 - 260.35
260.35 - 565.33
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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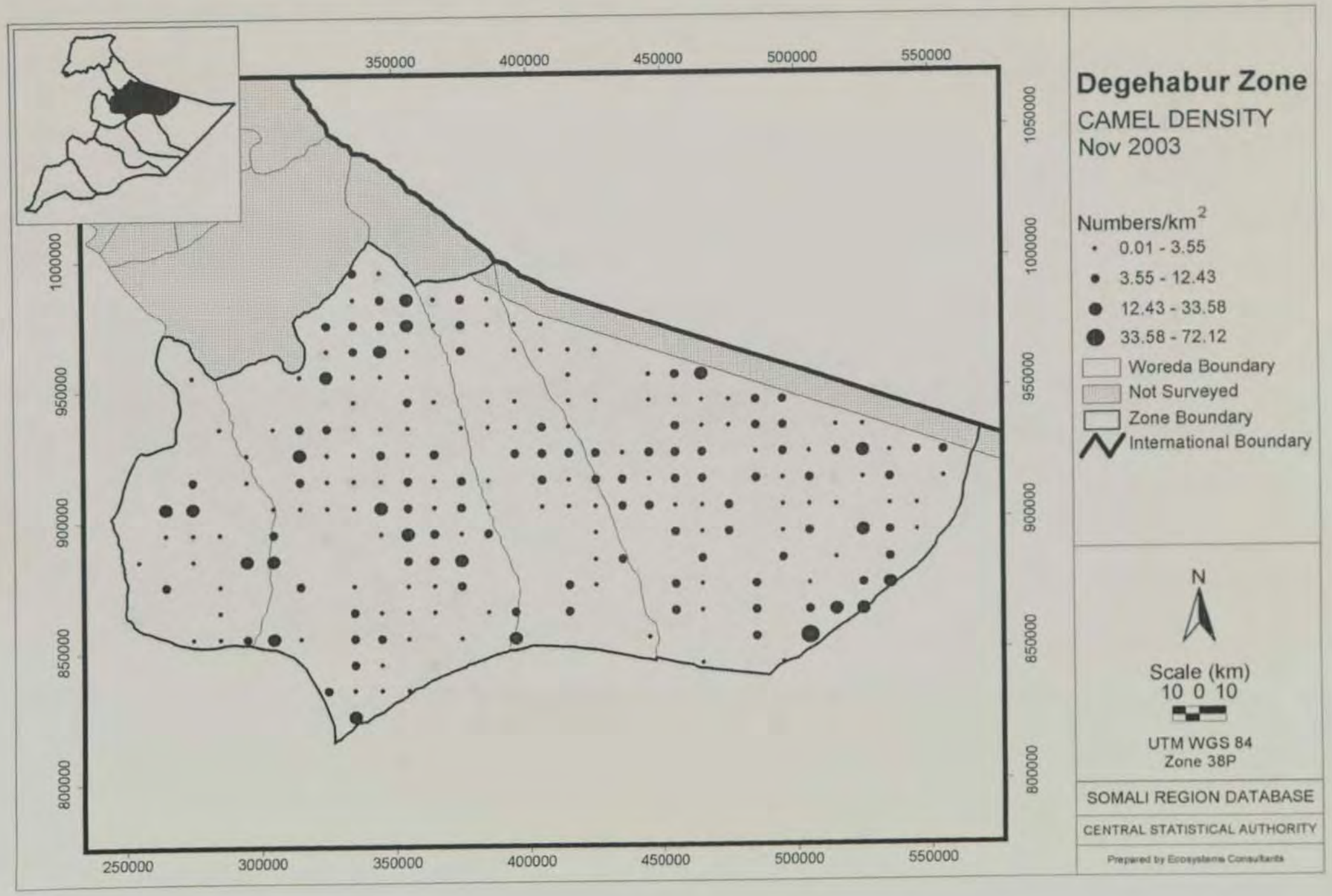
Degehabur Zone
CAMEL DENSITY
Nov 2003
Numbers/km2
0.01 - 3.55
3.55 - 12.43
12.43 - 33.58
33.58 - 72.12
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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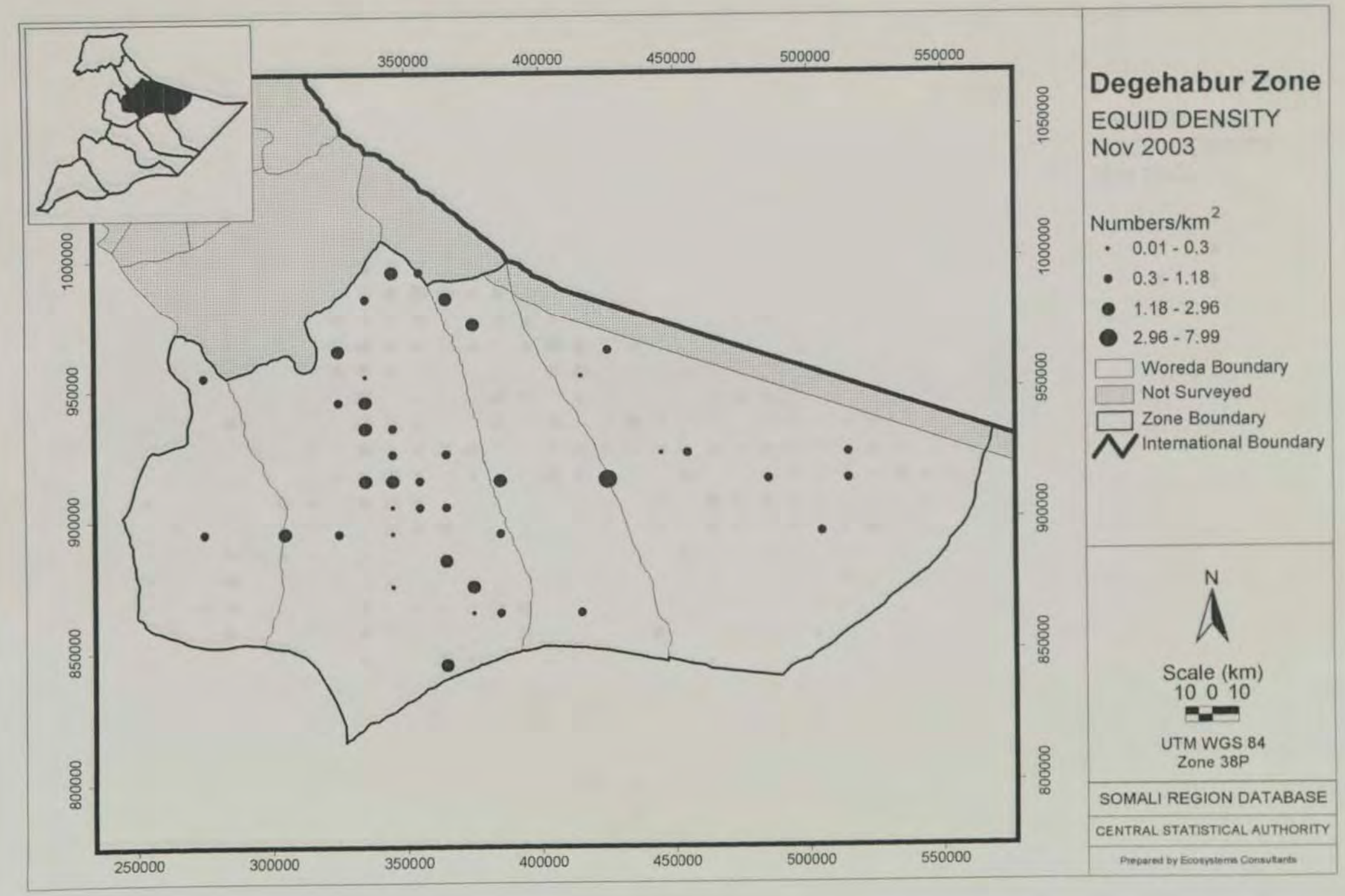
Degehabur Zone
EQUID DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 1.18
1.18 - 2.96
2.96 - 7.99
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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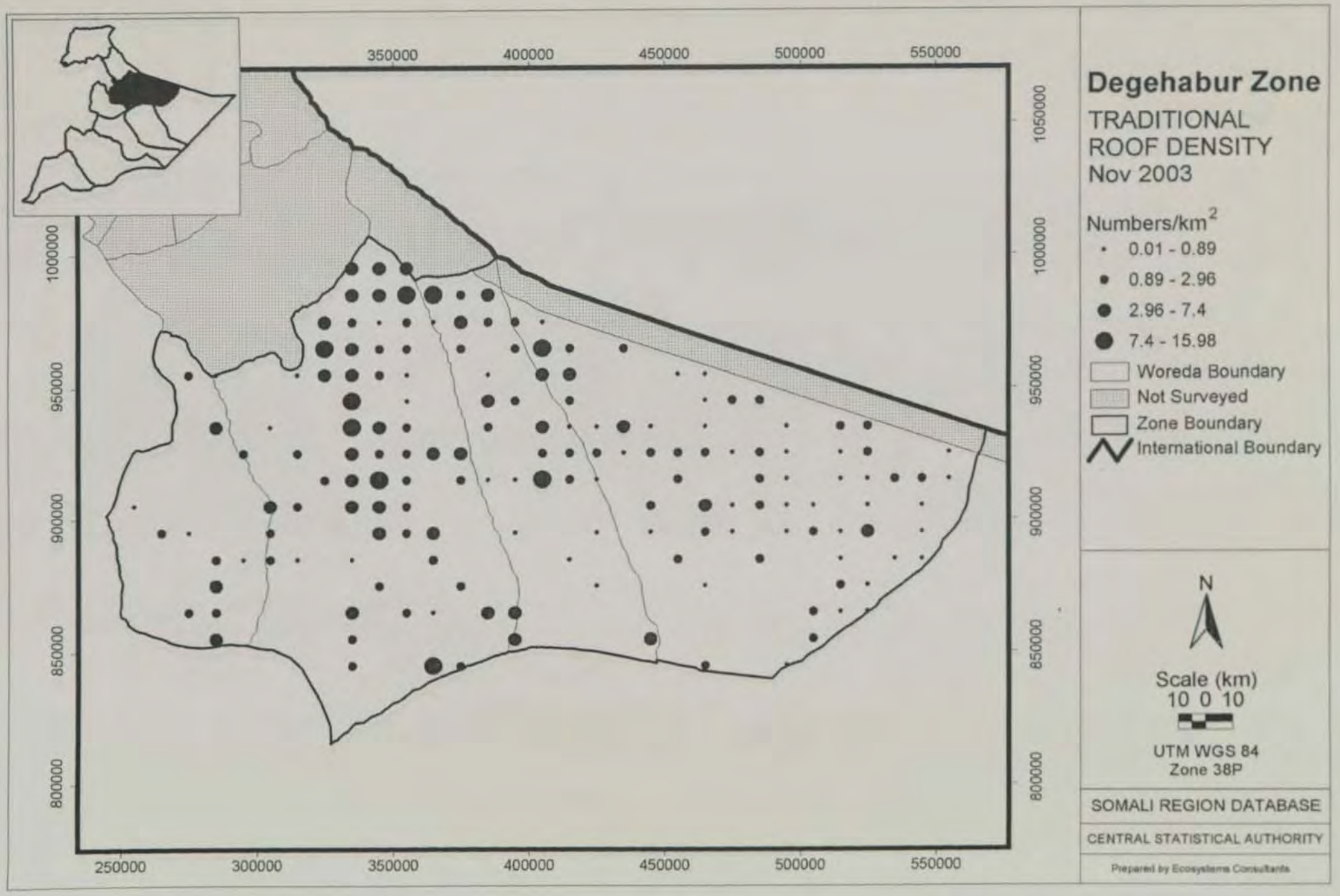
Degehabur Zone
TRADITIONAL
ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 0.89
0.89 - 2.96
2.96 - 7.4
7.4 - 15.98
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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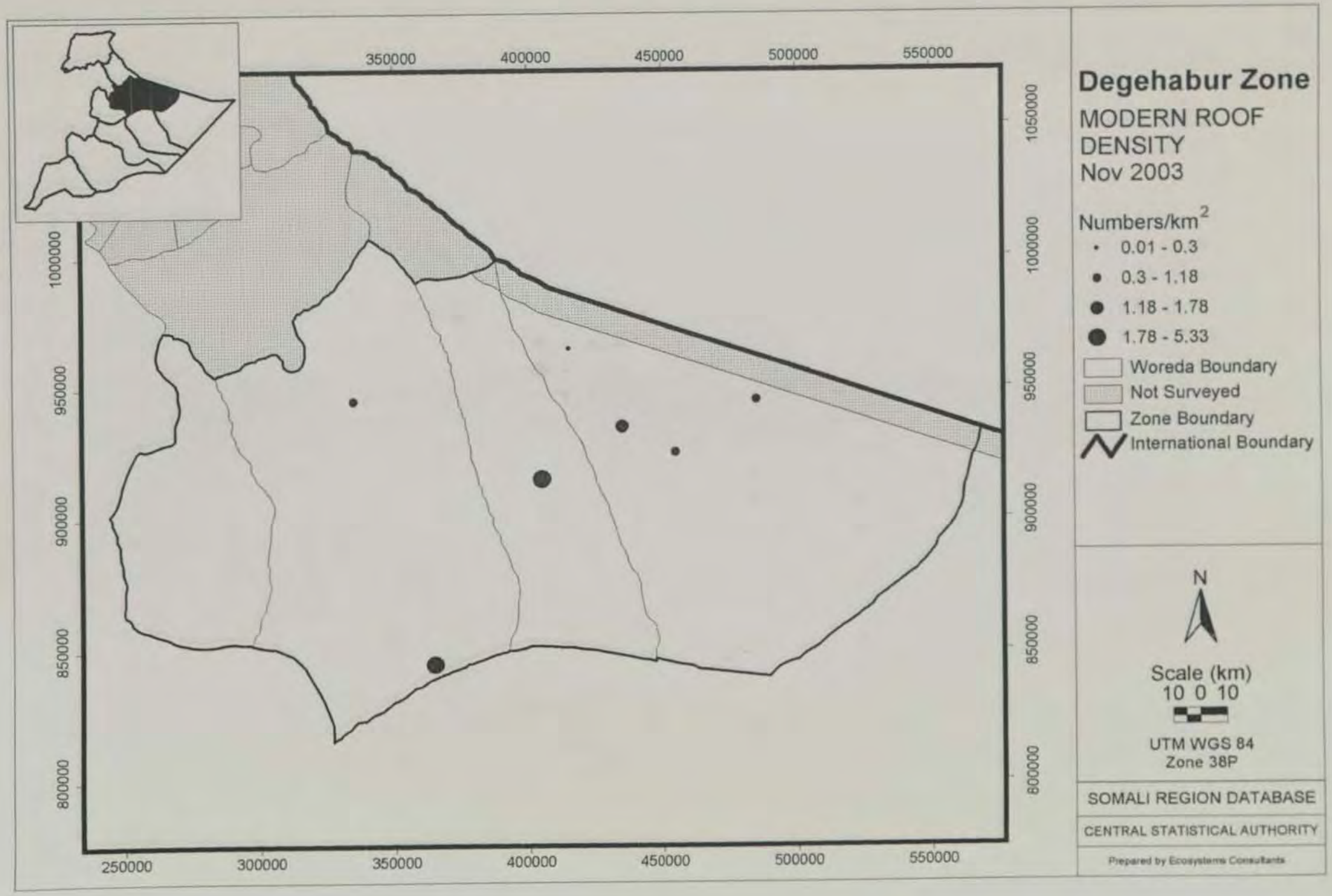
Degehabur Zone
MODERN ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 1.18
1.18 - 1.78
1.78 - 5.33
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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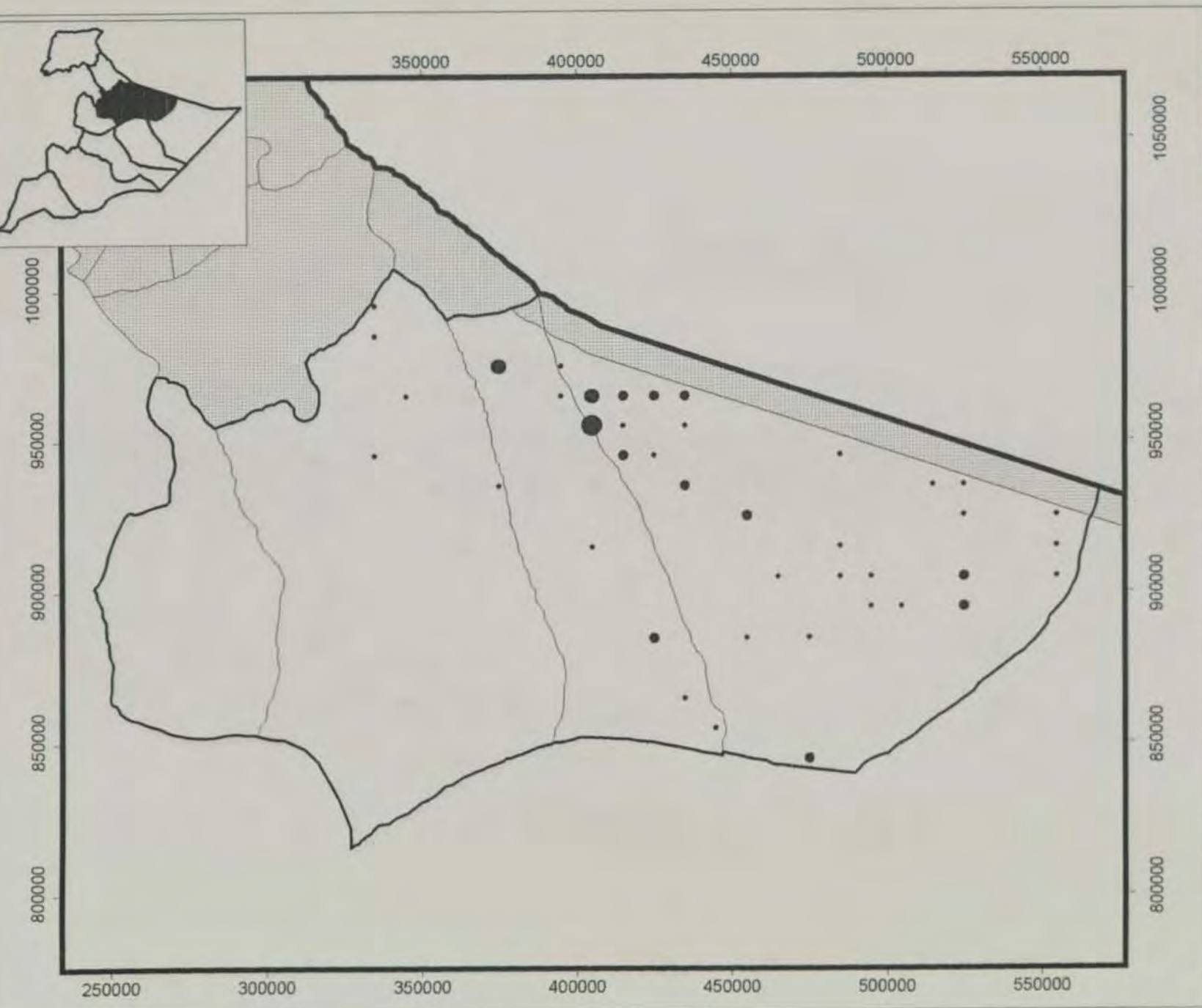


Degehabur Zone

DAM DENSITY
Nov 2003

Numbers/km^2

- 0.01 - 0.89
- 0.89 - 2.96
- 2.96 - 9.17
- 9.17 - 26.33

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

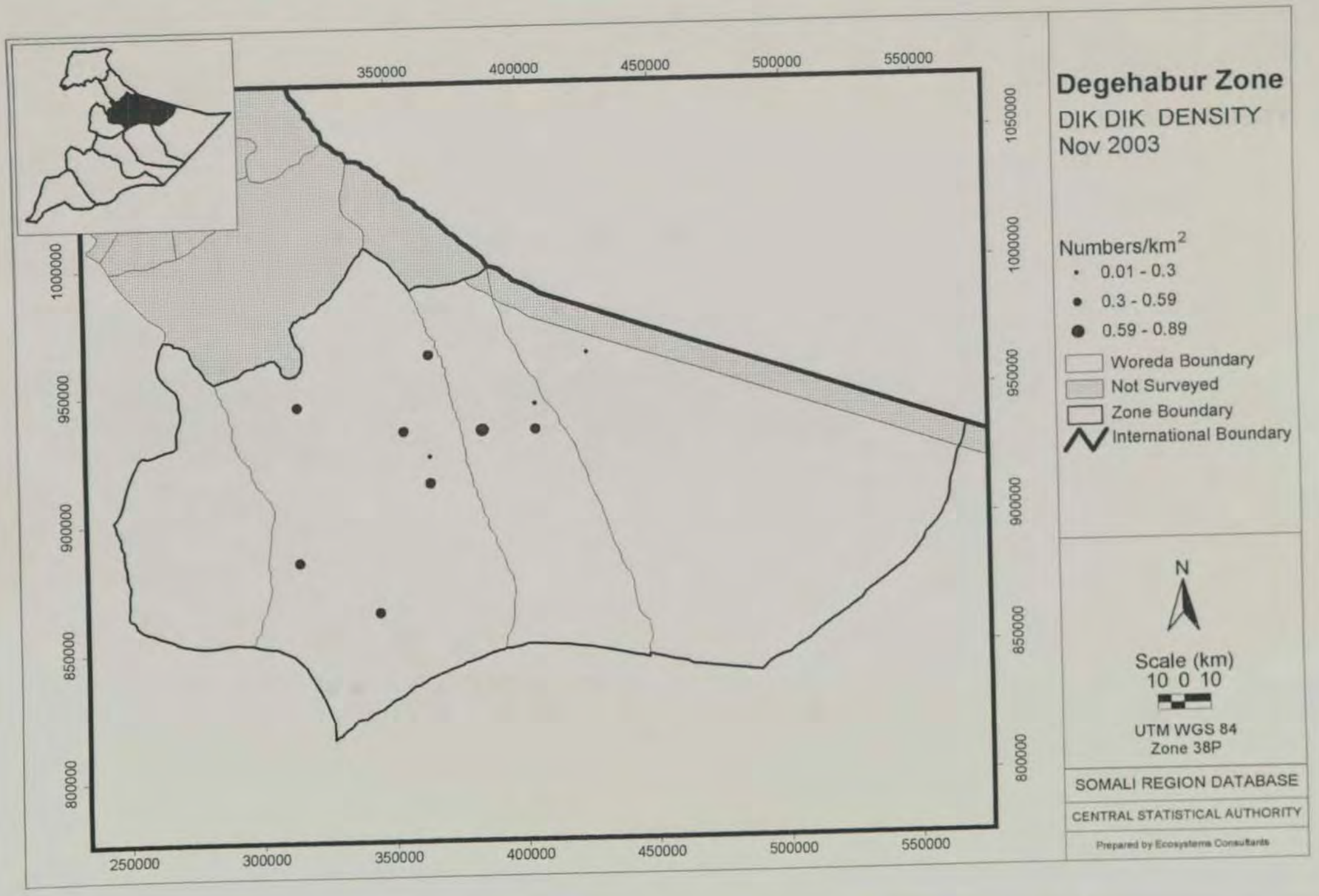
Scale (km)
10 0 10

UTM WGS 84
Zone 38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Degehabur Zone
DIK DIK DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.59
0.59 - 0.89
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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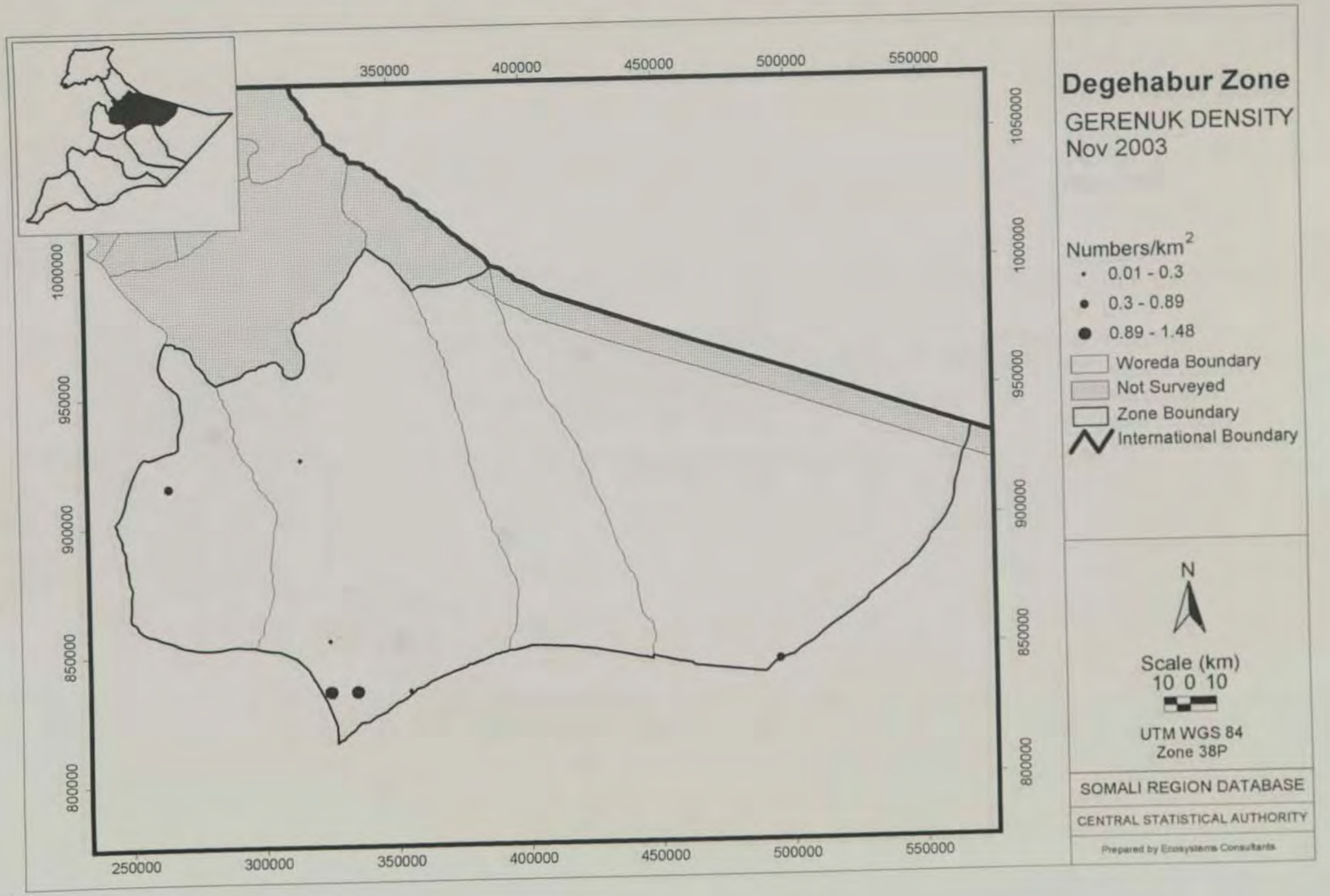
Degehabur Zone
GERENUK DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.89
0.89 - 1.48
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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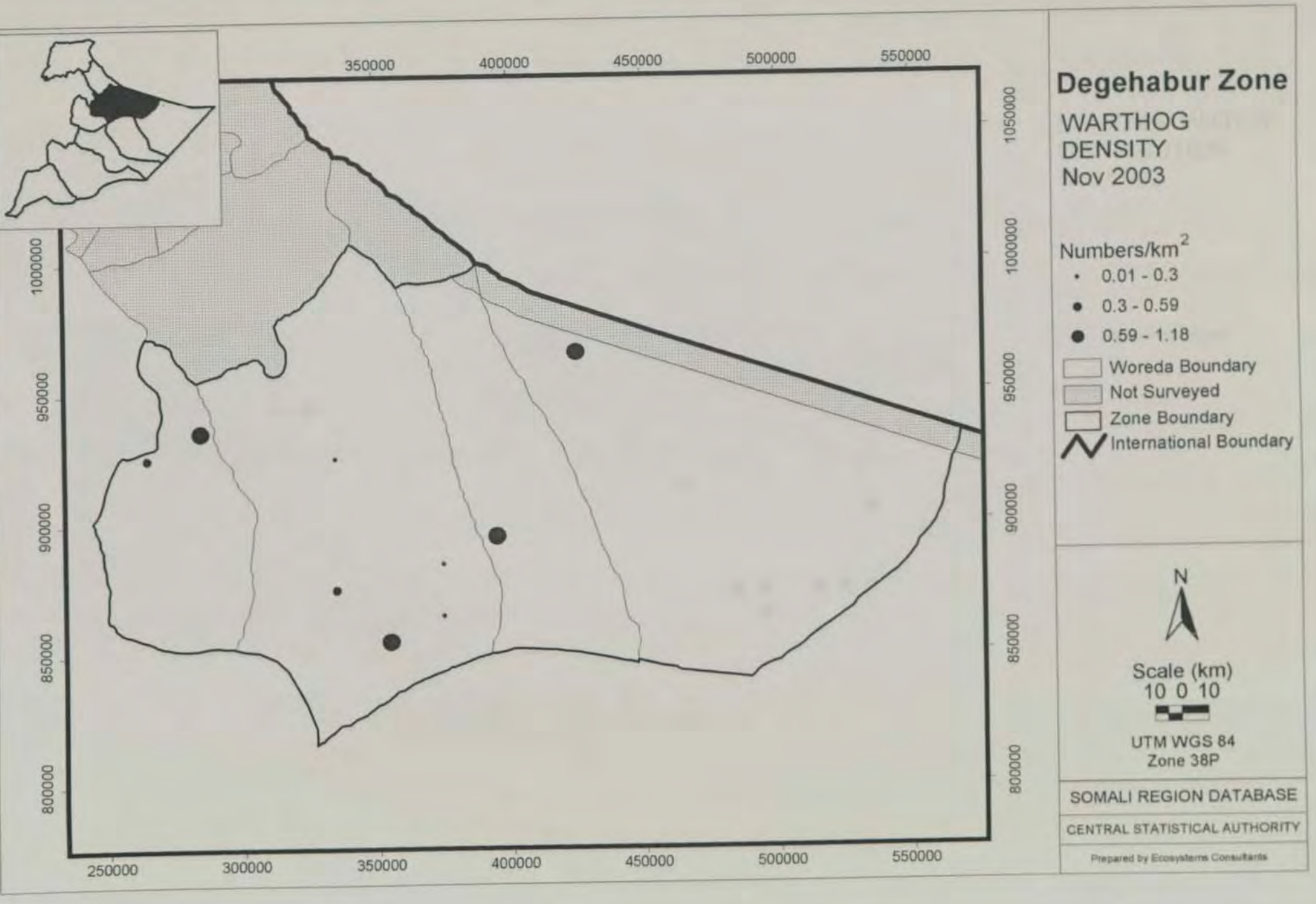
Degehabur Zone
WARTHOG
DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.59
0.59 - 1.18
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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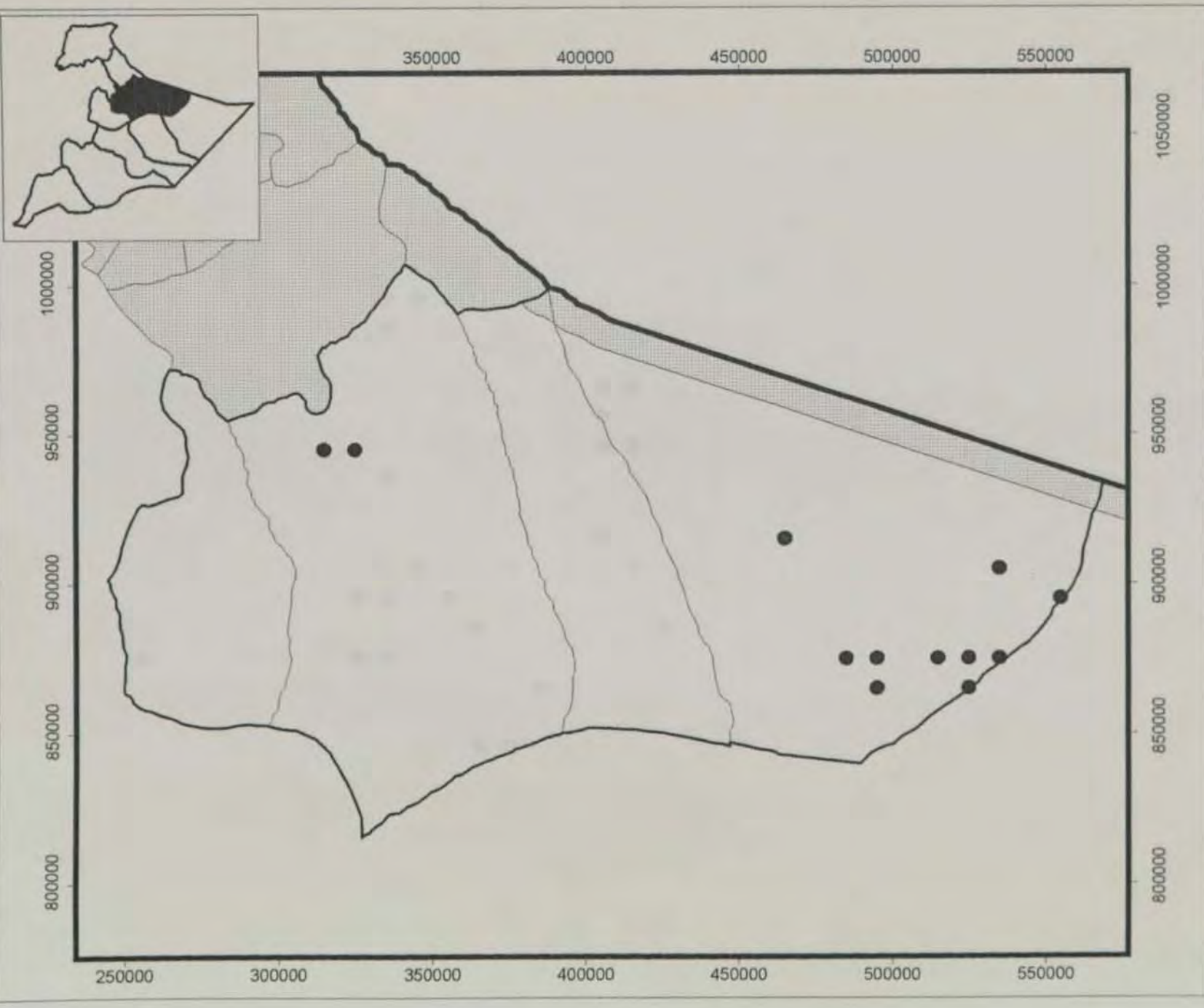


Degehabur Zone

SURFACE WATER DISTRIBUTION
Nov 2003

- Presence noted
- Woreda Boundary
- Not Surveyed
- Zone Boundary
- International Boundary

N

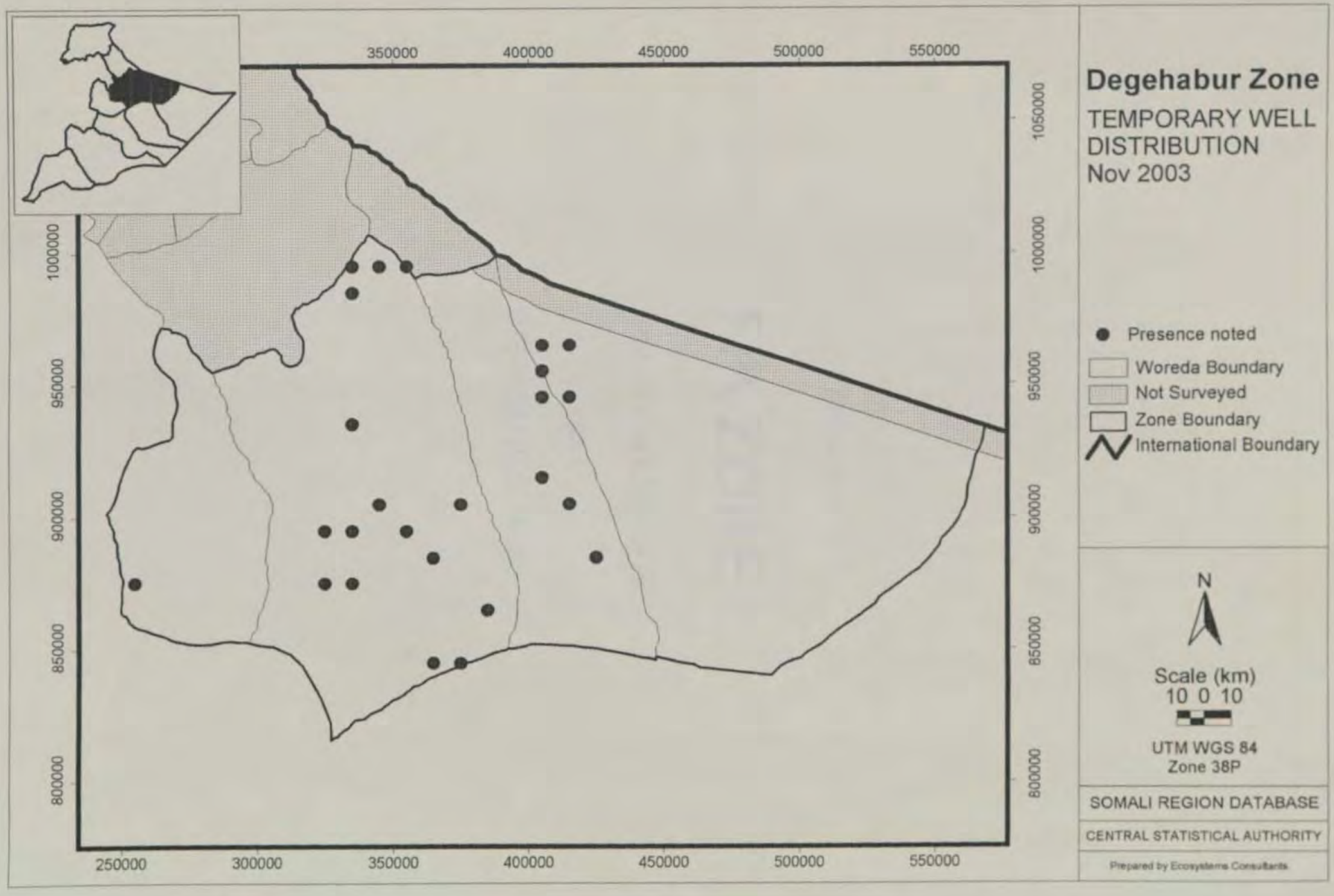
Scale (km)
10 0 10

UTM WGS 84
Zone 38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Degehabur Zone
TEMPORARY WELL DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
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Zone Boundary
International Boundary
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Scale (km)
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Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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ANNEX 3

FIK ZONE

POPULATION ESTIMATES

and

DISTRIBUTION MAPS

Area: 16,325 km^2

Variable name	Population estimate	SE	CV	95% CL	
				Upper limit	Lower limit
Cattle	17,072	2,524	15	22,023	12,121
Sheep and goats	199,036	29,802	15	258,747	139,325
Camels	25,605	5,171	20	35,847	15,363
Equids	3,072	810	26	4,669	1,475
Traditional roofs	11,282	3,270	29	17,713	4,851
Modern roofs	196	97	49	388	7
Dams and birkas	279	119	43	513	45
Dik Dik	168	95	57	358	6
Gerenuk	419	194	46	804	34
Lesser Kudu	56	37	66	128	2
Ostrich	279	200	72	675	10
Warthog	168	91	54	348	6
Livestock/roof ratio	21.7				

DISTRIBUTION OF CATTLE BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	17072	100	4516	26.45	12556	73.55
Under 6 month	2557	14.98	1099	6.44	1458	8.54
6 months - under 1 year	1989	11.65	683	4	1306	7.65
1 year - under 2 years	3051	17.87	871	5.1	2180	12.77
2 years and older	8263	48.4	1670	9.78	6593	38.62
10 years and above	1212	7.1	193	1.13	1019	5.97

DISTRIBUTIONS OF SHEEP AND GOATS BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Sheep and Goats	199036	100	49620	24.93	149416	75.07
Total Sheep	57561	28.92	14848	7.46	42713	21.46
Under 6 month	13873	6.97	6907	3.47	6966	3.5
6 months - under 1 year	9534	4.79	3165	1.59	6369	3.2
1 year - under 2 years	12081	6.07	2627	1.32	9454	4.75
2 years and older	22073	11.09	2150	1.08	19924	10.01
Total Goats	141475	71.08	34772	17.47	106703	53.61
Under 6 month	31965	16.06	15047	7.56	16918	8.5
6 months - under 1 year	21894	11	7484	3.76	14410	7.24
1 year - under 2 years	33975	17.07	7802	3.92	26173	13.15
2 years and older	53640	26.95	4439	2.23	49202	24.72

DISTRIBUTION OF CAMELS BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	25605	100	7861	30.7	17744	69.3
Under 4 years	6263	24.46	2717	10.61	3546	13.85
4 years and older	19342	75.54	5144	20.09	14198	55.45

DISTRIBUTIONS OF HORSES, ASSES & MULES BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Equids	3072	100	2115	68.85	957	31.15
Total Horses	13	0.41	13	0.41	0	0
Under 3 years	4	0.12	4	0.12	0	0
3 years and older	9	0.29	9	0.29	0	0
Total Asses	3033	98.73	2076	67.58	957	31.15
Under 3 years	362	11.77	208	6.77	154	5
3 years and older	2671	86.96	1868	60.81	803	26.15
Total Mules	26	0.86	26	0.86	0	0
Under 3 years	0	0	0	0	0	0
3 years and older	26	0.86	26	0.86	0	0

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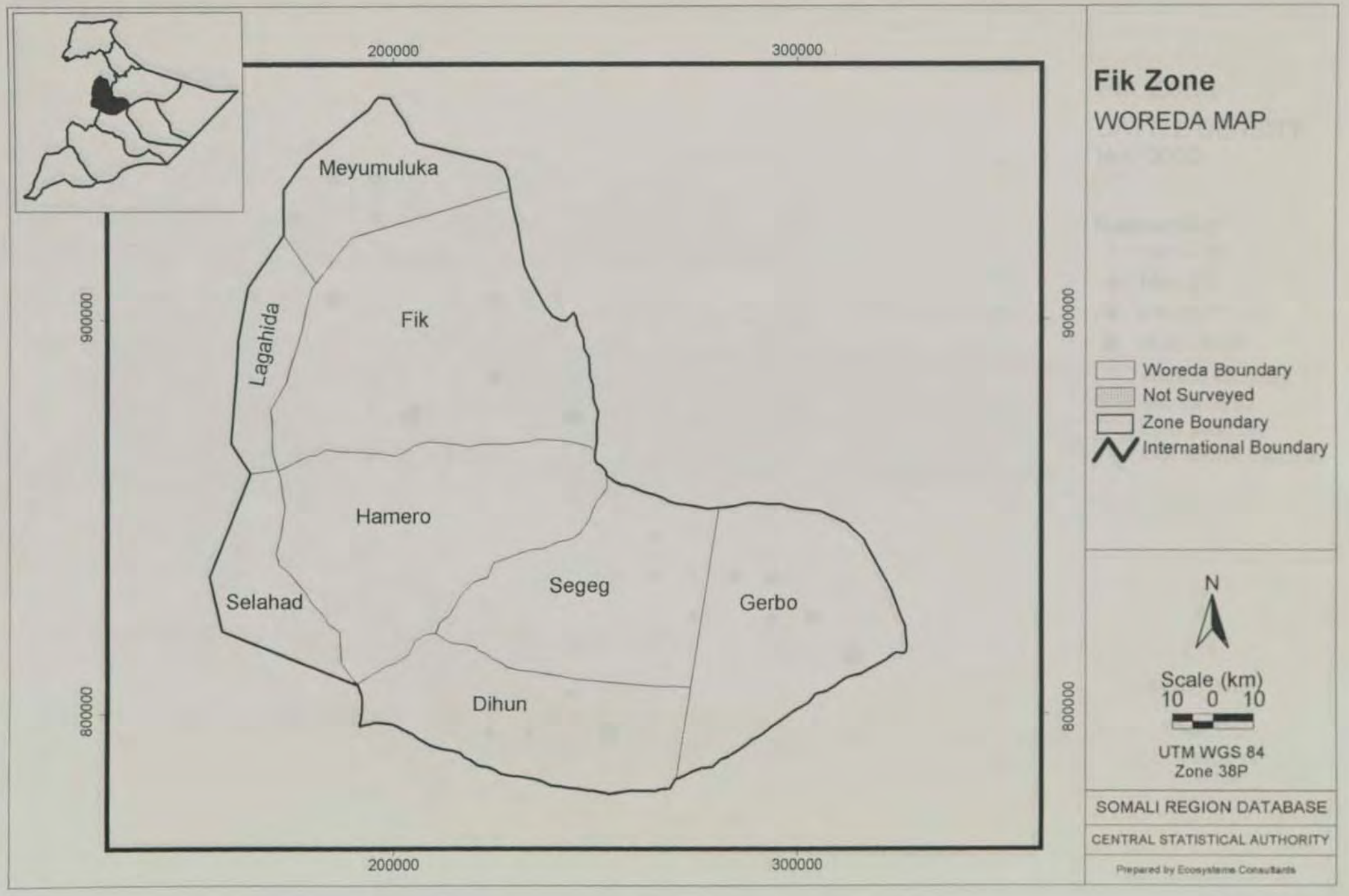
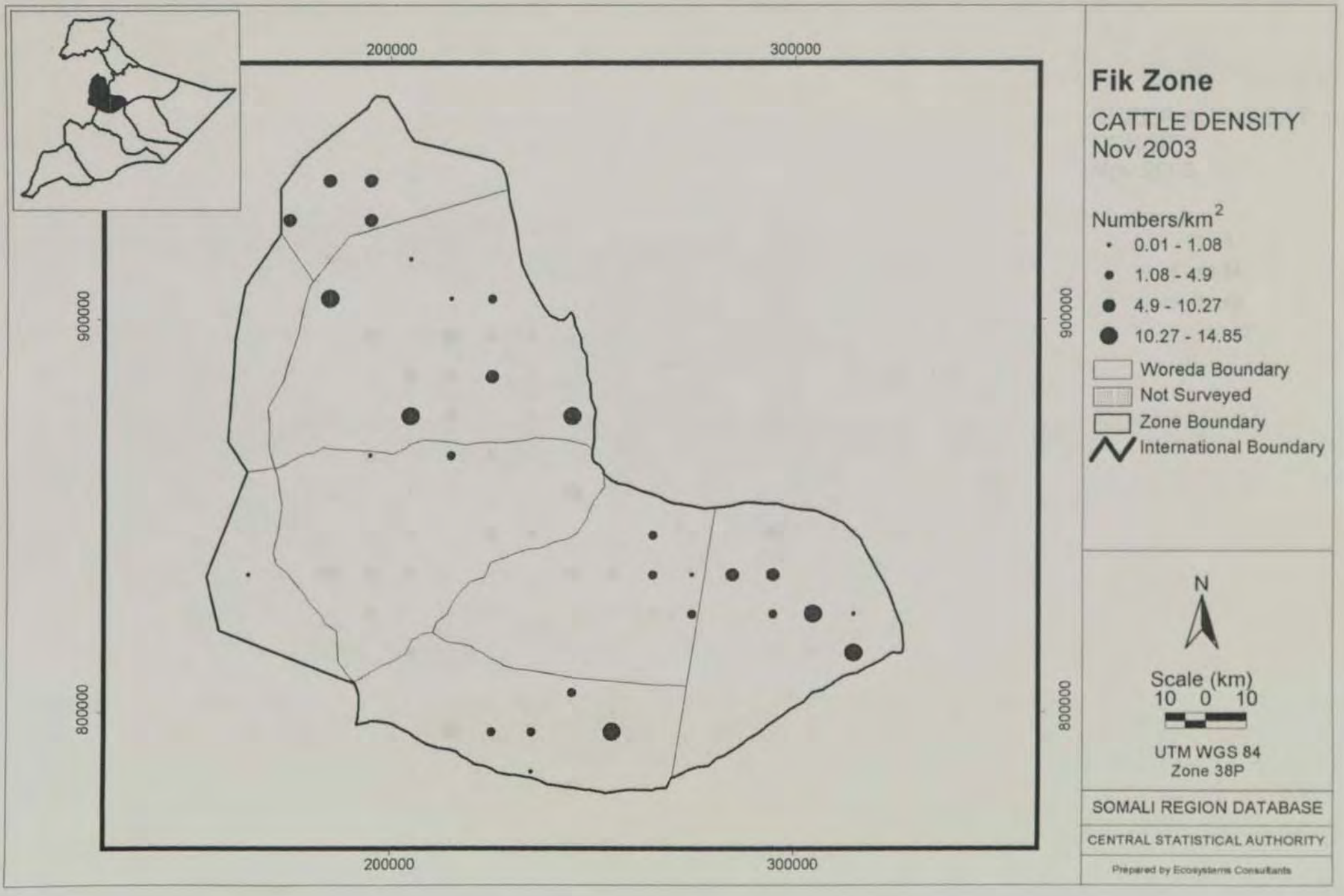
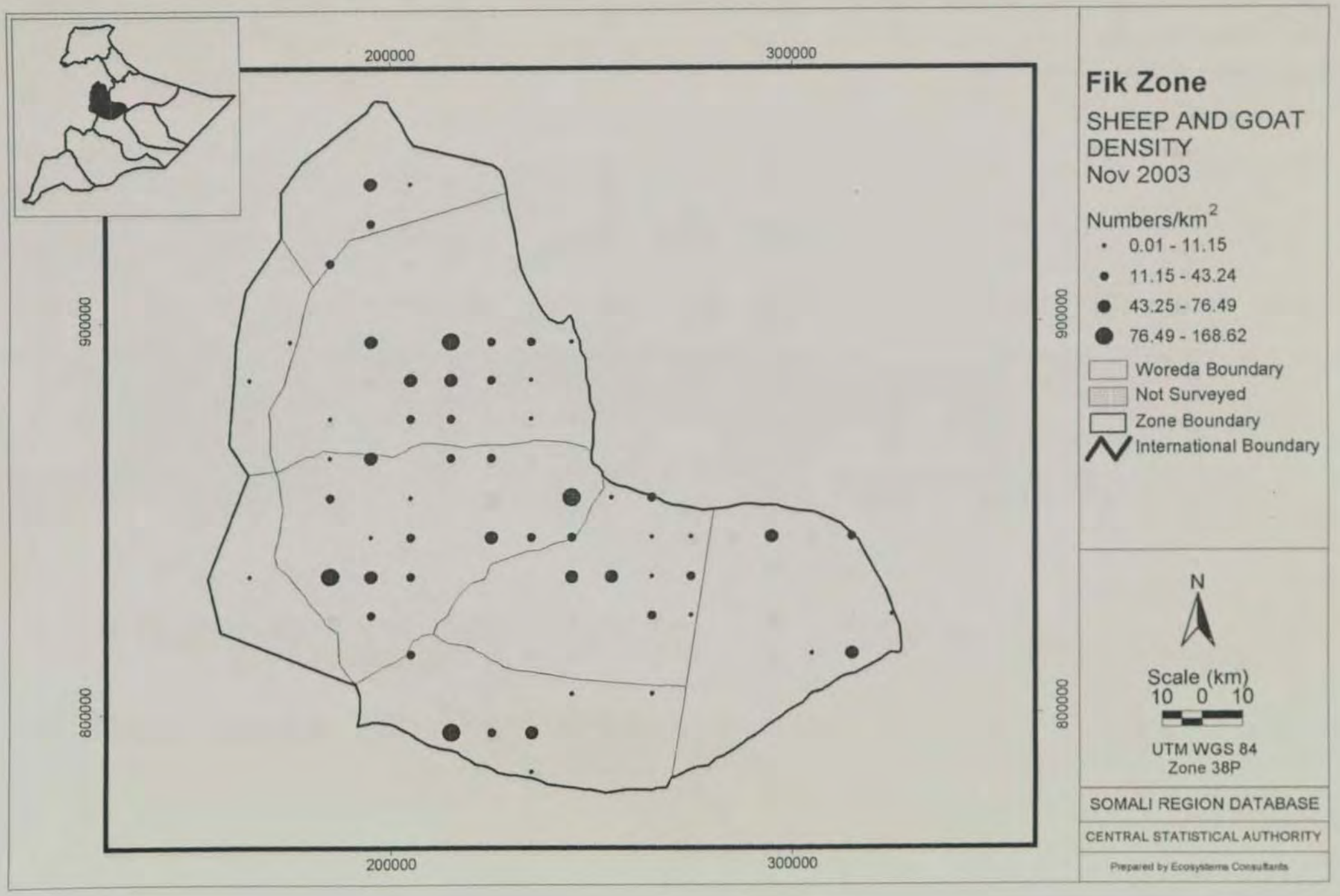

Fik Zone
WOREDA MAP
Meyumuluka
Fik
Lagahida
Hamero
Selahad
Segeg
Gerbo
Dihun
200000
300000
900000
800000
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants


Fik Zone
CATTLE DENSITY
Nov 2003
Numbers/km2
0.01 - 1.08
1.08 - 4.9
4.9 - 10.27
10.27 - 14.85
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
200000
300000
900000
800000


Fik Zone
SHEEP AND GOAT DENSITY
Nov 2003
Numbers/km2
0.01 - 11.15
11.15 - 43.24
43.25 - 76.49
76.49 - 168.62
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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300000
900000
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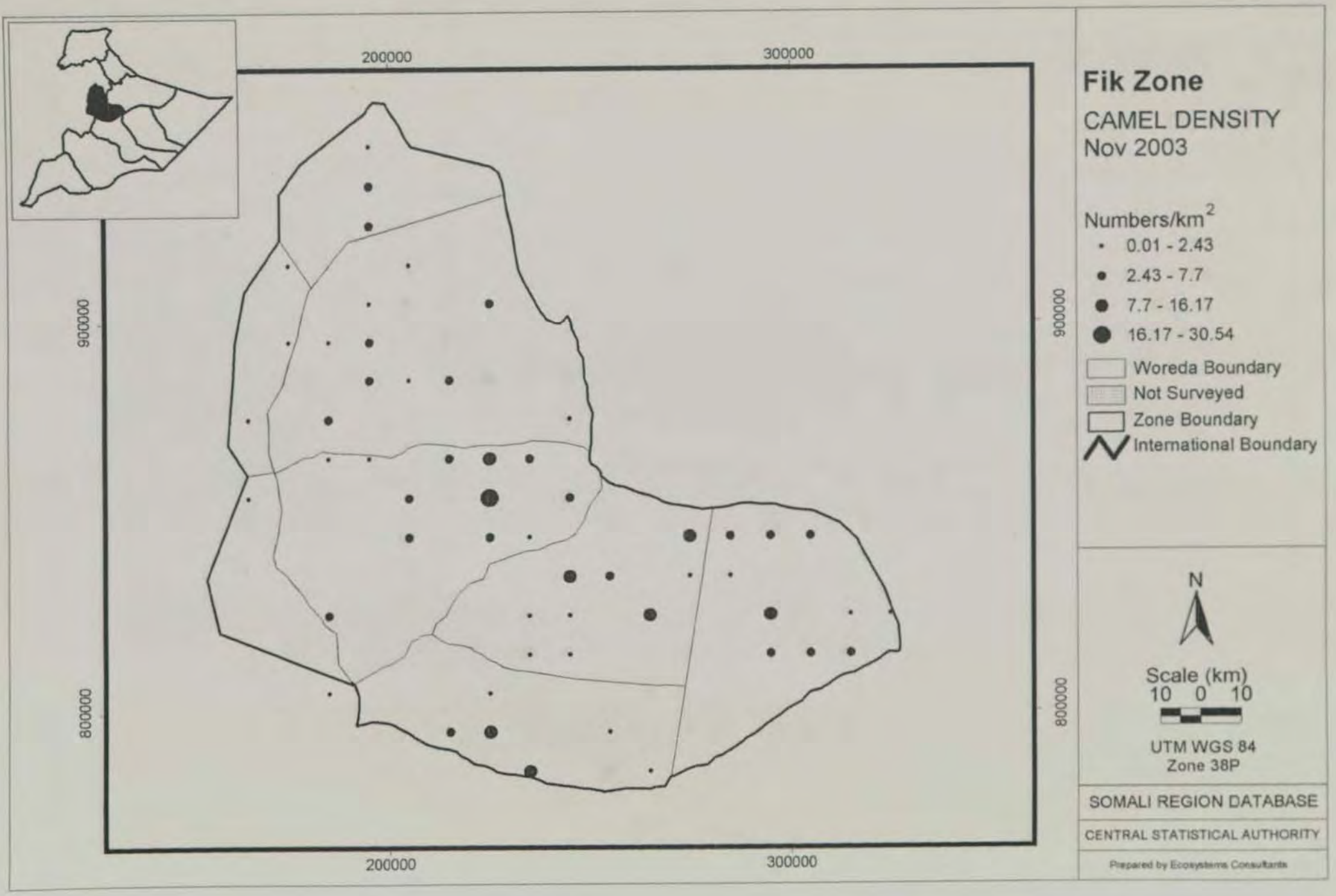
Fik Zone
CAMEL DENSITY
Nov 2003
Numbers/km2
0.01 - 2.43
2.43 - 7.7
7.7 - 16.17
16.17 - 30.54
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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900000
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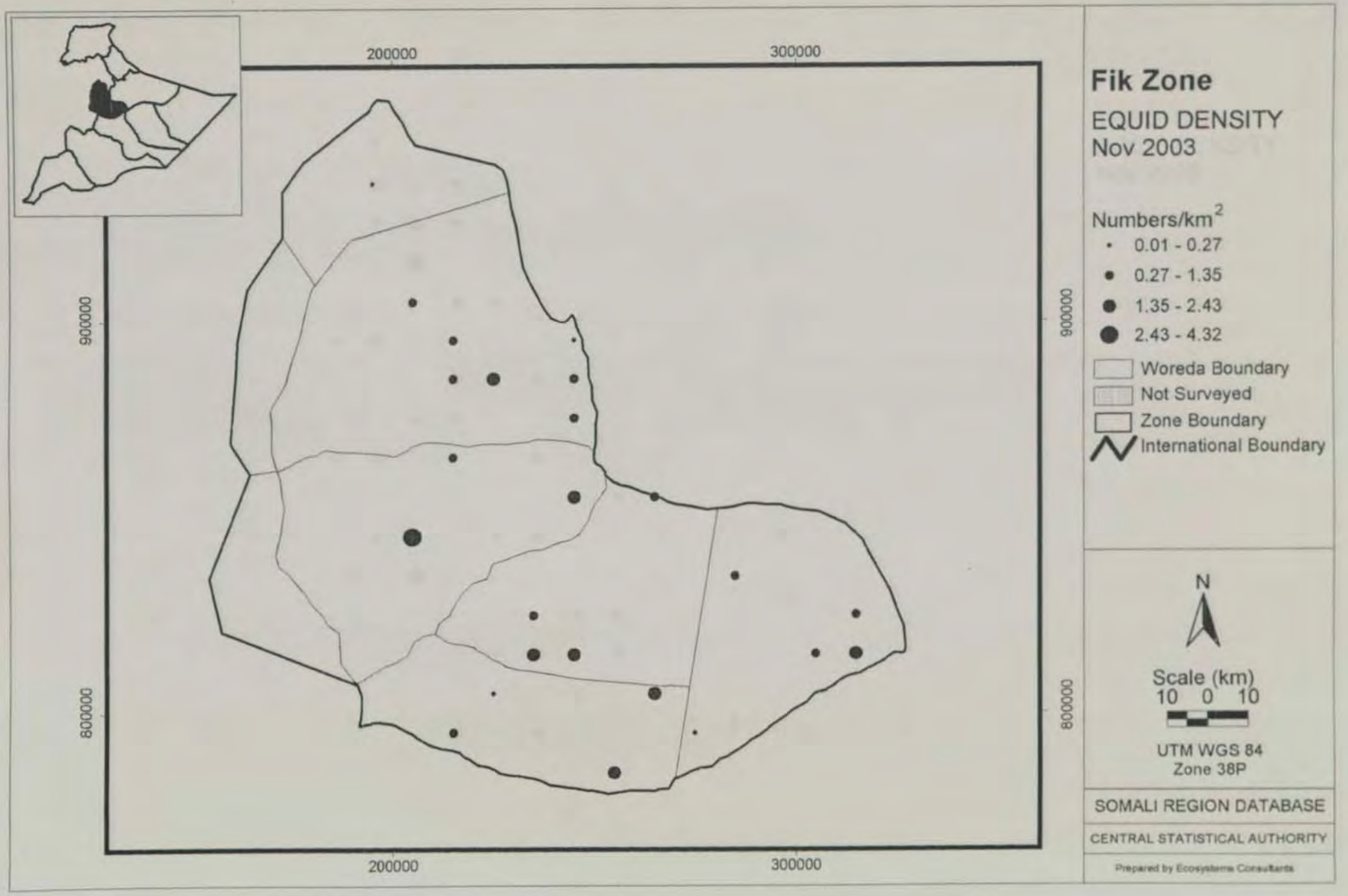
Fik Zone
EQUID DENSITY
Nov 2003
Numbers/km2
0.01 - 0.27
0.27 - 1.35
1.35 - 2.43
2.43 - 4.32
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
200000
300000
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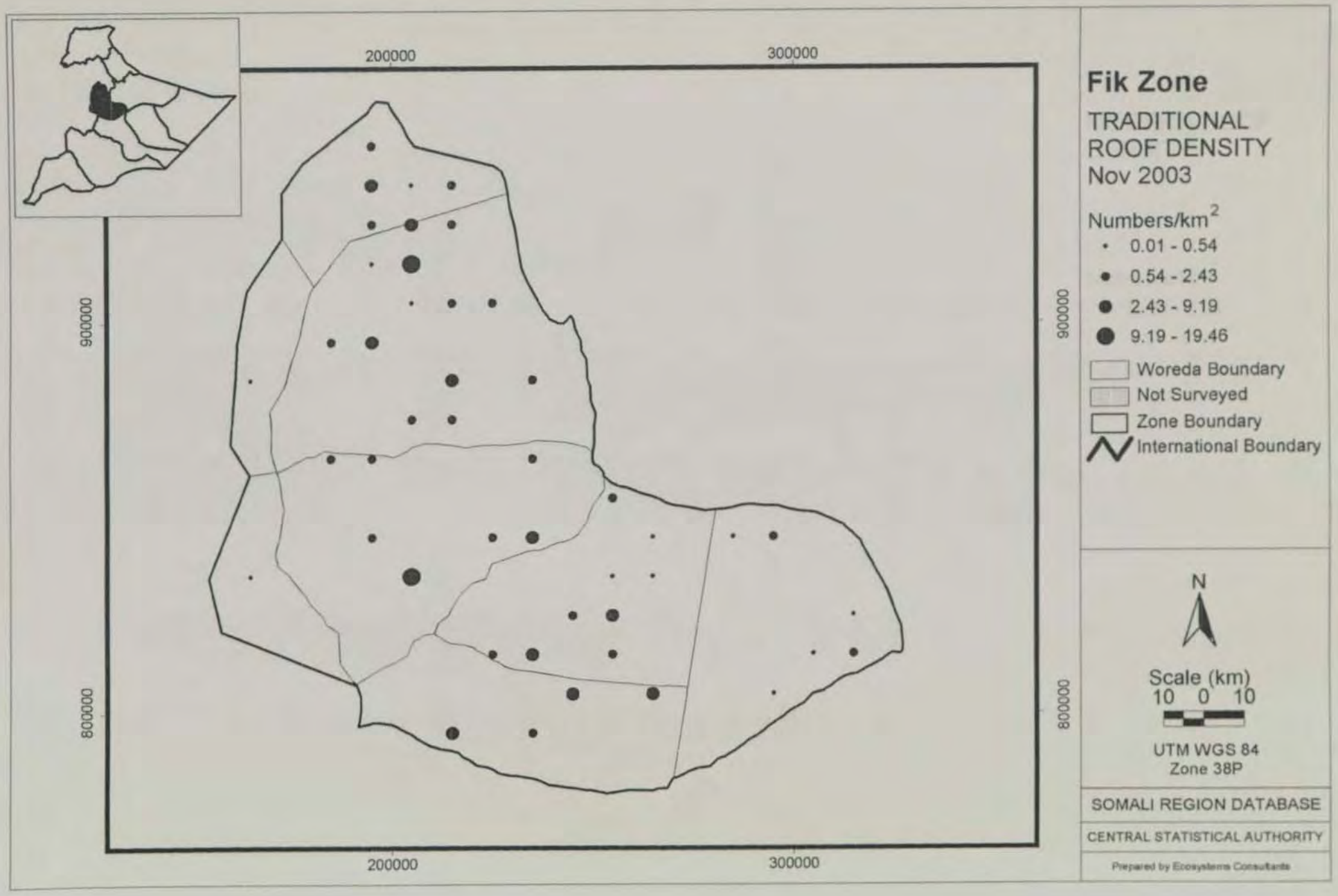
Fik Zone
TRADITIONAL
ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 0.54
0.54 - 2.43
2.43 - 9.19
9.19 - 19.46
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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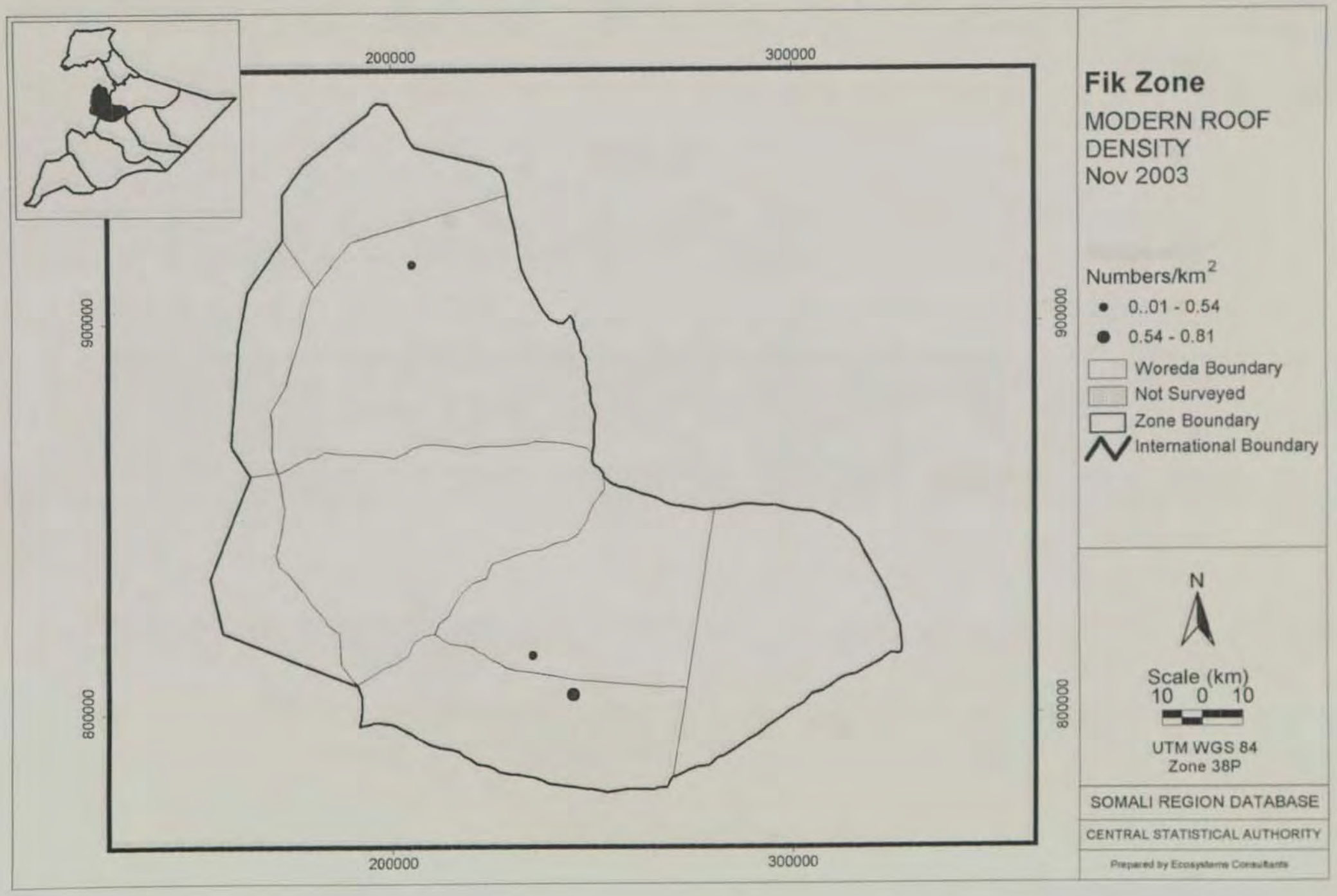
200000
300000
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Fik Zone
MODERN ROOF DENSITY
Nov 2003
Numbers/km2
0..01 - 0.54
0.54 - 0.81
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
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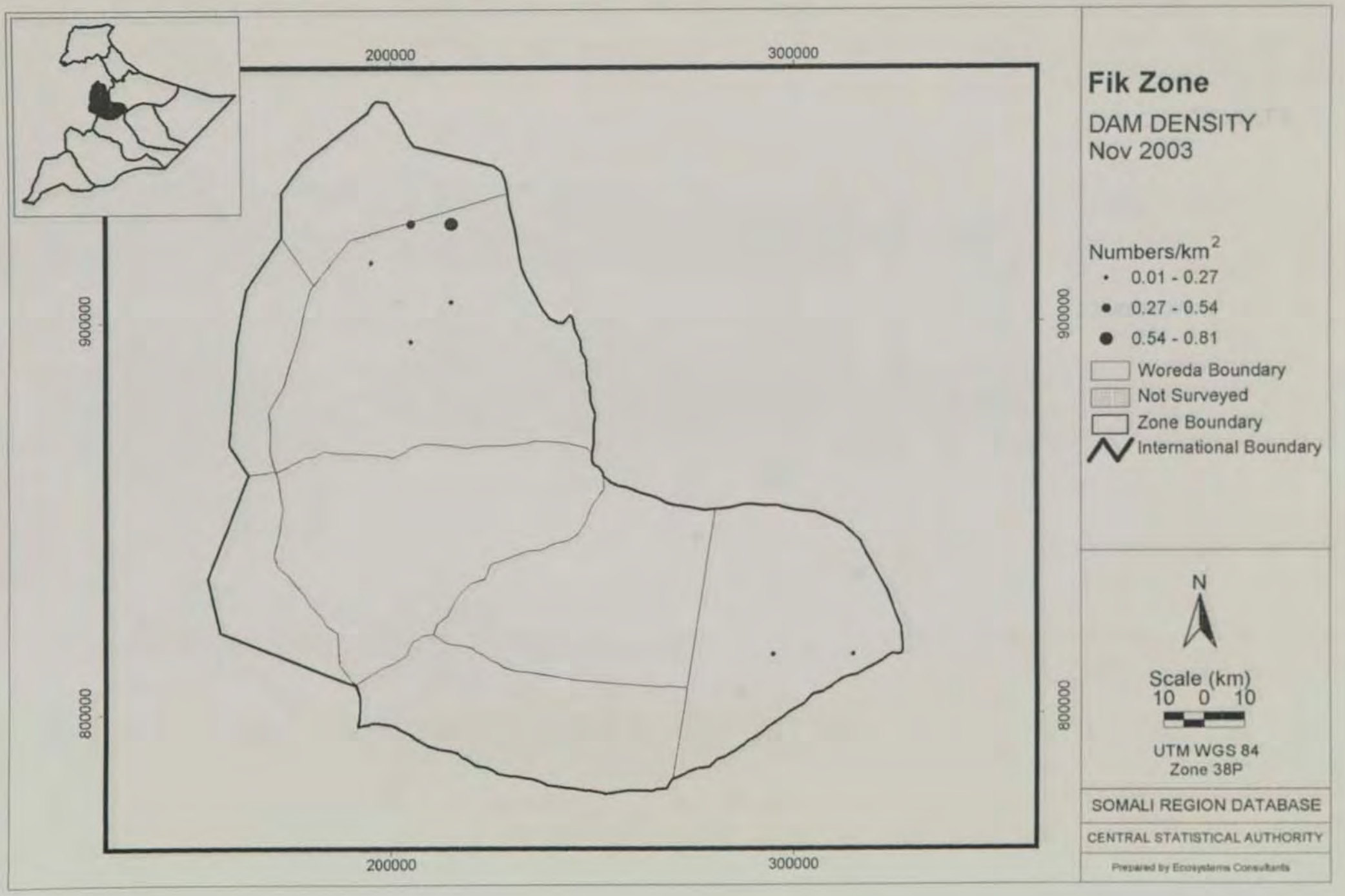
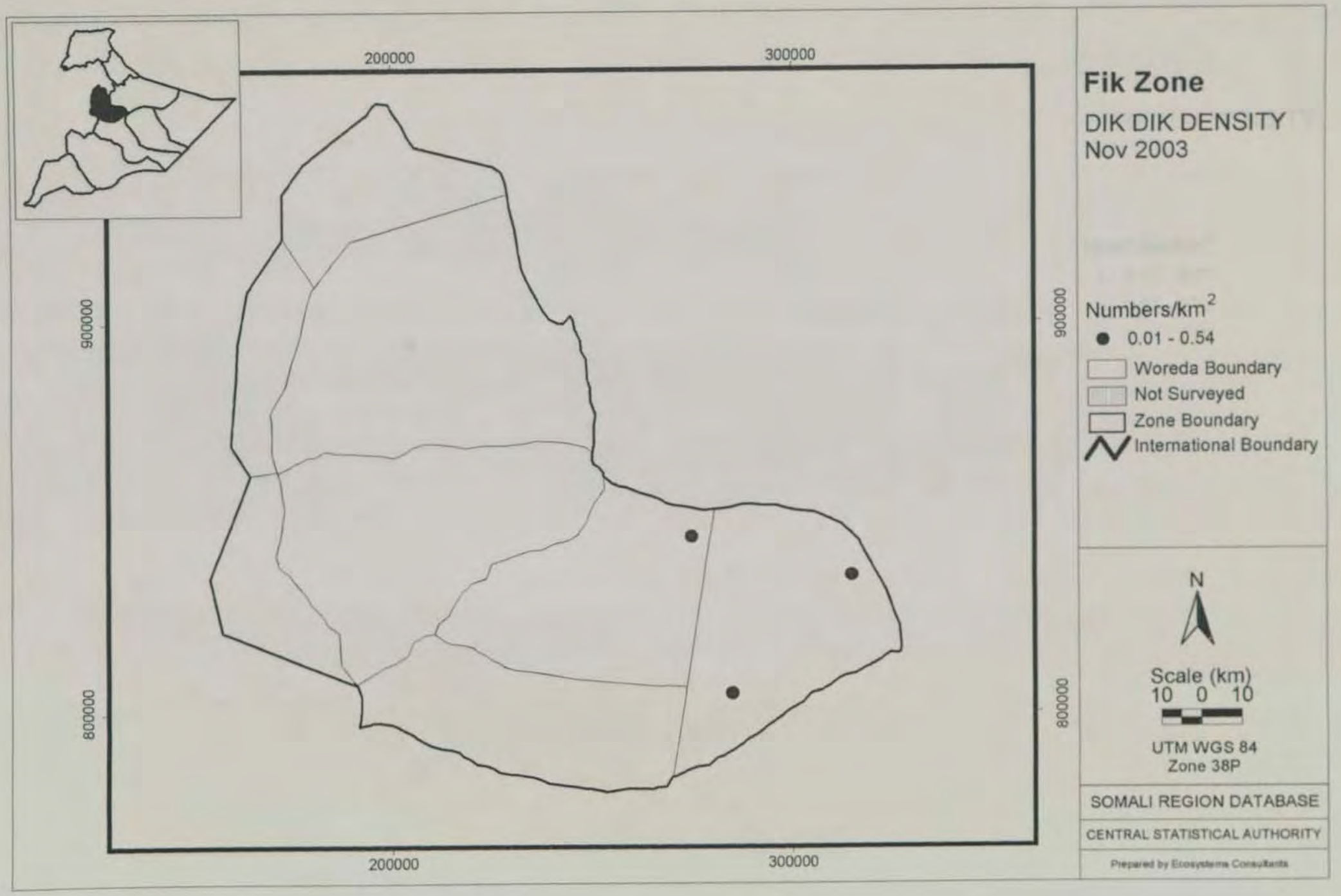
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants


200000
300000
900000
800000
Fik Zone
DAM DENSITY
Nov 2003
Numbers/km2
0.01 - 0.27
0.27 - 0.54
0.54 - 0.81
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants


Fik Zone
DIK DIK DENSITY
Nov 2003
Numbers/km2
0.01 - 0.54
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
200000
300000
900000
800000

Fik Zone
GERENUK DENSITY
Nov 2003
Numbers/km2
0.01 - 0.27
0.27 - 0.81
0.81 - 1.35
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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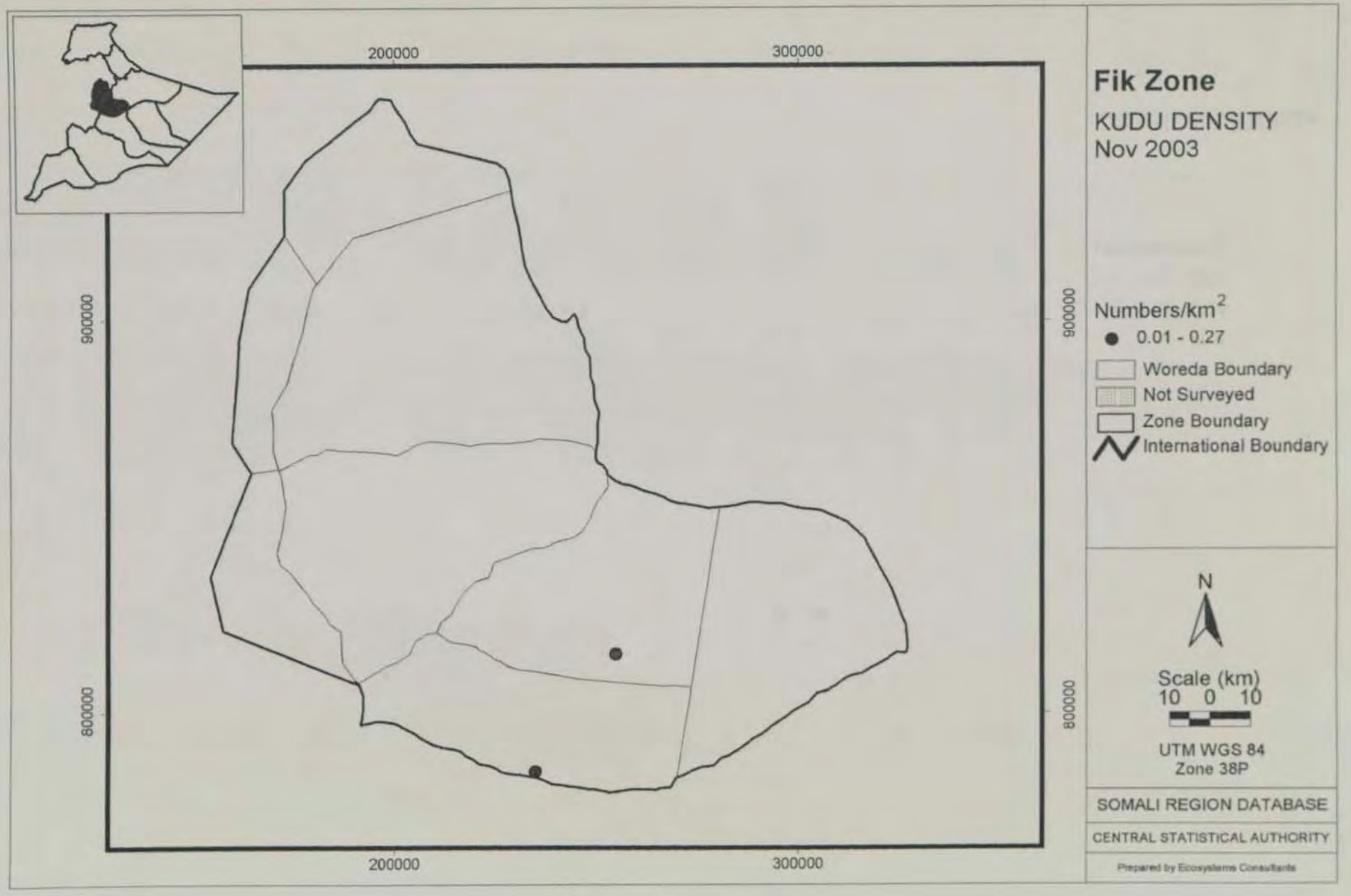
Fik Zone
KUDU DENSITY
Nov 2003
Numbers/km2
0.01 - 0.27
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
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Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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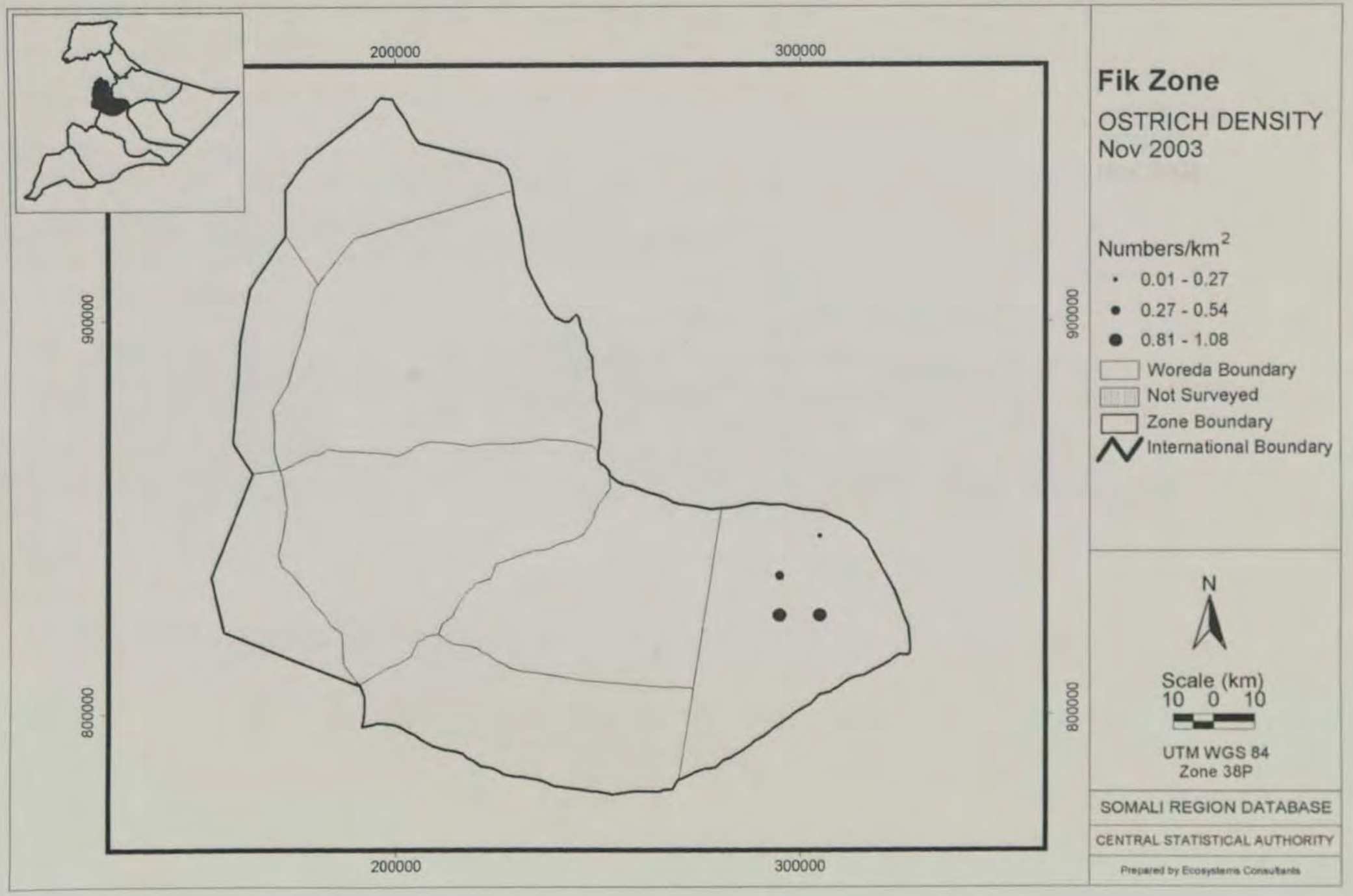
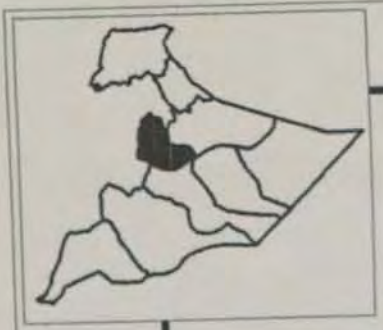
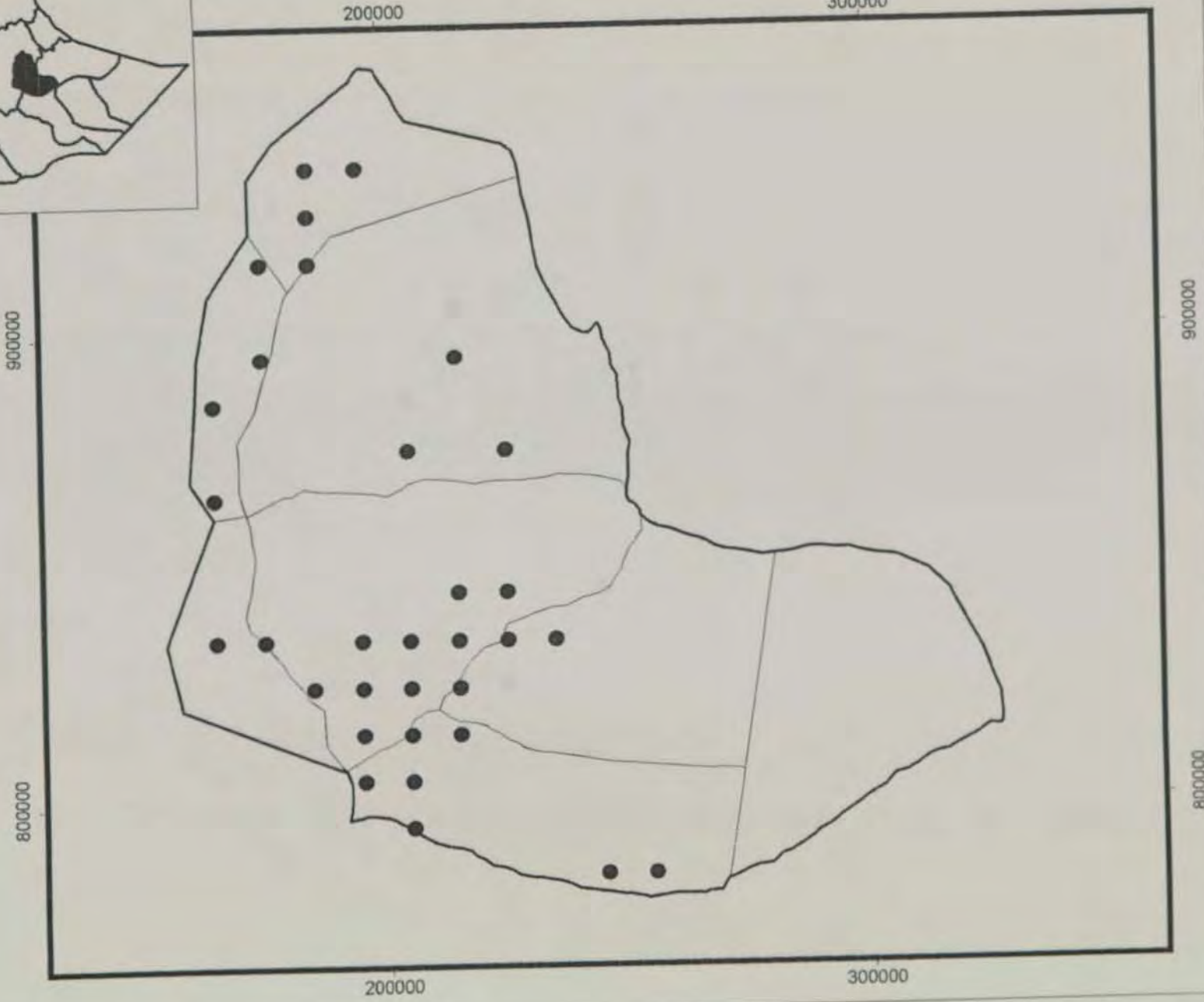

Fik Zone
OSTRICH DENSITY
Nov 2003
Numbers/km2
0.01 - 0.27
0.27 - 0.54
0.81 - 1.08
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
200000
300000
900000
800000

200000
300000
900000
800000
Fik Zone
WARTHOG
DENSITY
Nov 2003
Numbers/km2
0.01 - 0.27
0.27 - 0.54
0.54 - 0.81
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants





Fik Zone

SURFACE WATER DISTRIBUTION
Nov 2003

- Presence noted
- Woreda Boundary
- Not Surveyed
- Zone Boundary
- International Boundary

N

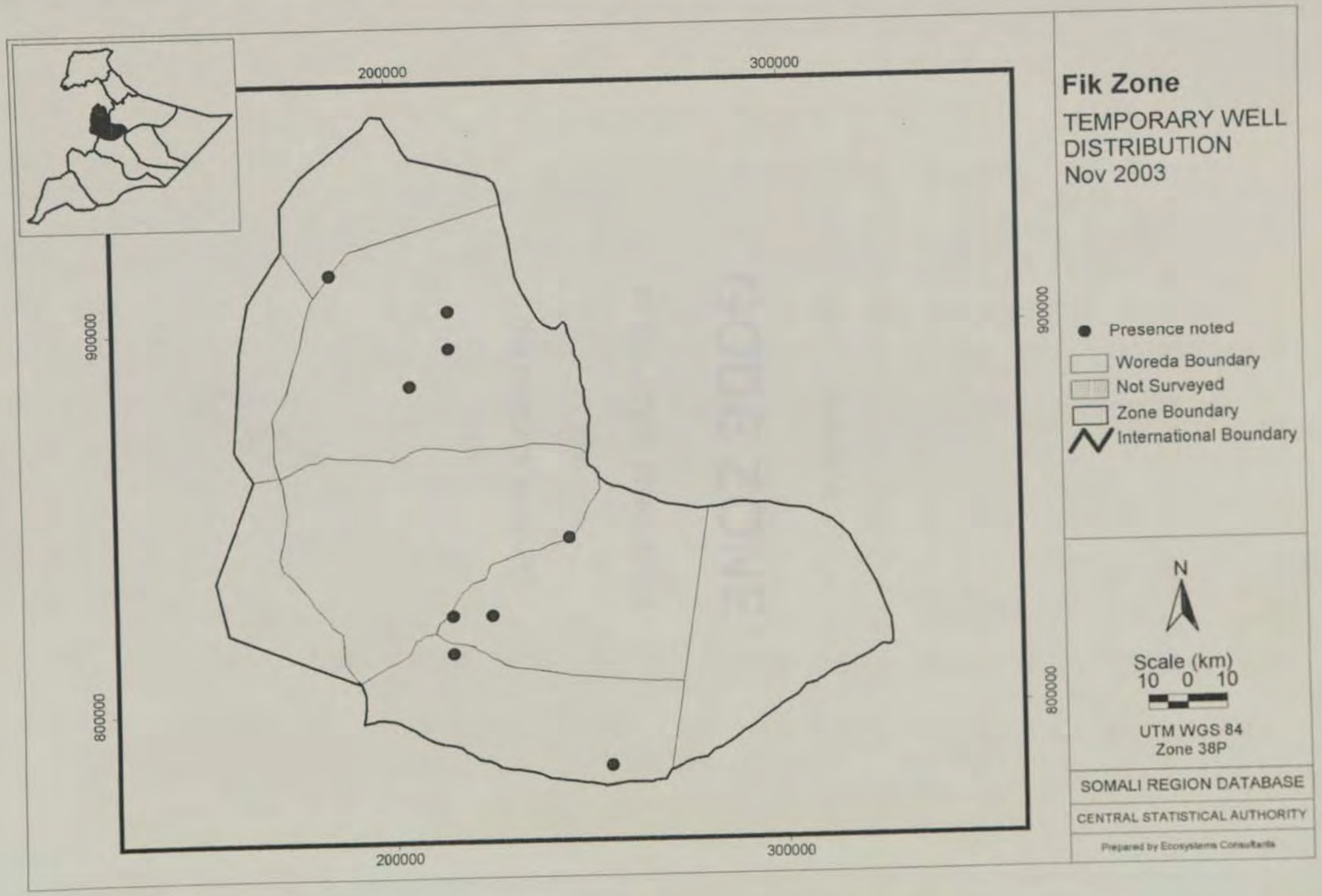
Scale (km)
10 0 10

UTM WGS 84
Zone 38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Fik Zone
TEMPORARY WELL DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
200000
300000
900000
800000

ANNEX 4

GODE ZONE

POPULATION ESTIMATES

and

DISTRIBUTION MAPS

Area: 35,498 km^2

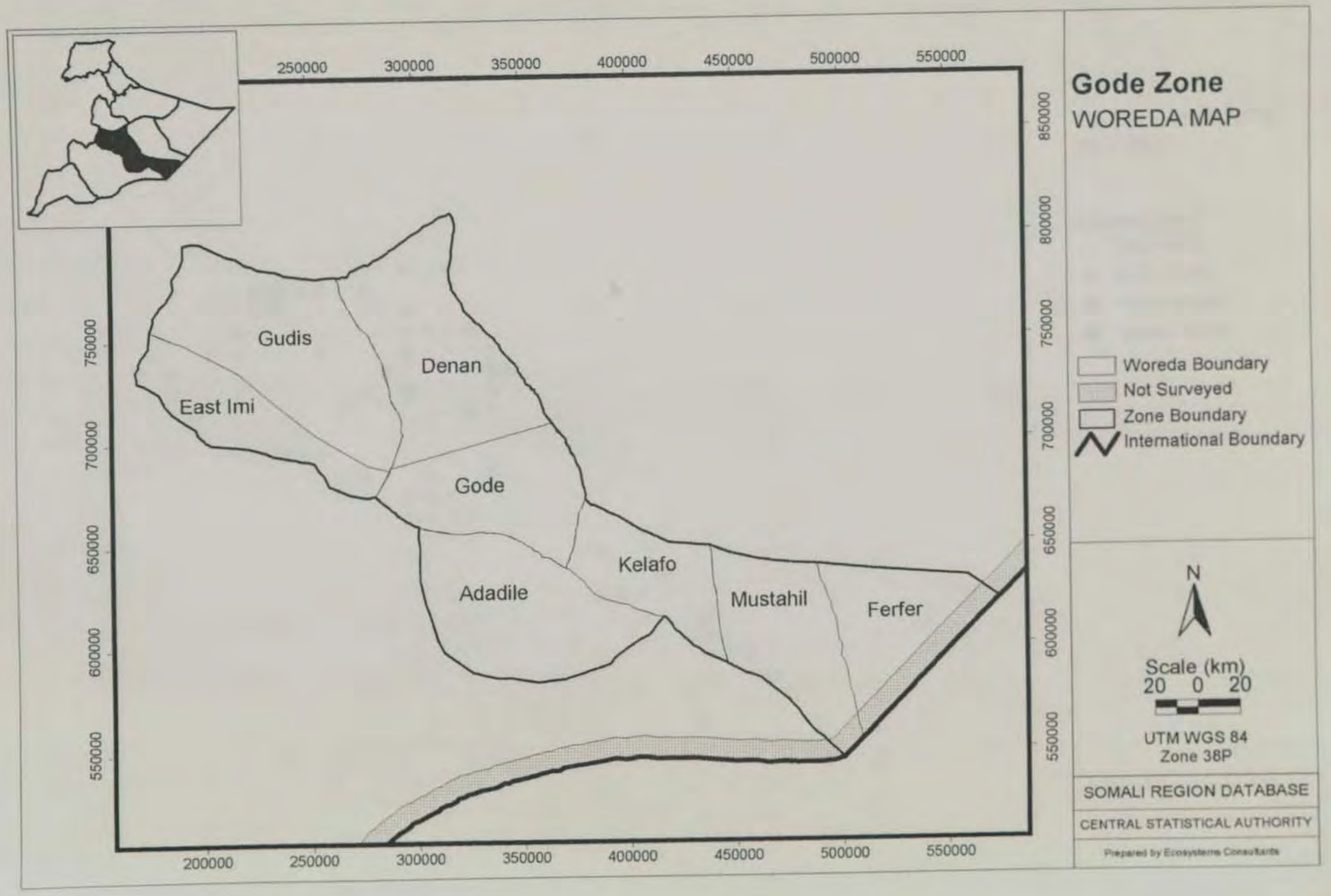
Variable name	Population estimate	SE	CV	95% CL	
				Upper limit	Lower limit
Cattle	165,277	26,906	16	218,166	112,388
Sheep and goats	1,503,537	237,305	16	1,969,633	1,037,441
Camels	115,498	16,155	14	146,682	84,314
Equids	10,816	2,748	25	16,224	5,408
Traditional roofs	34,937	6,433	18	47,514	22,360
Modern roofs	651	345	53	1,328	21
Dams and birkas	341	207	61	747	11
Dik Dik	155	85	55	321	5
Gerenuk	1,054	373	35	1,781	327
Ostrich	341	158	46	651	31
Warthog	713	248	35	1,198	228
Livestock/roof ratio	51.4				

DISTRIBUTION OF CATTLE BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	165277	100	53979	32.66	111298	67.34
Under 6 month	18114	10.96	7652	4.63	10462	6.33
6 months - under 1 year	18412	11.14	6710	4.06	11702	7.08
1 year - under 2 years	34427	20.83	12330	7.46	22098	13.37
2 years and older	70325	42.55	19552	11.83	50773	30.72
10 years and above	23998	14.52	7735	4.68	16263	9.84

DISTRIBUTIONS OF SHEEP AND GOATS BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Sheep and Goats	1503537	100	524884.8	34.91	978652.2	65.09
Total Sheep	517668	34.43	199369	13.26	318298.8	21.17
Under 6 month	69163	4.6	30973	2.06	38190	2.54
6 months - under 1 year	91265	6.07	32326	2.15	58939	3.92
1 year - under 2 years	137574	9.15	53827	3.58	83747	5.57
2 years and older	219667	14.61	82243	5.47	137423	9.14
Total Goats	985869	65.57	325365	21.64	660504	43.93
Under 6 month	128101	8.52	56834	3.78	71268	4.74
6 months - under 1 year	166442	11.07	57585	3.83	108856	7.24
1 year - under 2 years	244174	16.24	99534	6.62	144640	9.62
2 years and older	447152	29.74	111412	7.41	335740	22.33

DISTRIBUTION OF CAMELS BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	115498	100	42965	37.2	72533	62.8
Under 4 years	43704	37.84	18872	16.34	24832	21.5
4 years and older	71794	62.16	24093	20.86	47701	41.3

DISTRIBUTIONS OF HORSES, ASSES & MULES BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Equids	10816	100	4100	37.91	6716	62.09
Total Horses	0	0	0	0	0	0
Under 3 years	0	0	0	0	0	0
3 years and older	0	0	0	0	0	0
Total Asses	10758	99.46	4081	37.73	6677	61.73
Under 3 years	2948	27.26	1503	13.9	1445	13.36
3 years and older	7809	72.2	2577	23.83	5232	48.37
Total Mules	58	0.54	19	0.18	39	0.36
Under 3 years	0	0	0	0	0	0
3 years and older	58	0.54	19	0.18	39	0.36


Gode Zone
WOREDA MAP
Gudis
Denan
East Imi
Gode
Kelafo
Adadile
Mustahil
Ferfer
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
250000
300000
350000
400000
450000
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550000
200000
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800000
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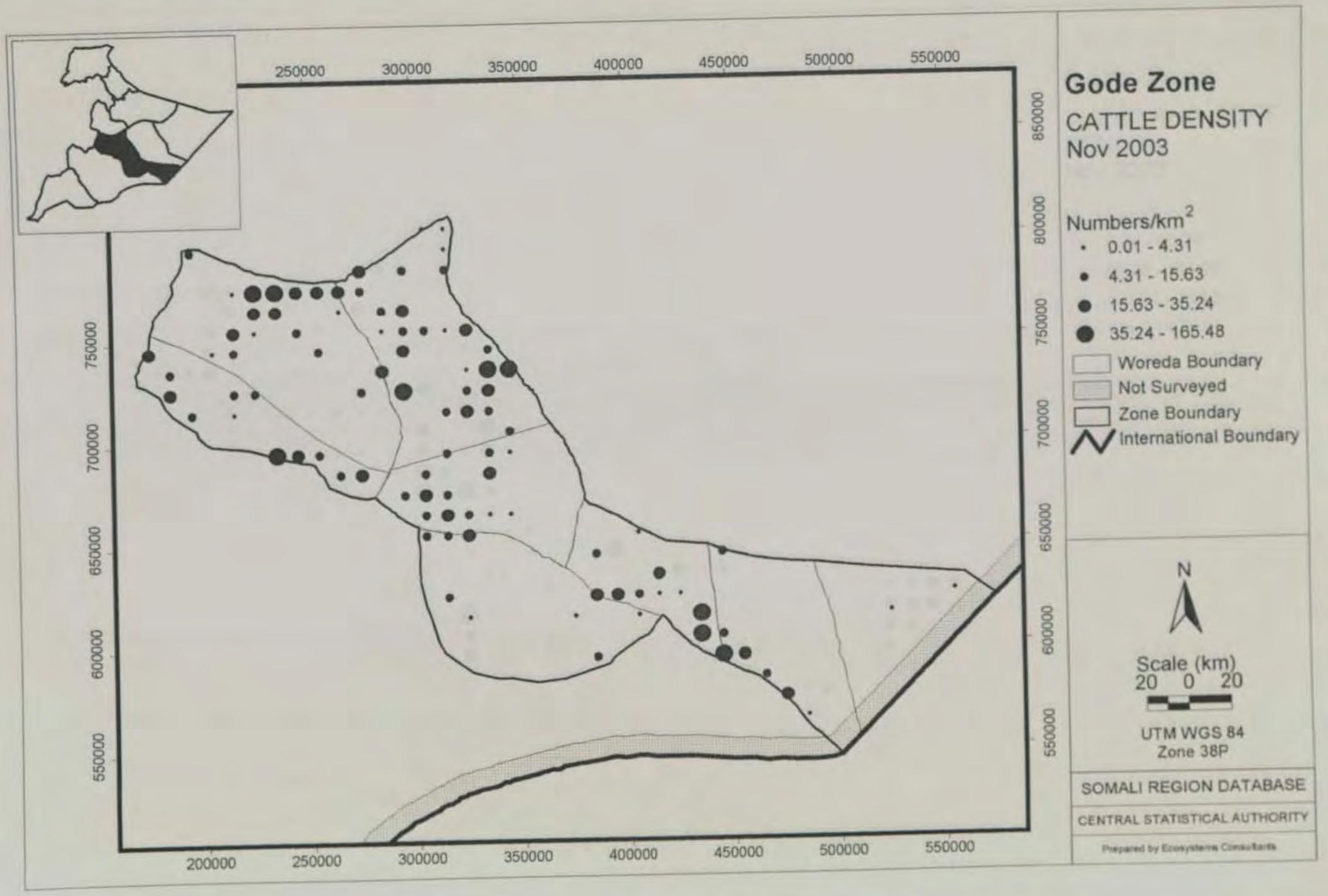
Gode Zone
CATTLE DENSITY
Nov 2003
Numbers/km2
0.01 - 4.31
4.31 - 15.63
15.63 - 35.24
35.24 - 165.48
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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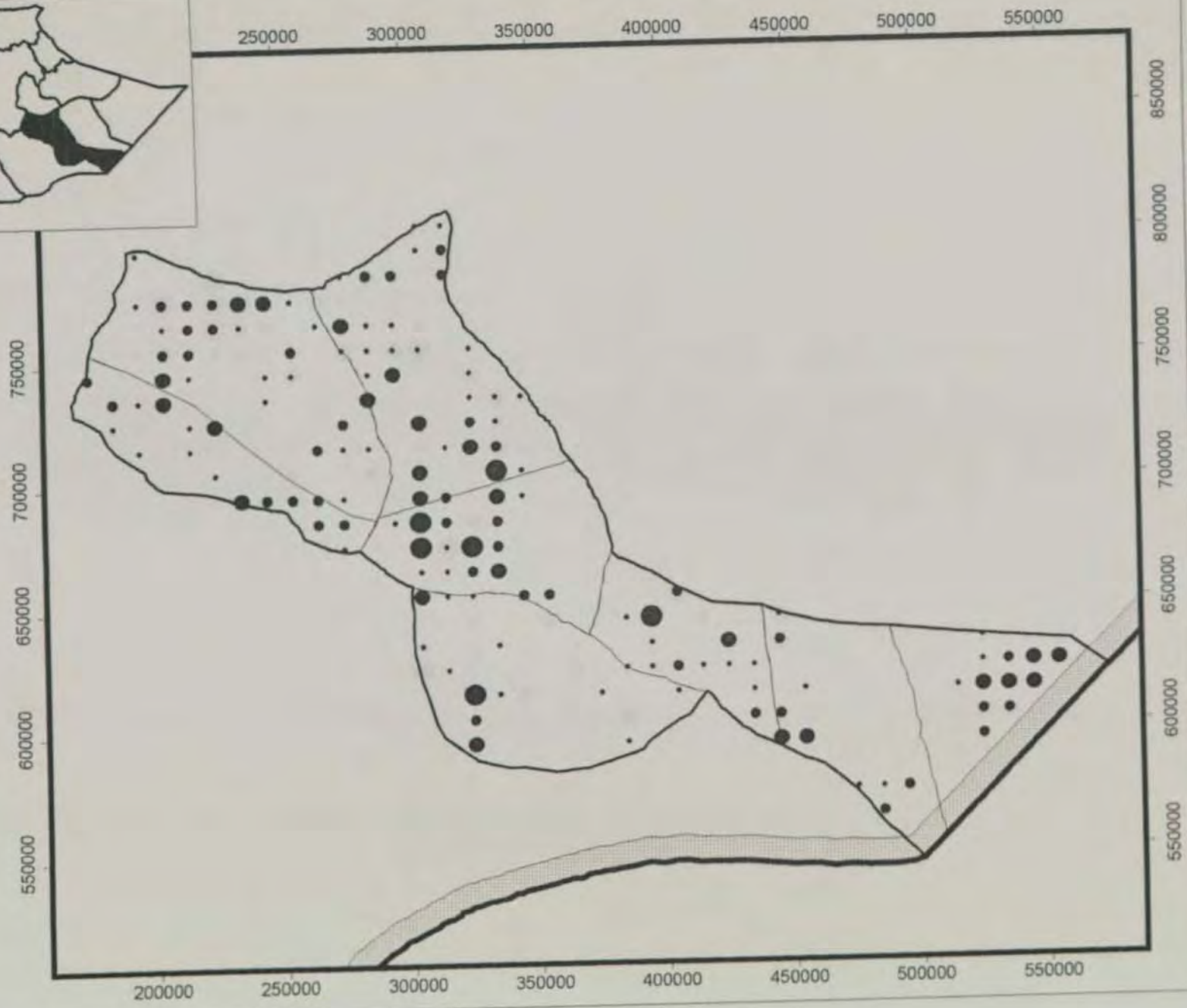


Gode Zone

SHEEP AND GOAT DENSITY
Nov 2003

Numbers/km^2

- 0.01 - 46.99
- 46.99 - 161.22
- 161.22 - 334.5
- 334.5 - 675.65

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

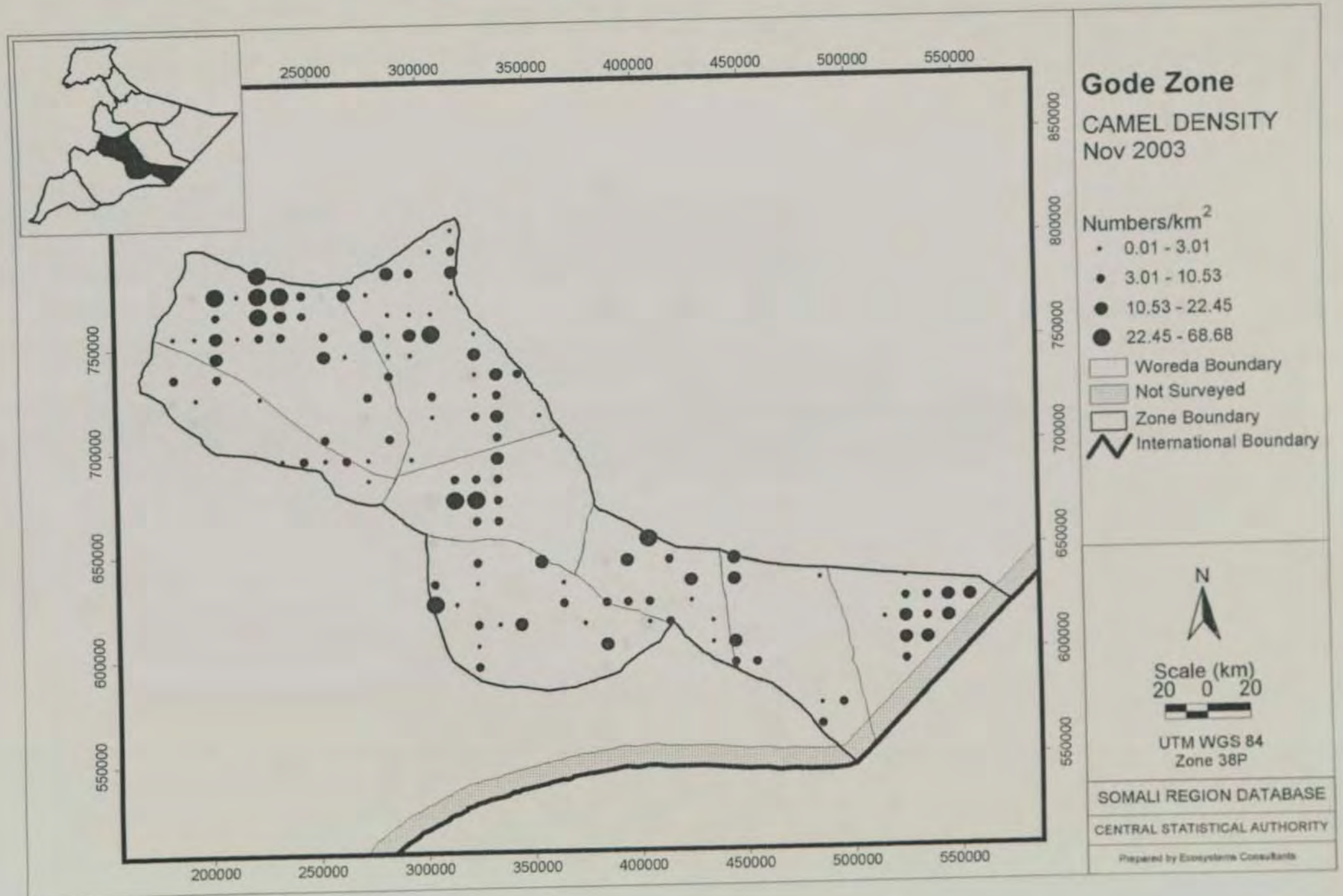
Scale (km)
20 0 20

UTM WGS 84
Zone 38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Gode Zone
CAMEL DENSITY
Nov 2003
Numbers/km2
0.01 - 3.01
3.01 - 10.53
10.53 - 22.45
22.45 - 68.68
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
250000
300000
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800000
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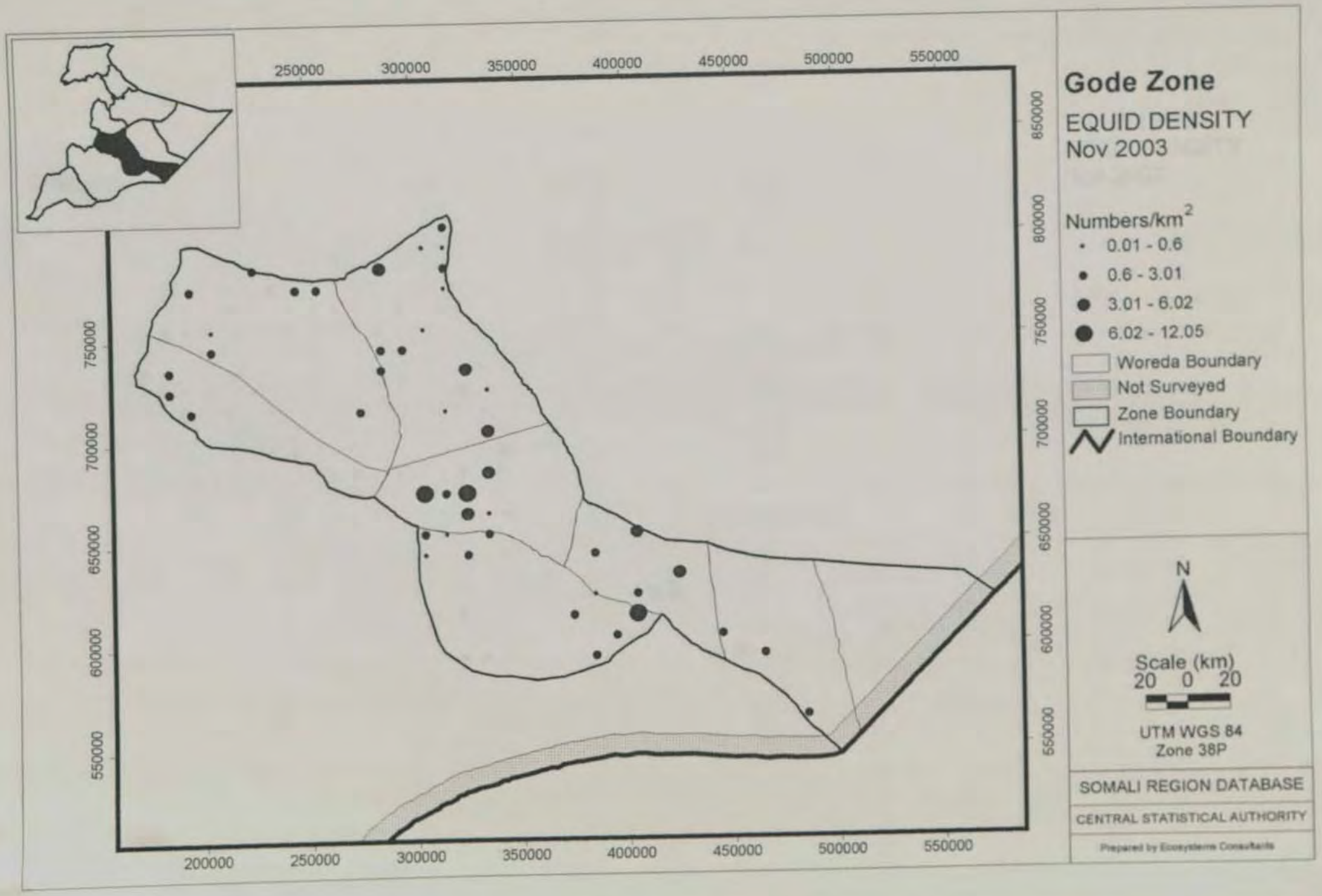
Gode Zone
EQUID DENSITY
Nov 2003
Numbers/km2
0.01 - 0.6
0.6 - 3.01
3.01 - 6.02
6.02 - 12.05
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
250000
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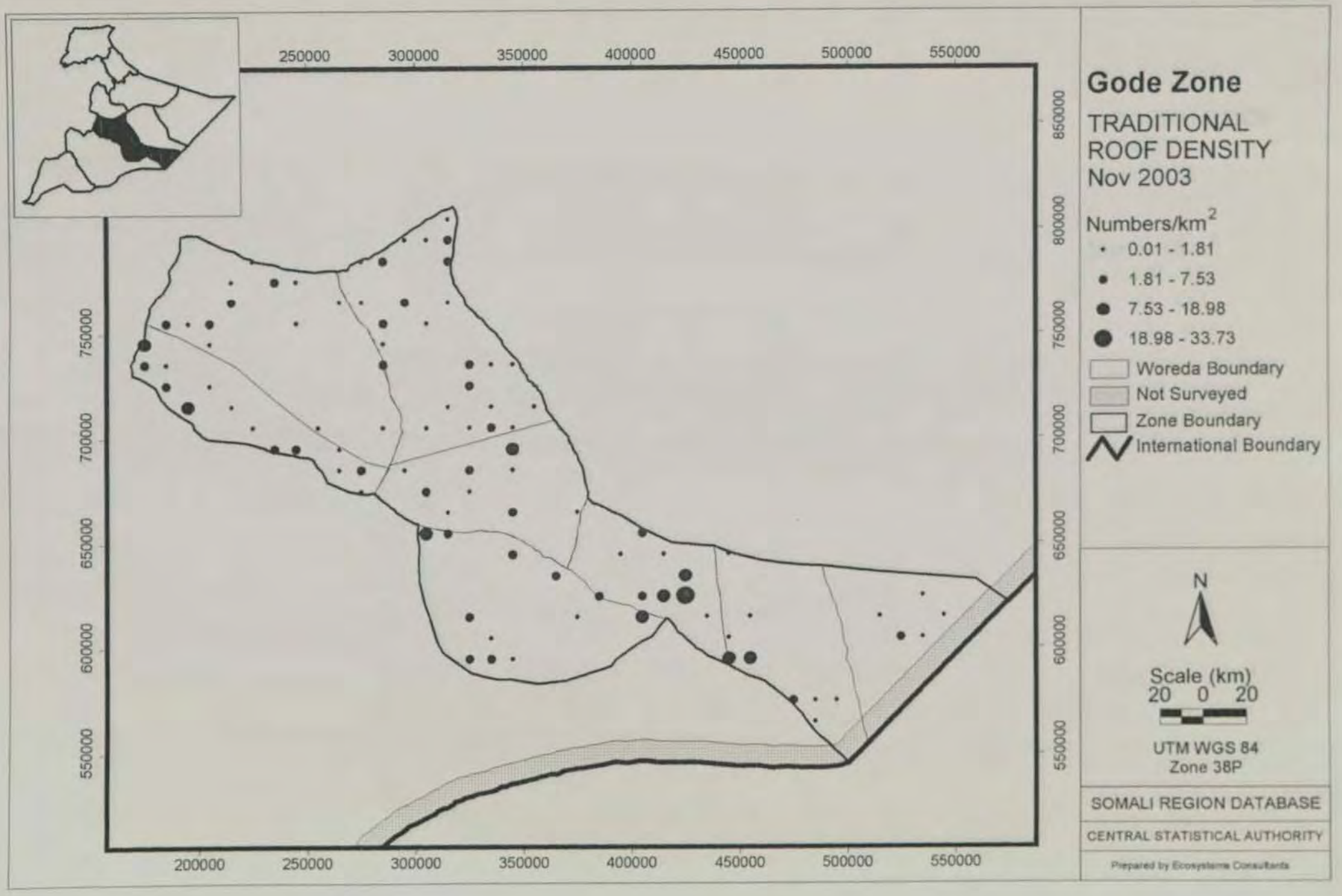
Gode Zone
TRADITIONAL
ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 1.81
1.81 - 7.53
7.53 - 18.98
18.98 - 33.73
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
250000
300000
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800000
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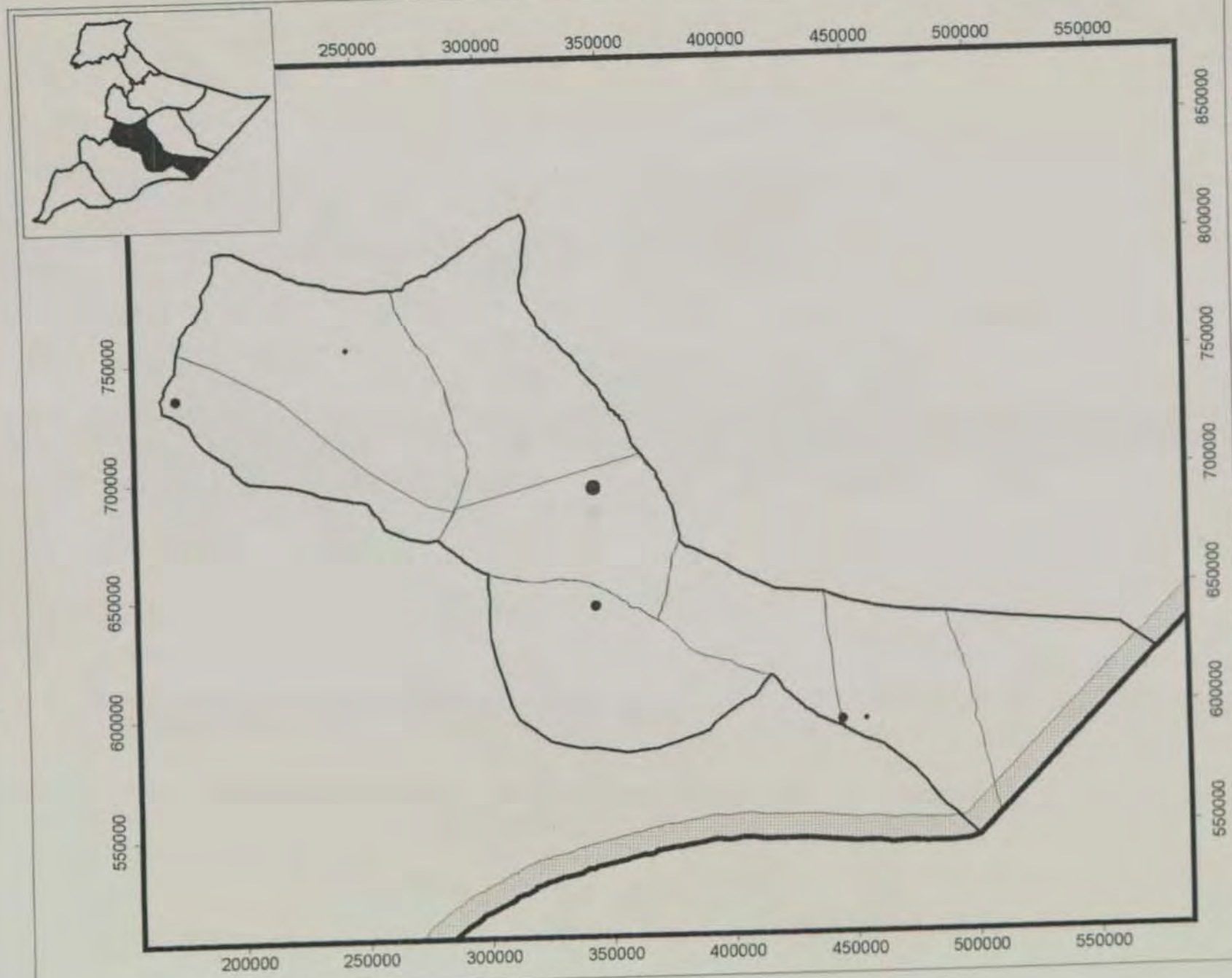


Gode Zone

MODERN ROOF DENSITY
Nov 2003

Numbers/km^2

- 0.01 - 0.3
- 0.3 - 1.51
- 1.51 - 2.11

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

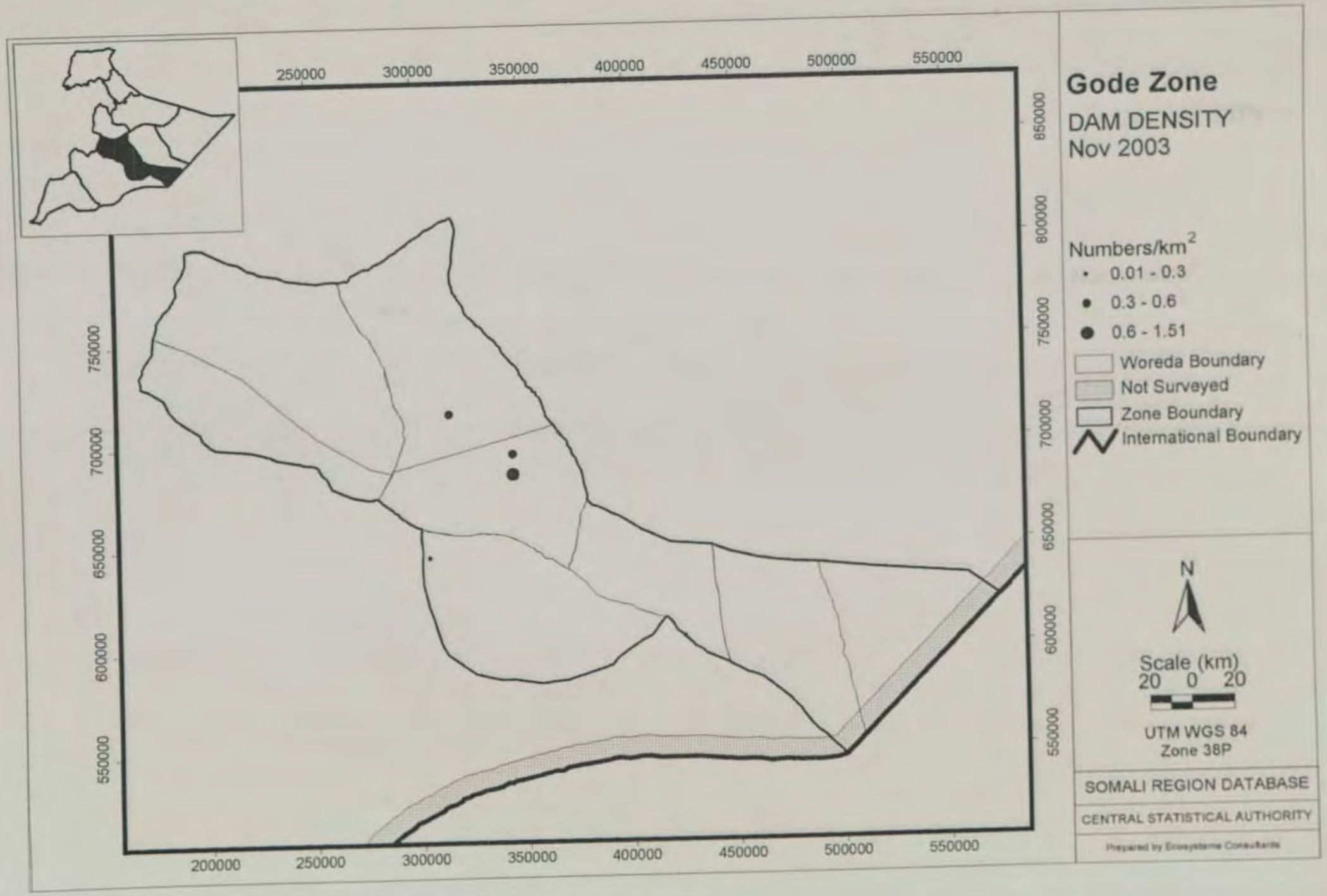
Scale (km)
20 0 20

UTM WGS 84
Zone 38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Gode Zone
DAM DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.6
0.6 - 1.51
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
200000
250000
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350000
400000
450000
500000
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650000
700000
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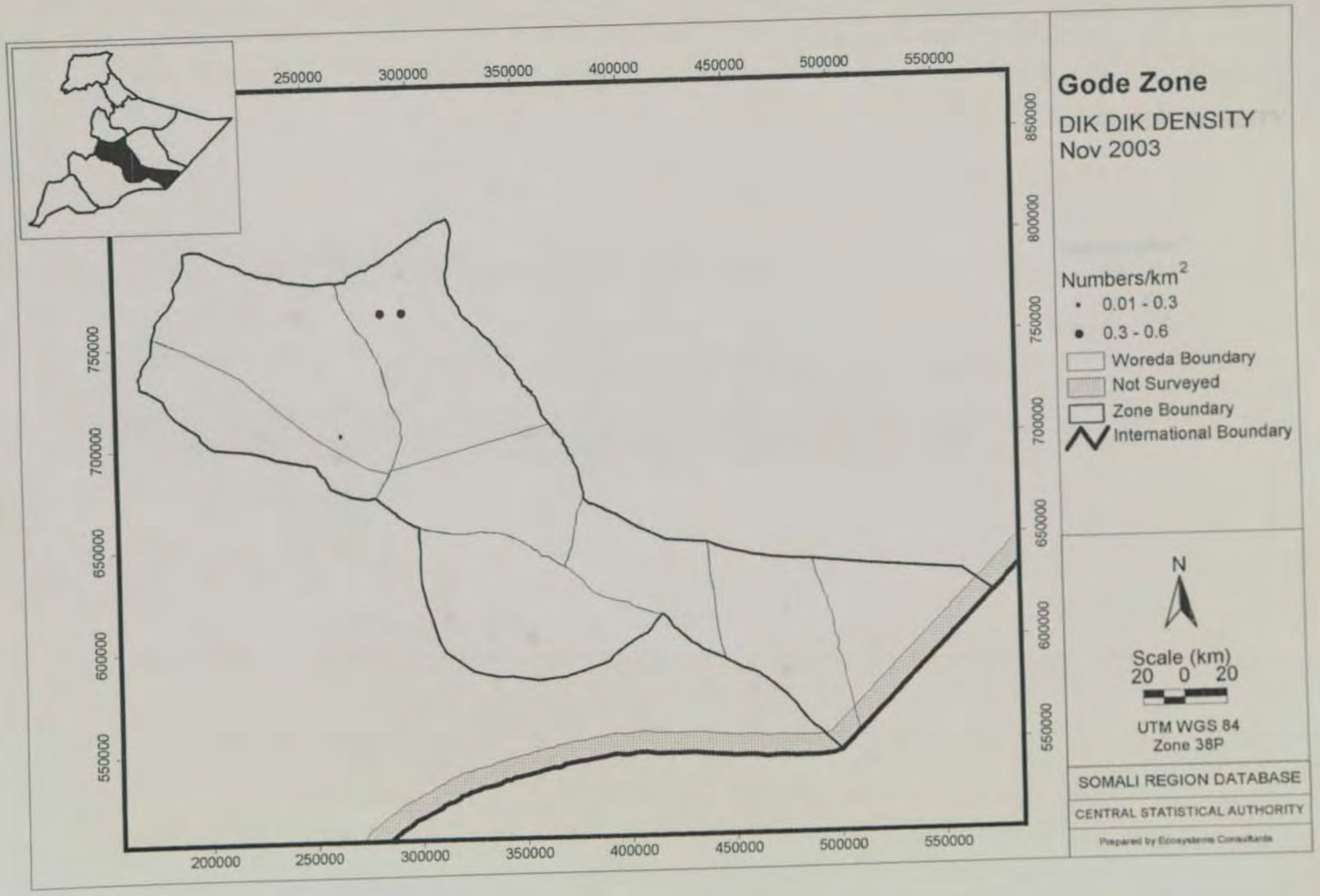
Gode Zone
DIK DIK DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.6
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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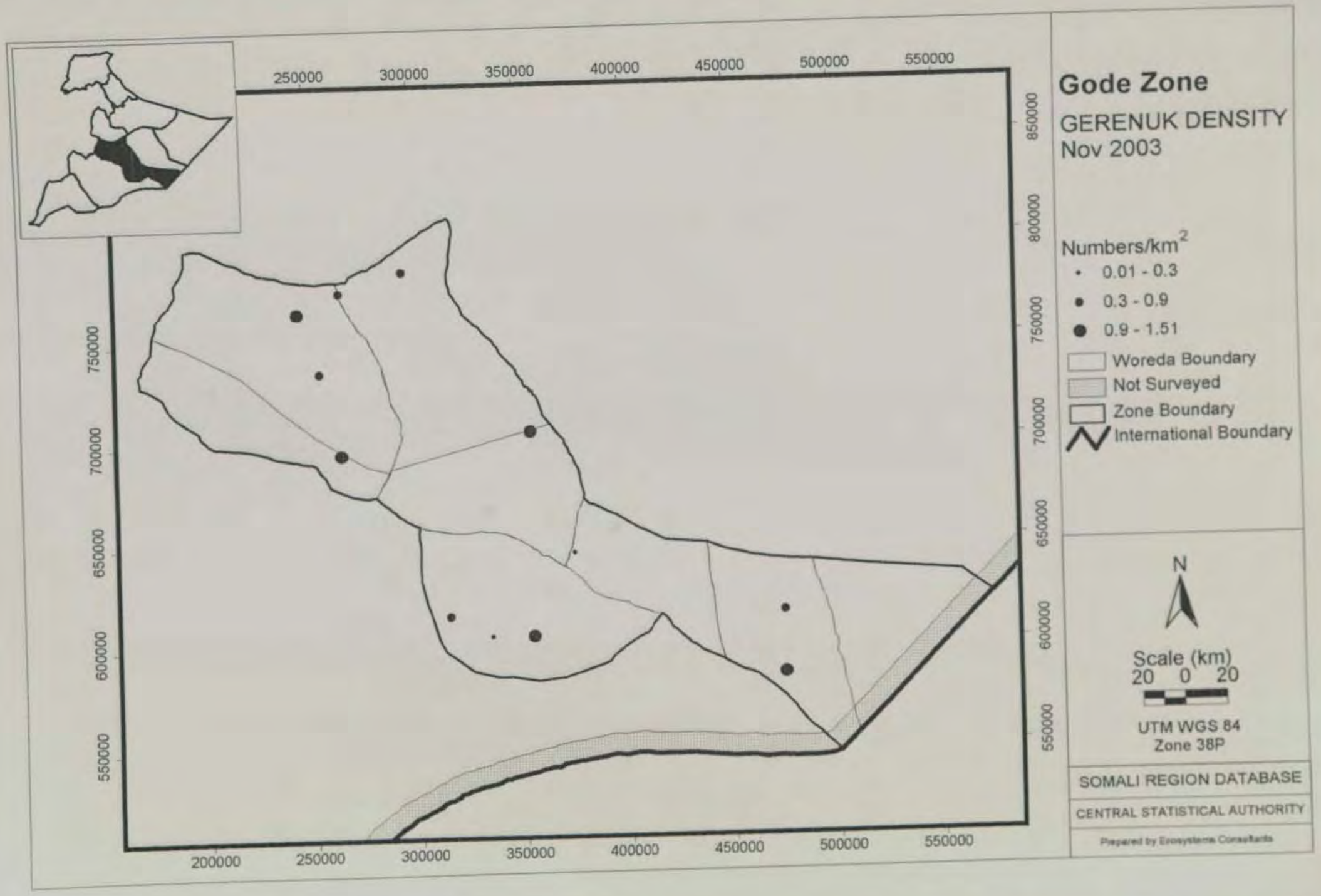
Gode Zone
GERENUK DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.9
0.9 - 1.51
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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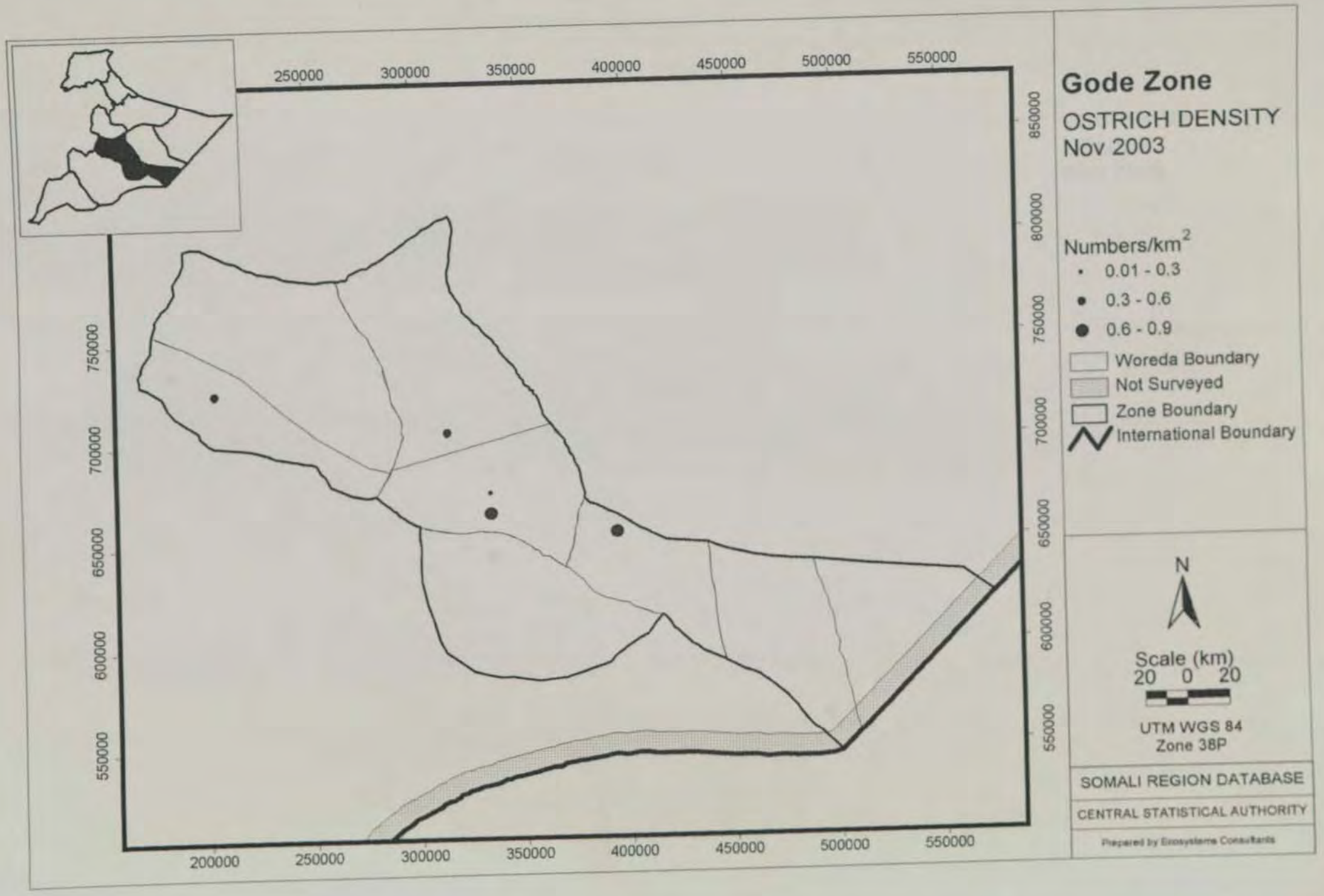
Gode Zone
OSTRICH DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.6
0.6 - 0.9
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
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UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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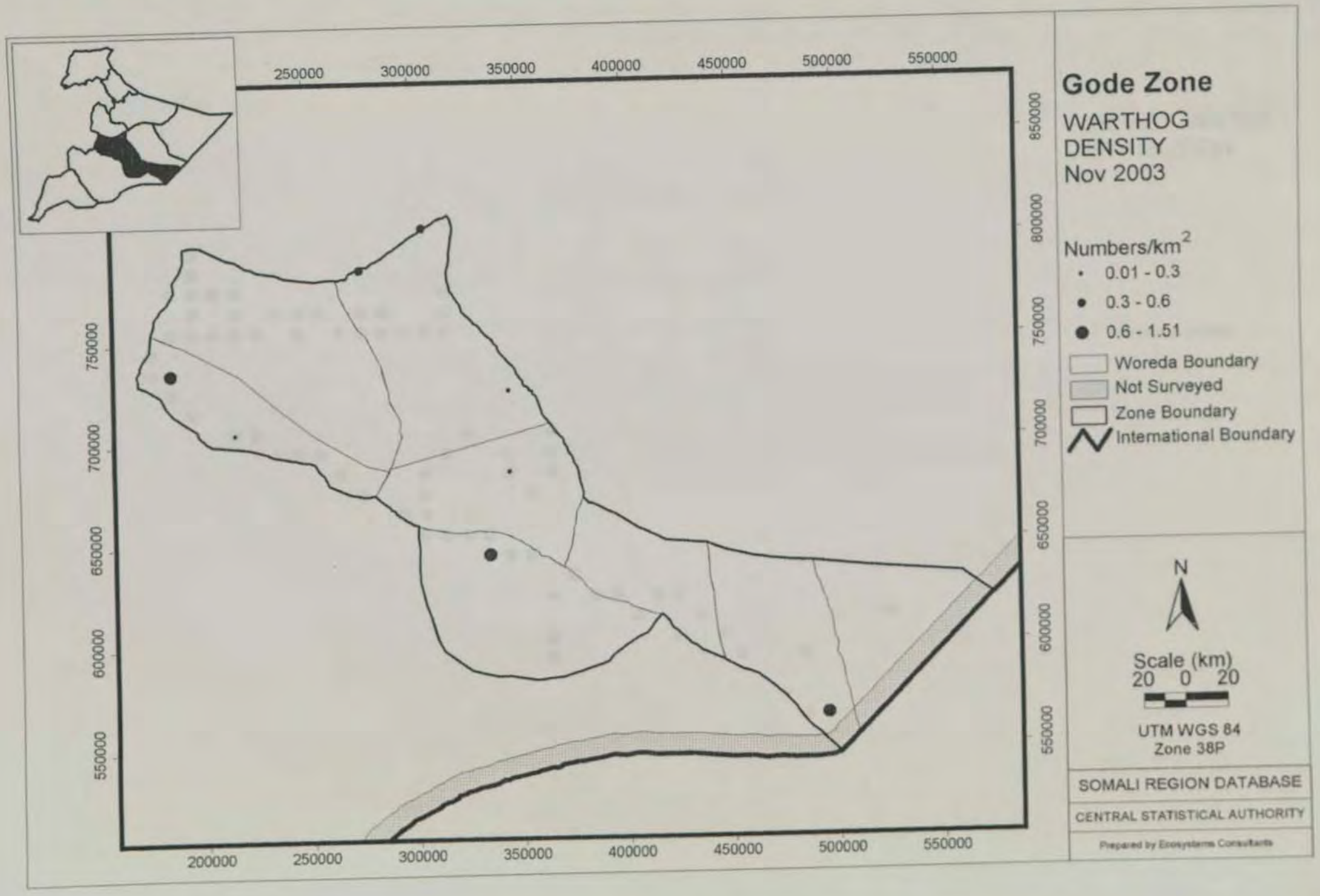
Gode Zone
WARTHOG
DENSITY
Nov 2003
Numbers/km2
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0.3 - 0.6
0.6 - 1.51
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
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Scale (km)
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UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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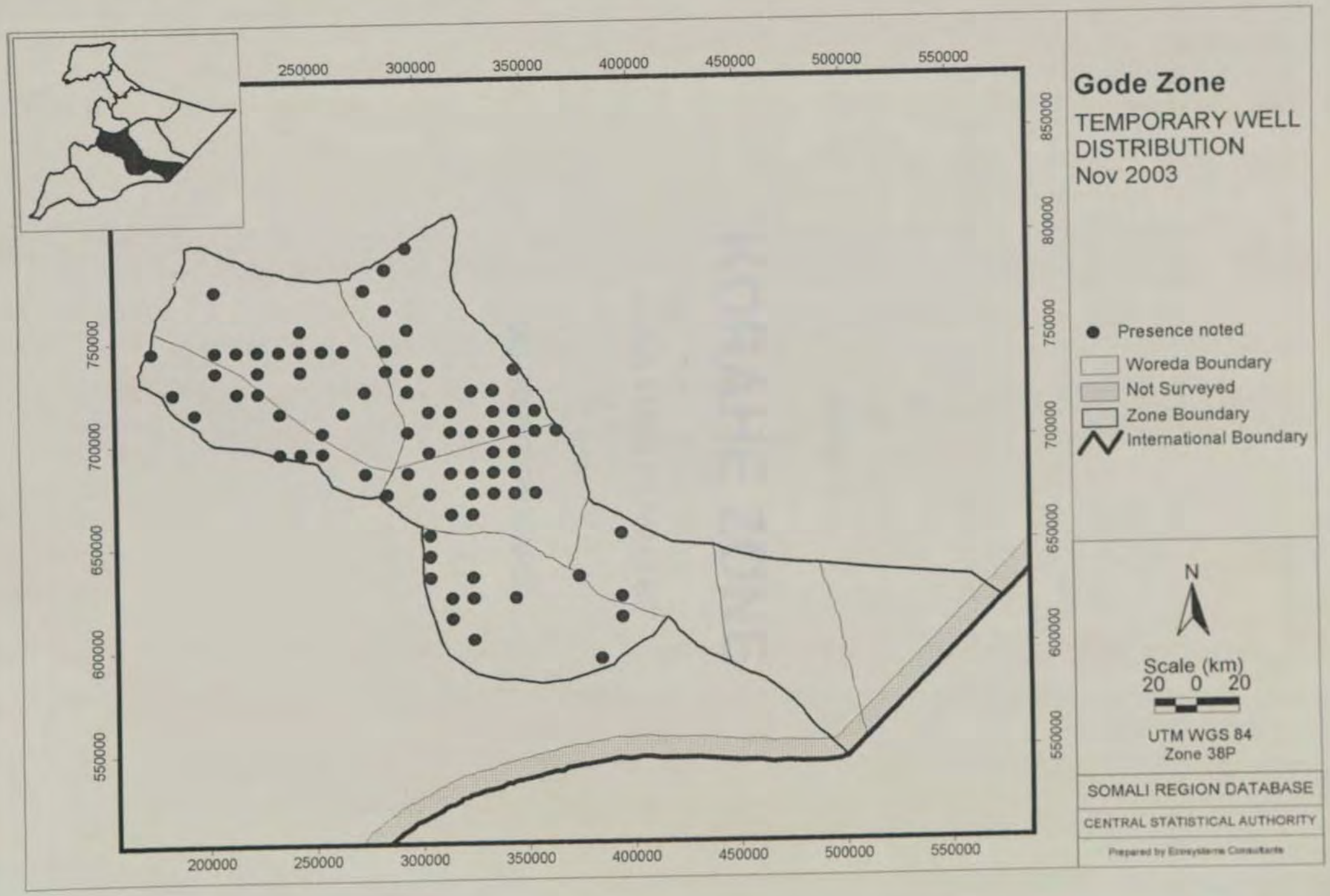
Gode Zone
TEMPORARY WELL DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
250000
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ANNEX 5

KORAHE ZONE

POPULATION ESTIMATES

and

DISTRIBUTION MAPS

Area: 32,202 km^2

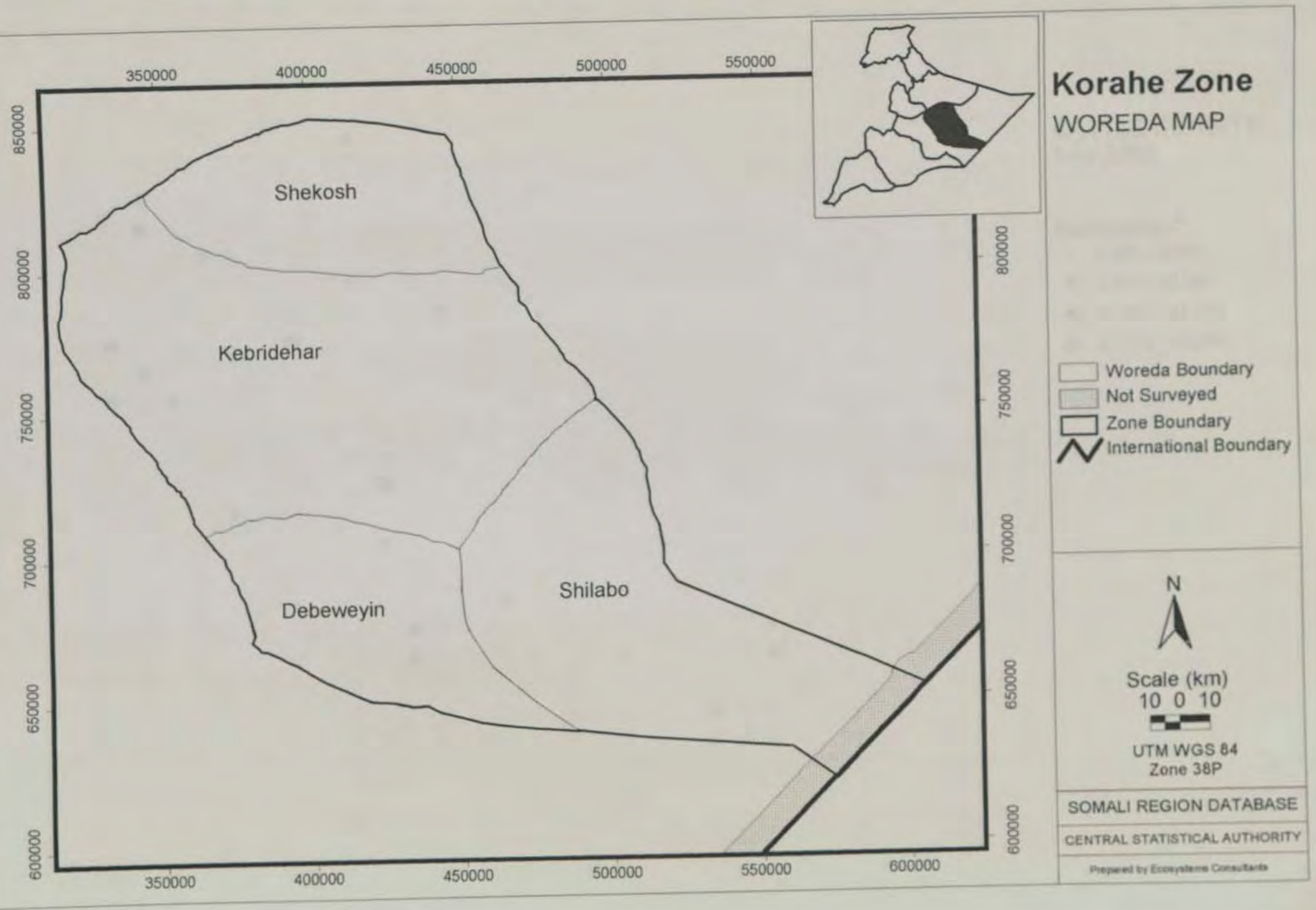
Variable name	Population estimate	SE	CV	95% CL	
				Upper limit	Lower limit
Cattle	26,301	6,064	23	38,399	14,203
Sheep and goats	1,053,669	263,996	25	1,580,504	526,835
Camels	149,971	35,251	24	220,457	79,485
Equids	2,518	651	26	3,802	1,234
Traditional roofs	14,357	6,127	43	26,560	2,154
Modern roofs	31	29	94	90	1
Dams and birkas	768	352	46	1,467	69
Dik Dik	154	95	62	342	5
Gazelle	369	345	93	1,055	12
Gerenuk	1,013	378	37	1,763	263
Lesser Kudu	184	88	48	357	11
Ostrich	737	363	49	1,459	24
Warthog	553	270	49	1,089	18
Livestock/roof ratio	85.8				

DISTRIBUTION OF CATTLE BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	26301	100	8590	32.66	17711	67.34
Under 6 month	2883	10.96	1218	4.63	1665	6.33
6 months - under 1 year	2930	11.14	1068	4.06	1862	7.08
1 year - under 2 years	5478	20.83	1962	7.46	3516	13.37
2 years and older	11191	42.55	3111	11.83	8080	30.72
10 years and above	3819	14.52	1231	4.68	2588	9.84

DISTRIBUTIONS OF SHEEP AND GOATS BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Sheep and Goats	1053669	100	367836	34.91	685833	65.09
Total Sheep	362778	34.43	139717	13.26	223062	21.17
Under 6 month	48469	4.6	21706	2.06	26763	2.54
6 months - under 1 year	63958	6.07	22654	2.15	41304	3.92
1 year - under 2 years	96411	9.15	37721	3.58	58689	5.57
2 years and older	153941	14.61	57636	5.47	96305	9.14
Total Goats	690891	65.57	228014	21.64	462877	43.93
Under 6 month	89773	8.52	39829	3.78	49944	4.74
6 months - under 1 year	116641	11.07	40356	3.83	76286	7.24
1 year - under 2 years	171116	16.24	69753	6.62	101363	9.62
2 years and older	313361	29.74	78077	7.41	235284	22.33

DISTRIBUTION OF CAMELS BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	149971	100	55789	37.2	94182	62.8
Under 4 years	56749	37.84	24505	16.34	32244	21.5
4 years and older	93222	62.16	31284	20.86	61938	41.3

DISTRIBUTIONS OF HORSES, ASSES & MULES BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Equids	2518	100	955	37.91	1563	62.09
Total Horses	0	0	0	0	0	0
Under 3 years	0	0	0	0	0	0
3 years and older	0	0	0	0	0	0
Total Asses	2504	99.5	950	37.73	1554	61.73
Under 3 years	686	27.3	350	13.9	336	13.36
3 years and older	1818	72.2	600	23.83	1218	48.37
Total Mules	14	0.5	5	0.18	9	0.36
Under 3 years	0	0.0	0	0	0	0
3 years and older	14	0.5	5	0.18	9	0.36


Korahe Zone
WOREDA MAP
Shekosh
Kebridehar
Debeweyin
Shilabo
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
350000
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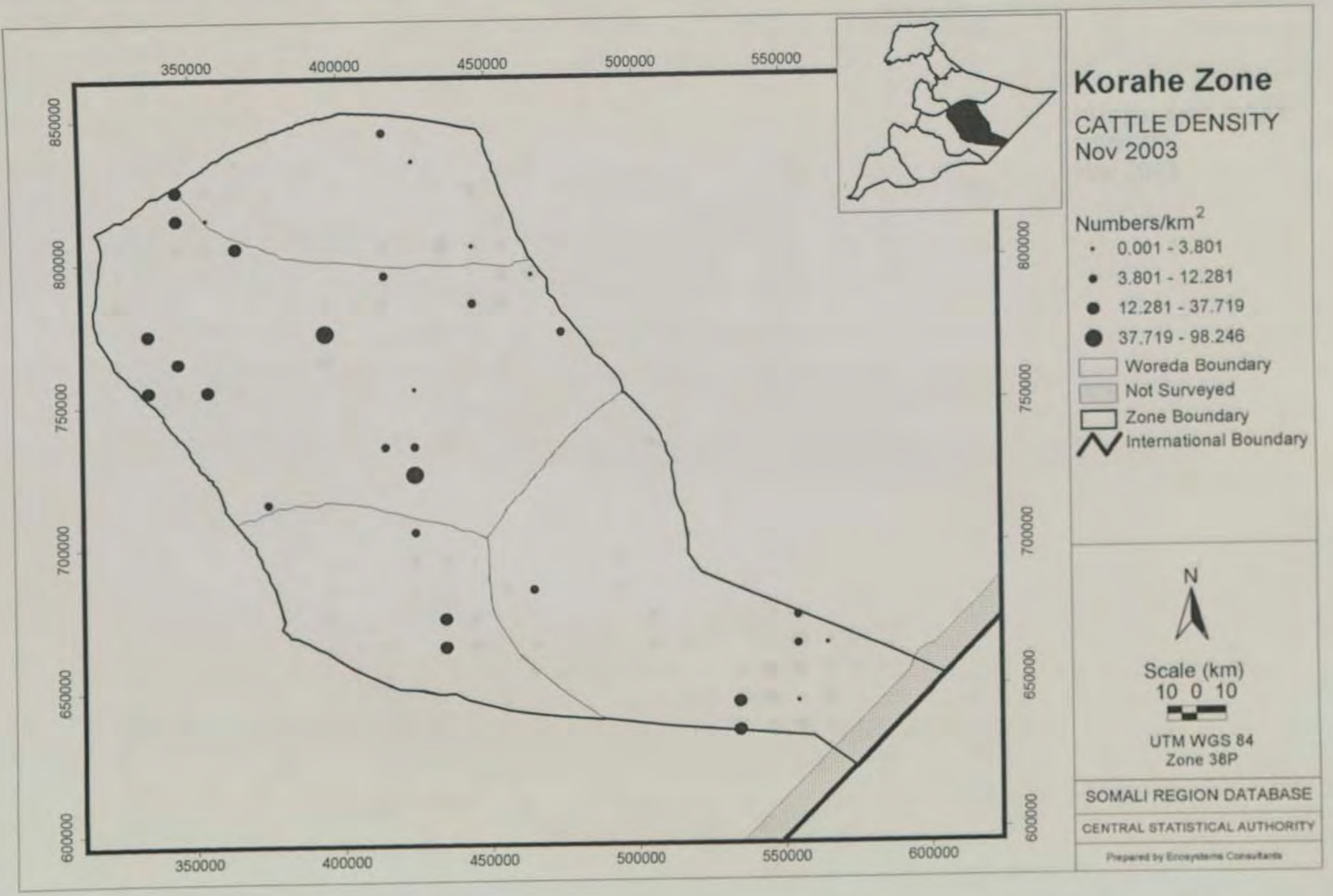
Korahe Zone
CATTLE DENSITY
Nov 2003
Numbers/km2
0.001 - 3.801
3.801 - 12.281
12.281 - 37.719
37.719 - 98.246
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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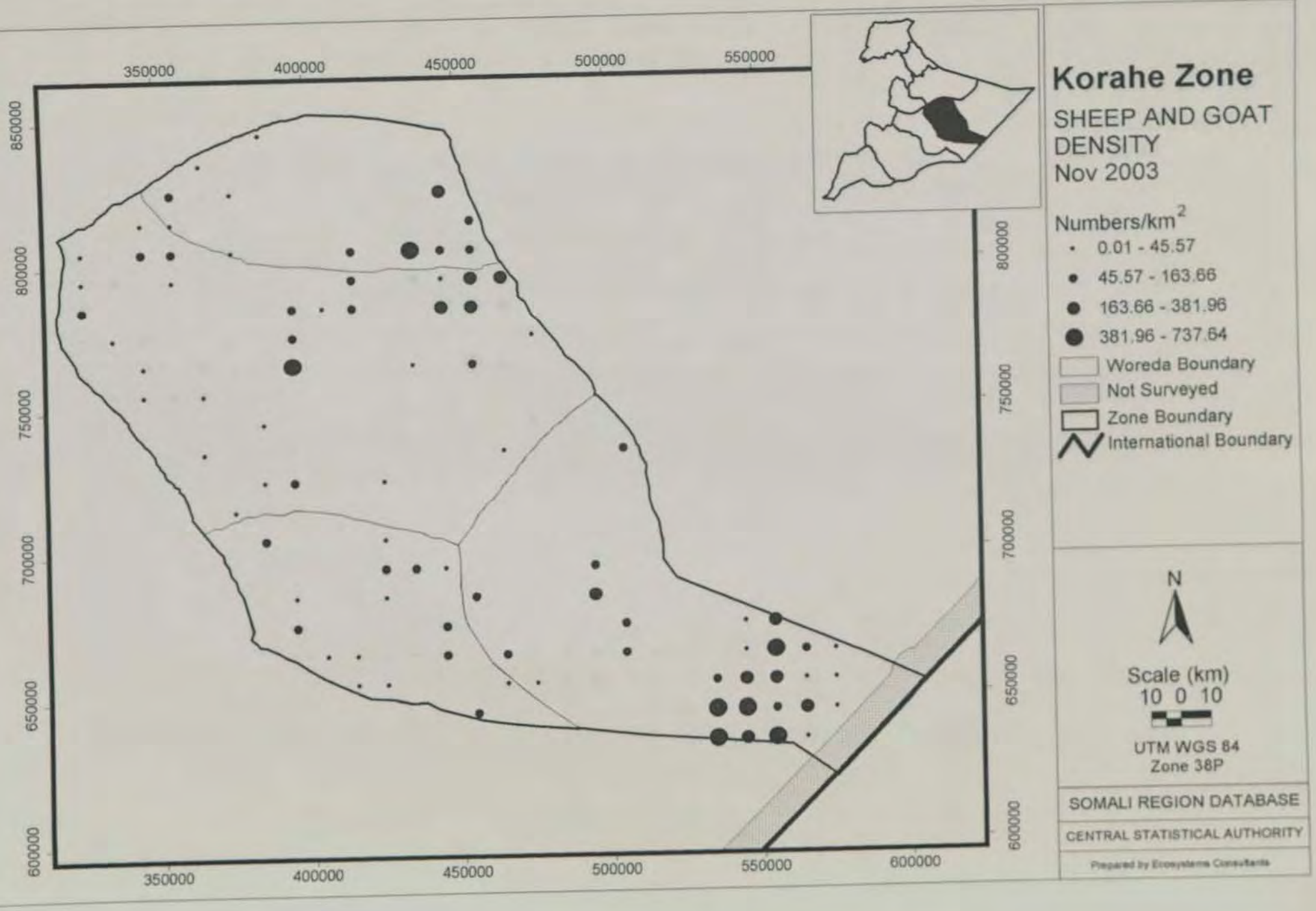
Korahe Zone
SHEEP AND GOAT DENSITY
Nov 2003
Numbers/km2
0.01 - 45.57
45.57 - 163.66
163.66 - 381.96
381.96 - 737.64
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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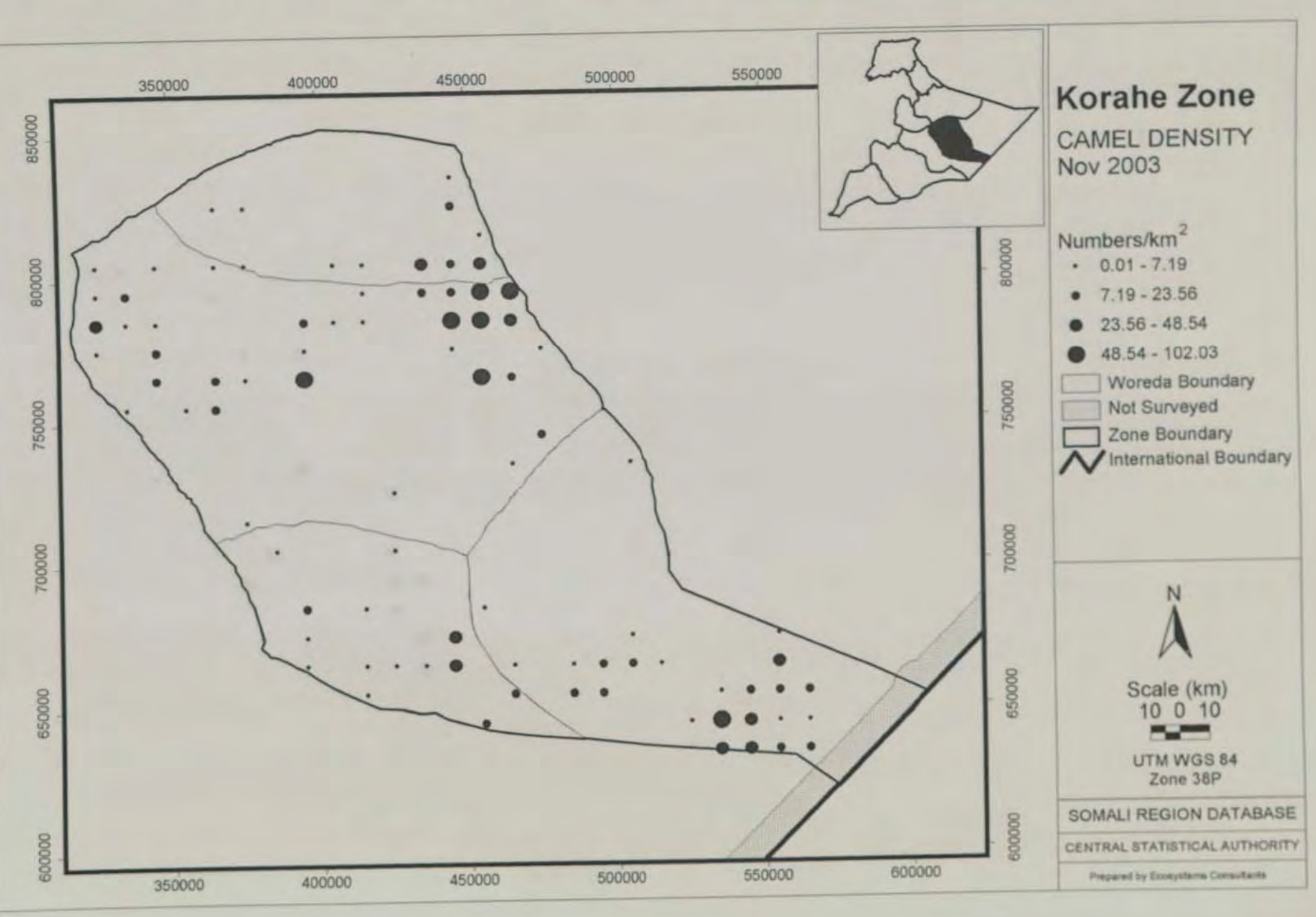
Korahe Zone
CAMEL DENSITY
Nov 2003
Numbers/km2
0.01 - 7.19
7.19 - 23.56
23.56 - 48.54
48.54 - 102.03
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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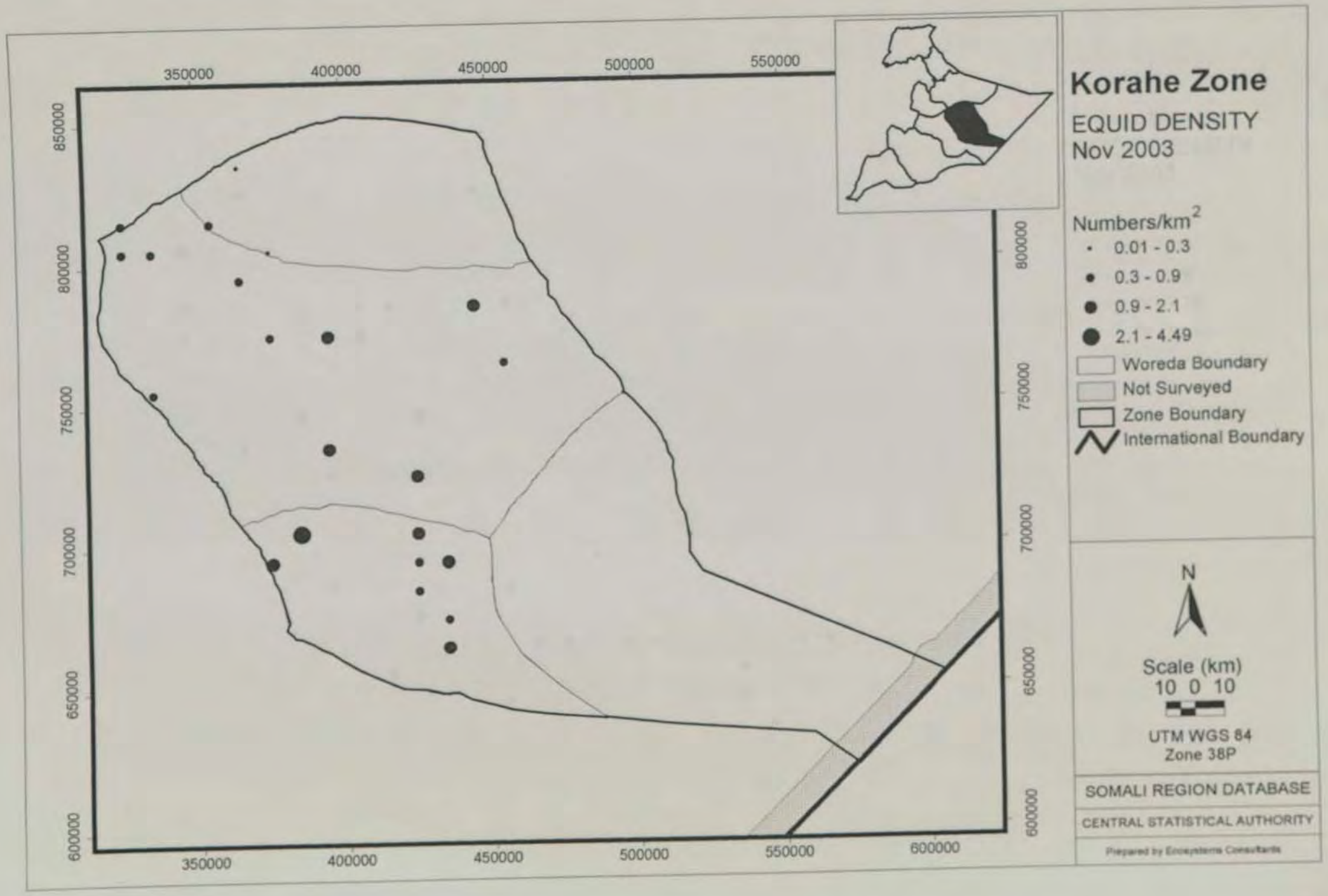
Korahe Zone
EQUID DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.9
0.9 - 2.1
2.1 - 4.49
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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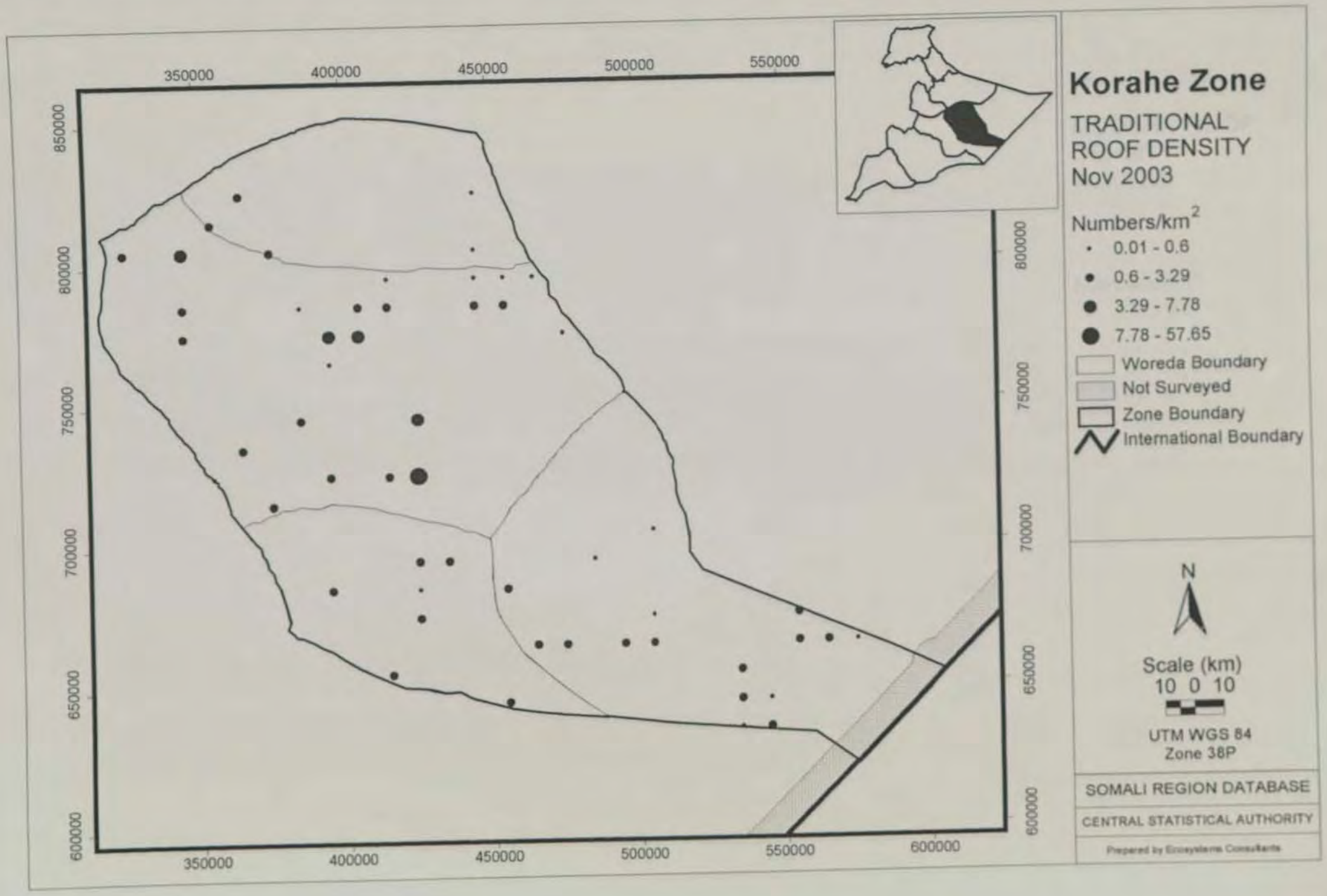
Korahe Zone
TRADITIONAL
ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 0.6
0.6 - 3.29
3.29 - 7.78
7.78 - 57.65
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
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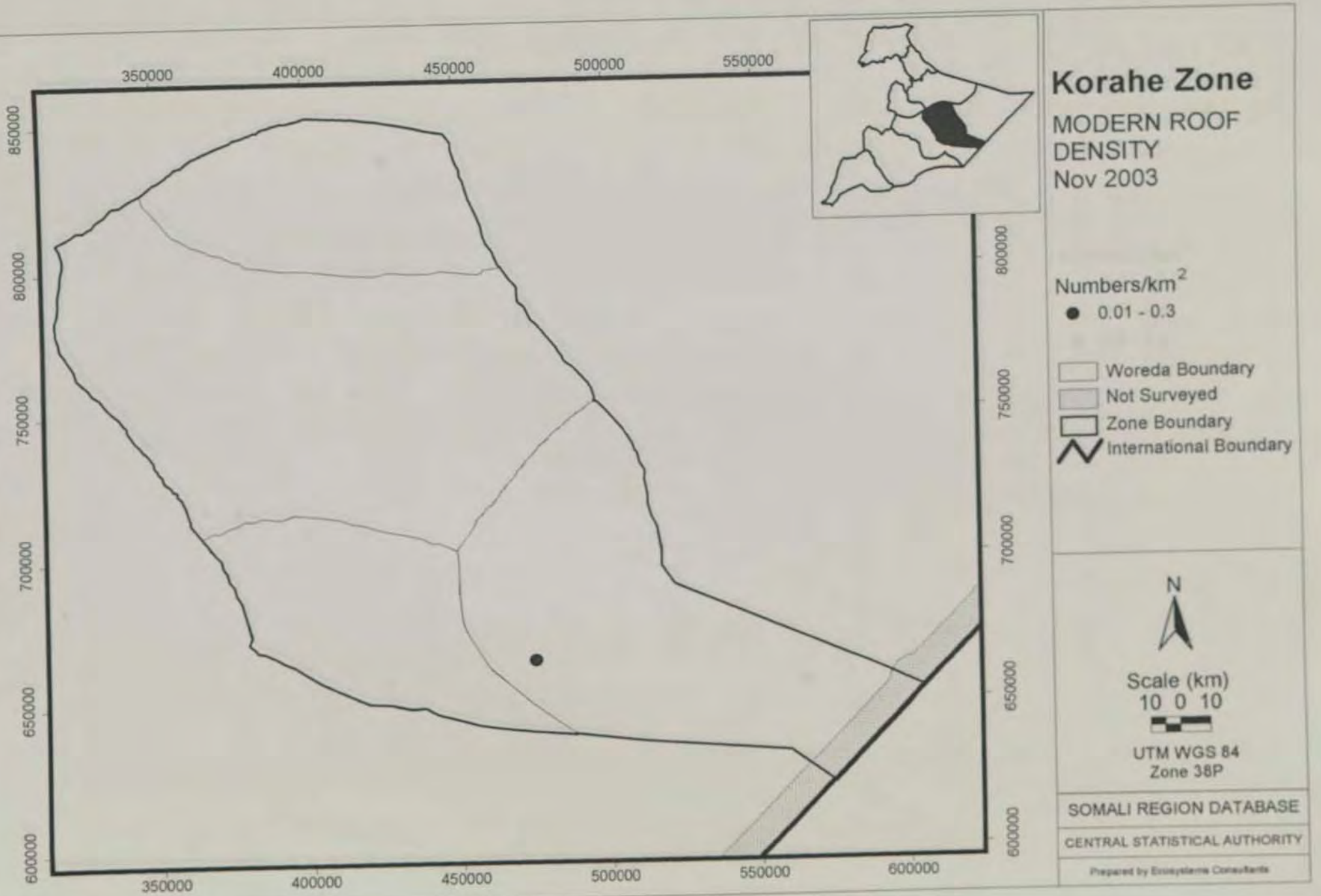
Korahe Zone
MODERN ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
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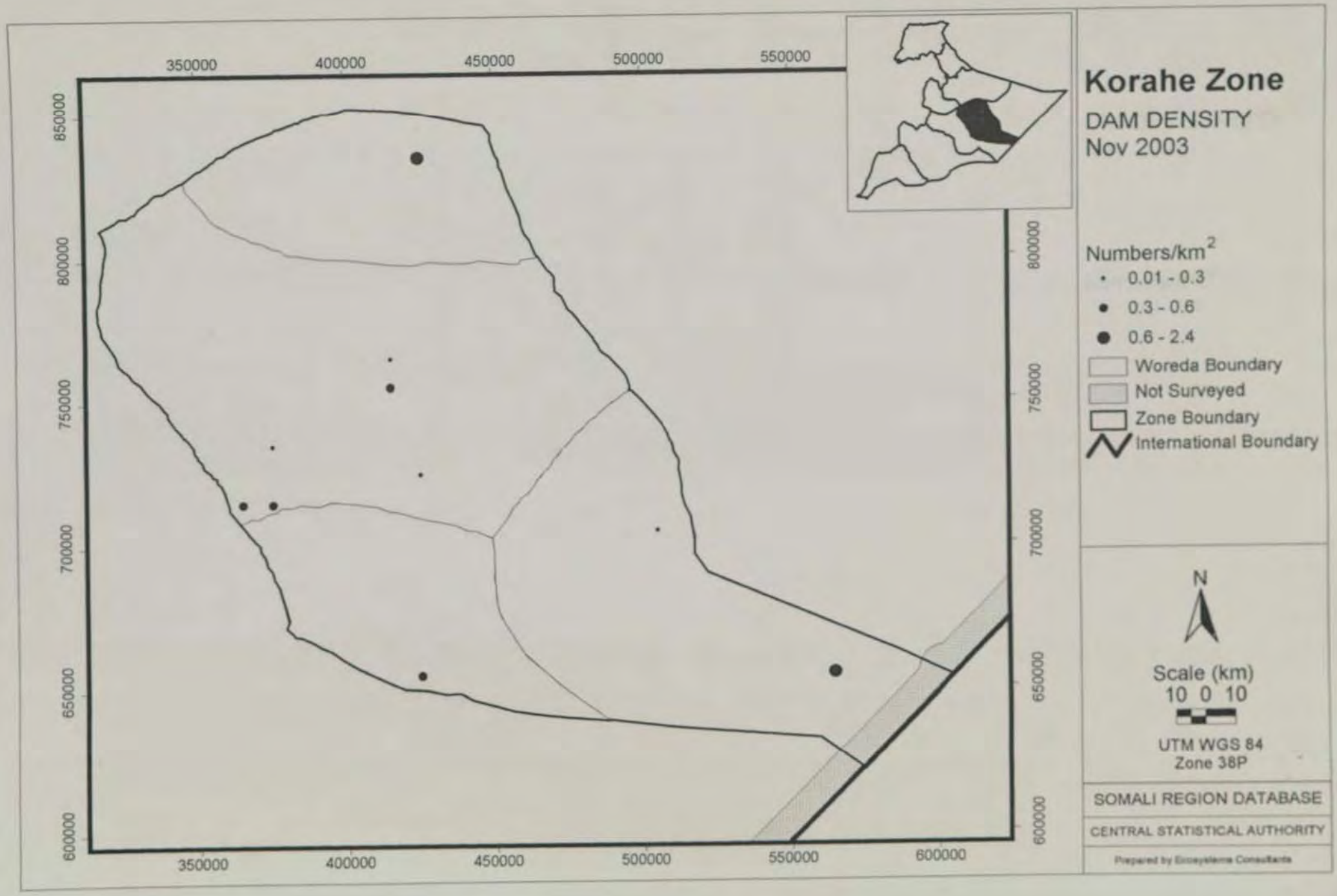
Korahe Zone
DAM DENSITY
Nov 2003
Numbers/km2
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0.3 - 0.6
0.6 - 2.4
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
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UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
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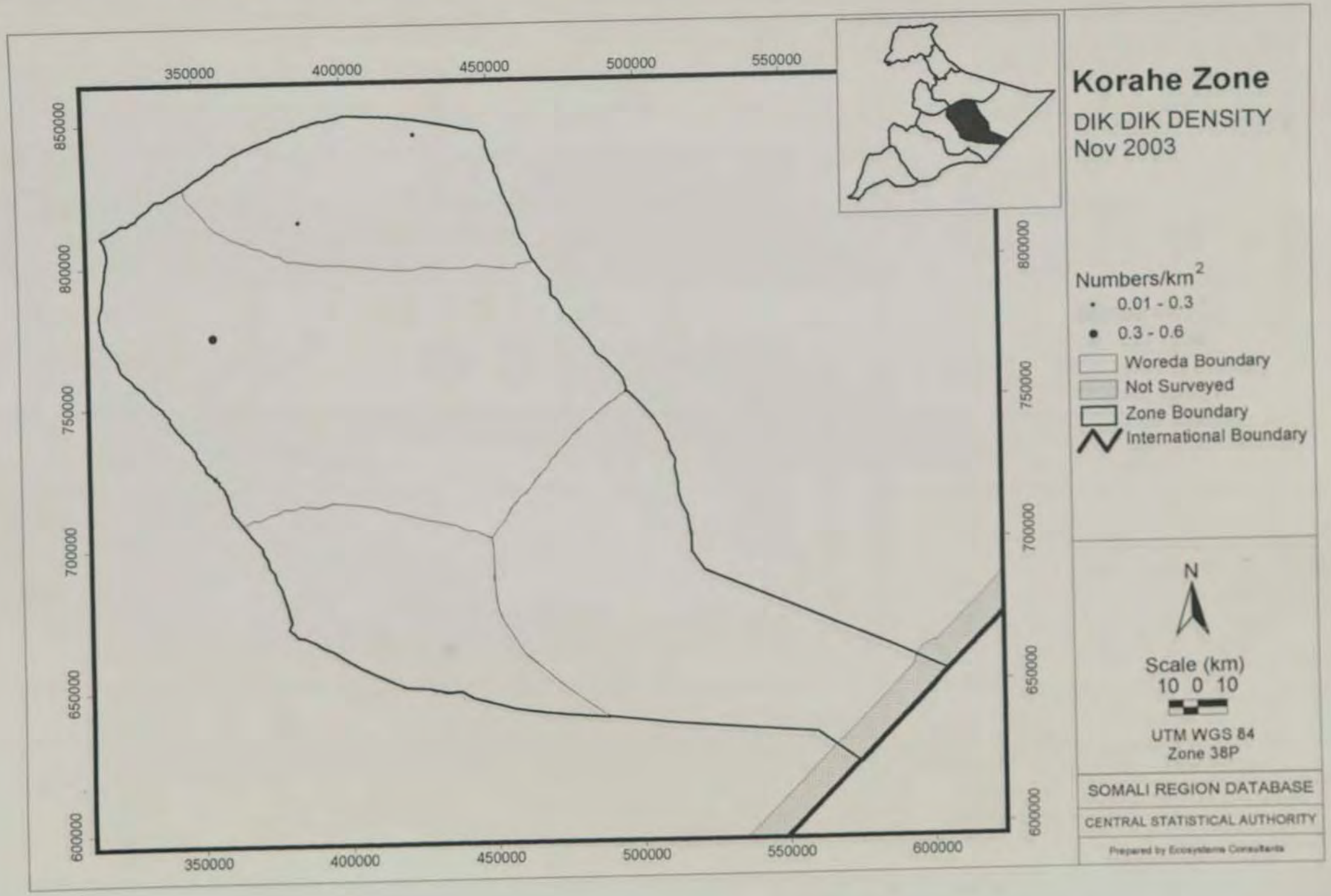
Korahe Zone
DIK DIK DENSITY
Nov 2003
Numbers/km2
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0.3 - 0.6
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
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SOMALI REGION DATABASE
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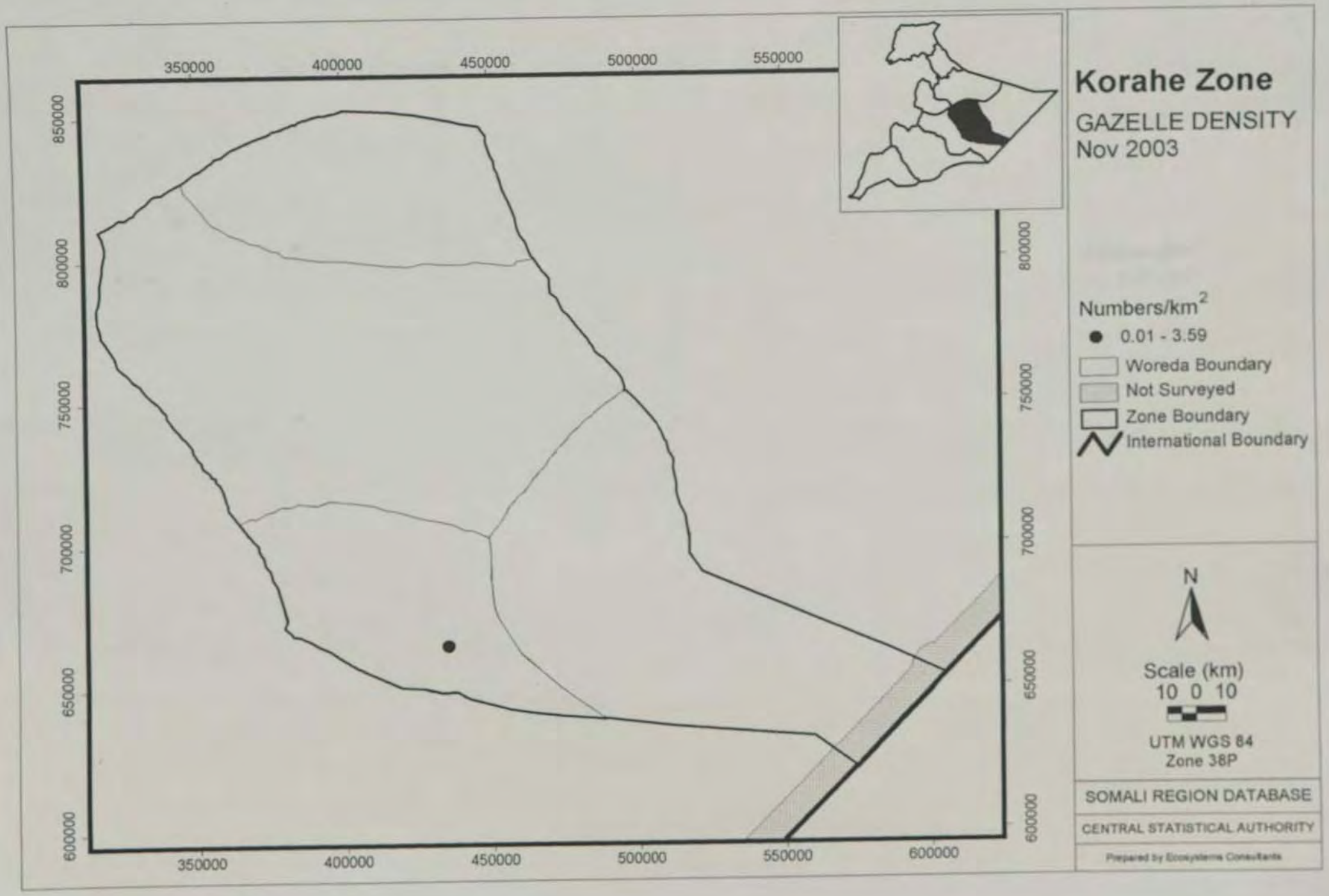
Korahe Zone
GAZELLE DENSITY
Nov 2003
Numbers/km2
0.01 - 3.59
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
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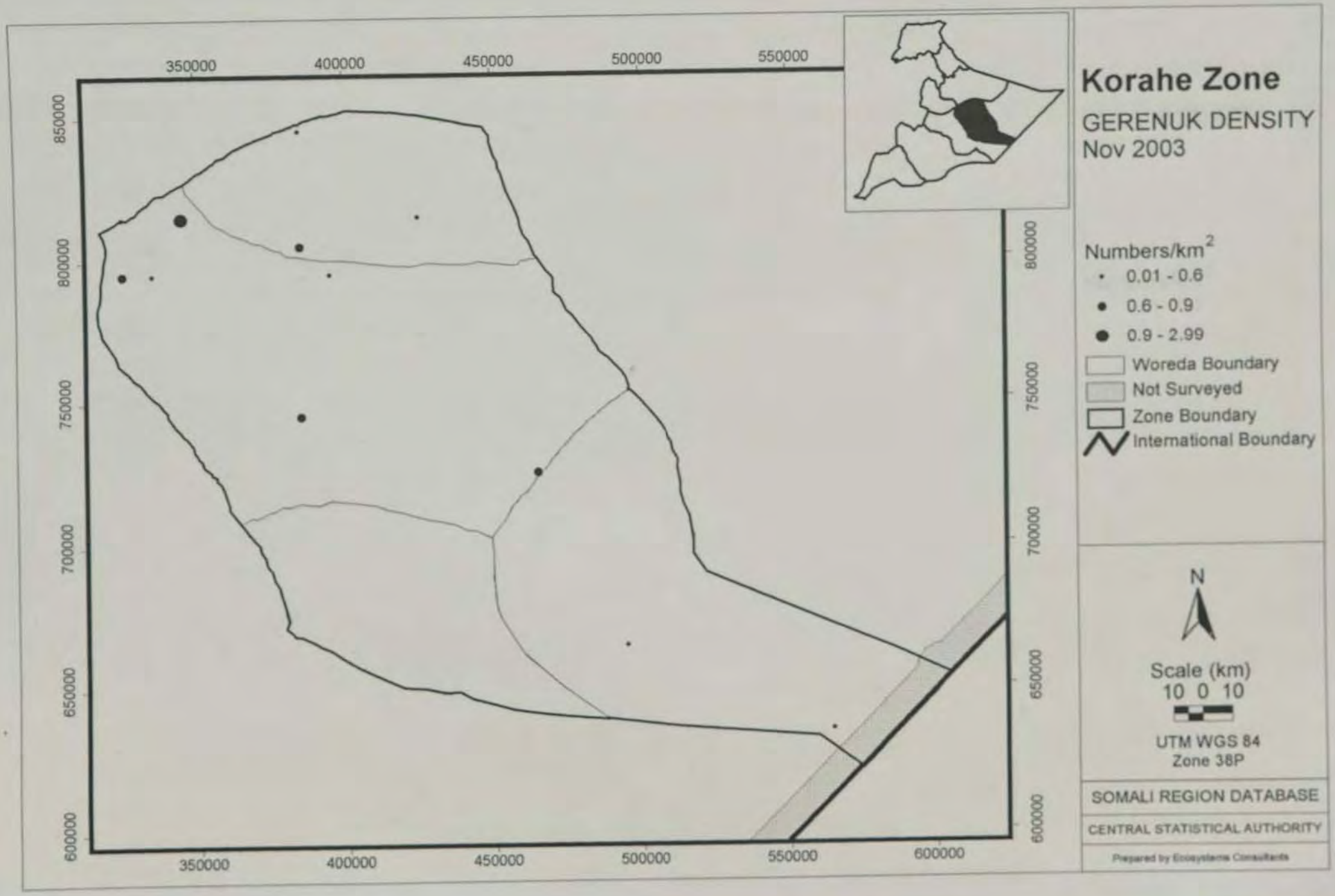
Korahe Zone
GERENUK DENSITY
Nov 2003
Numbers/km2
0.01 - 0.6
0.6 - 0.9
0.9 - 2.99
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
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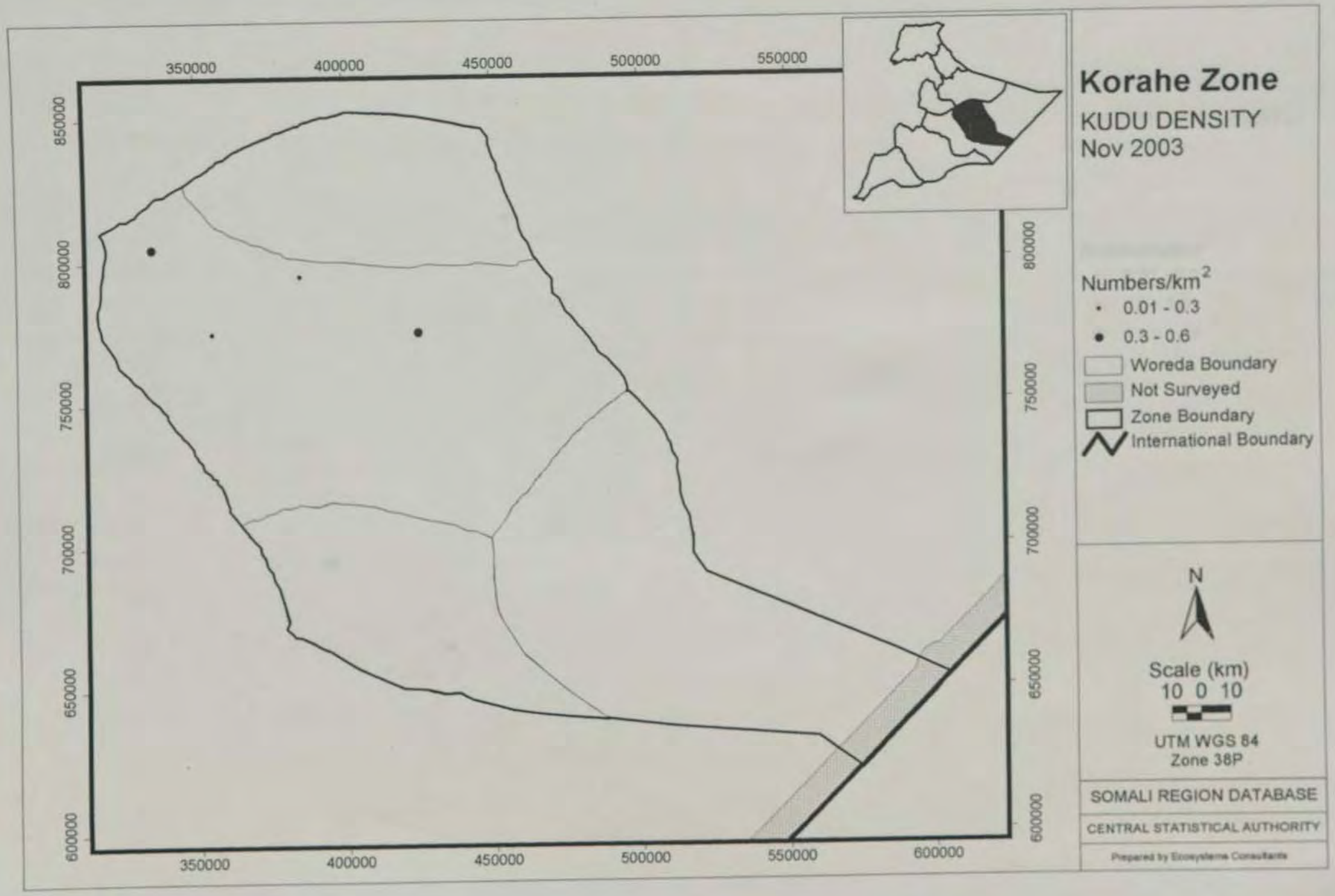
Korahe Zone
KUDU DENSITY
Nov 2003
Numbers/km2
0.01 - 0.3
0.3 - 0.6
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
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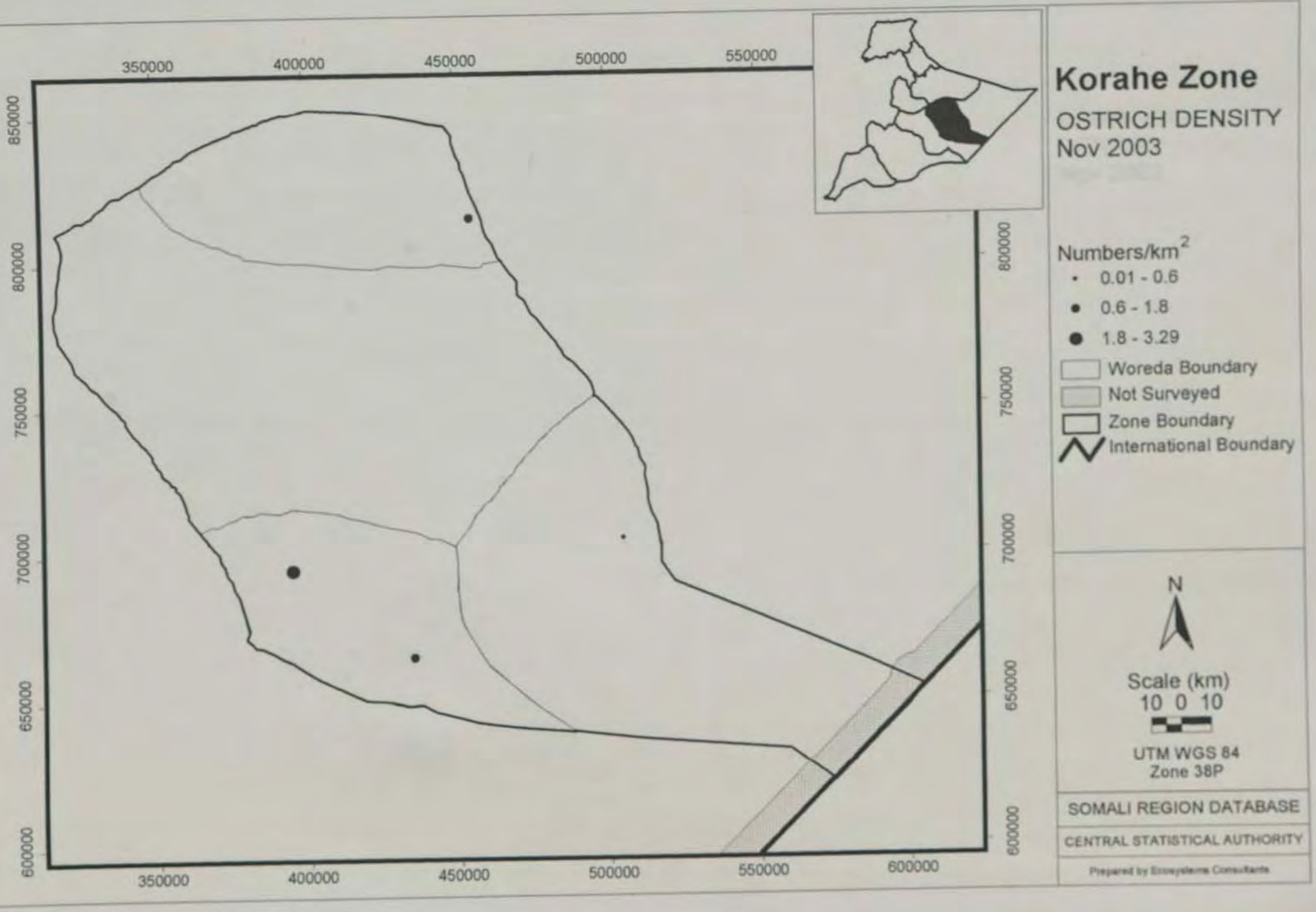
Korahe Zone
OSTRICH DENSITY
Nov 2003
Numbers/km2
0.01 - 0.6
0.6 - 1.8
1.8 - 3.29
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
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Scale (km)
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Zone 38P
SOMALI REGION DATABASE
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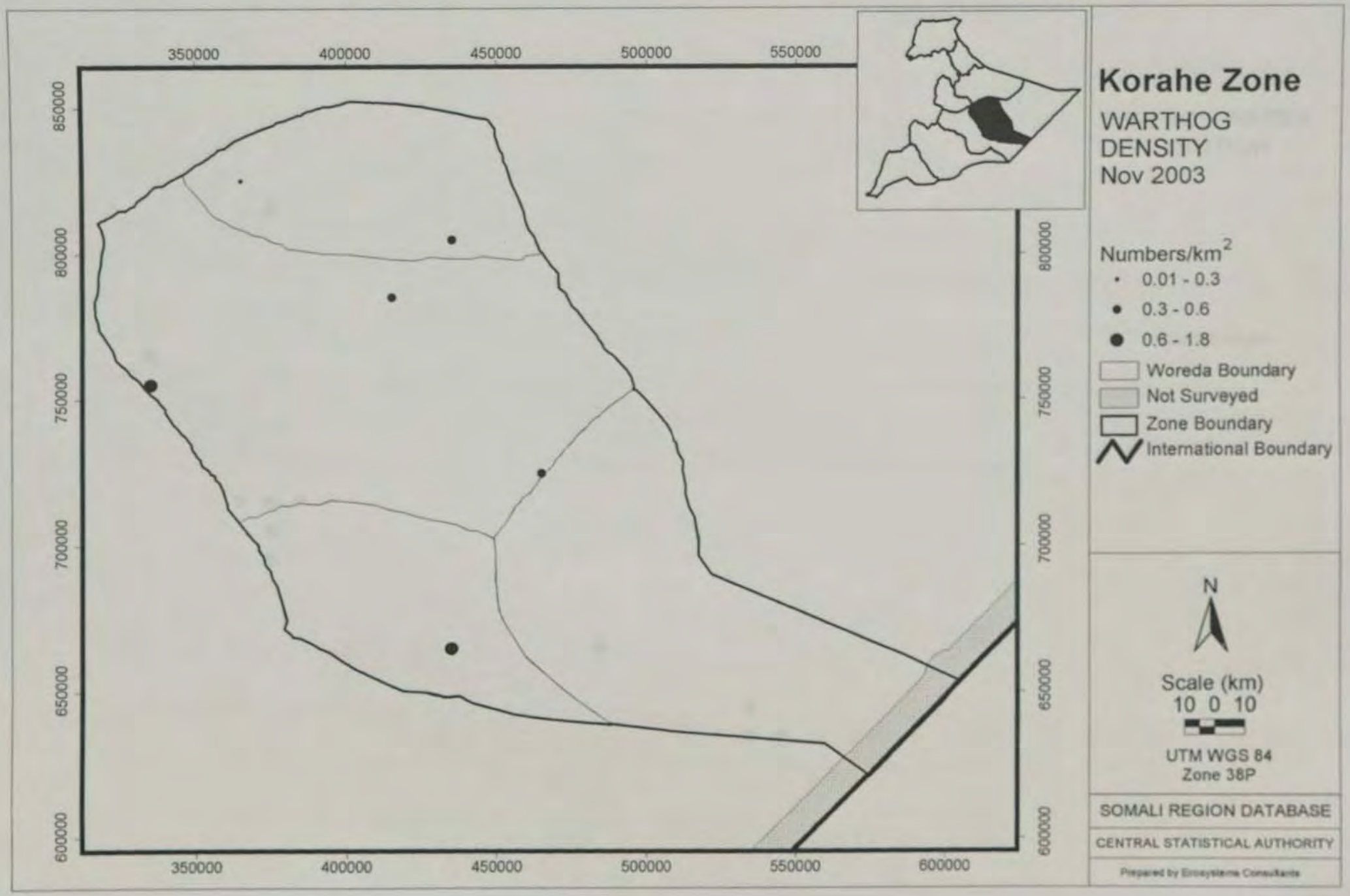
Korahe Zone
WARTHOG
DENSITY
Nov 2003
Numbers/km2
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0.3 - 0.6
0.6 - 1.8
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
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Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
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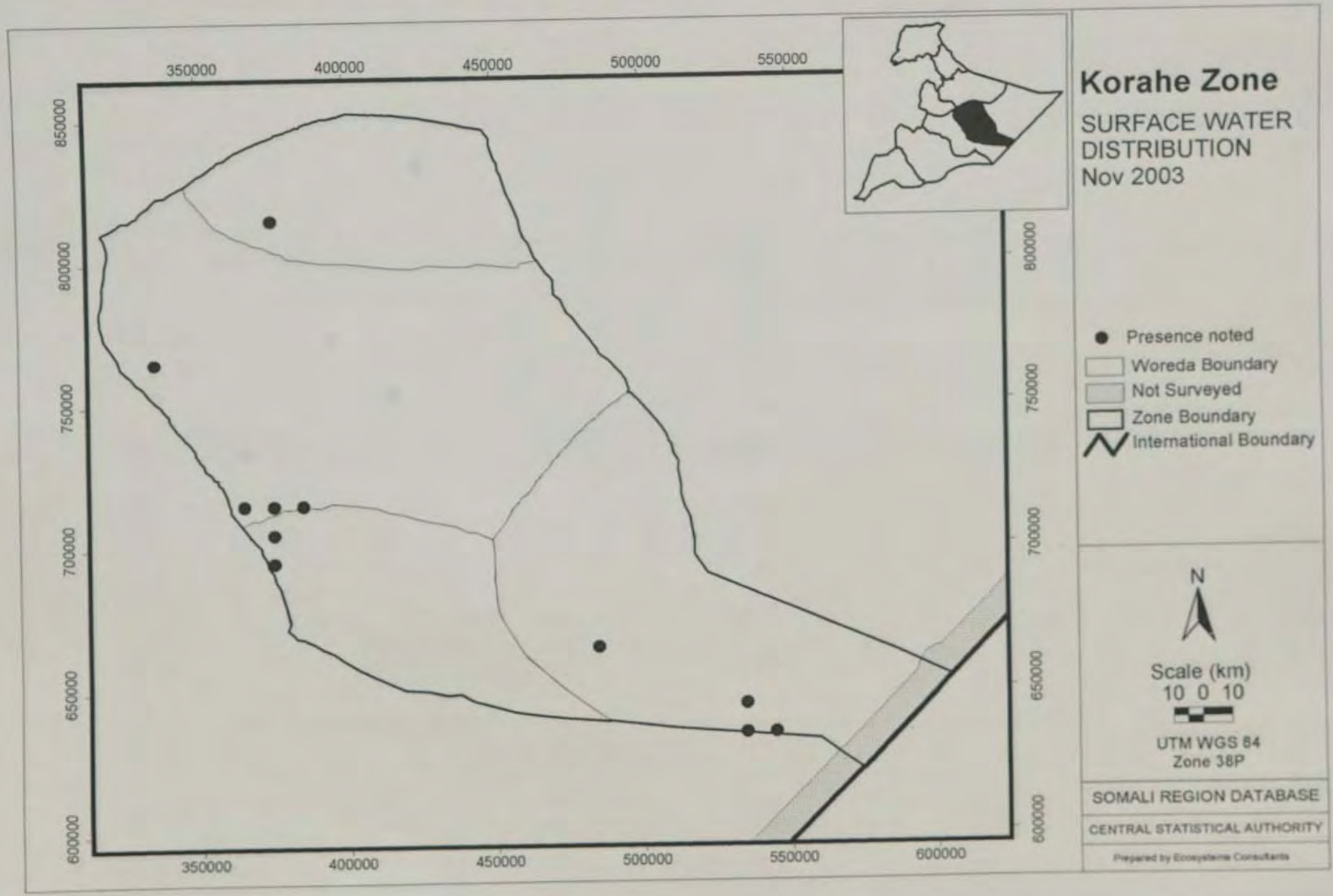
Korahe Zone
SURFACE WATER DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
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UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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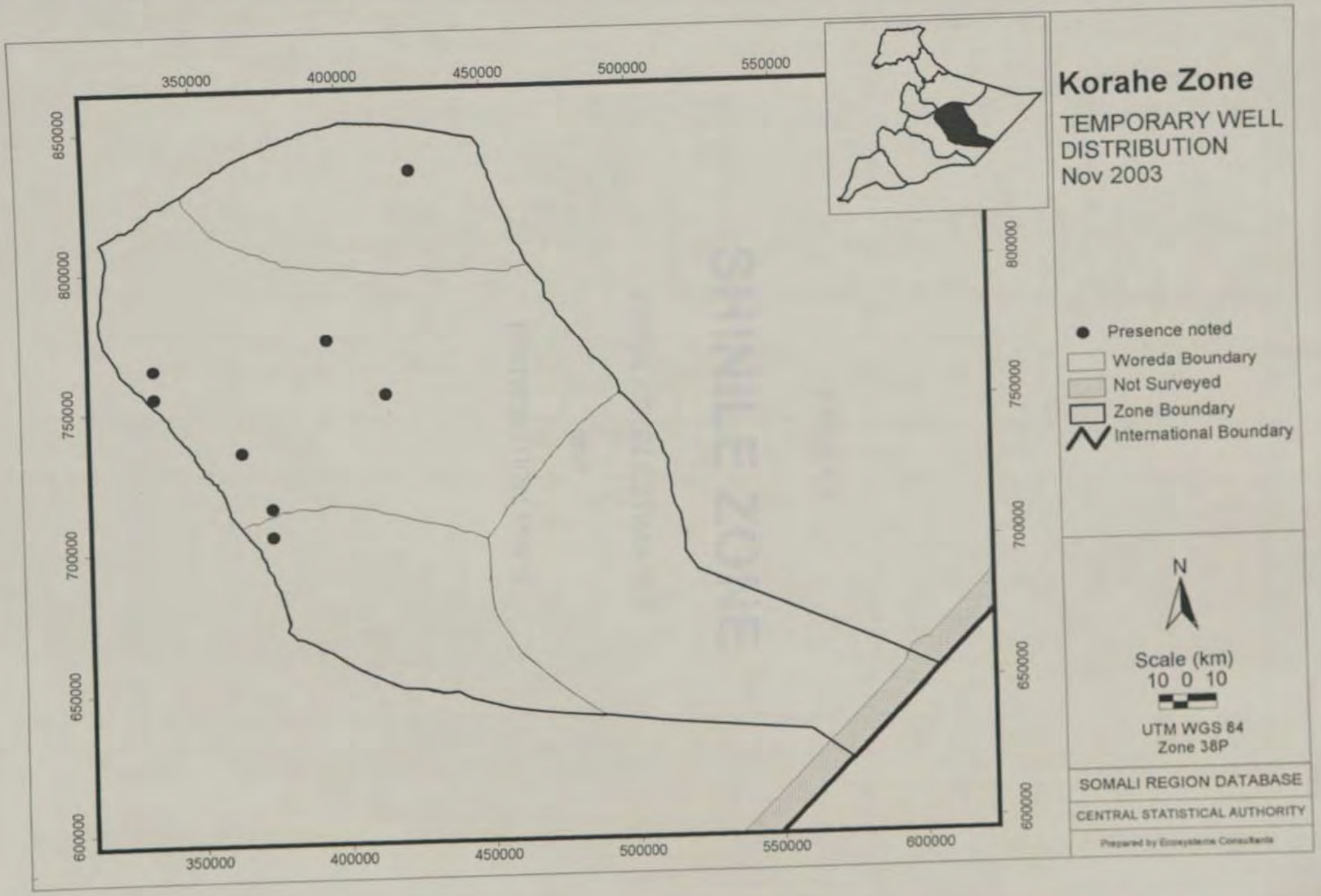
Korahe Zone
TEMPORARY WELL DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
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Scale (km)
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UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
350000
400000
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700000
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600000

ANNEX 6

SHINILE ZONE

POPULATION ESTIMATES

and

DISTRIBUTION MAPS

Area: 30,721 km^2

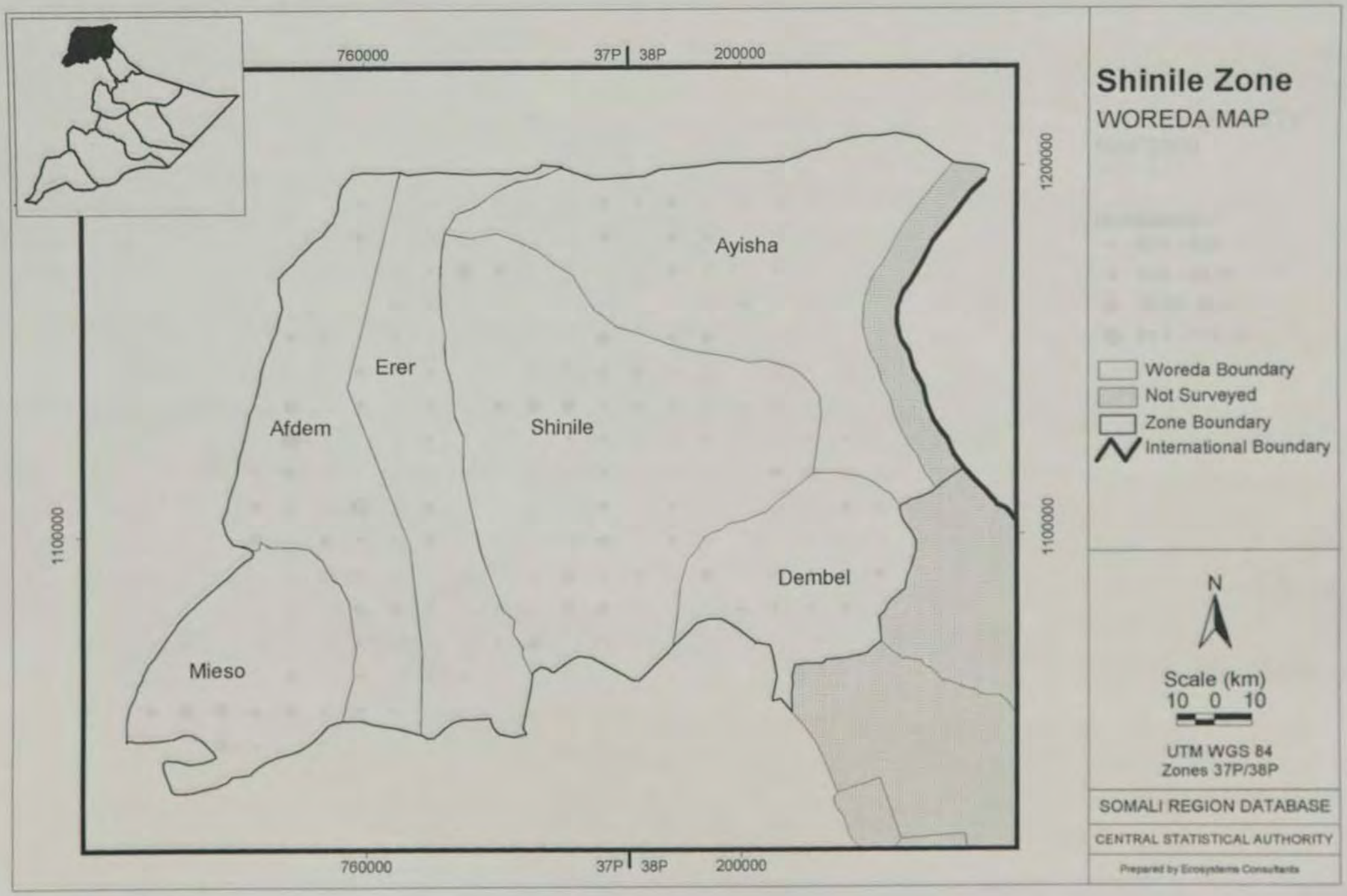
Variable name	Population estimate	SE	CV	95% CL	
				Upper limit	Lower limit
Cattle	207,472	27,954	13	263,489	151,455
Sheep and goats	1,520,407	81,530	5	1,687,652	1,353,162
Camels	103,052	14,946	15	132,937	73,167
Equids	16,329	2,805	17	21,881	10,777
Traditional roofs	37,734	5,216	14	47,922	27,546
Modern roofs	5,911	3,807	64	13,477	177
Dams and birkas	835	250	30	1,328	342
Gazelle	11,454	2,565	22	16,494	6,414
Gerenuk	3,840	1,155	30	6,144	1,536
Lesser Kudu	234	123	53	477	7
Ostrich	468	216	46	894	42
Warthog	568	248	44	1,056	80
Livestock/roof ratio	49.0				

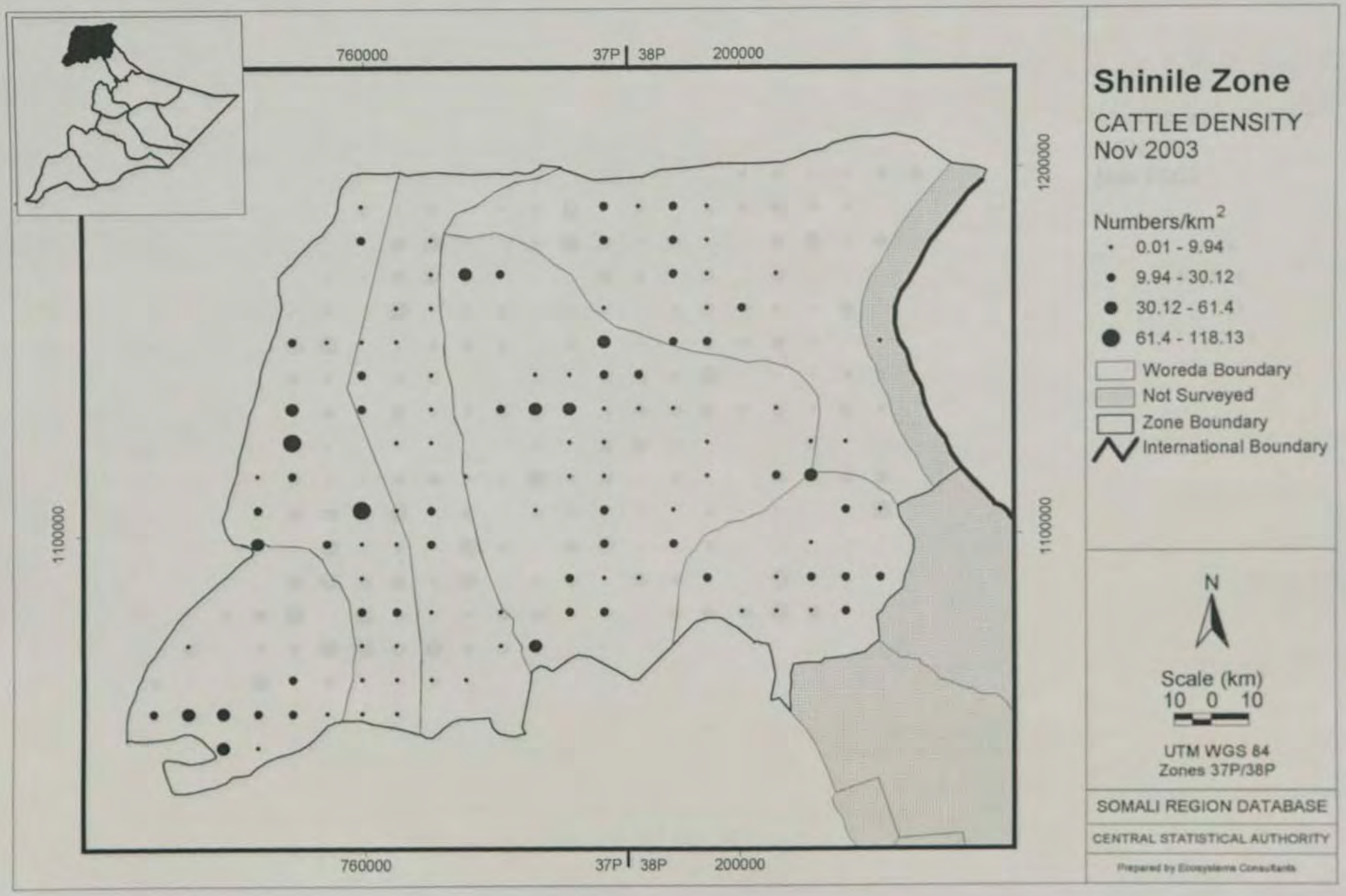
DISTRIBUTION OF CATTLE BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	207472	100	32034	15.44	175438	84.56
Under 6 month	19087	9.20	7925	3.82	11162	5.38
6 months - under 1 year	20436	9.85	4357	2.1	16079	7.75
1 year - under 2 years	37137	17.90	8963	4.32	28175	13.58
2 years and older	115541	55.69	10477	5.05	105064	50.64
10 years and above	15270	7.36	311	0.15	14959	7.21

DISTRIBUTIONS OF SHEEP AND GOATS BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Sheep and Goats	1520407	100	326431	21.47	1193976	78.53
Total Sheep	670956	44.13	148392	9.76	522564	34.37
Under 6 month	118440	7.79	45612	3	72827	4.79
6 months - under 1 year	101411	6.67	27823	1.83	73588	4.84
1 year - under 2 years	134556	8.85	30408	2	104148	6.85
2 years and older	316549	20.82	44548	2.93	272001	17.89
Total Goats	849451	55.87	178040	11.71	671412	44.16
Under 6 month	167549	11.02	62793	4.13	104756	6.89
6 months - under 1 year	112510	7.4	31168	2.05	81342	5.35
1 year - under 2 years	200998	13.22	42571	2.8	158426	10.42
2 years and older	368395	24.23	41507	2.73	326888	21.5

DISTRIBUTION OF CAMELS BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	103052	100	33863	32.86	69189	67.14
Under 4 years	20198	19.6	8605	8.35	11593	11.25
4 years and older	82854	80.4	25258	24.51	57596	55.89

DISTRIBUTIONS OF HORSES, ASSES & MULES BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Equids	16329	100	8403	51.46	7926	48.54
Total Horses	0	0	0	0	0	0
Total Asses	16138	98.83	8284	50.73	7854	48.1
Under 3 years	1599	9.79	931	5.7	668	4.09
3 years and older	14539	89.04	7353	45.03	7186	44.01
Total Mules	191	1.17	119	0.73	72	0.44
Under 3 years	47	0.29	47	0.29	0	0
3 years and older	144	0.88	72	0.44	72	0.44


Shinile Zone
WOREDA MAP
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
760000
37P 38P
200000
1200000
1100000
Ayisha
Erer
Afdem
Shinile
Dembel
Mieso


Shinile Zone
CATTLE DENSITY
Nov 2003
Numbers/km2
0.01 - 9.94
9.94 - 30.12
30.12 - 61.4
61.4 - 118.13
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
760000
37P
38P
200000
1200000
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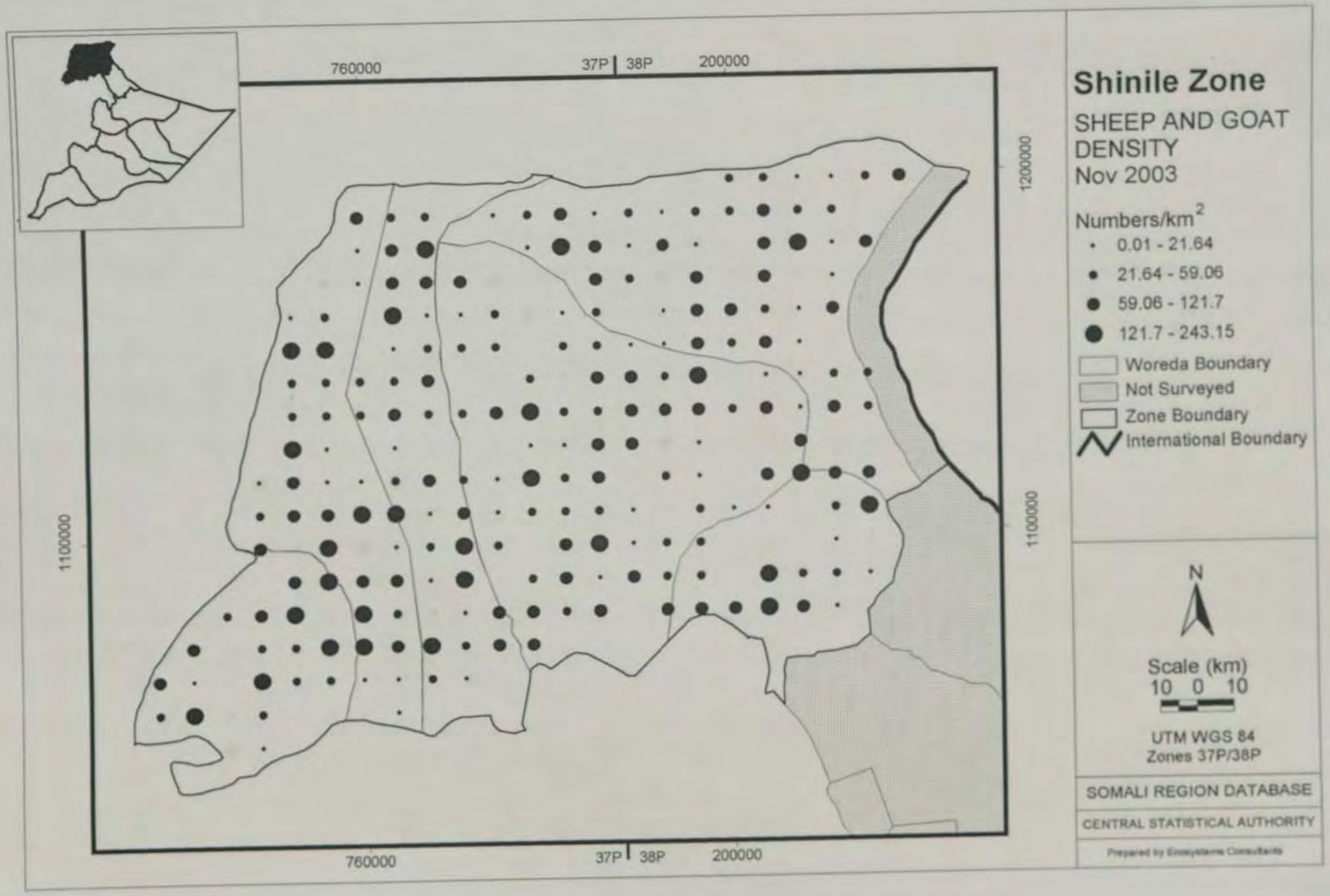
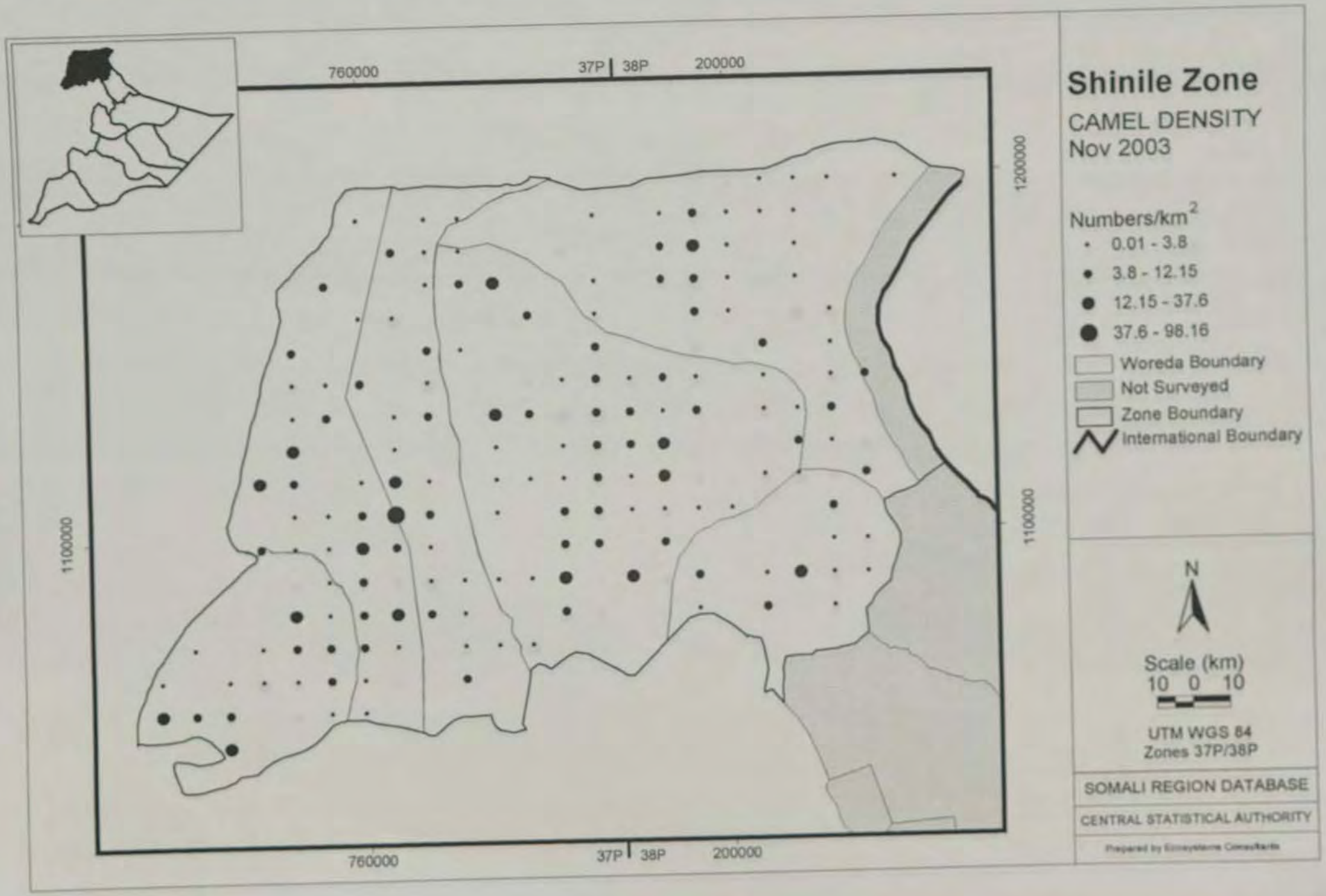

Shinile Zone
SHEEP AND GOAT DENSITY
Nov 2003
Numbers/km2
0.01 - 21.64
21.64 - 59.06
59.06 - 121.7
121.7 - 243.15
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
760000
37P 38P
200000
1200000
1100000


Shinile Zone
CAMEL DENSITY
Nov 2003
Numbers/km2
0.01 - 3.8
3.8 - 12.15
12.15 - 37.6
37.6 - 98.16
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
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Zones 37P/38P
SOMALI REGION DATABASE
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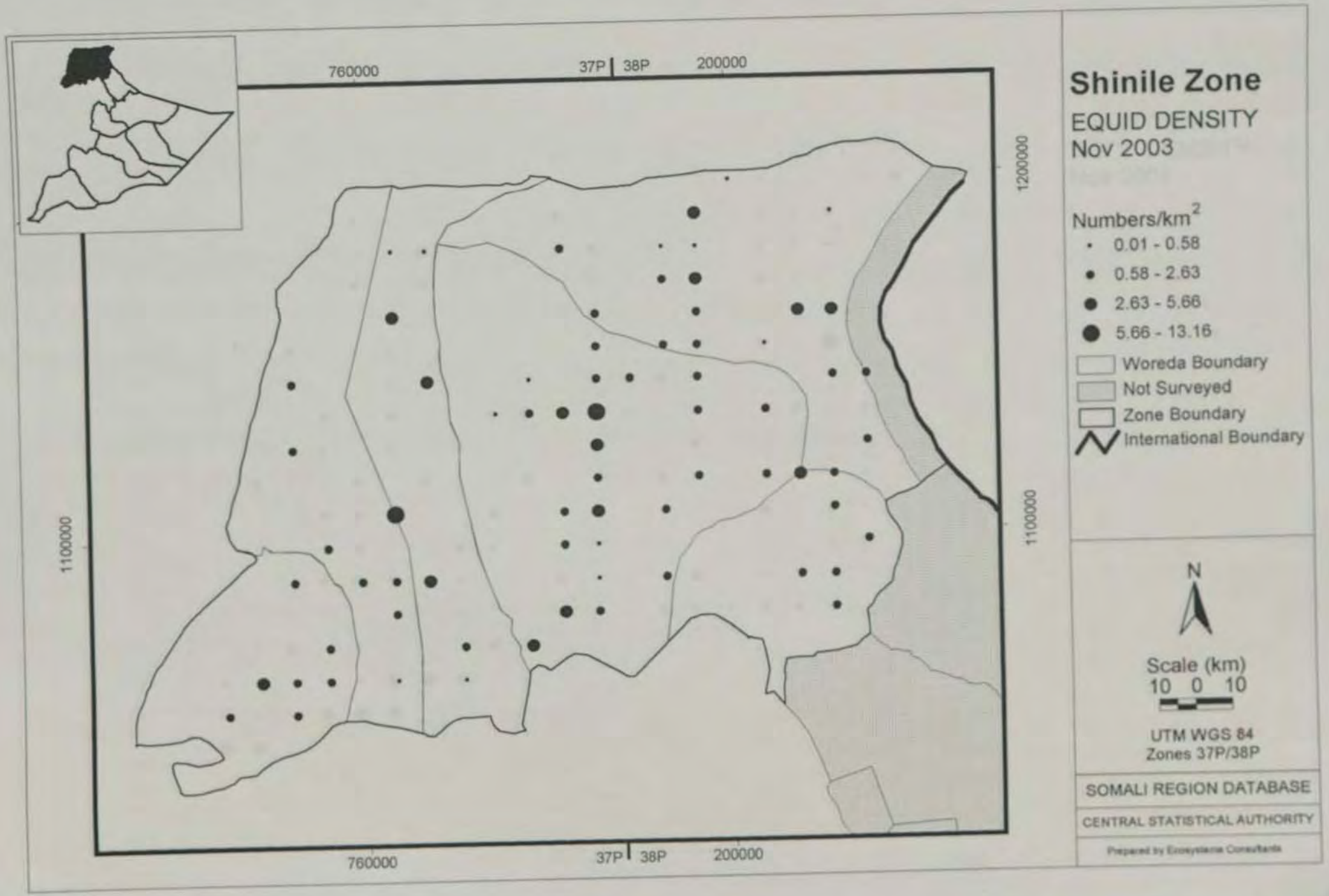
Shinile Zone
EQUID DENSITY
Nov 2003
Numbers/km2
0.01 - 0.58
0.58 - 2.63
2.63 - 5.66
5.66 - 13.16
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
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Zones 37P/38P
SOMALI REGION DATABASE
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37P 38P
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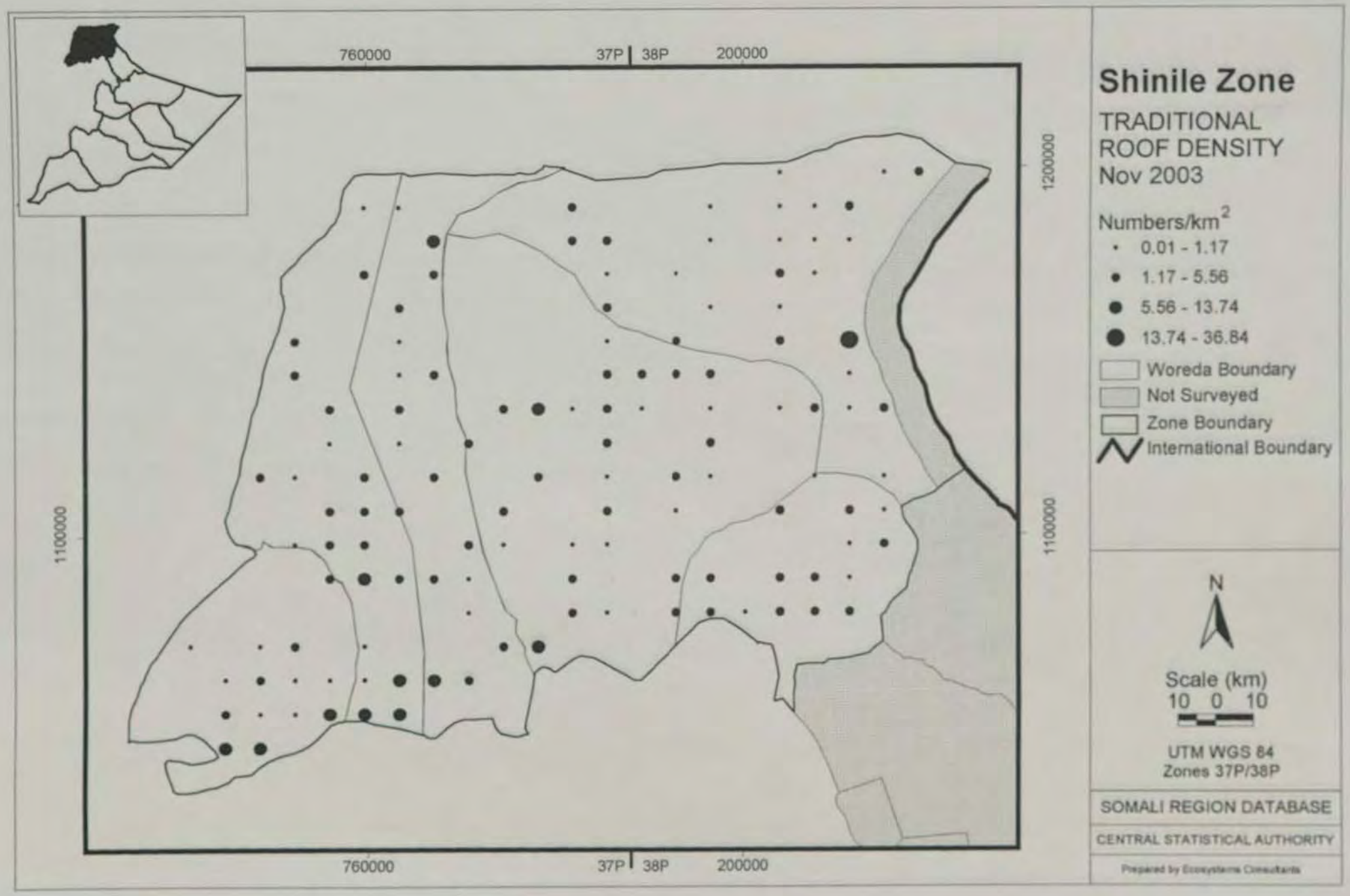
Shinile Zone
TRADITIONAL
ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 1.17
1.17 - 5.56
5.56 - 13.74
13.74 - 36.84
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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37P 38P
200000
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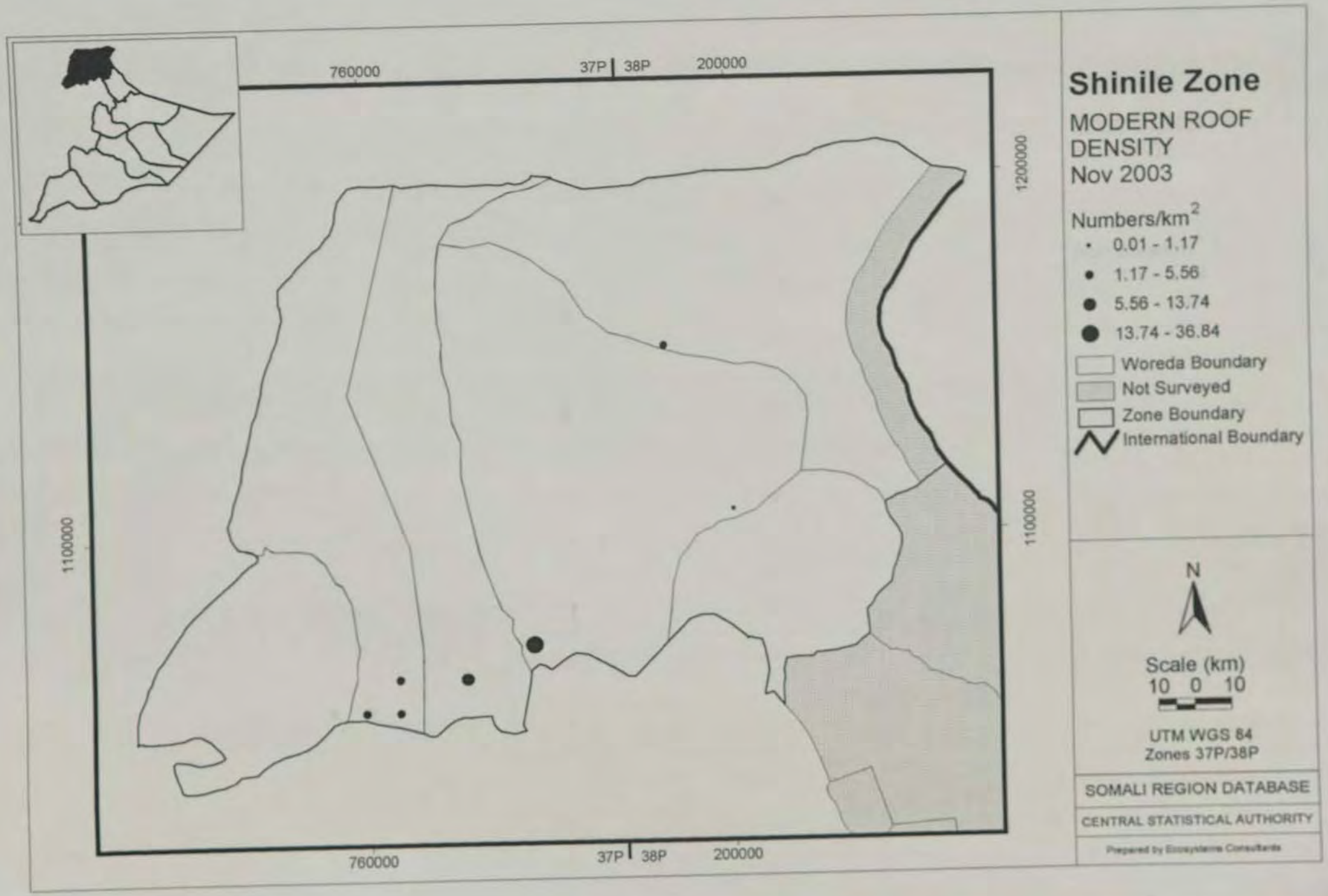
Shinile Zone
MODERN ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 1.17
1.17 - 5.56
5.56 - 13.74
13.74 - 36.84
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
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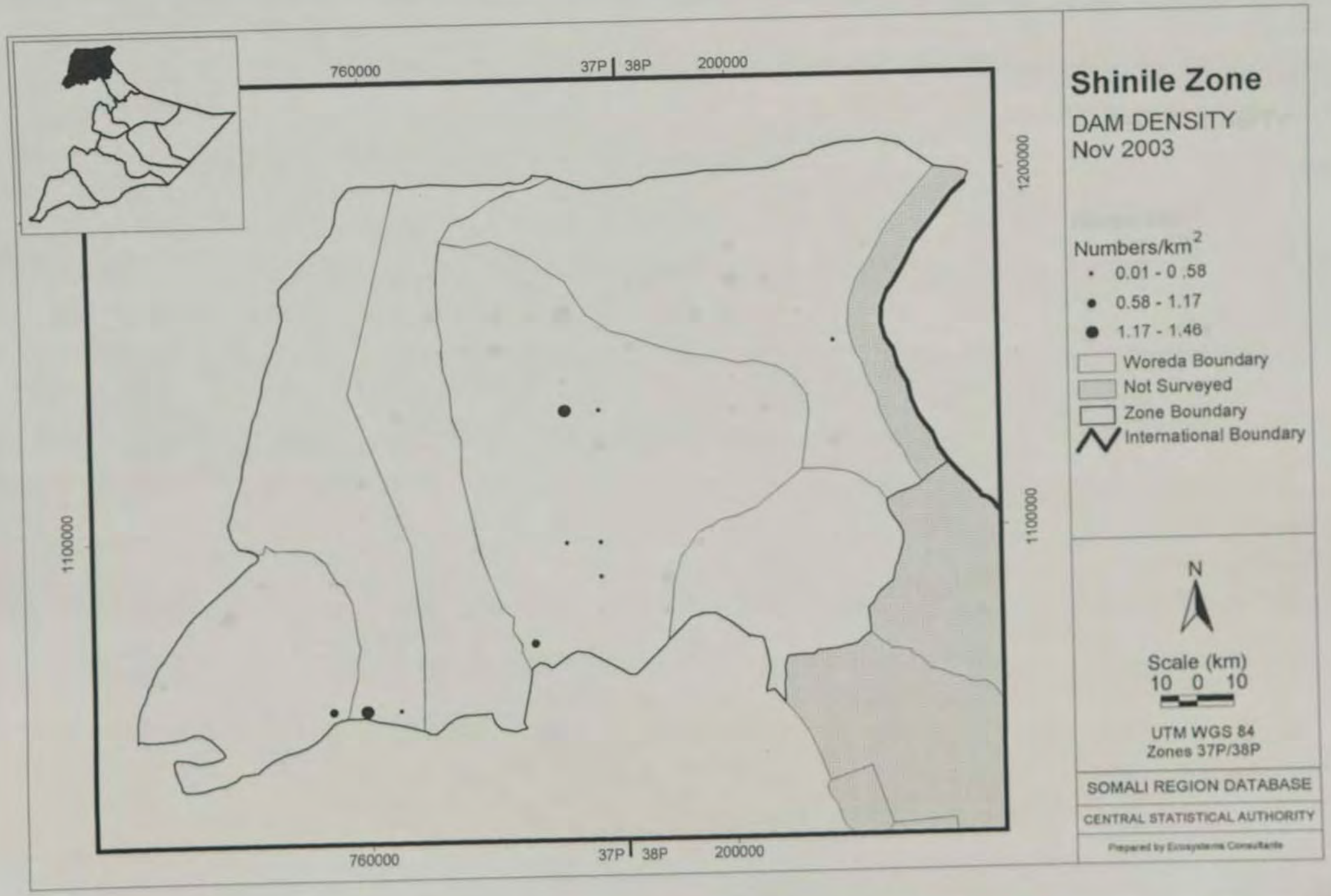
37P 38P
200000
1200000
1100000


Shinile Zone
DAM DENSITY
Nov 2003
Numbers/km2
0.01 - 0.58
0.58 - 1.17
1.17 - 1.46
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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37P
38P
200000
1200000
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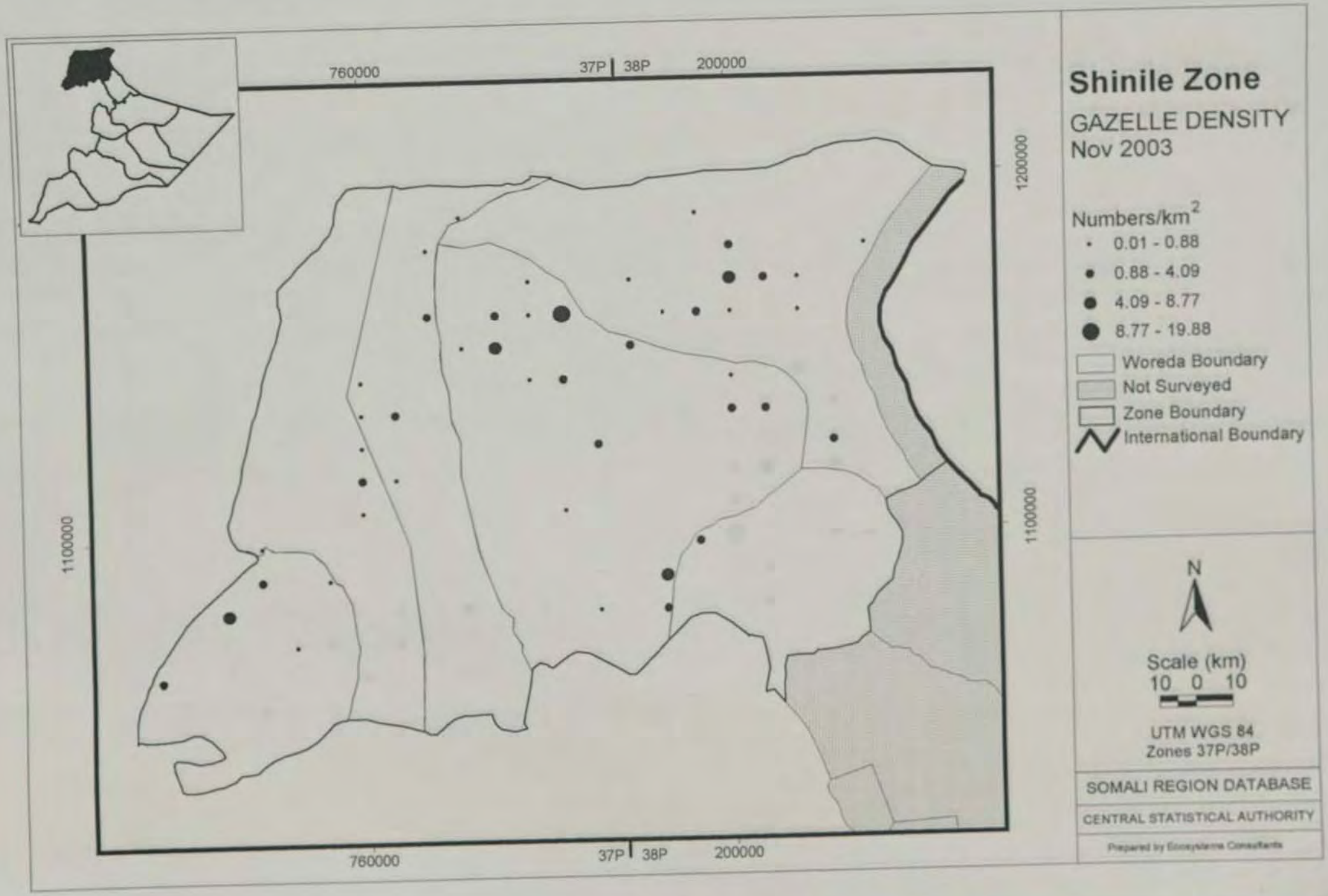
Shinile Zone
GAZELLE DENSITY
Nov 2003
Numbers/km2
0.01 - 0.88
0.88 - 4.09
4.09 - 8.77
8.77 - 19.88
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
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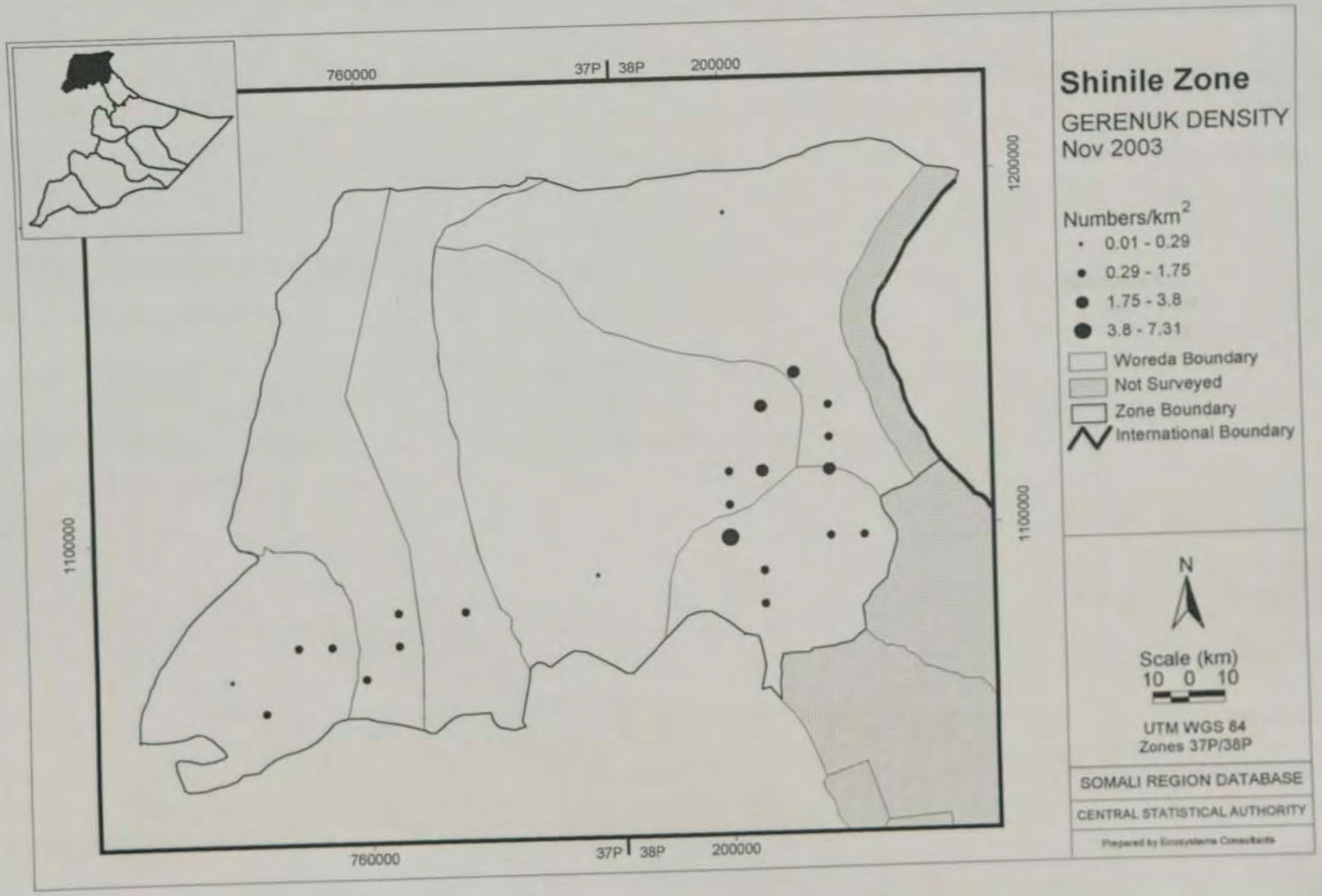
Shinile Zone
GERENUK DENSITY
Nov 2003
Numbers/km2
0.01 - 0.29
0.29 - 1.75
1.75 - 3.8
3.8 - 7.31
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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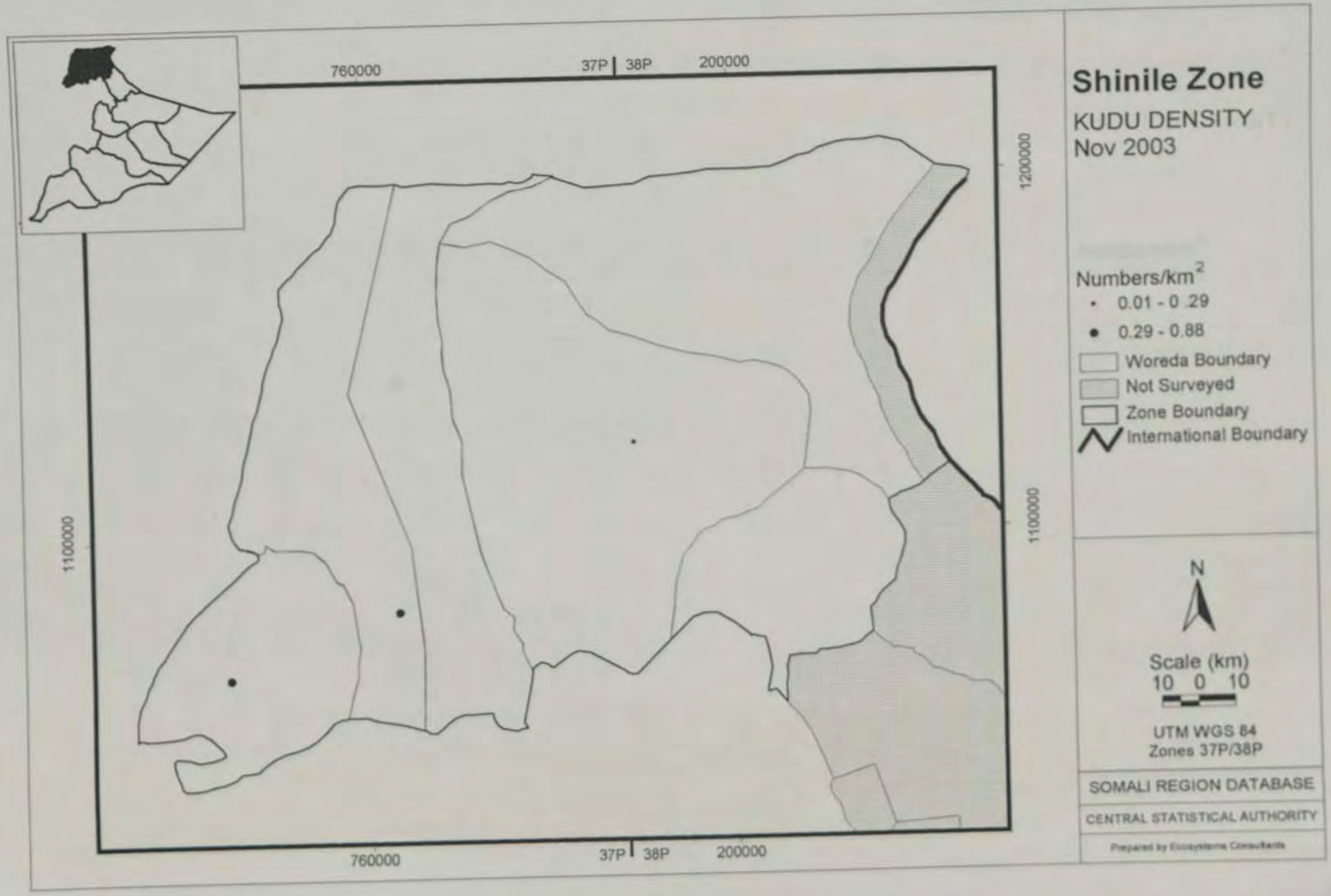
Shinile Zone
KUDU DENSITY
Nov 2003
Numbers/km2
0.01 - 0.29
0.29 - 0.88
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
760000
37P 38P
200000
1200000
1100000
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760000
37P 38P
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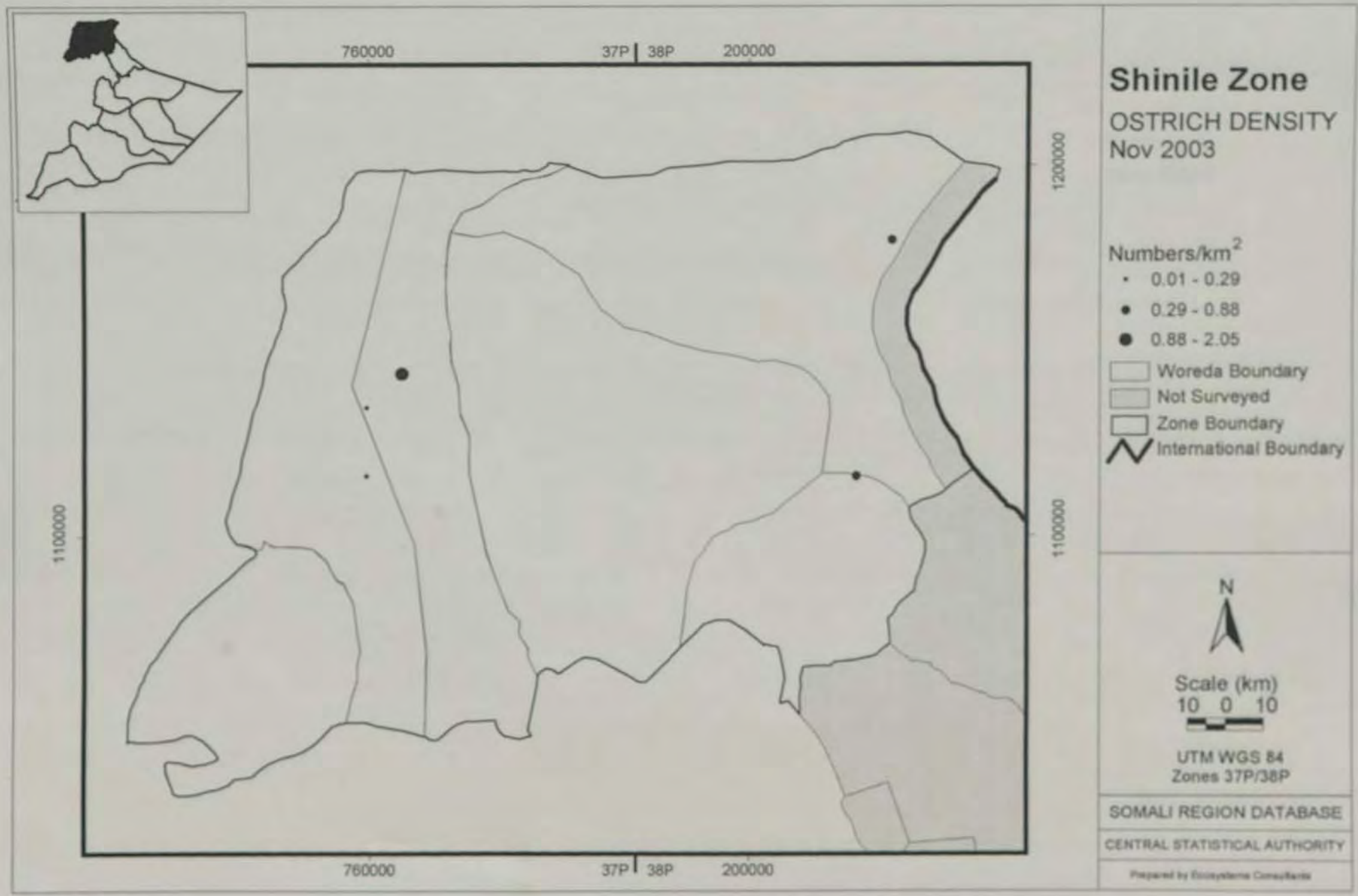
Shinile Zone
OSTRICH DENSITY
Nov 2003
Numbers/km2
0.01 - 0.29
0.29 - 0.88
0.88 - 2.05
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
760000
37P 38P
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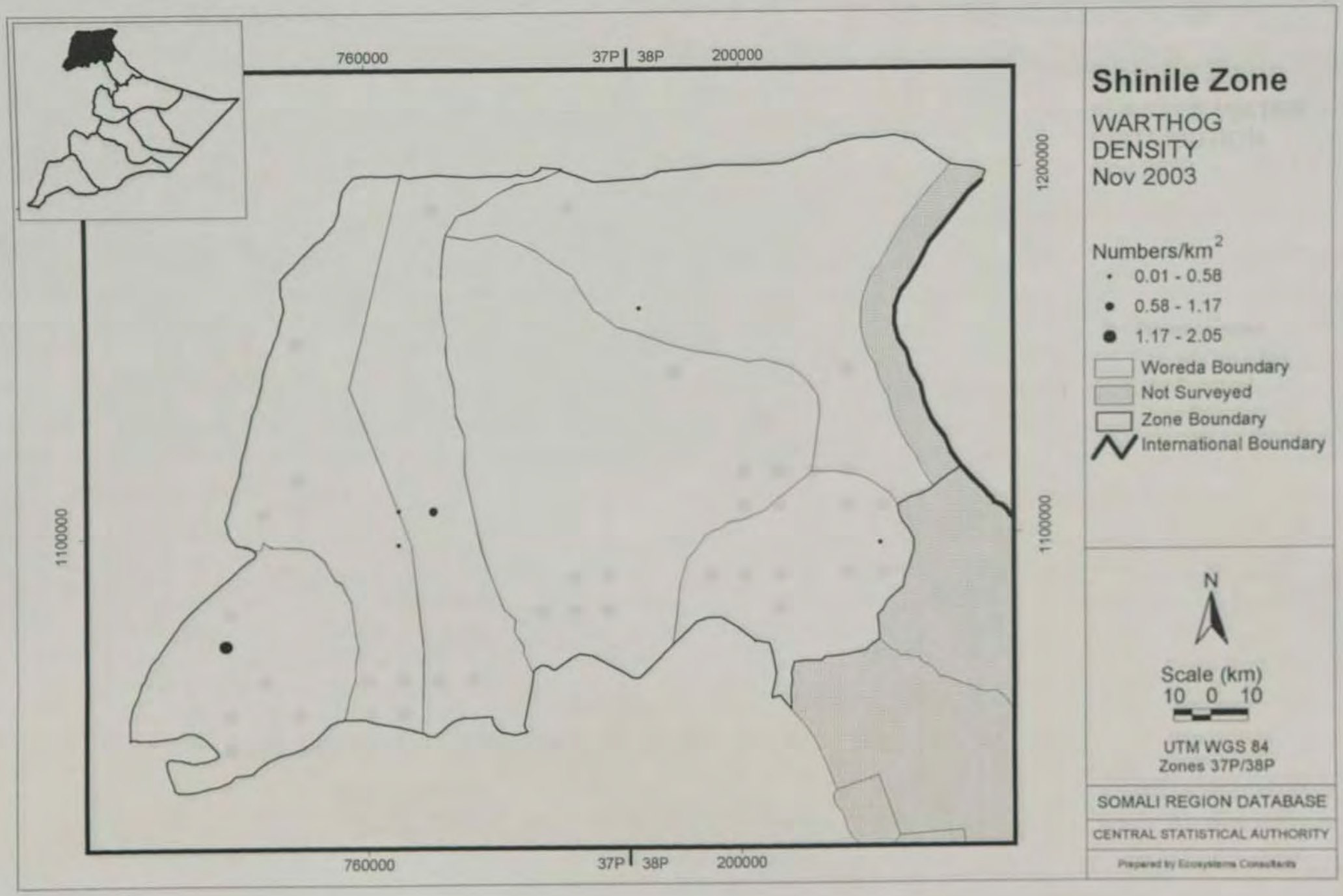
Shinile Zone
WARTHOG
DENSITY
Nov 2003
Numbers/km2
0.01 - 0.58
0.58 - 1.17
1.17 - 2.05
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
760000
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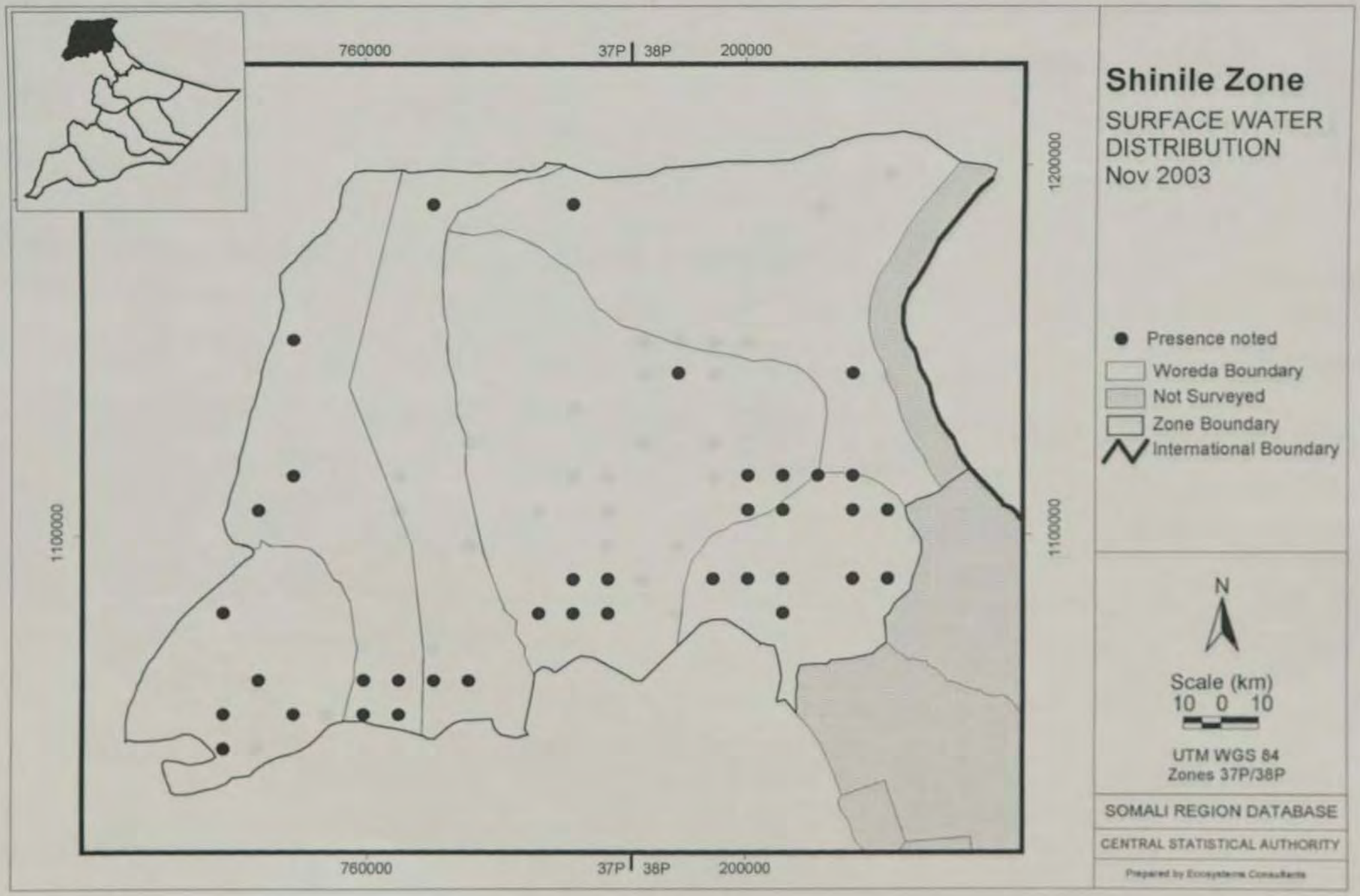
Shinile Zone
SURFACE WATER DISTRIBUTION
Nov 2003
760000
37P | 38P
200000
1200000
1100000
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
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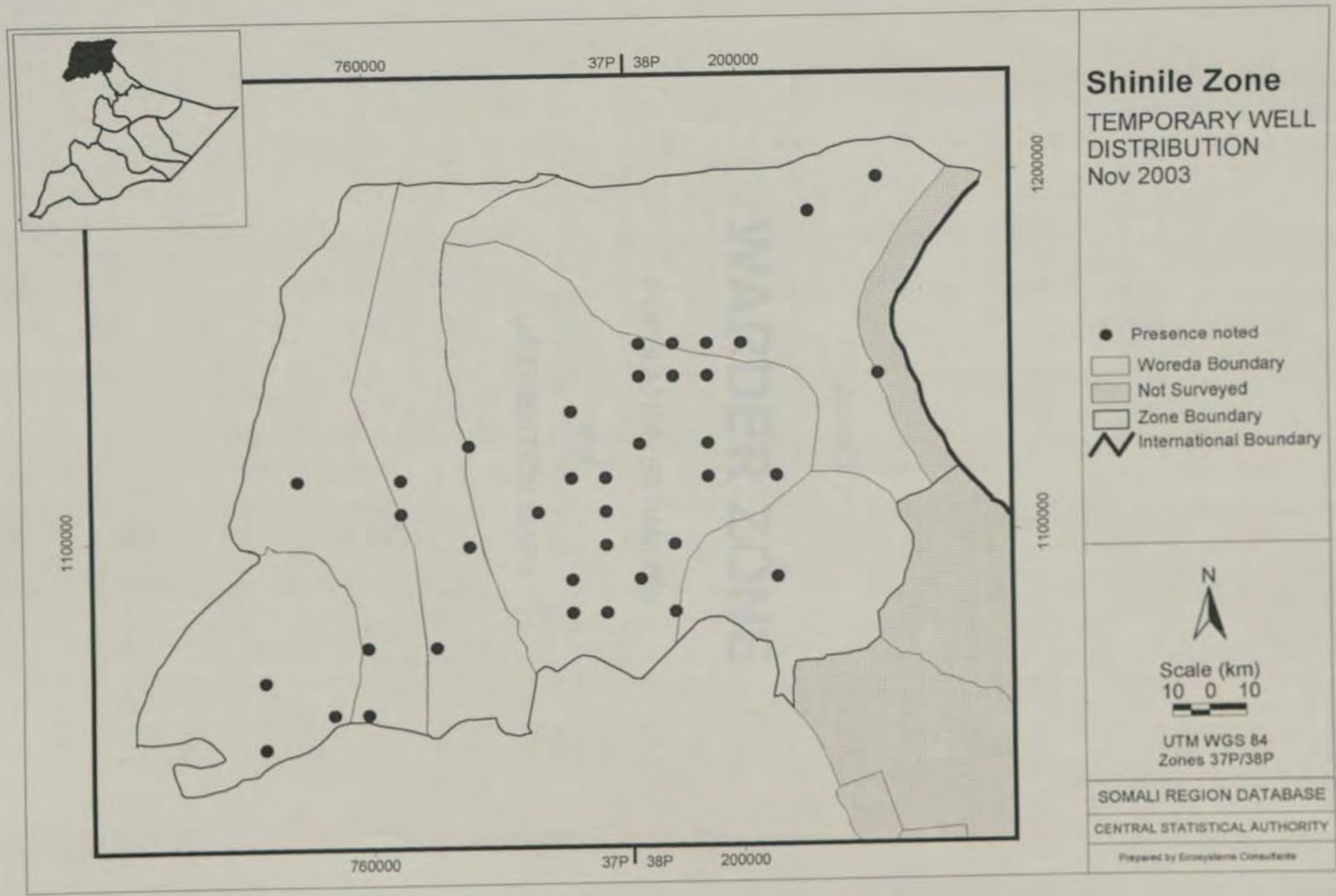
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants


Shinile Zone
TEMPORARY WELL DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
10 0 10
UTM WGS 84
Zones 37P/38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
760000
37P 38P
200000
1200000
1100000
1100000
760000
37P 38P
200000

ANNEX 7

WARDER ZONE

POPULATION ESTIMATES

and

DISTRIBUTION MAPS

Area: 52,423 km^2

Variable name	Population estimate	SE	CV	95% CL	
				Upper limit	Lower limit
Cattle	36,146	5,123	14	46,267	26,025
Sheep and goats	3,666,693	299,942	8	4,253,364	3,080,022
Camels	376,183	28,611	8	432,610	319,756
Equids	468	311	66	1,076	14
Traditional roofs	20,474	2,456	12	25,388	15,560
Modern roofs	1,840	594	32	2,999	681
Dams and birkas	5,286	678	13	6,608	3,965
Dibatag	335	168	50	667	10
Ostrich	34	28	82	90	1
Warthog	402	161	40	720	84
Livestock/roof ratio	199.3				

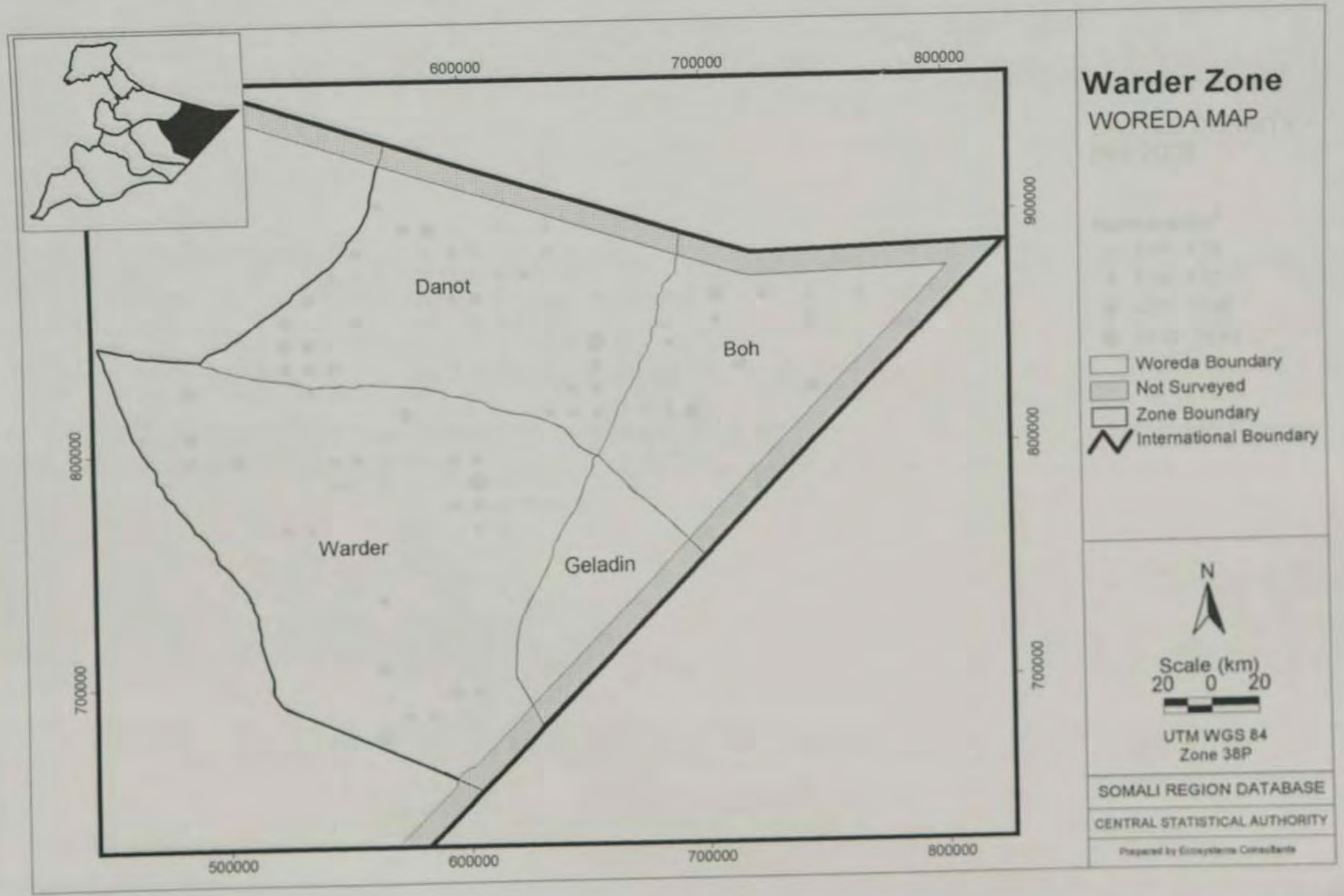
Warder has by far the highest livestock to pastoral dwelling ratio of any of the zones surveyed (see Table 4 in the main text). However, these results may be anomalous in that they could be explained by a (presumably temporary) influx of migrants. The zone holds a relatively large number of birkas which are features one would assume to be associated with permanent residents, but only 17% of sheep and goat observations took place in grid squares in which birkas were noted. The observers also noted that many large herds were seen in areas apparently devoid of habitation, and that a high proportion of the dwellings seen appeared new. All this suggests many of the livestock could have been non-resident visitors (presumably from Somalia), but only a repeat survey is likely to prove this one way or the other.

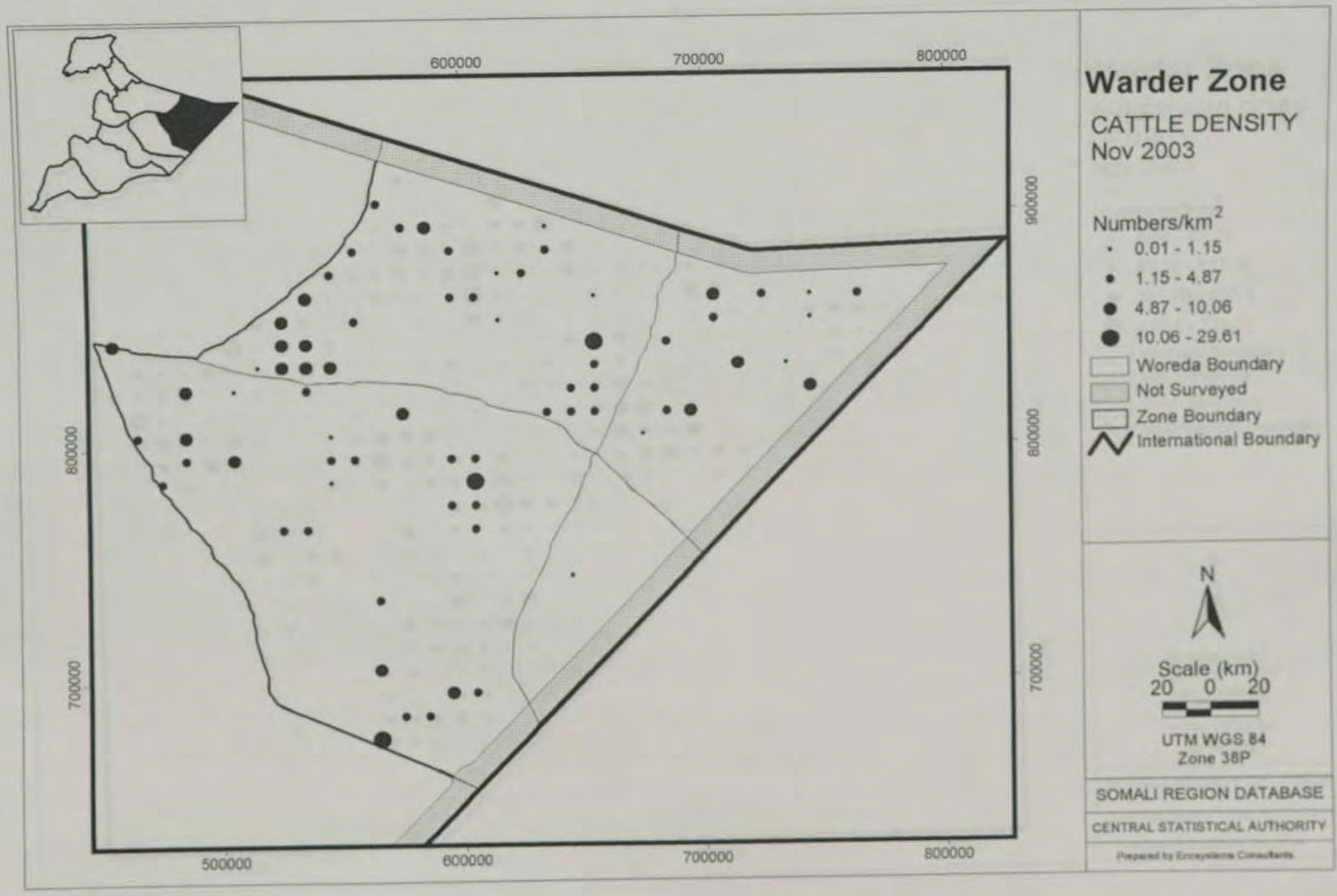
DISTRIBUTION OF CATTLE BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	36146	100	8935	24.72	27211	75.28
Under 6 month	6412	17.74	2946	8.15	3466	9.59
6 months – under 1 year	3777	10.45	1659	4.59	2118	5.86
1 year – under 2 years	6094	16.86	2270	6.28	3824	10.58
2 years and older	18225	50.42	1930	5.34	16295	45.08
10 years and above	1637	4.53	130	0.36	1507	4.17

DISTRIBUTIONS OF SHEEP AND GOATS BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Sheep and Goats	3666693	100	1016407	27.72	2650286	72.28
Total Sheep	2253550	61.46	598038	16.31	1655512	45.15
Under 6 month	475203	12.96	202768	5.53	272435	7.43
6 months – under 1 year	251168	6.85	94601	2.58	156568	4.27
1 year – under 2 years	339169	9.25	104134	2.84	235035	6.41
2 years and older	1187642	32.39	196168	5.35	991474	27.04
Total Goats	1413143	38.54	418370	11.41	994774	27.13
Under 6 month	272069	7.42	119168	3.25	152901	4.17
6 months – under 1 year	156568	4.27	59034	1.61	97534	2.66
1 year – under 2 years	202035	5.51	78467	2.14	123568	3.37
2 years and older	782472	21.34	161701	4.41	620771	16.93

DISTRIBUTION OF CAMELS BY AGE AND SEX 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
Total	376183	100	83889	22.3	292294	77.7
Under 4 years	108867	28.94	37581	9.99	71287	18.95
4 years and older	267316	71.06	46308	12.31	221008	58.75

DISTRIBUTIONS OF HORSES, ASSES & MULES BY SEX AND AGE 2003(1996 E.C)						
	Total		Male		Female	
Age	Number	%	Number	%	Number	%
All Equids	468	100	201	43	267	57
Total Horses	1	0.36	1	0.27	0	0.09
Under 3 years	0	0	0	0	0	0
3 years and older	1	0.36	1	0.27	0	0.09
Total Asses	460	98.2	197	42.19	262	56.01
Under 3 years	137	29.26	77	16.43	60	12.83
3 years and older	323	68.94	121	25.76	202	43.18
Total Mules	7	1.44	3	0.54	4	0.9
Under 3 years	2	0.45	2	0.36	0	0.09
3 years and older	5	0.99	1	0.18	4	0.81


Warder Zone
WOREDA MAP
Danot
Boh
Warder
Geladin
600000
700000
800000
900000
800000
700000
500000
600000
700000
800000
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY


Warder Zone
CATTLE DENSITY
Nov 2003
Numbers/km2
0.01 - 1.15
1.15 - 4.87
4.87 - 10.06
10.06 - 29.61
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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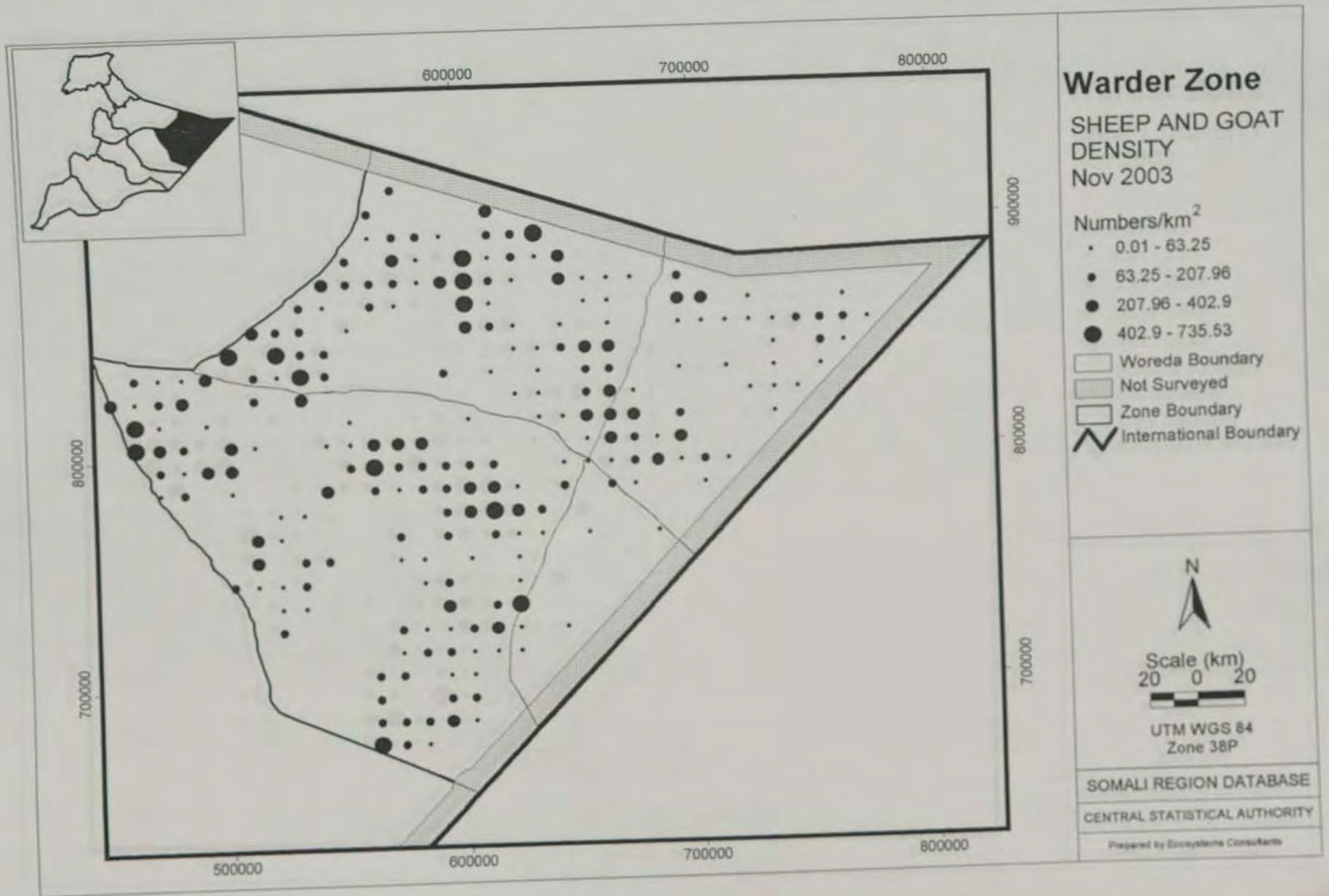
700000
800000
900000
800000
700000
500000
600000
700000
800000


Warder Zone
SHEEP AND GOAT DENSITY
Nov 2003
Numbers/km2
0.01 - 63.25
63.25 - 207.96
207.96 - 402.9
402.9 - 735.53
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
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700000
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800000
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500000
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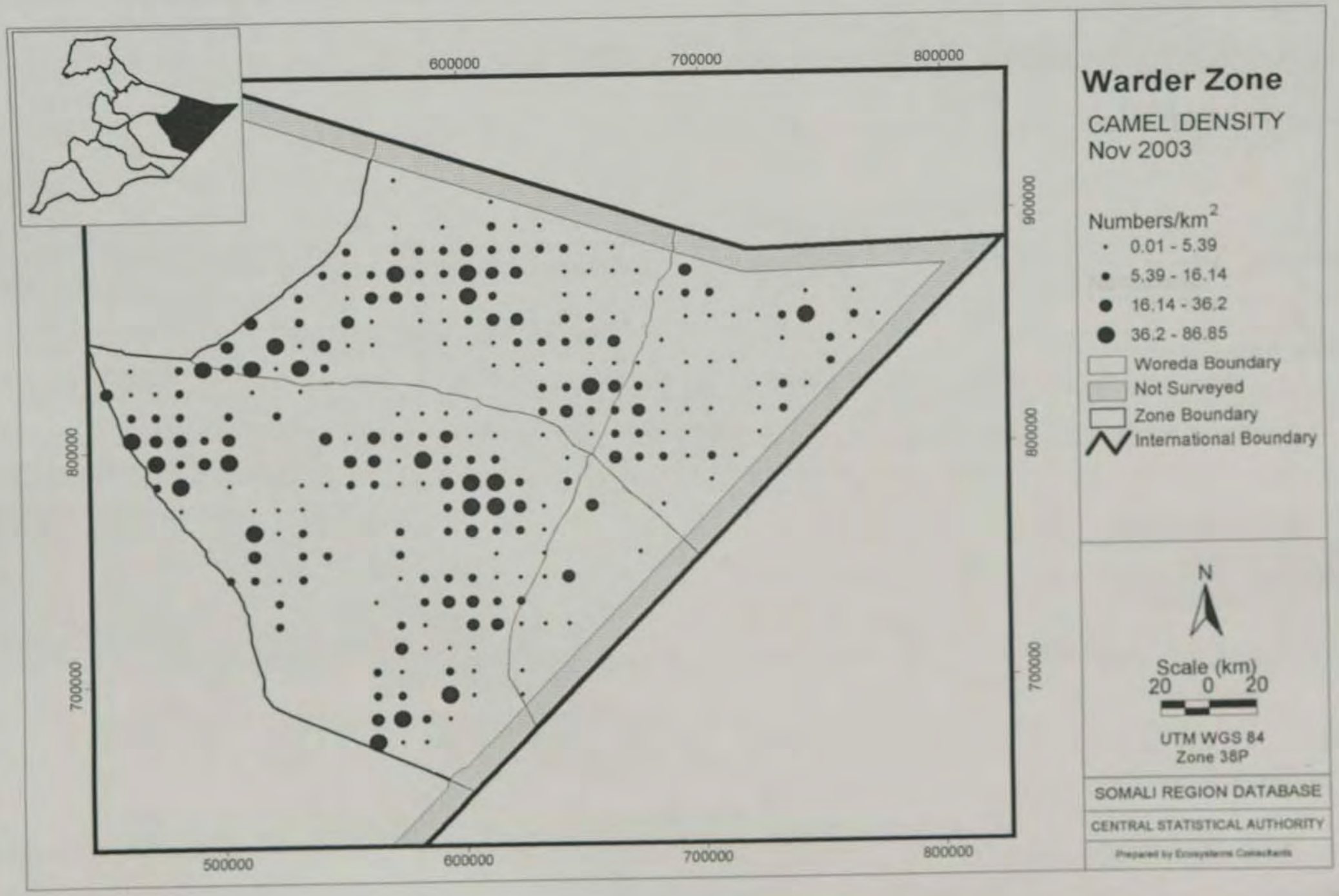
800000


Warder Zone
CAMEL DENSITY
Nov 2003
Numbers/km2
0.01 - 5.39
5.39 - 16.14
16.14 - 36.2
36.2 - 86.85
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
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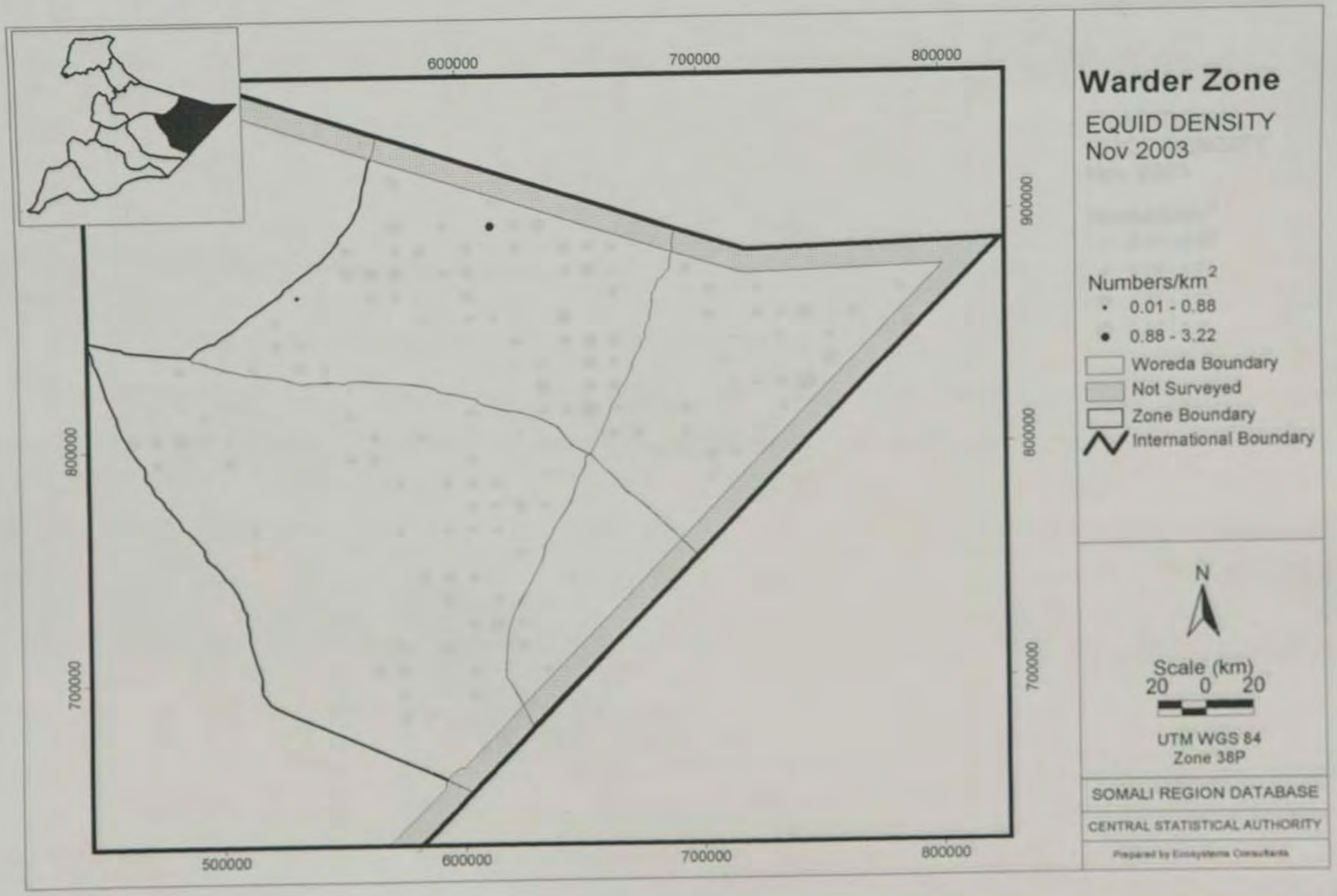
Warder Zone
EQUID DENSITY
Nov 2003
Numbers/km2
0.01 - 0.88
0.88 - 3.22
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
600000
700000
800000
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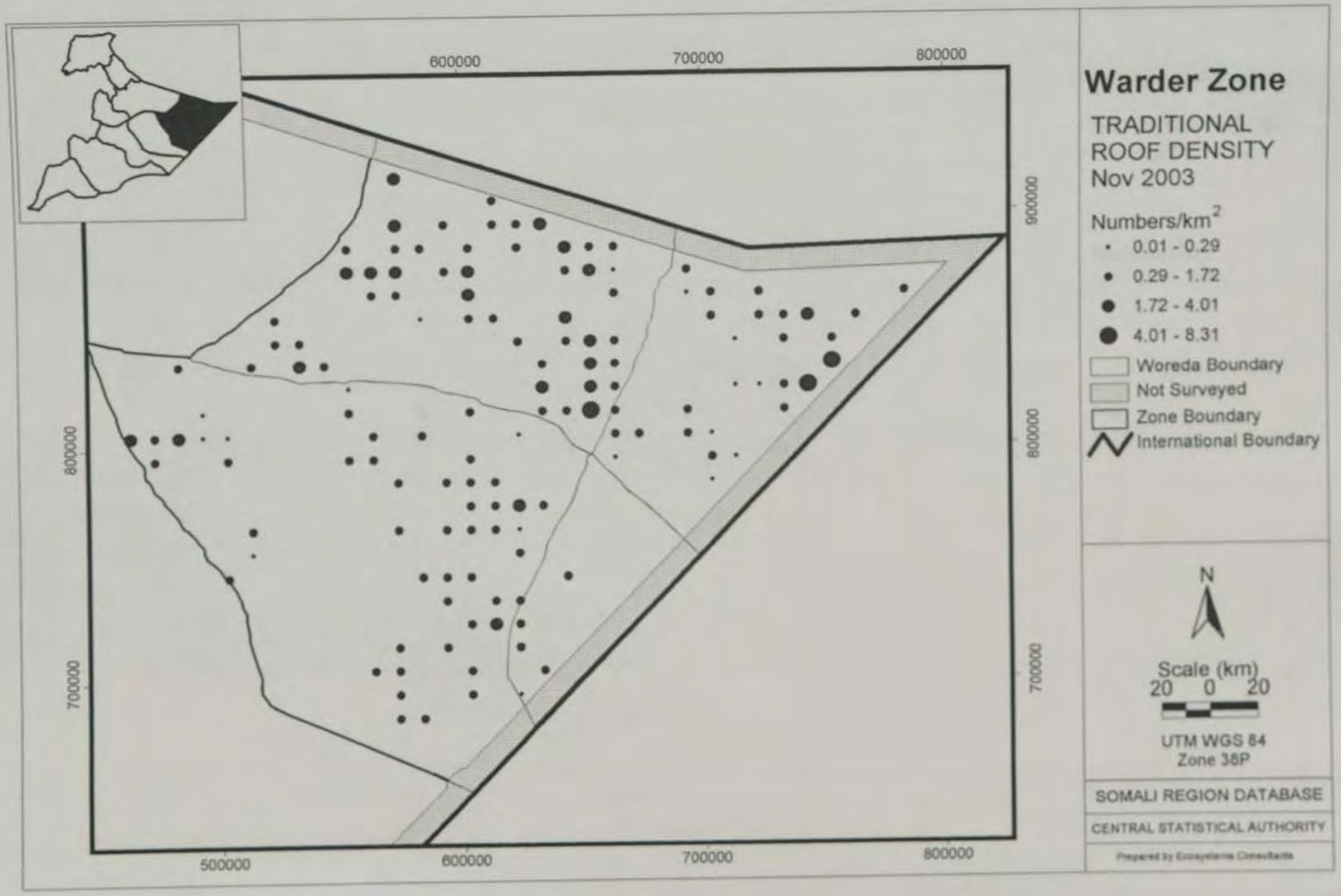
Warder Zone
TRADITIONAL
ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 0.29
0.29 - 1.72
1.72 - 4.01
4.01 - 8.31
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
600000
700000
800000
900000
800000
700000
500000
600000
700000
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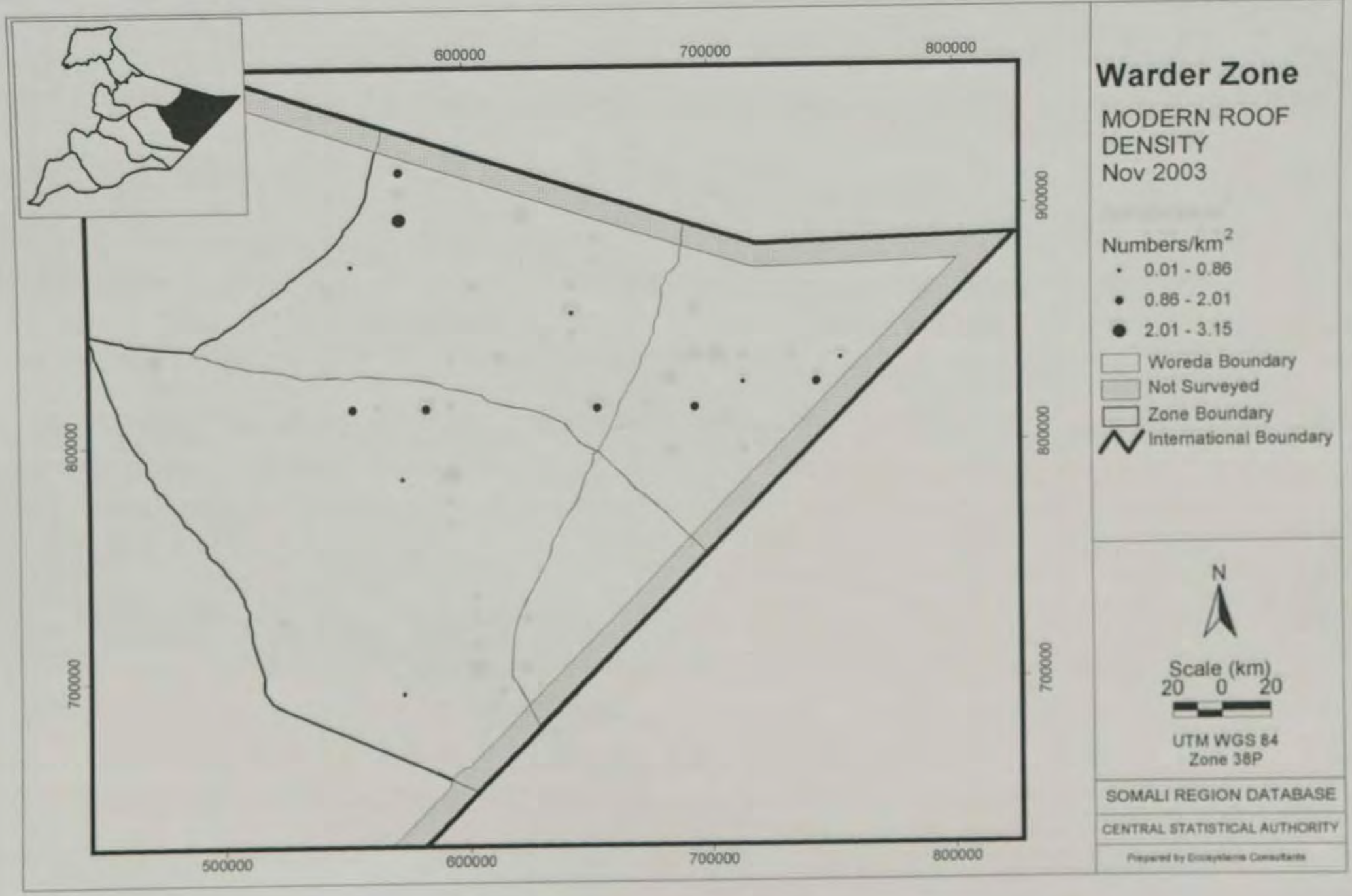
700000


Warder Zone
MODERN ROOF DENSITY
Nov 2003
Numbers/km2
0.01 - 0.86
0.86 - 2.01
2.01 - 3.15
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
600000
700000
800000
500000
900000
800000
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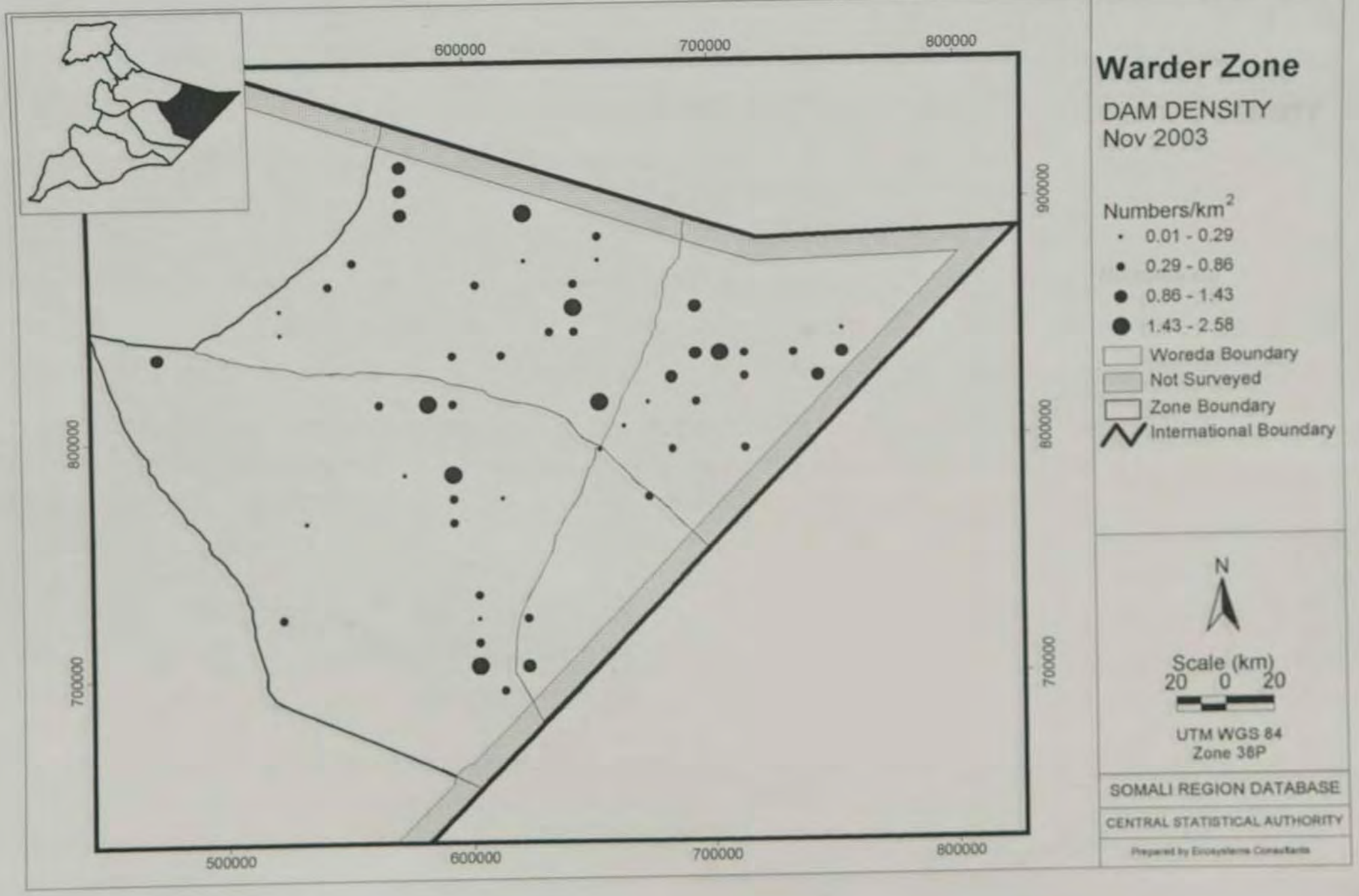
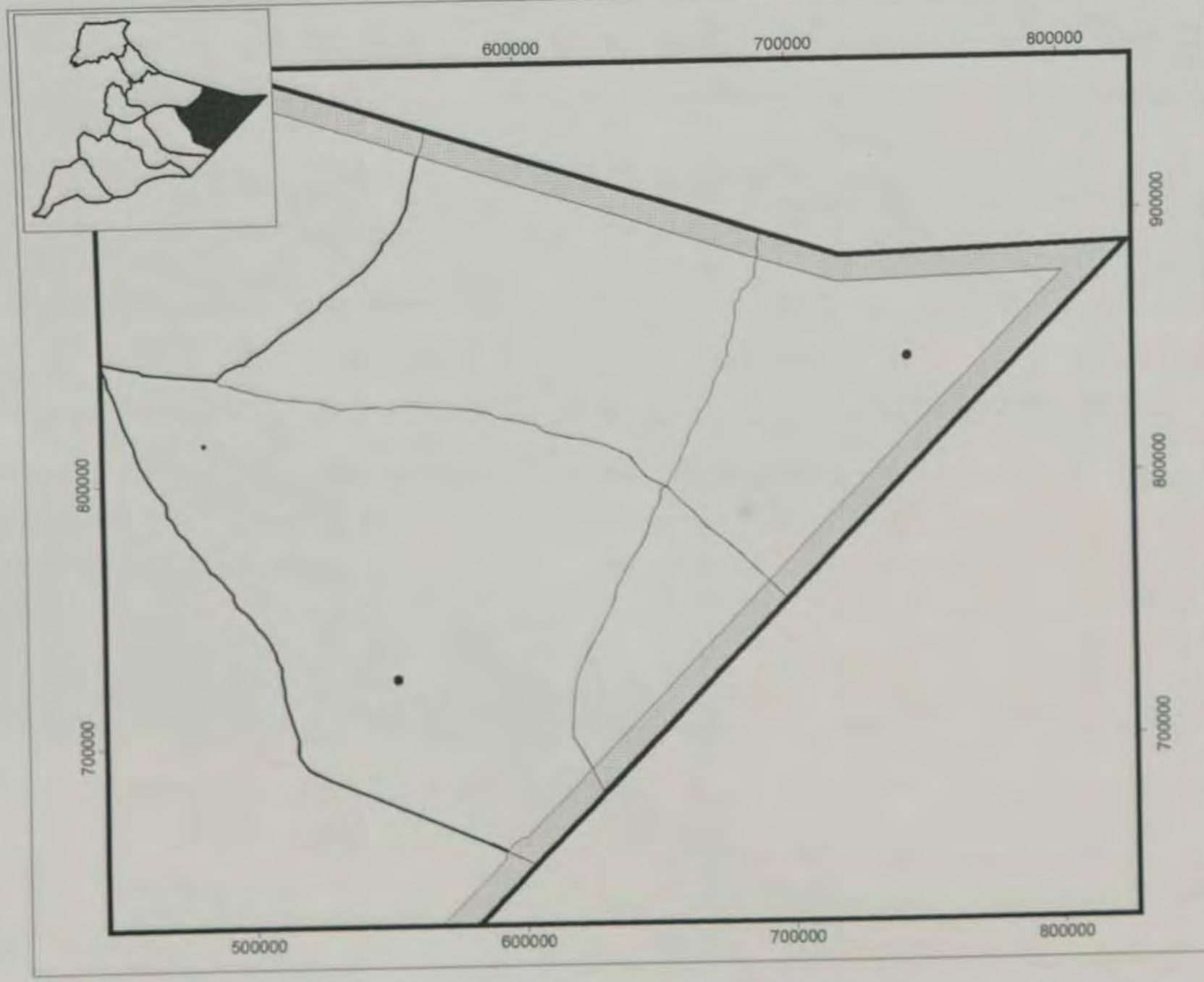

Warder Zone
DAM DENSITY
Nov 2003
Numbers/km2
0.01 - 0.29
0.29 - 0.86
0.86 - 1.43
1.43 - 2.58
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
Prepared by Ecosystems Consultants
600000
700000
800000
900000
500000



Warder Zone

DIBATAG DENSITY
Nov 2003

Numbers/km^2

- 0.01 - 0.57
- 0.57 - 1.15

Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary

N

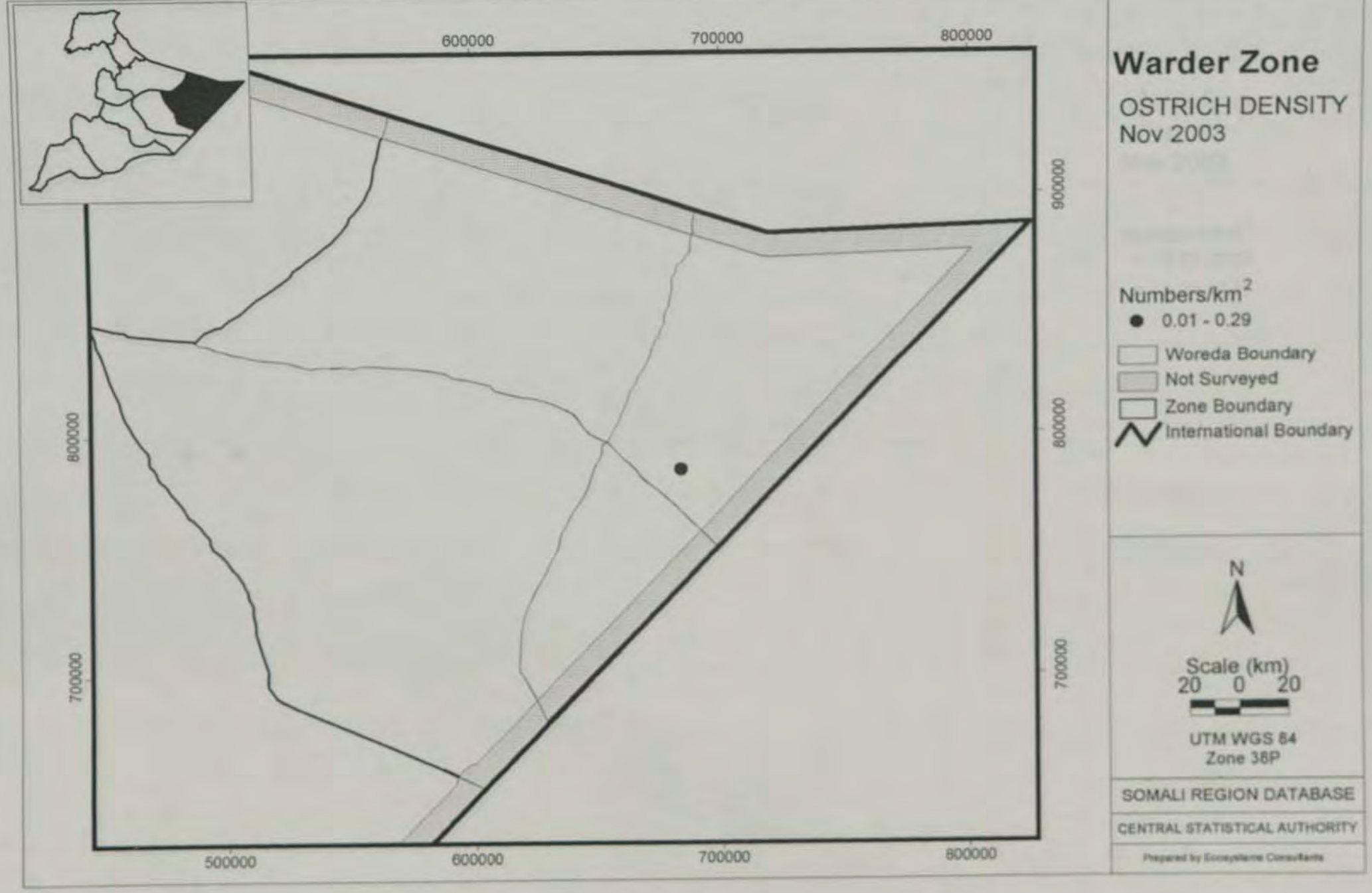
Scale (km)
20 0 20

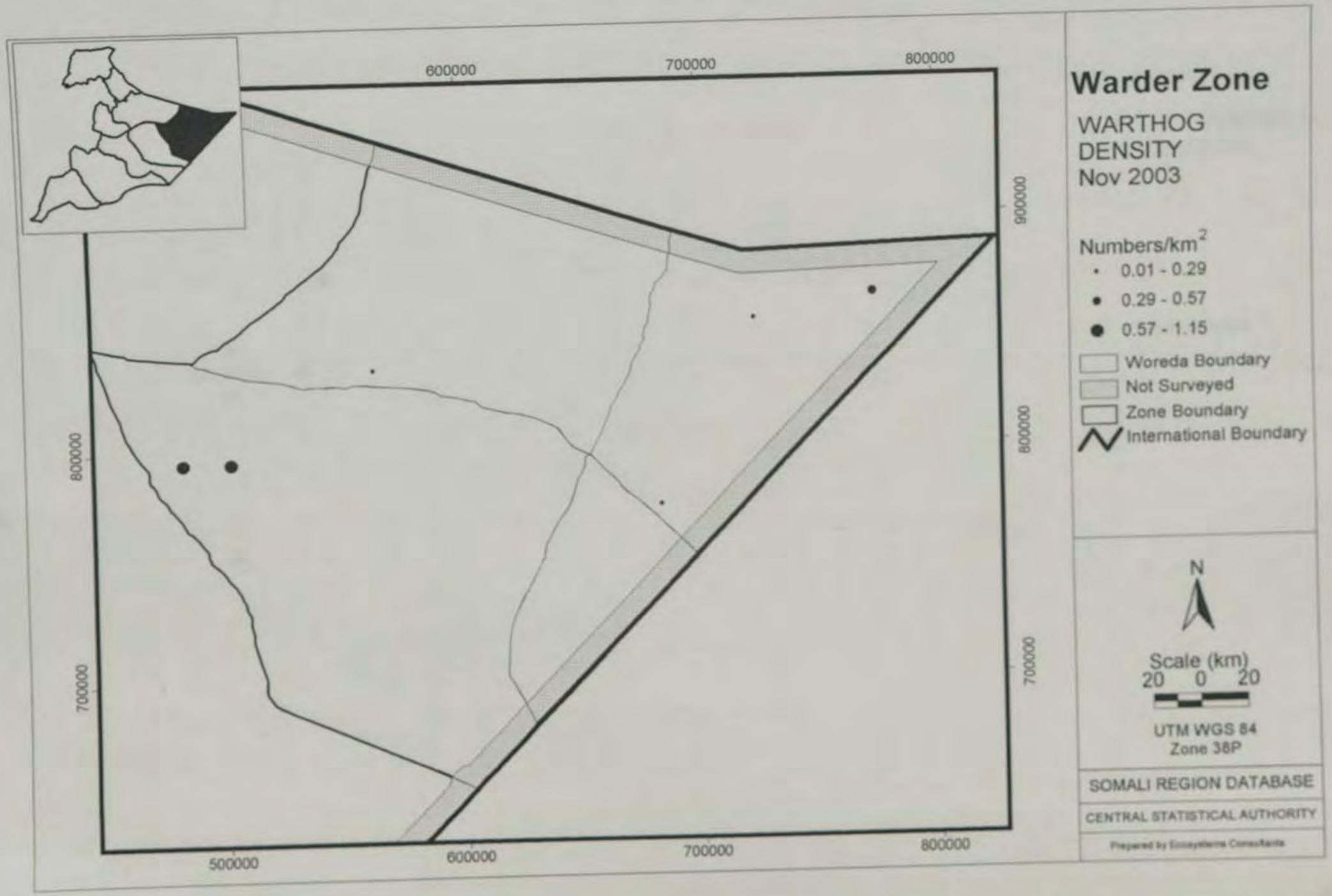
UTM WGS 84
Zone 38P

SOMALI REGION DATABASE

CENTRAL STATISTICAL AUTHORITY

Prepared by Ecosystems Consultants


Warder Zone
OSTRICH DENSITY
Nov 2003
Numbers/km2
0.01 - 0.29
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
600000
700000
800000
900000
500000


Warder Zone
WARTHOG
DENSITY
Nov 2003
Numbers/km2
0.01 - 0.29
0.29 - 0.57
0.57 - 1.15
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
600000
700000
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900000
800000
700000
500000
600000
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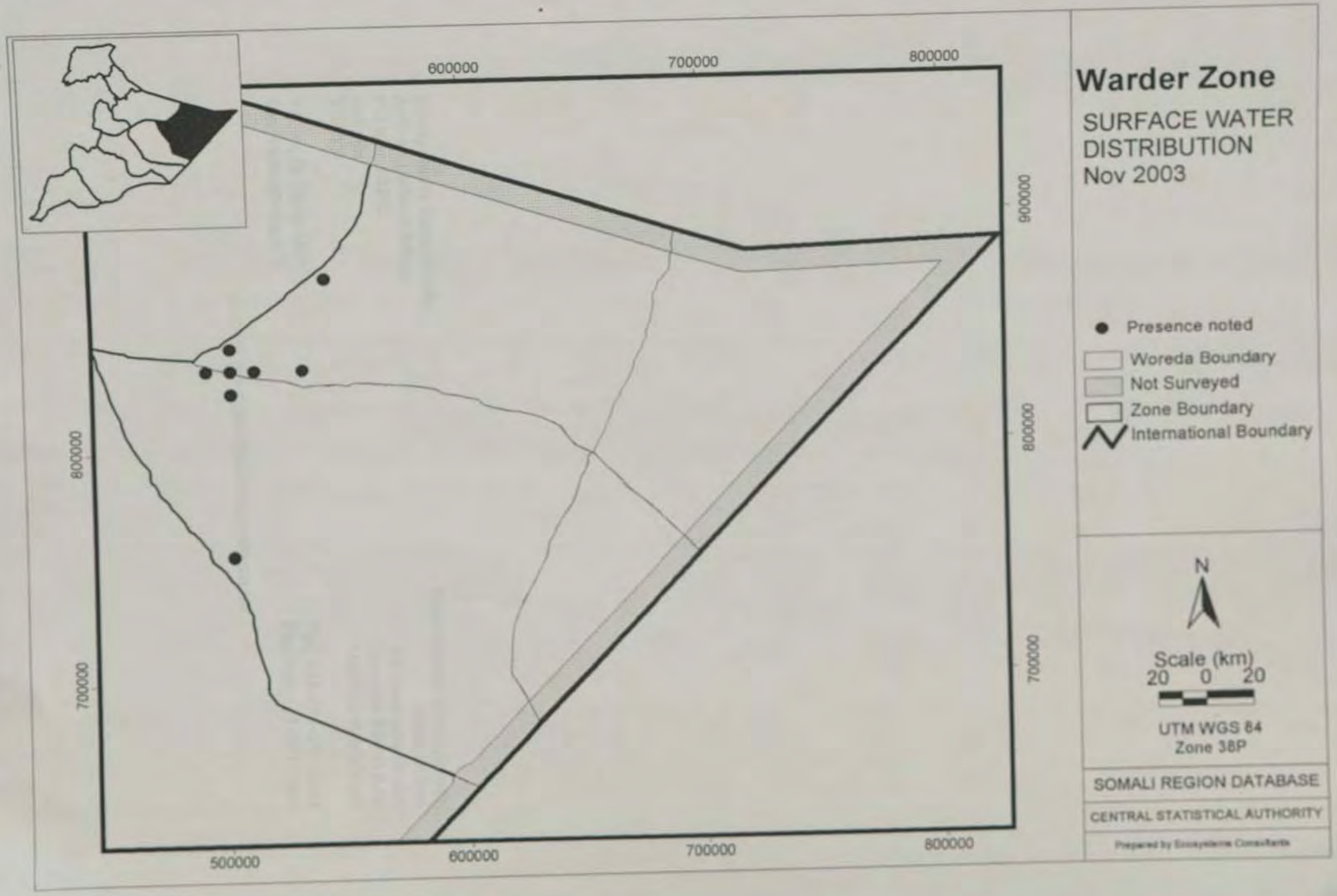
Warder Zone
SURFACE WATER DISTRIBUTION
Nov 2003
Presence noted
Woreda Boundary
Not Surveyed
Zone Boundary
International Boundary
N
Scale (km)
20 0 20
UTM WGS 84
Zone 38P
SOMALI REGION DATABASE
CENTRAL STATISTICAL AUTHORITY
600000
700000
800000
500000
900000