- OTHER Data Products No 1 -

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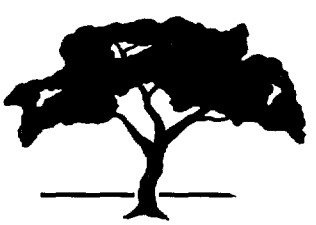


JESS *Juba Environmental and Socioeconomic Studies*

Daraasaadka Dooxada Jubba

A project of

Ministry of Juba Valley Development
U S Agency for International Development
Associates in Rural Development Inc

PN-ABK-554

JESS

FINAL REPORT MAPS

2

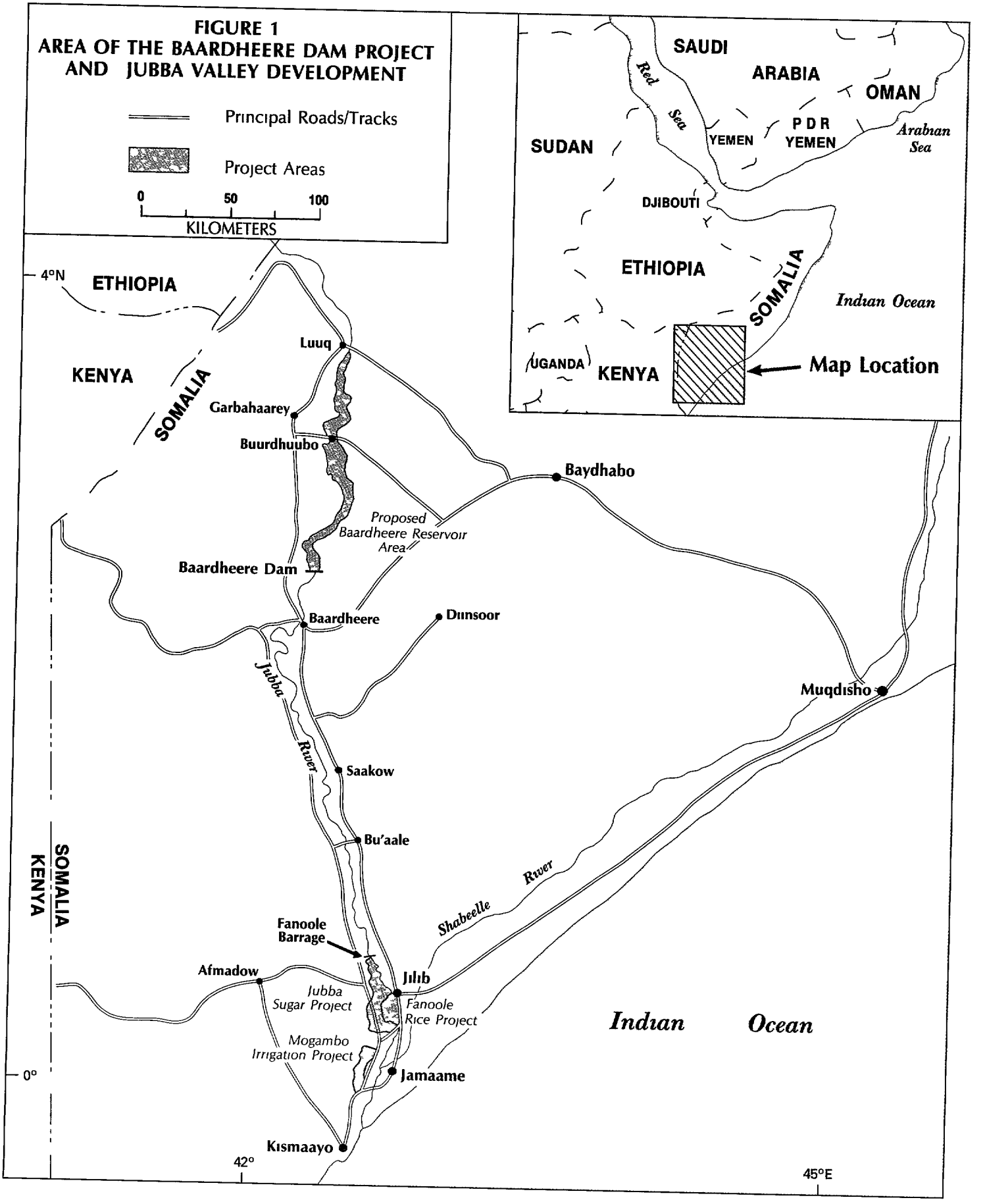


FIGURE 1
AREA OF THE BAARDHEERE DAM PROJECT
AND JUBBA VALLEY DEVELOPMENT
Principal Roads/Tracks
Project Areas
0
50
100
KILOMETERS
SAUDI
ARABIA
OMAN
Red
Sea
SUDAN
YEMEN
P D R
YEMEN
Arabian
Sea
DJIBOUTI
ETHIOPIA
SOMALIA
Indian Ocean
UGANDA
KENYA
Map Location
4°N
ETHIOPIA
KENYA
SOMALIA
Luuq
Garbahaarey
Buurdhuubo
Baydhabo
Proposed
Baardheere Reservoir
Area
Baardheere Dam
Baardheere
Diinsoor
Jubba
River
Muqdisho
Saakow
Bu'aale
SOMALIA
KENYA
Shabeelle
River
Fanoole
Barrage
Afmadow
Jilib
Jubba
Sugar Project
Fanoole
Rice Project
Indian
Ocean
Mogambo
Irrigation Project
0°
Jamaame
Kismaayo
42°
45°E

TEBS MAP #1
TEBS STUDY AREA

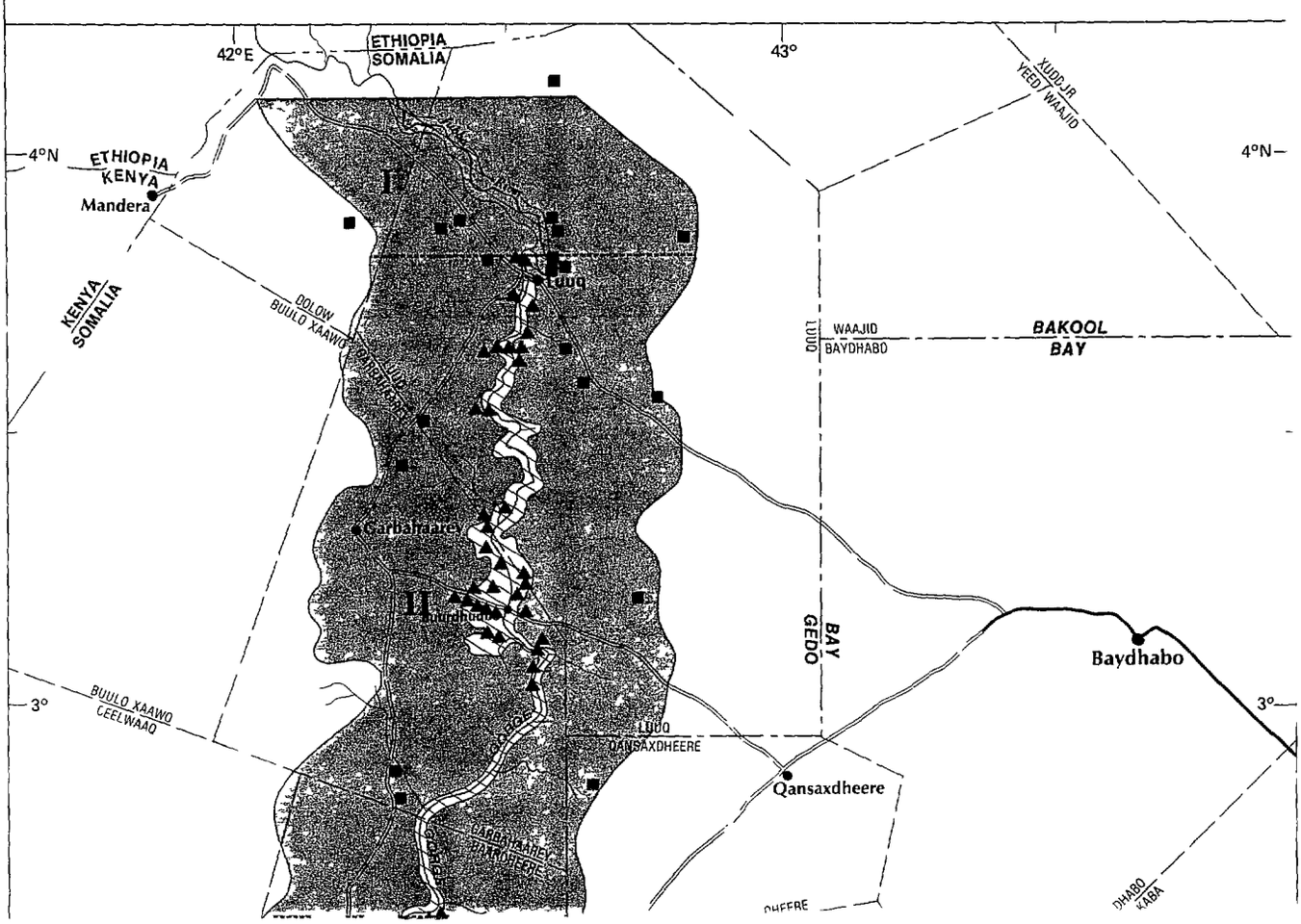
0 5 10 20 30 40 50
SCALE IN KILOMETERS
R F = 1 1 000 000

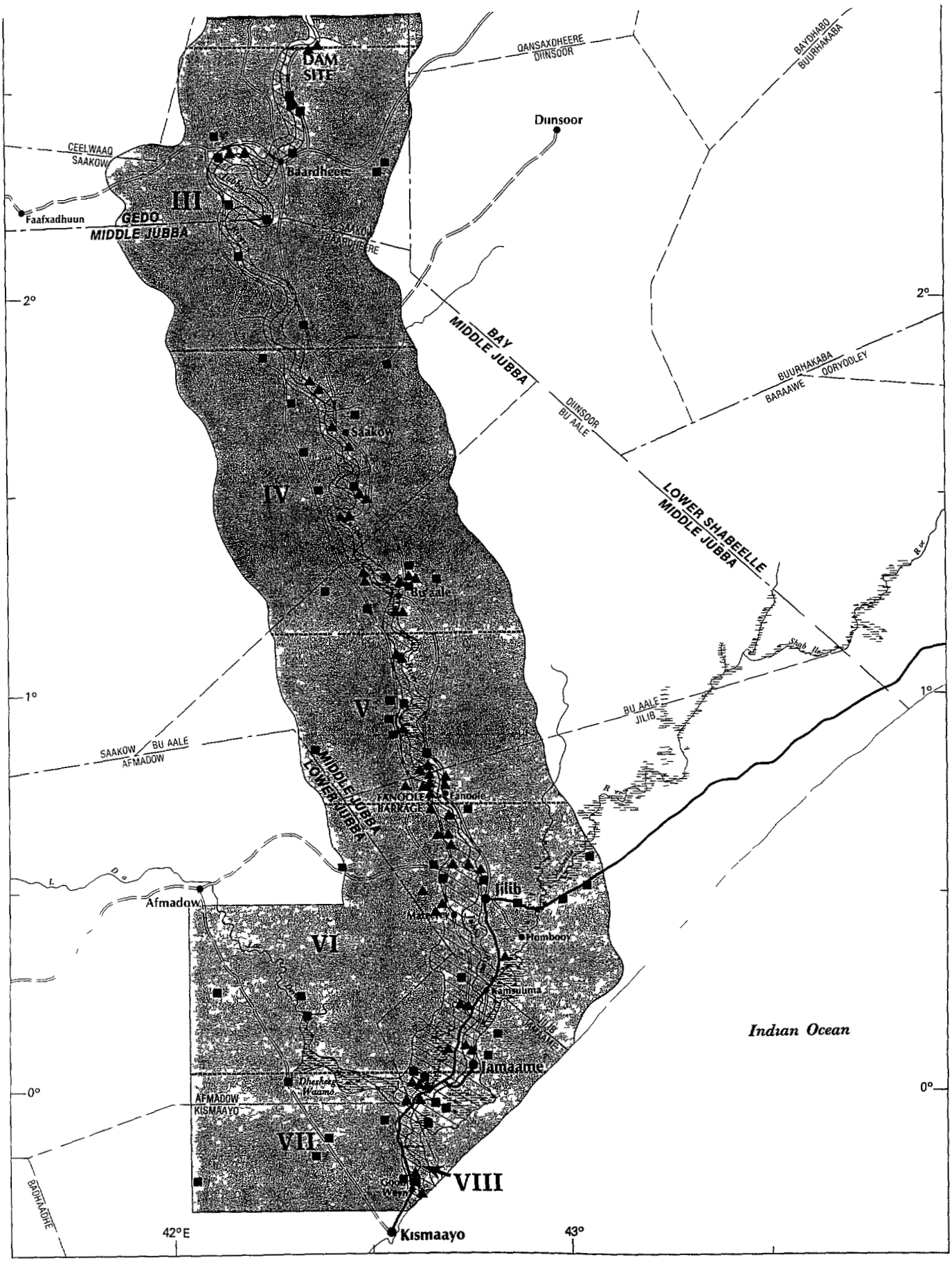
LEGEND

- Surfaced Roads (Tarmac)
- Maintained Dirt Roads
- Bush Tracks (Alignment Approximate)
- Wetlands
- Inundation Area of Dam
- District Boundary
- Regional Boundary
- Floodplain
- River Dependent Zone
- IV River Section
- River Section Boundary

Vegetation Ground Monitoring Sites

- ▲ TEBS S tes (IESS)
- ■ Southern Rangeland Survey Sites (Watson and Nimmo Resource Management and Research 1985)




DAM SITE
QANSAXDHEERE
DIINSOOR
BAYDHABO
BUURHAKABA
Dunsoor
CEELWAAQ
SAAKOW
Baardheere
III
Faafxadhuun
GEDO
MIDDLE JUBBA
SAAKOW
BAARDHEERE
2°
BAY
MIDDLE JUBBA
BUURHAKABA
BARAAWE
OORYOOLEY
DIINSOOR
BU AALE
Saakow
IV
LOWER SHABEELLE
MIDDLE JUBBA
Bu aale
Shab Ile
1°
V
BU AALE
JILIB
SAAKOW
BU AALE
AFMADOW
MIDDLE JUBBA
LOWER JUBBA
FANOOLE
BARRAGE
Fanoole
Jilib
Afmadow
Homboy
VI
Kamsuuma
JILIB
JAMAAME
Indian Ocean
Jamaame
Dhesheeg Waamo
0°
AFMADOW
KISMAAYO
VII
VIII
BADHAADHE
42°E
Kismaayo
43°

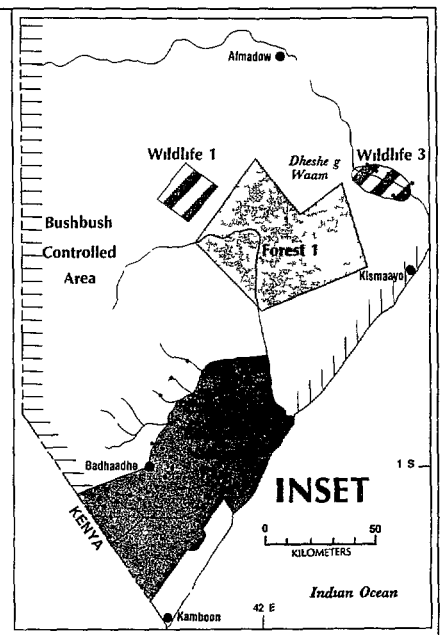
5

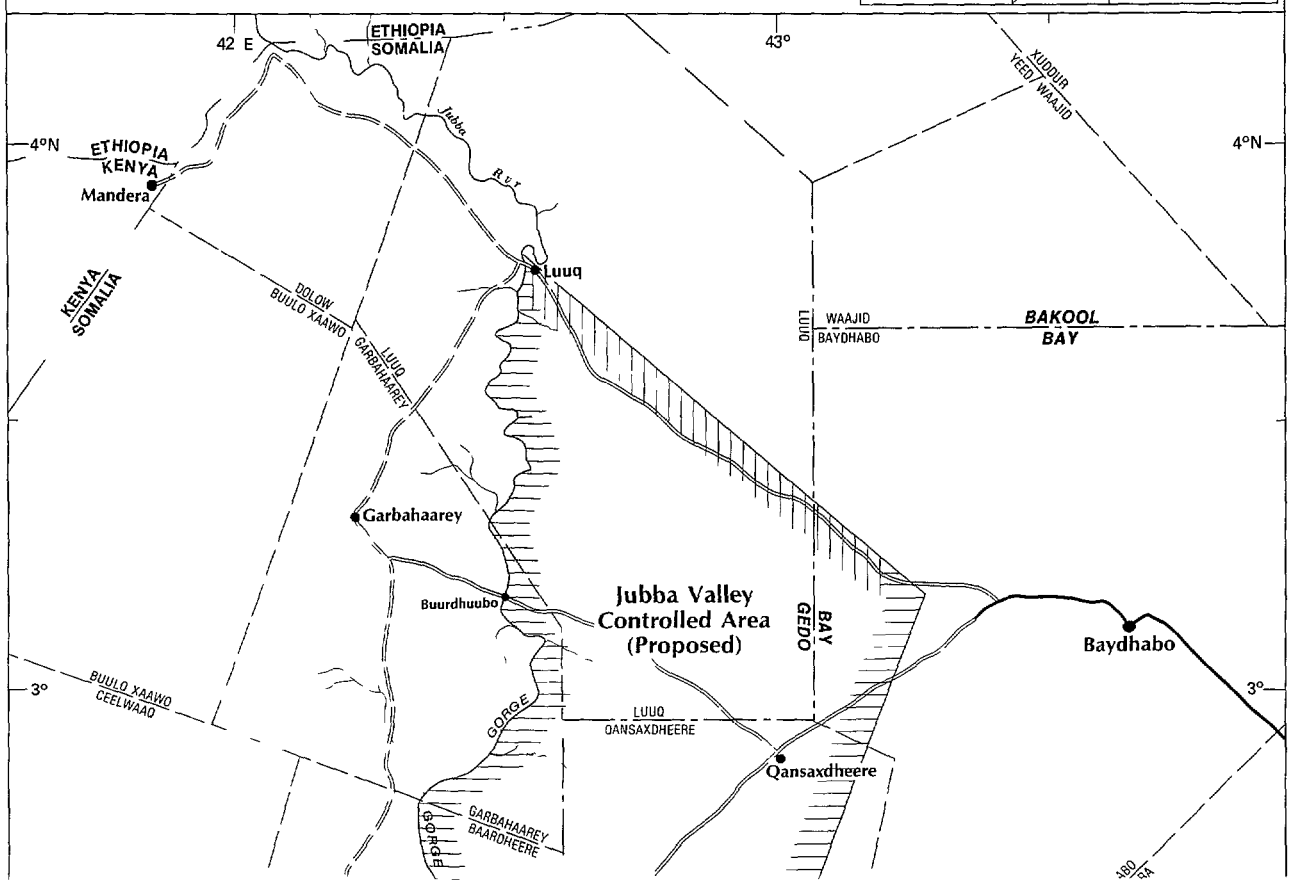
TEBS MAP #2
EXISTING AND PROPOSED CONSERVATION AREAS, AND TSETSE INFESTATION AREAS

0 5 10 20 30 40 50
SCALE IN KILOMETERS
R F = 1 1 000 000

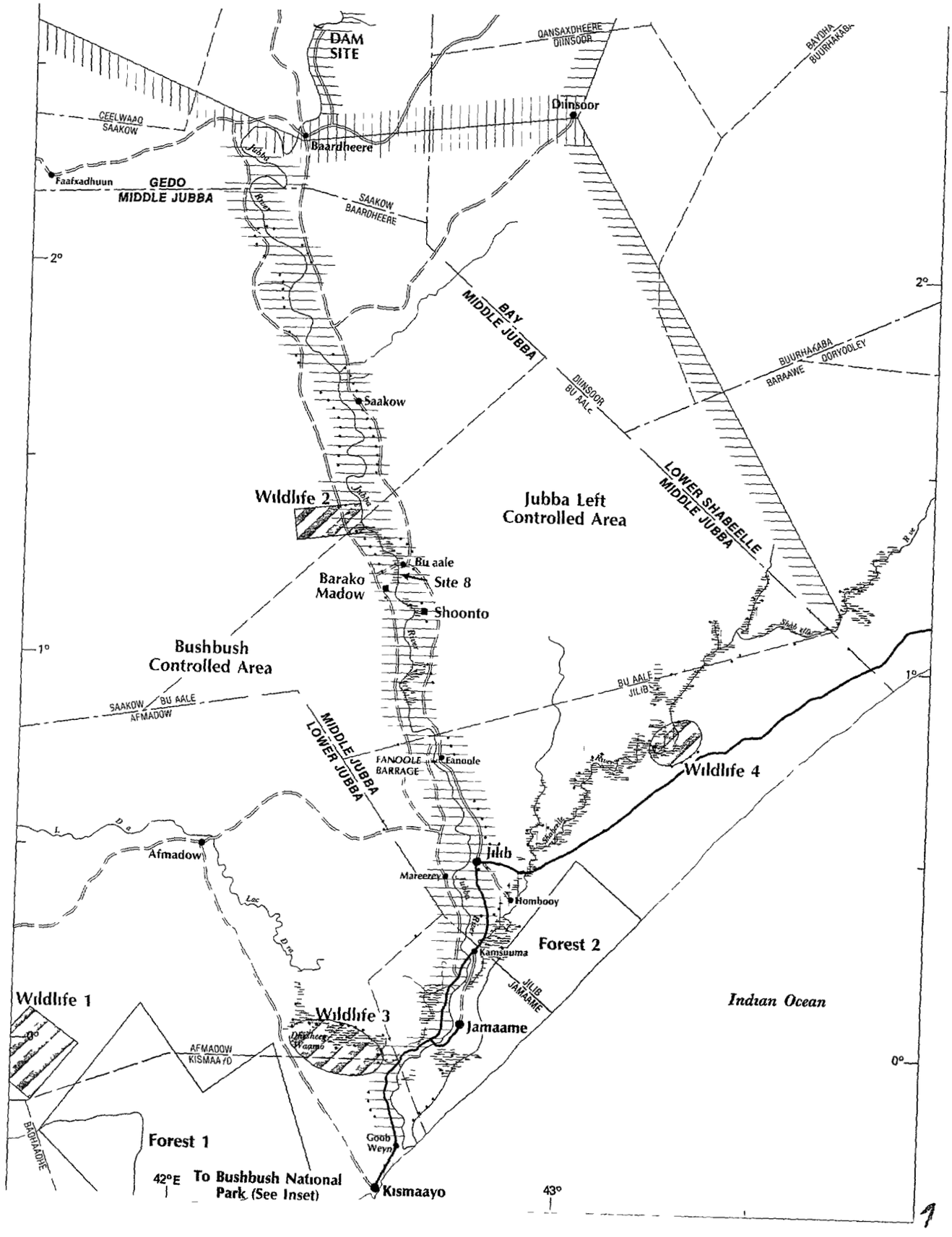
LEGEND

- Surfaced Roads (Tarmac)
- Maintained Dirt Roads
- Bush Tracks (Alignment Approximate)
- Wetlands
- Inundation Area of Dam
- District Boundary
- Regional Boundary
- National Park
- Forest Reserve
- Wildlife Reserve
- Controlled Area Boundary
- Limits of Tsetse Infestation





6


DAM SITE
QANSAXDHEERE DIINSOOR
BAYDHA BUURHAKABA
CEELWAAQ SAAKOW
Diinsoor
Baardheere
Faafxadhuun
GEDO
MIDDLE JUBBA
SAAKOW BAARDHEERE
2°
BAY
MIDDLE JUBBA
DIINSOOR BU AALE
BUURHAKABA DOOYOOLEY
BARAAWE
Saakow
LOWER SHABEELLE
MIDDLE JUBBA
Wildlife 2
Jubba Left Controlled Area
Bu aale
Site 8
Barako Madow
Shoonto
Bushbush Controlled Area
1°
BU AALE JILIB
SAAKOW BU AALE AFMADOW
MIDDLE JUBBA
LOWER JUBBA
FANOOLE BARRAGE
Fanoole
Wildlife 4
Afmadow
Jilib
Mareerey
Hombooy
Forest 2
Kamsuuma
JILIB JAMAAME
Wildlife 1
Wildlife 3
Jamaame
Indian Ocean
AFMADOW KISMAAYO
0°
BADHAADHE
Forest 1
Goob Weyn
42°E
To Bushbush National Park (See Inset)
Kismaayo
43°

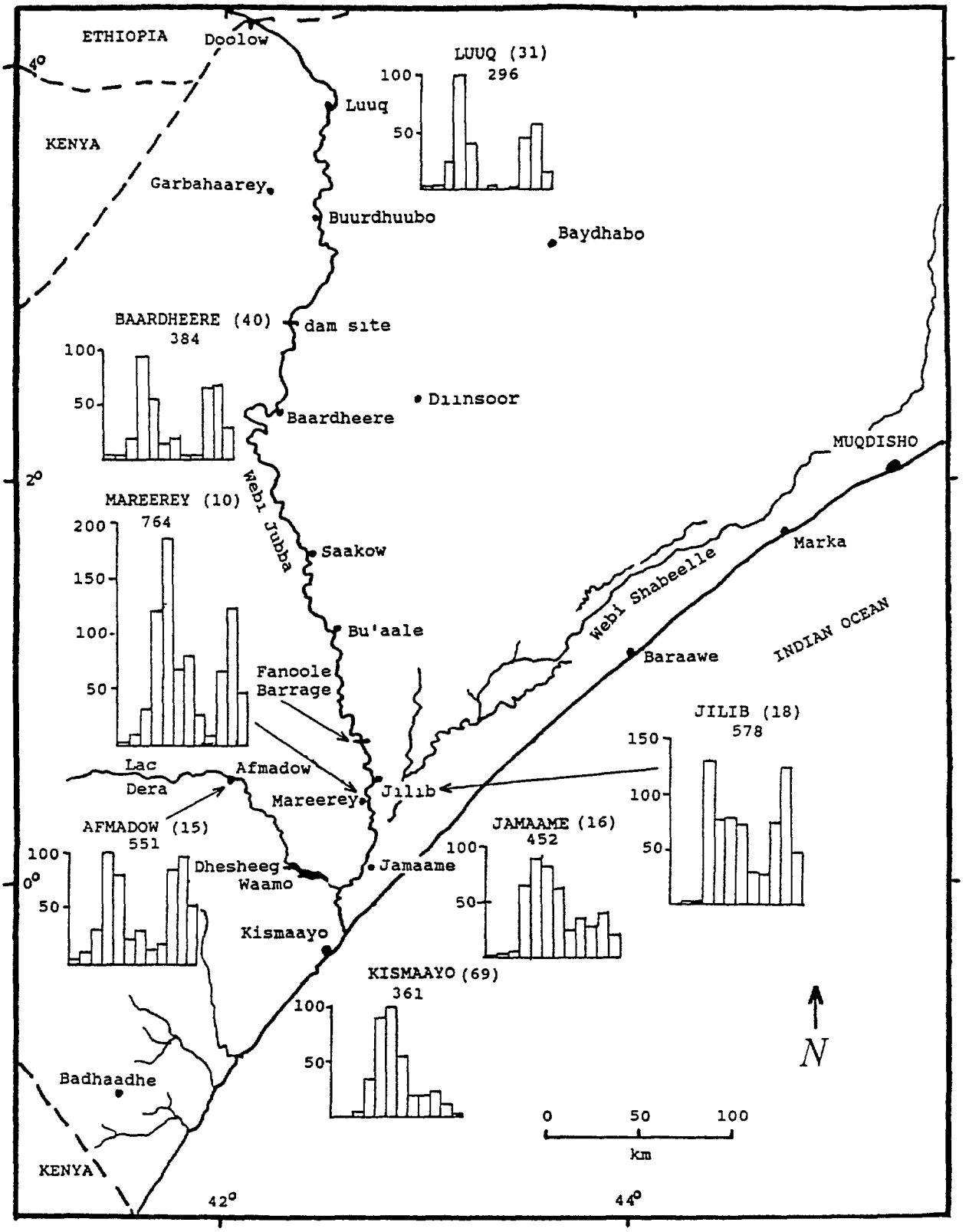


Figure 2 Rainfall map of southern Somalia Rainfall charts have annual total beneath station name and number of years of records in parentheses (Data from Watson & Nimmo 1985 and Food Early Warning System Ministy of Agriculture)

8

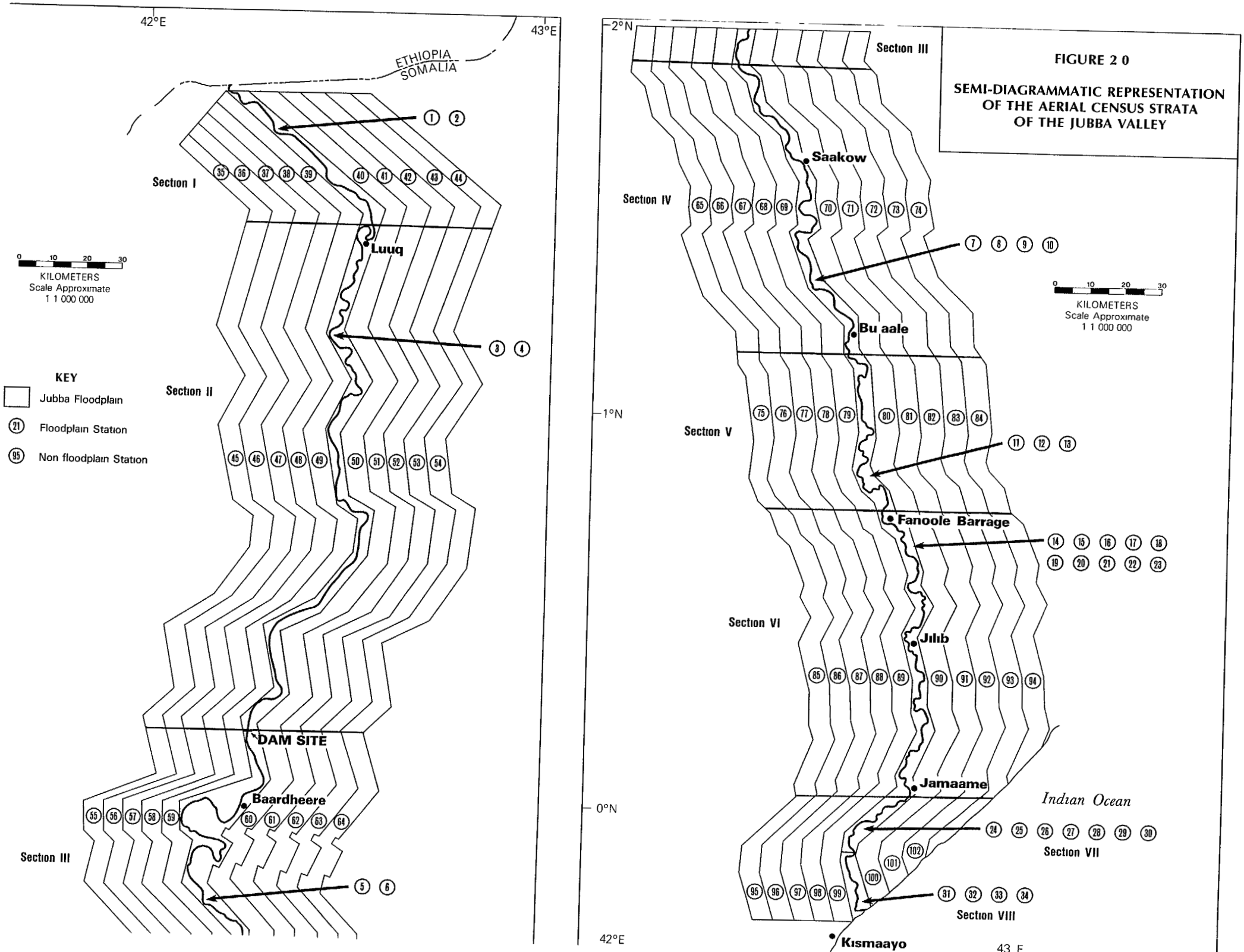
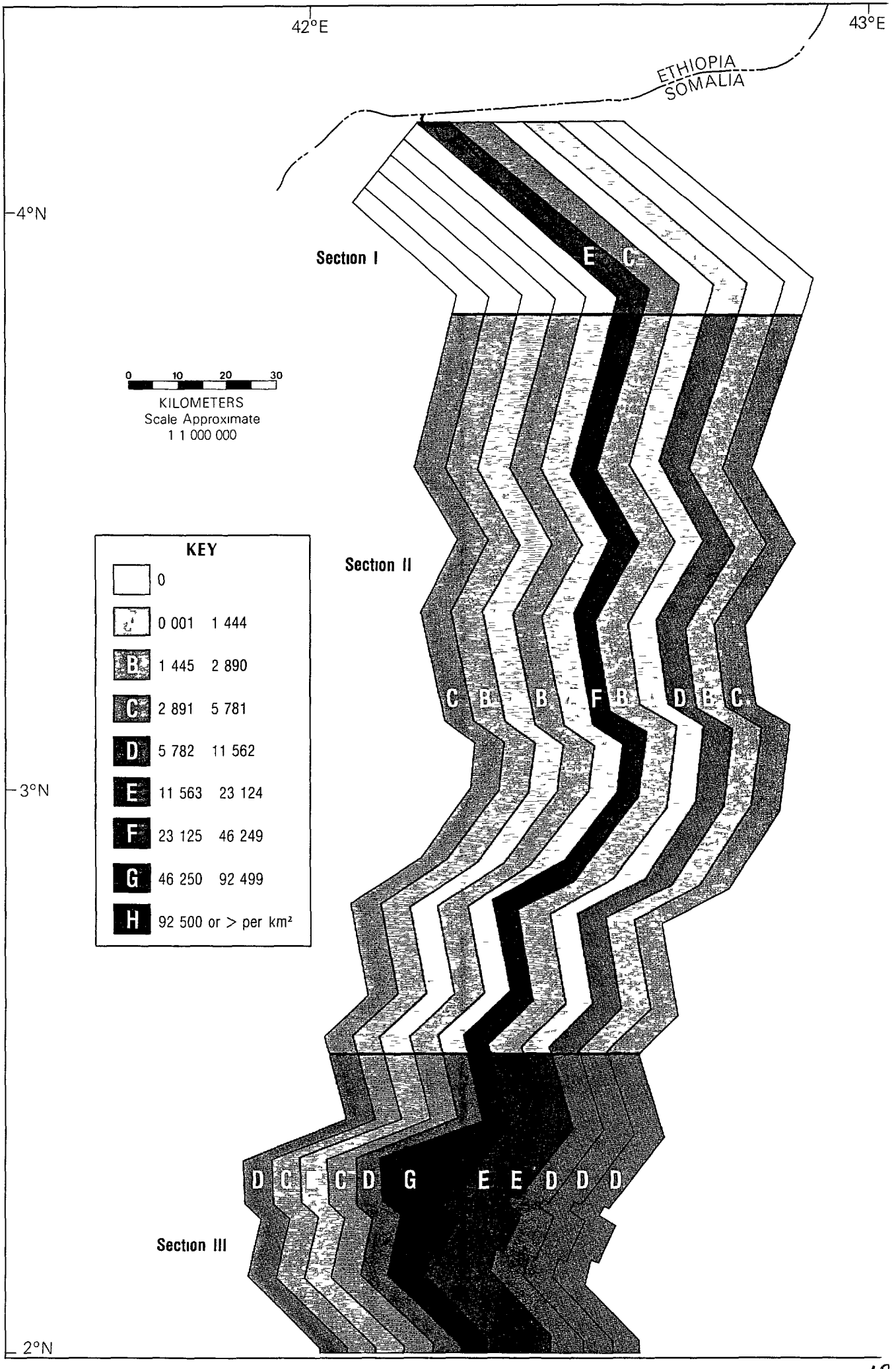


FIGURE 2 0

SEMI-DIAGRAMMATIC REPRESENTATION OF THE AERIAL CENSUS STRATA OF THE JUBBA VALLEY


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
Section II
Section III
E C
C B B F B D B C
D G C C D G E E D D D
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
0 001 1 444
B 1 445 2 890
C 2 891 5 781
D 5 782 11 562
E 11 563 23 124
F 23 125 46 249
G 46 250 92 499
H 92 500 or > per km²

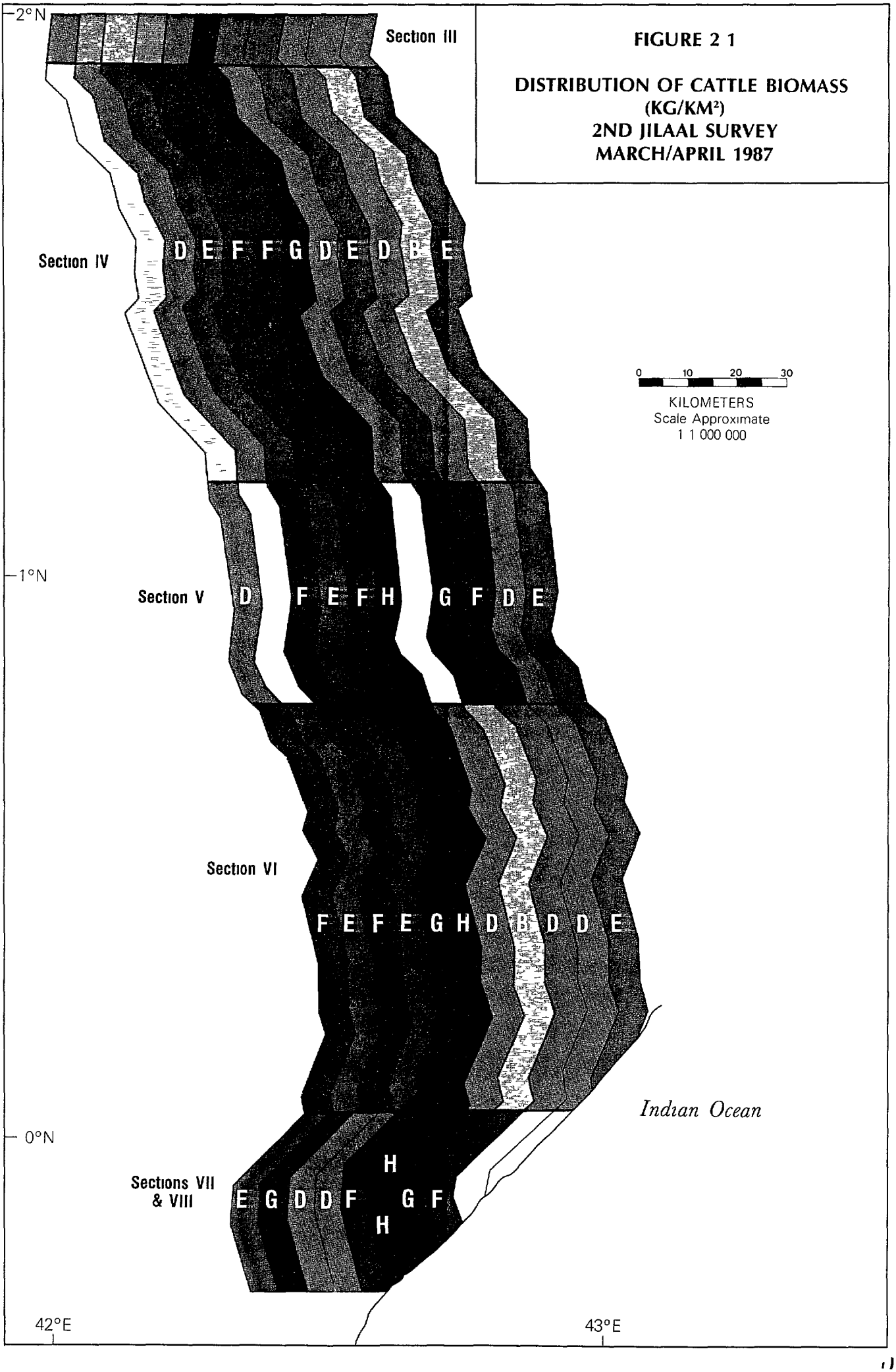
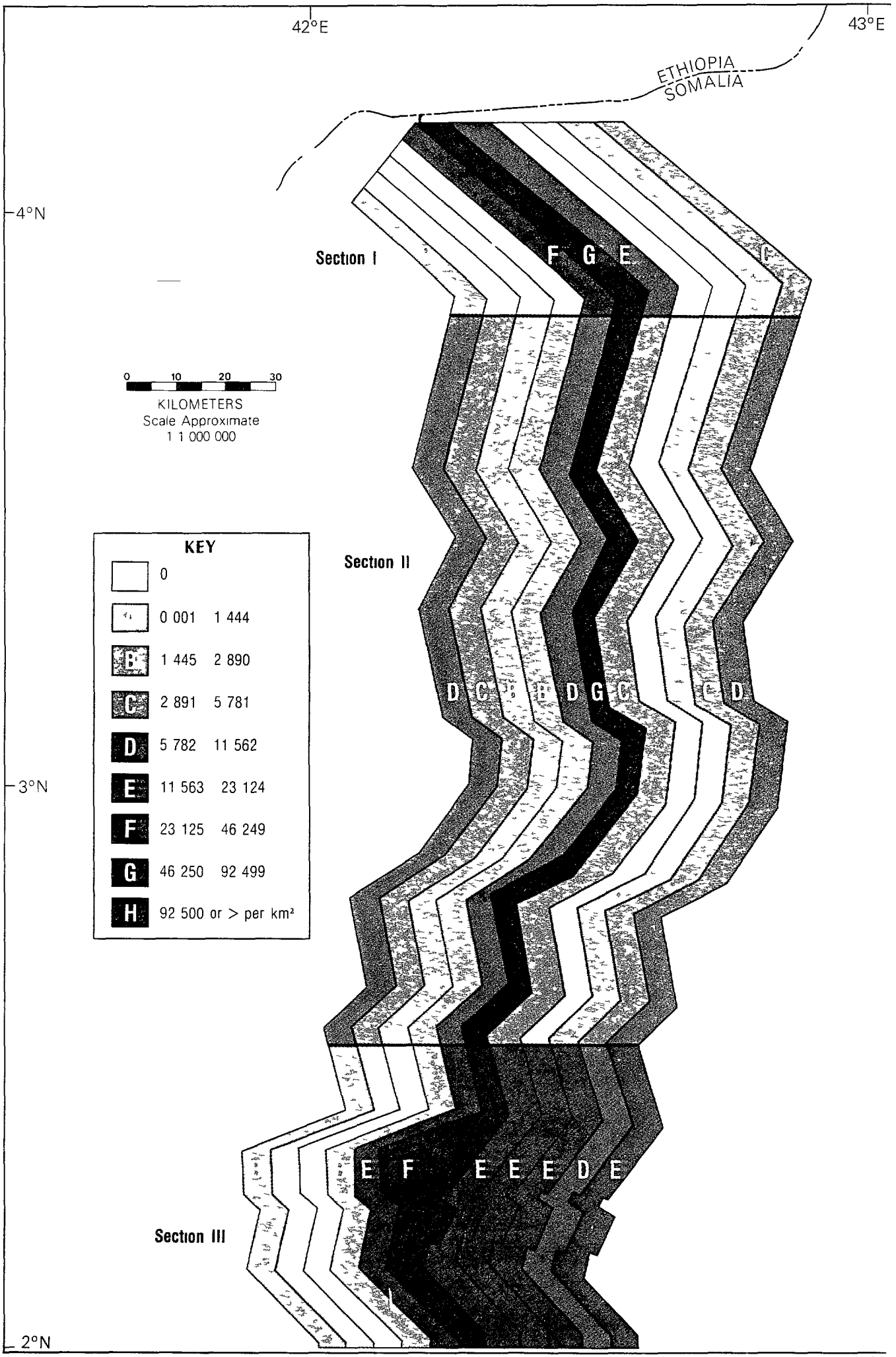


FIGURE 2 1

DISTRIBUTION OF CATTLE BIOMASS
(KG/KM²)
2ND JILAAL SURVEY
MARCH/APRIL 1987


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
Section II
Section III
F G E
C
D C B B D G C C D
E F E E E D E
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
0 001 1 444
B 1 445 2 890
C 2 891 5 781
D 5 782 11 562
E 11 563 23 124
F 23 125 46 249
G 46 250 92 499
H 92 500 or > per km²

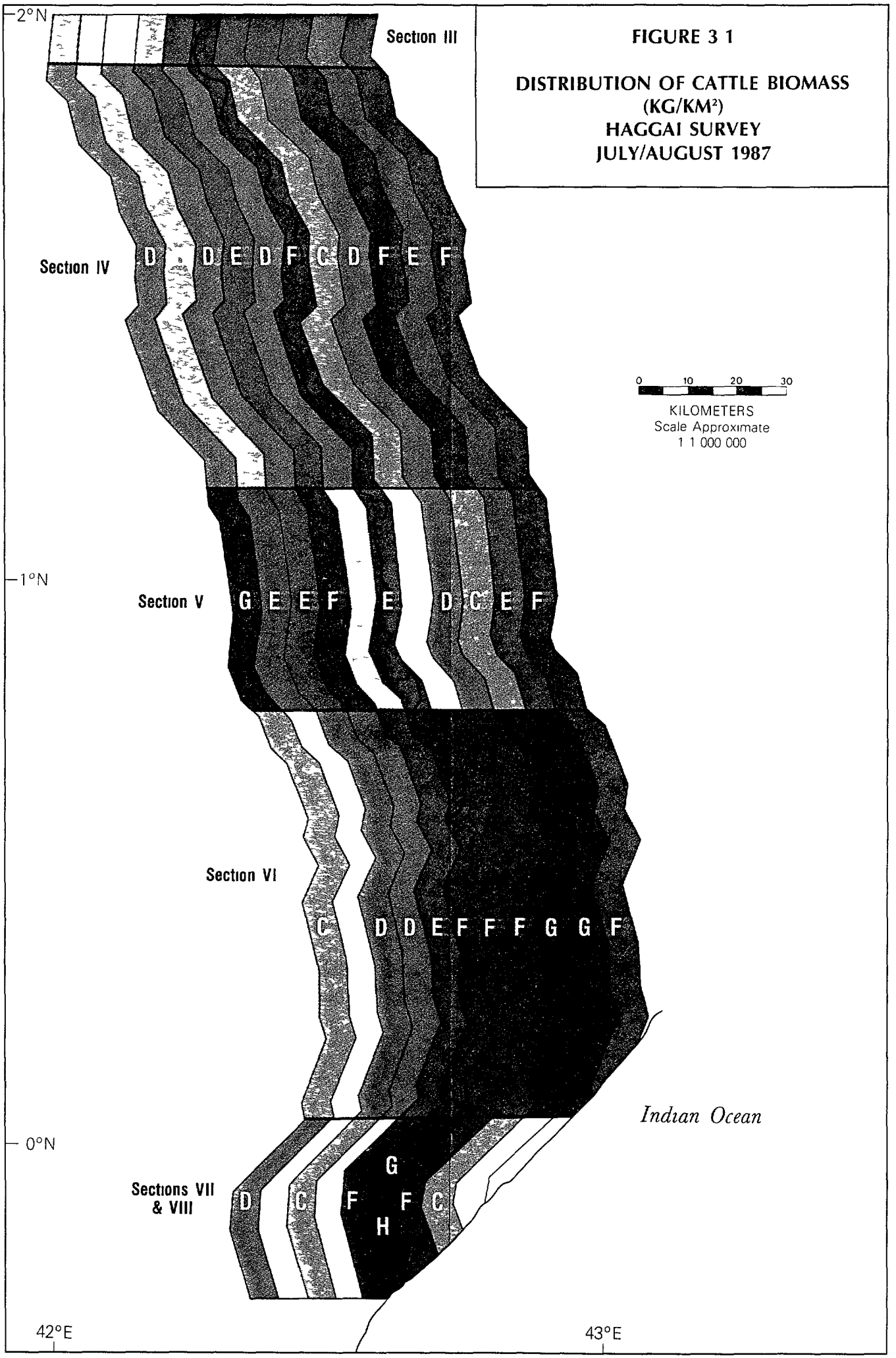
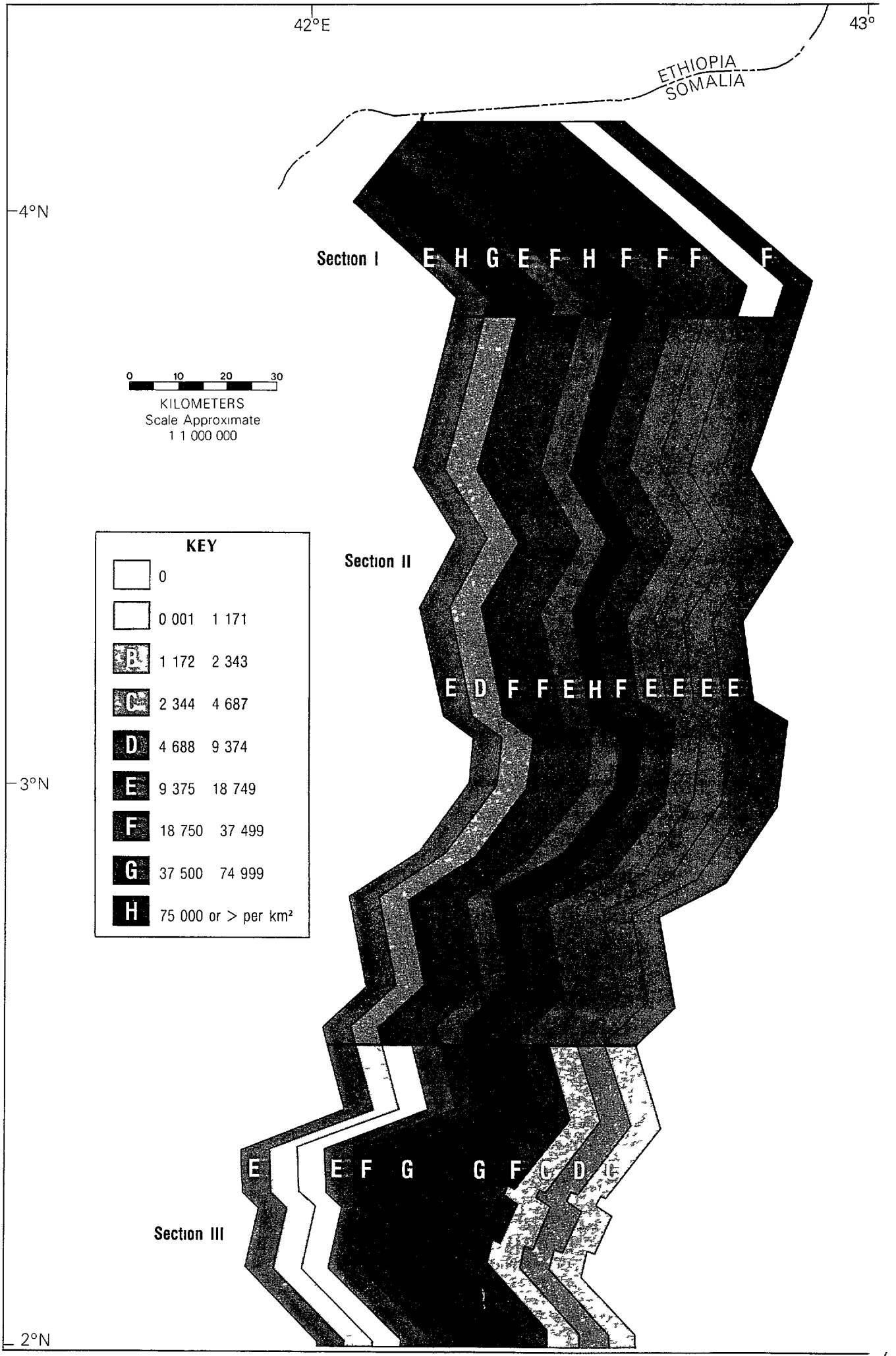


FIGURE 3 1

DISTRIBUTION OF CATTLE BIOMASS
(KG/KM²)
HAGGAI SURVEY
JULY/AUGUST 1987


42°E
43°
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
E H G E F H F F F F
Section II
E D F F E H F E E E E
Section III
E E F G G F C D C
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
0 001 1 171
B 1 172 2 343
C 2 344 4 687
D 4 688 9 374
E 9 375 18 749
F 18 750 37 499
G 37 500 74 999
H 75 000 or > per km²

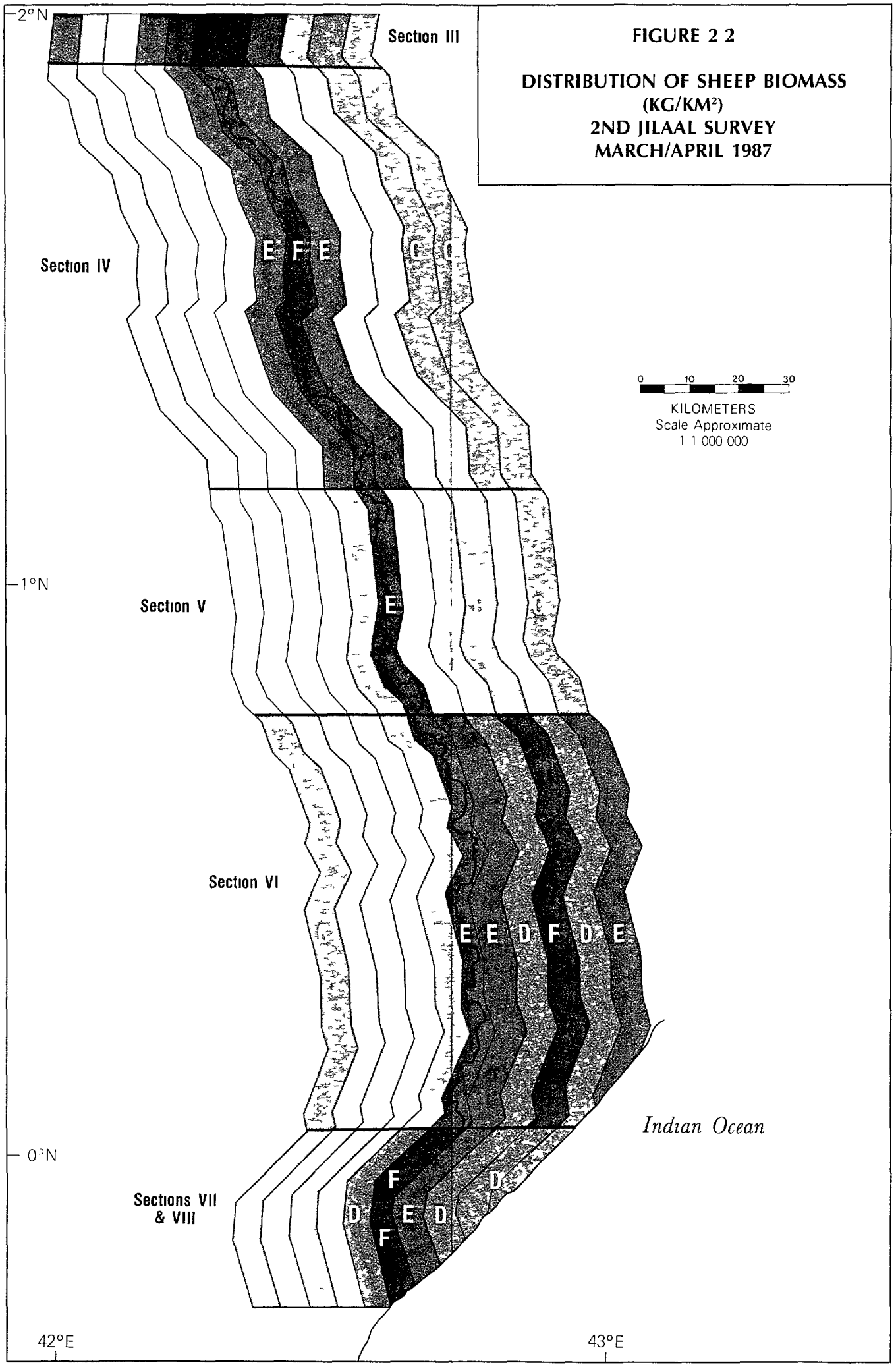
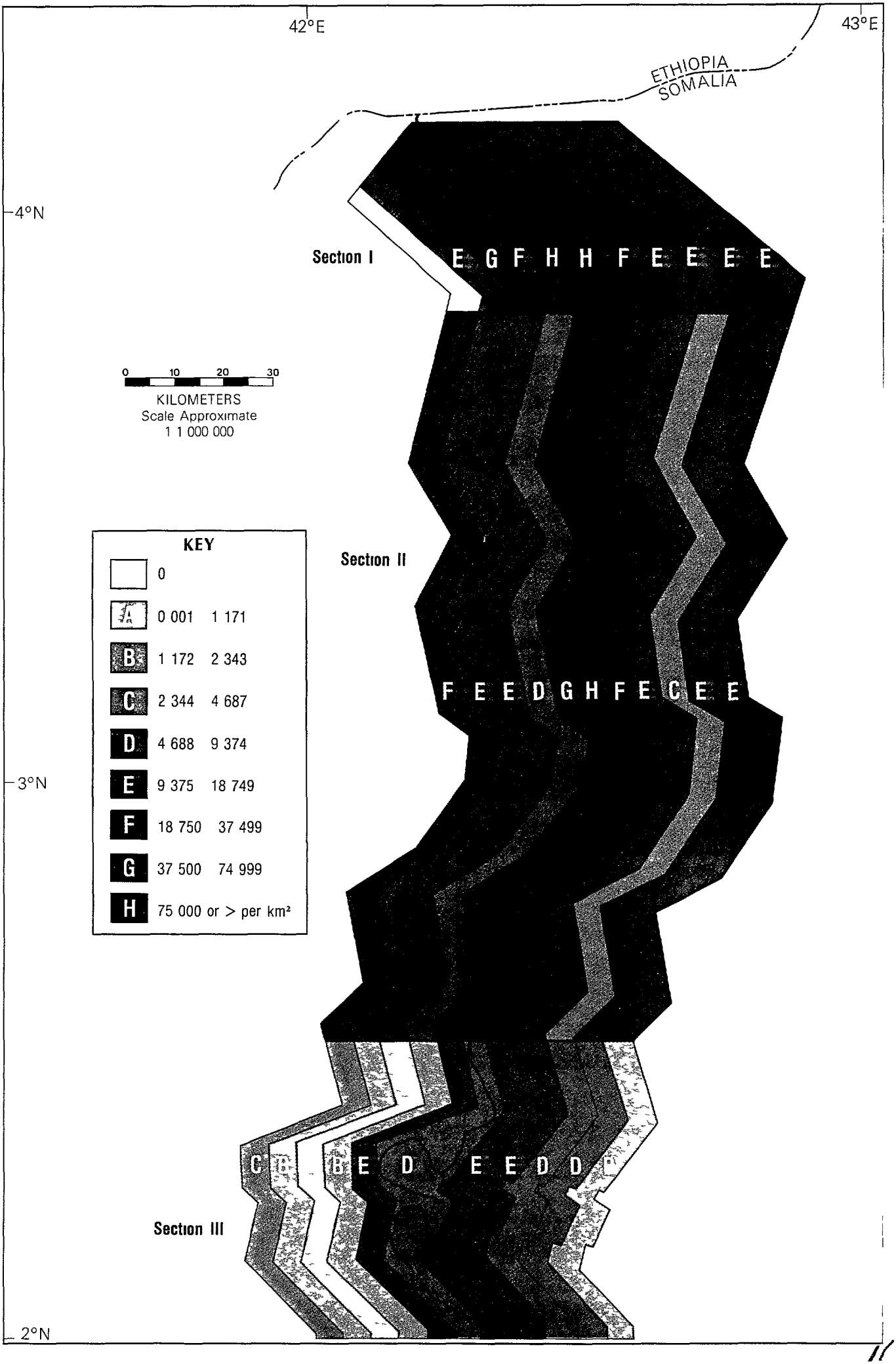


FIGURE 2 2
DISTRIBUTION OF SHEEP BIOMASS
(KG/KM²)
2ND JILAAL SURVEY
MARCH/APRIL 1987
2°N
1°N
0°N
42°E
43°E
Section III
Section IV
Section V
Section VI
Sections VII
& VIII
E F E
E
E E D F D E
F
D
D E D
F
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
Indian Ocean

15


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
E G F H H F E E E E
Section II
F E E D G H F E C E E
Section III
C B B E D E E D D
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
A 0 001 1 171
B 1 172 2 343
C 2 344 4 687
D 4 688 9 374
E 9 375 18 749
F 18 750 37 499
G 37 500 74 999
H 75 000 or > per km²

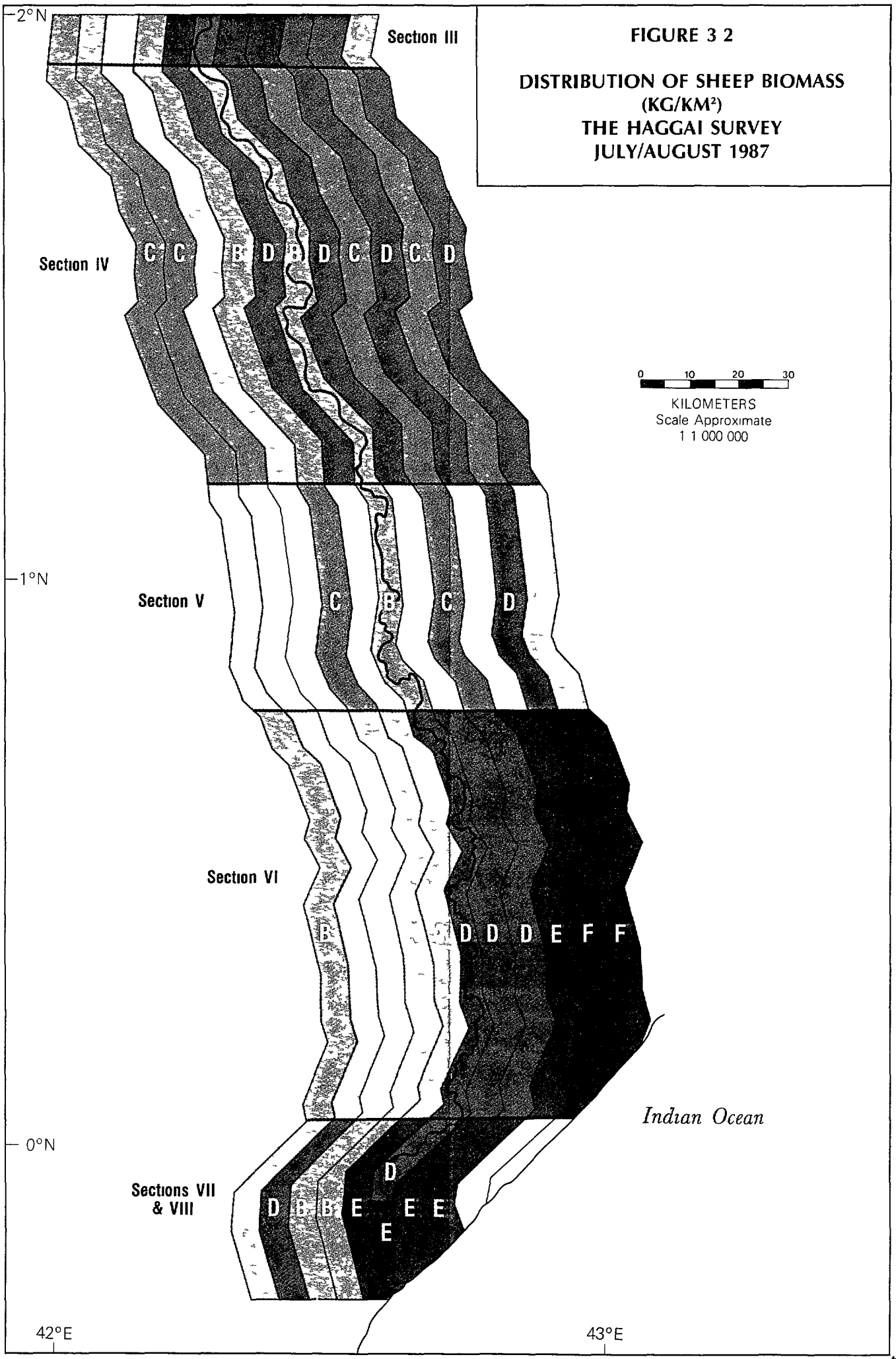
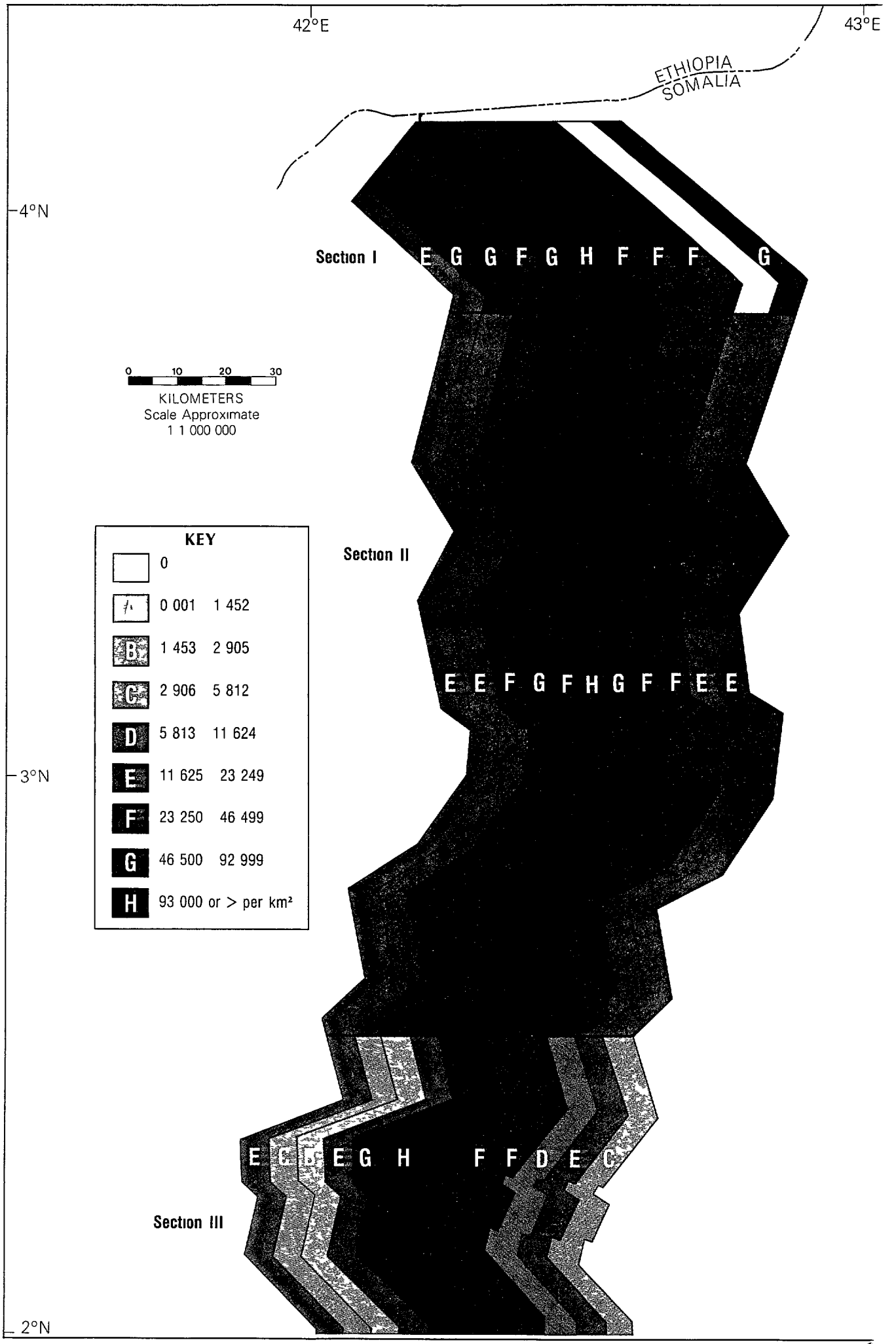


FIGURE 3 2
DISTRIBUTION OF SHEEP BIOMASS
(KG/KM²)
THE HAGGAI SURVEY
JULY/AUGUST 1987
2°N
1°N
0°N
42°E
43°E
Section III
Section IV
Section V
Section VI
Sections VII
& VIII
C C B D B D C D C D
C B C D
B D D D E F F
D
D B B E E E
E
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
Indian Ocean


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
E G G F G H F F F G
Section II
E E F G F H G F F E E
Section III
E C B E G H F F D E C
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
0 001 1 452
1 453 2 905
2 906 5 812
5 813 11 624
11 625 23 249
23 250 46 499
46 500 92 999
93 000 or > per km²

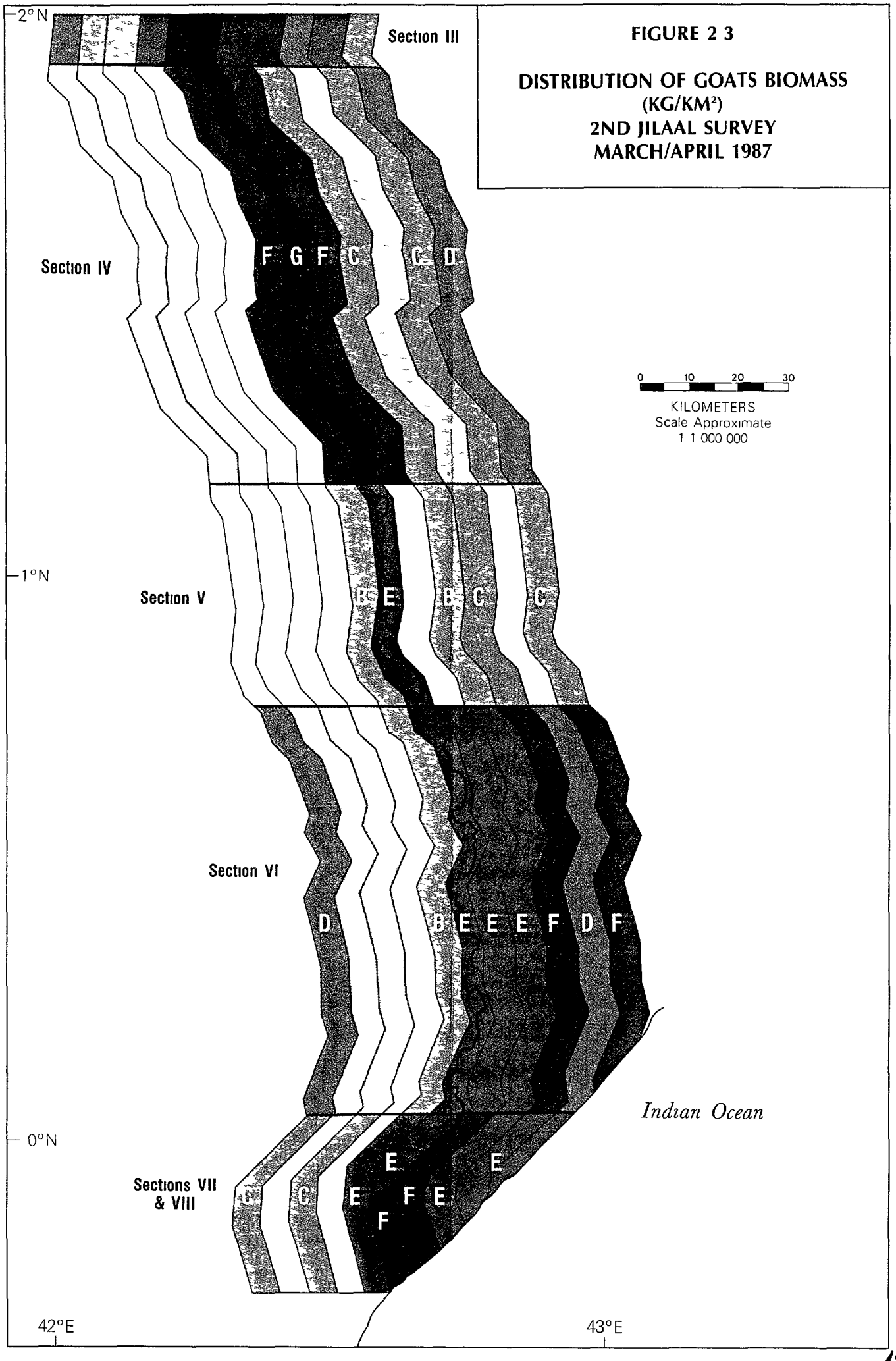
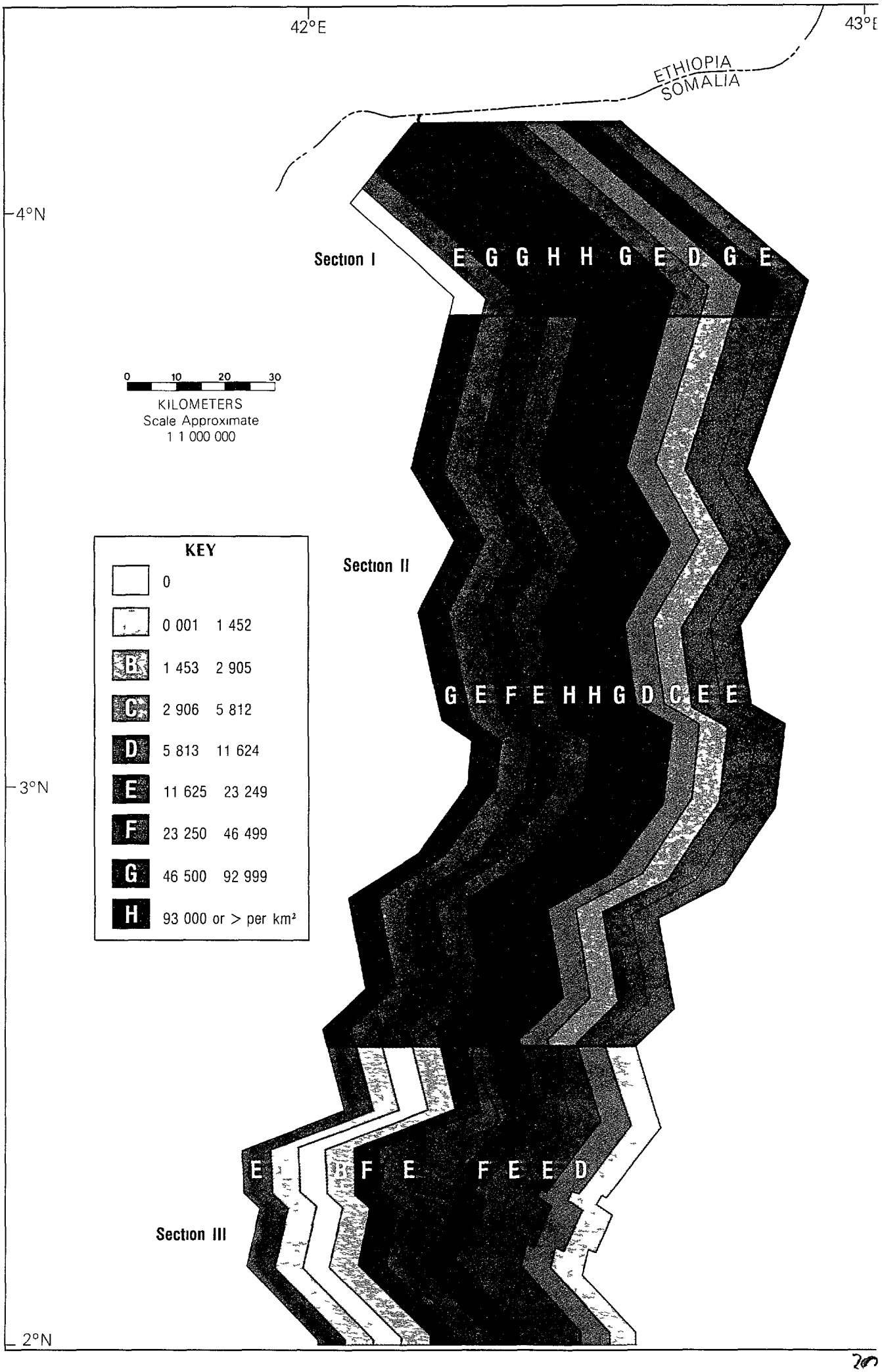


FIGURE 2 3
DISTRIBUTION OF GOATS BIOMASS
(KG/KM²)
2ND JILAAL SURVEY
MARCH/APRIL 1987
2°N
1°N
0°N
42°E
43°E
Section III
Section IV
Section V
Section VI
Sections VII
& VIII
F G F C C D
B E B C C
D B E E E F D F
C C E E F E
F
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
Indian Ocean


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
E G G H H G E D G E
Section II
G E F E H H G D C E E
Section III
E B F E F E E D
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
0 001 1 452
B 1 453 2 905
C 2 906 5 812
D 5 813 11 624
E 11 625 23 249
F 23 250 46 499
G 46 500 92 999
H 93 000 or > per km²

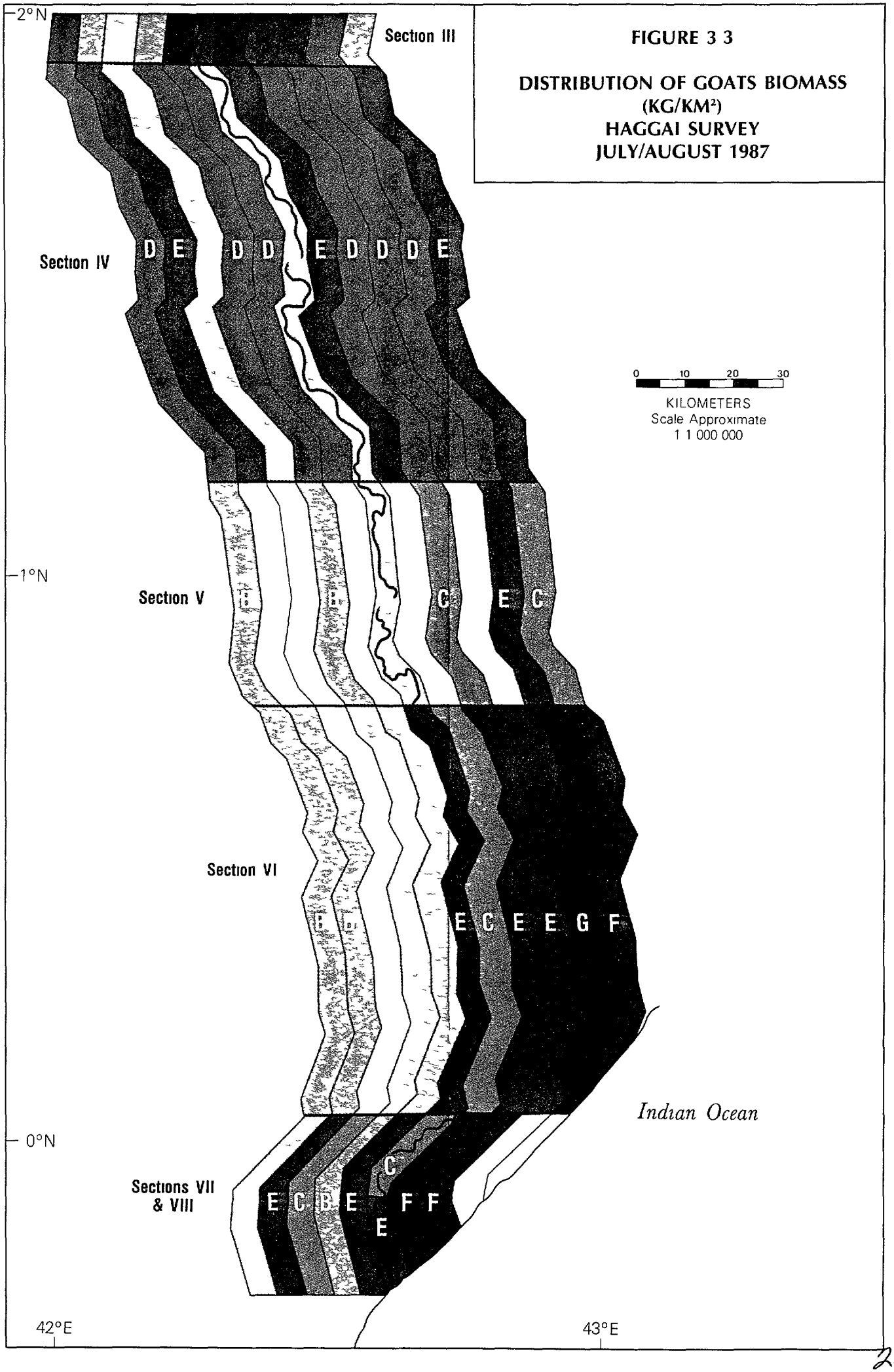
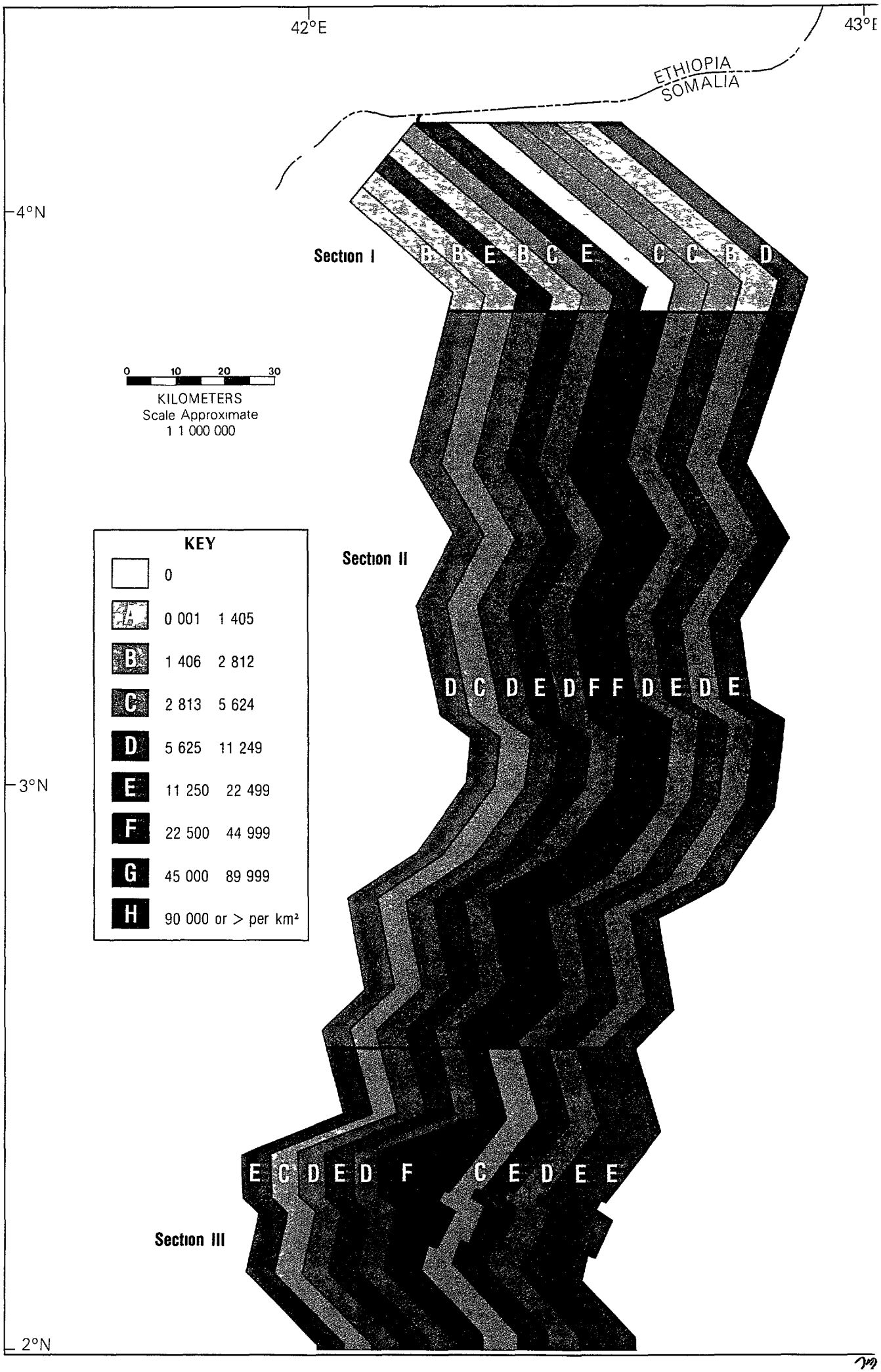


FIGURE 3 3
DISTRIBUTION OF GOATS BIOMASS
(KG/KM²)
HAGGAI SURVEY
JULY/AUGUST 1987
2°N
1°N
0°N
42°E
43°E
Section III
Section IV
Section V
Section VI
Sections VII
& VIII
D E D D E D D D E
C E C
E C E E G F
C
E C B E F F
E
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
Indian Ocean


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
B B E B C E C C B D
Section II
D C D E D F F D E D E
Section III
E C D E D F C E D E E
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
A 0 001 1 405
B 1 406 2 812
C 2 813 5 624
D 5 625 11 249
E 11 250 22 499
F 22 500 44 999
G 45 000 89 999
H 90 000 or > per km²

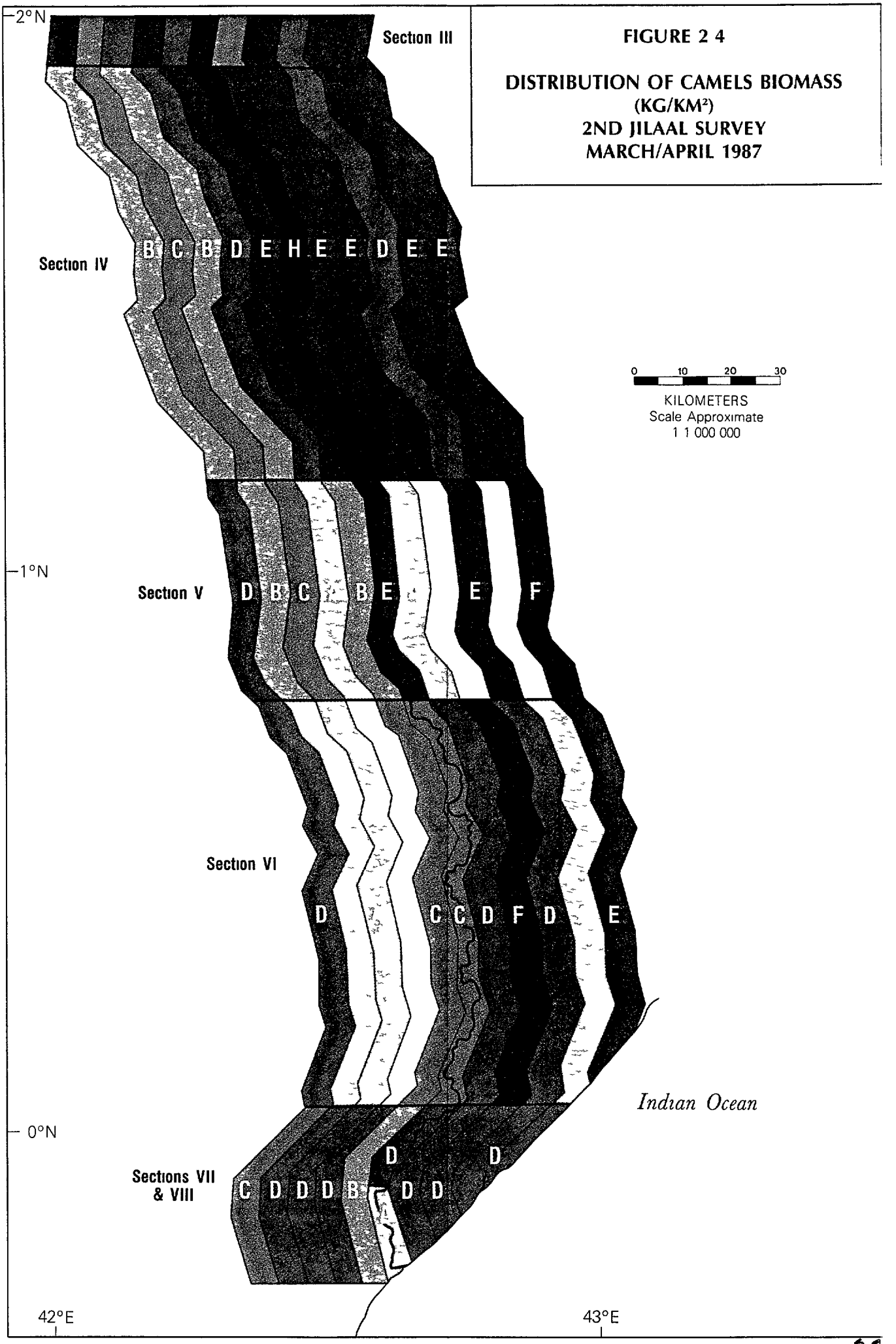
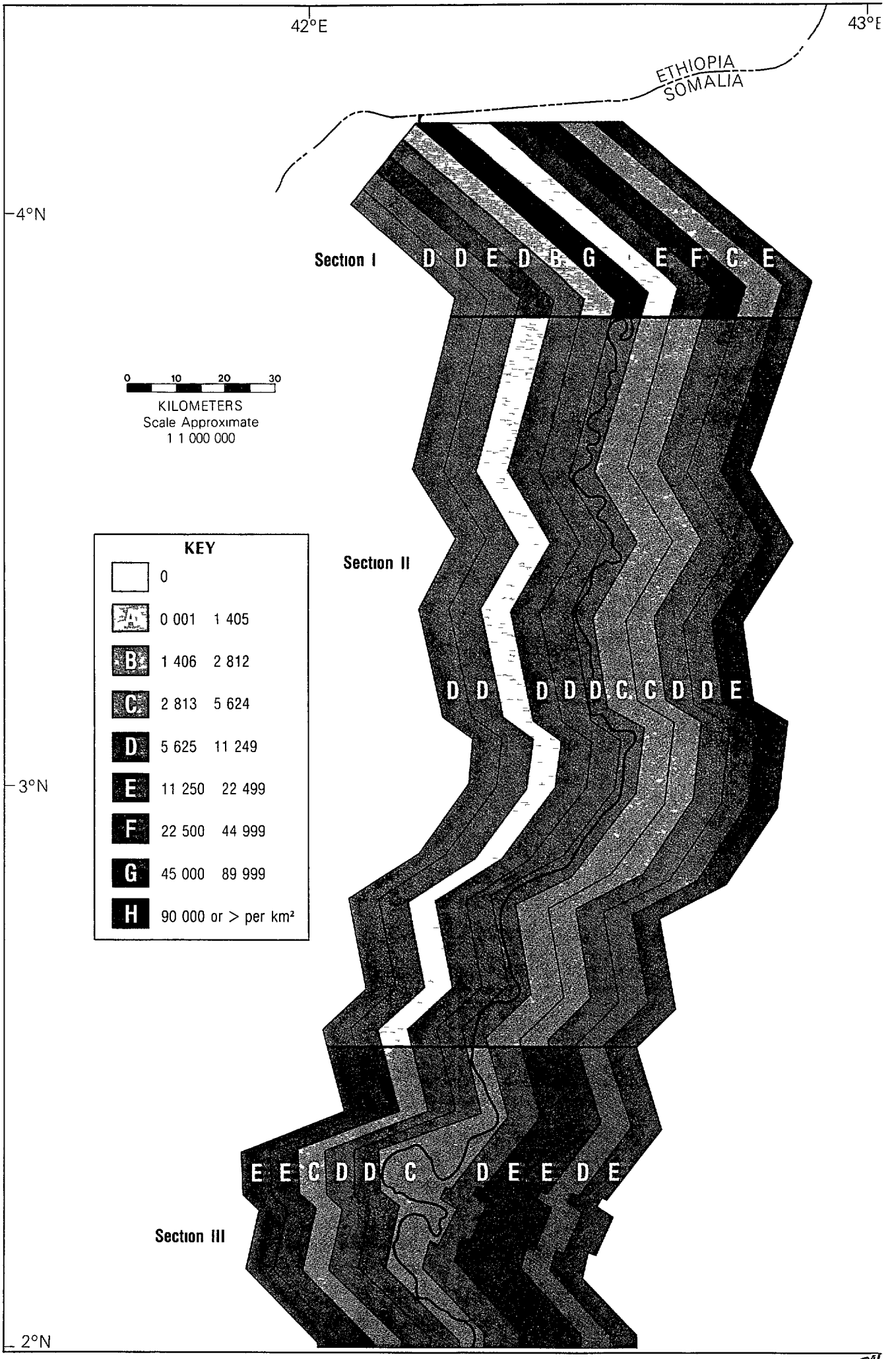


FIGURE 2 4
DISTRIBUTION OF CAMELS BIOMASS
(KG/KM²)
2ND JILAAL SURVEY
MARCH/APRIL 1987
2°N
1°N
0°N
42°E
43°E
Section III
Section IV
Section V
Section VI
Sections VII & VIII
B C B D E H E E D E E
D B C B E E F
D C C D F D E
C D D D B D D D D
Indian Ocean
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
D D E D B G E F C E
Section II
D D D D D C C D D E
Section III
E E C D D C D E E D E
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
A 0 001 1 405
B 1 406 2 812
C 2 813 5 624
D 5 625 11 249
E 11 250 22 499
F 22 500 44 999
G 45 000 89 999
H 90 000 or > per km²

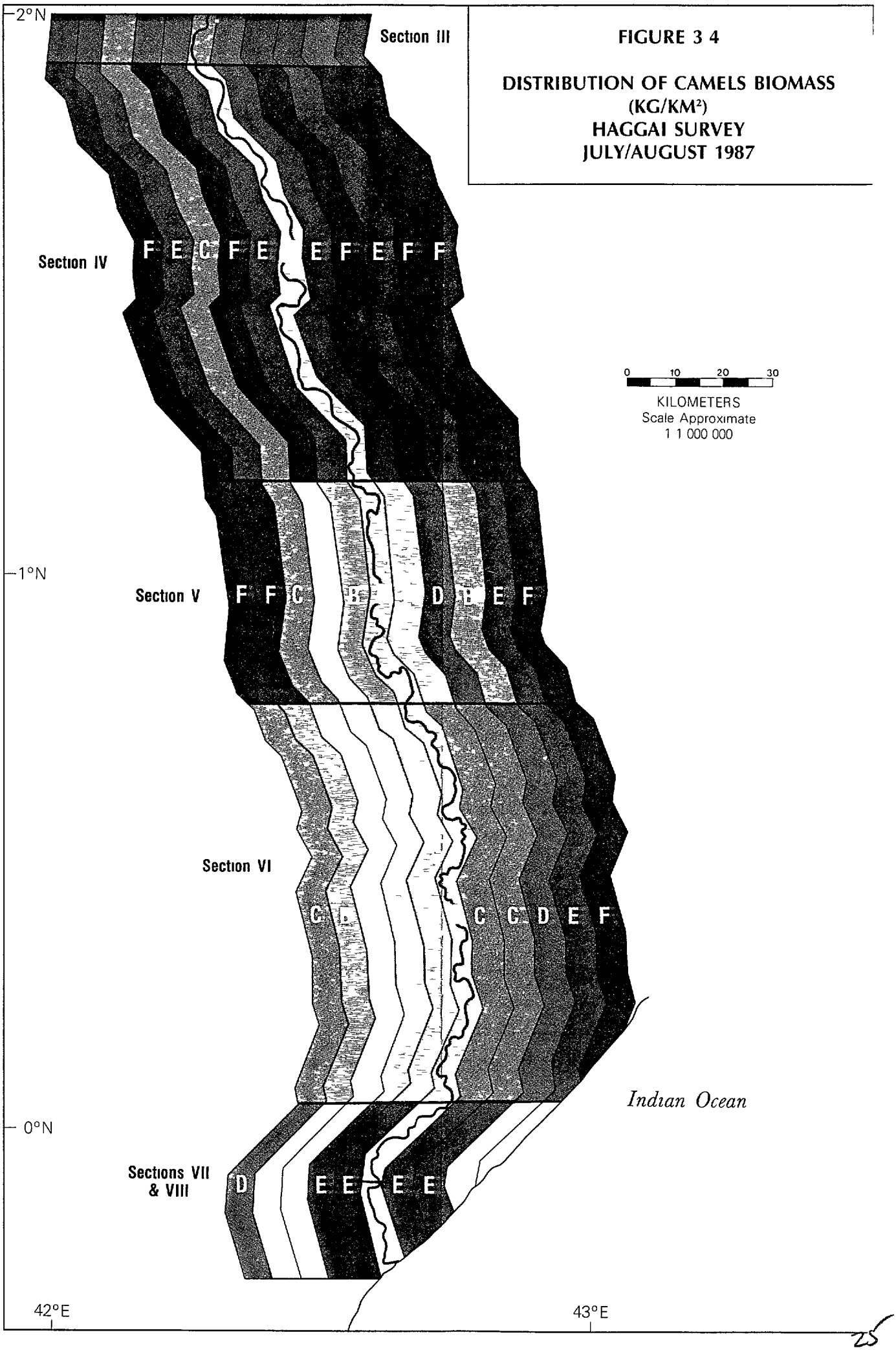
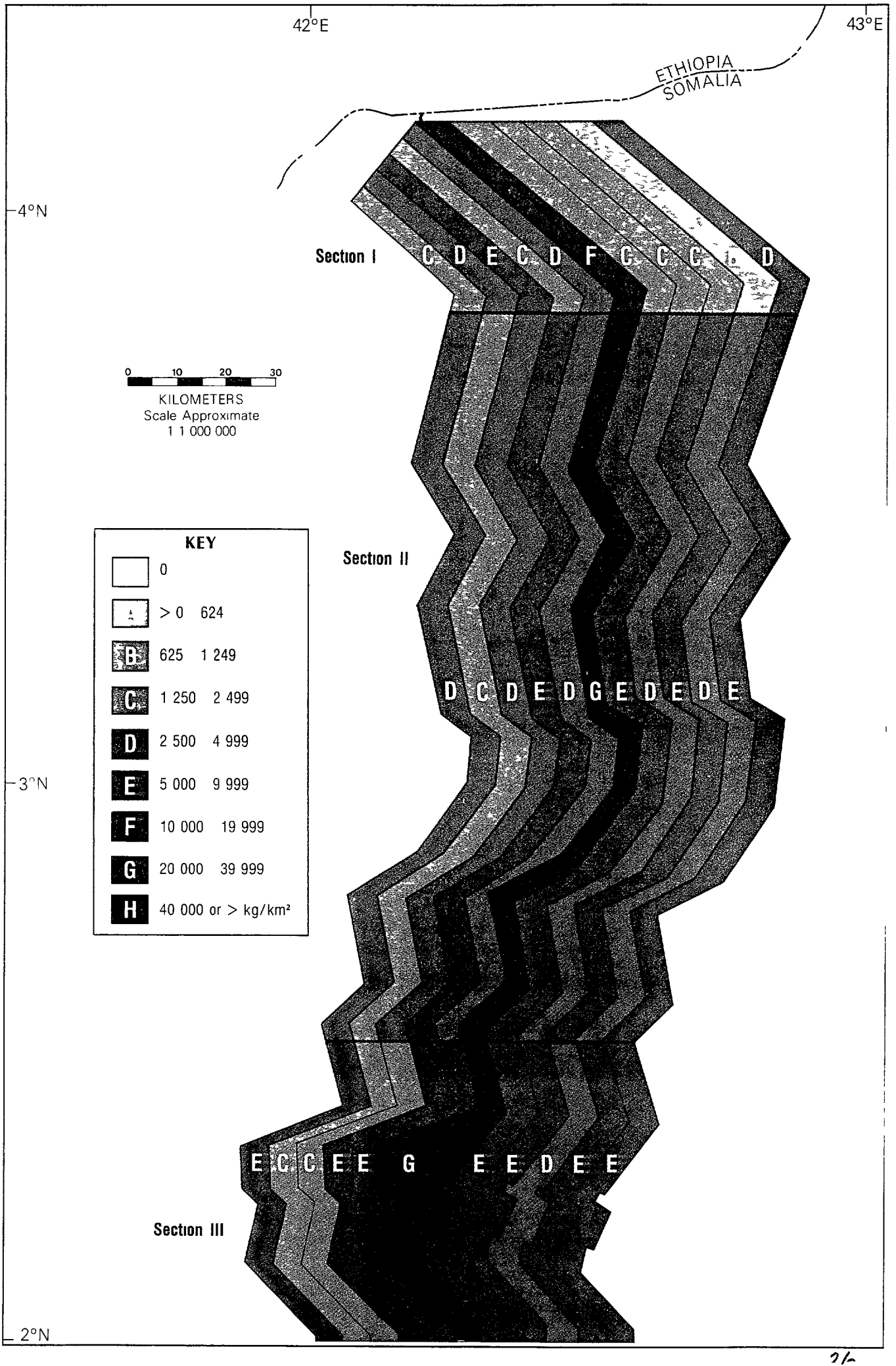


FIGURE 3 4
DISTRIBUTION OF CAMELS BIOMASS
(KG/KM²)
HAGGAI SURVEY
JULY/AUGUST 1987
2°N
1°N
0°N
42°E
43°E
Section III
Section IV
Section V
Section VI
Sections VII & VIII
F E C F E E F E F F
F F C B D B E F
C B C C D E F
D E E E E
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
Indian Ocean


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
C D E C D F C C C D
Section II
D C D E D G E D E D E
Section III
E C C E E G E E D E E
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
A > 0 624
B 625 1 249
C 1 250 2 499
D 2 500 4 999
E 5 000 9 999
F 10 000 19 999
G 20 000 39 999
H 40 000 or > kg/km²

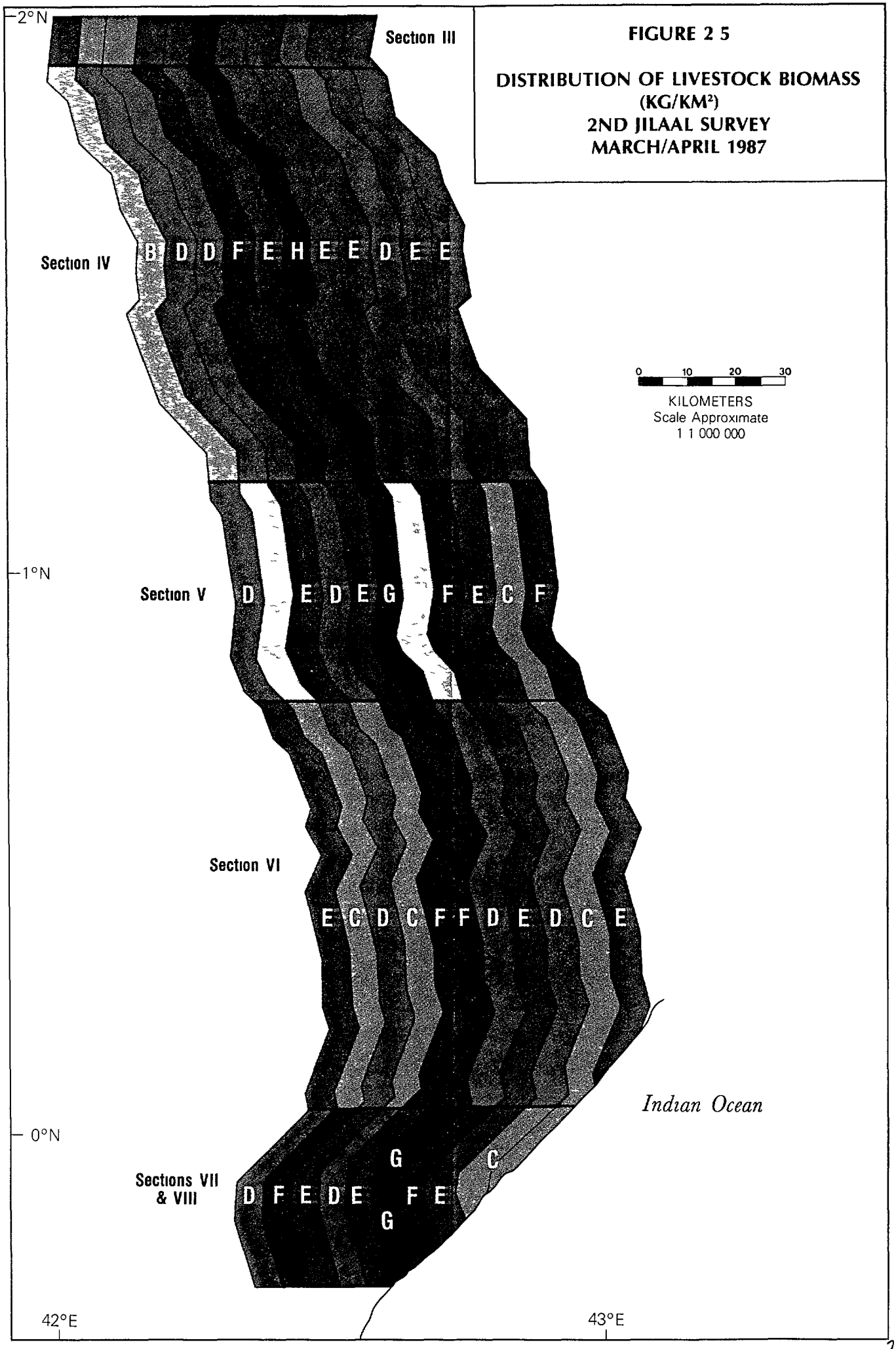
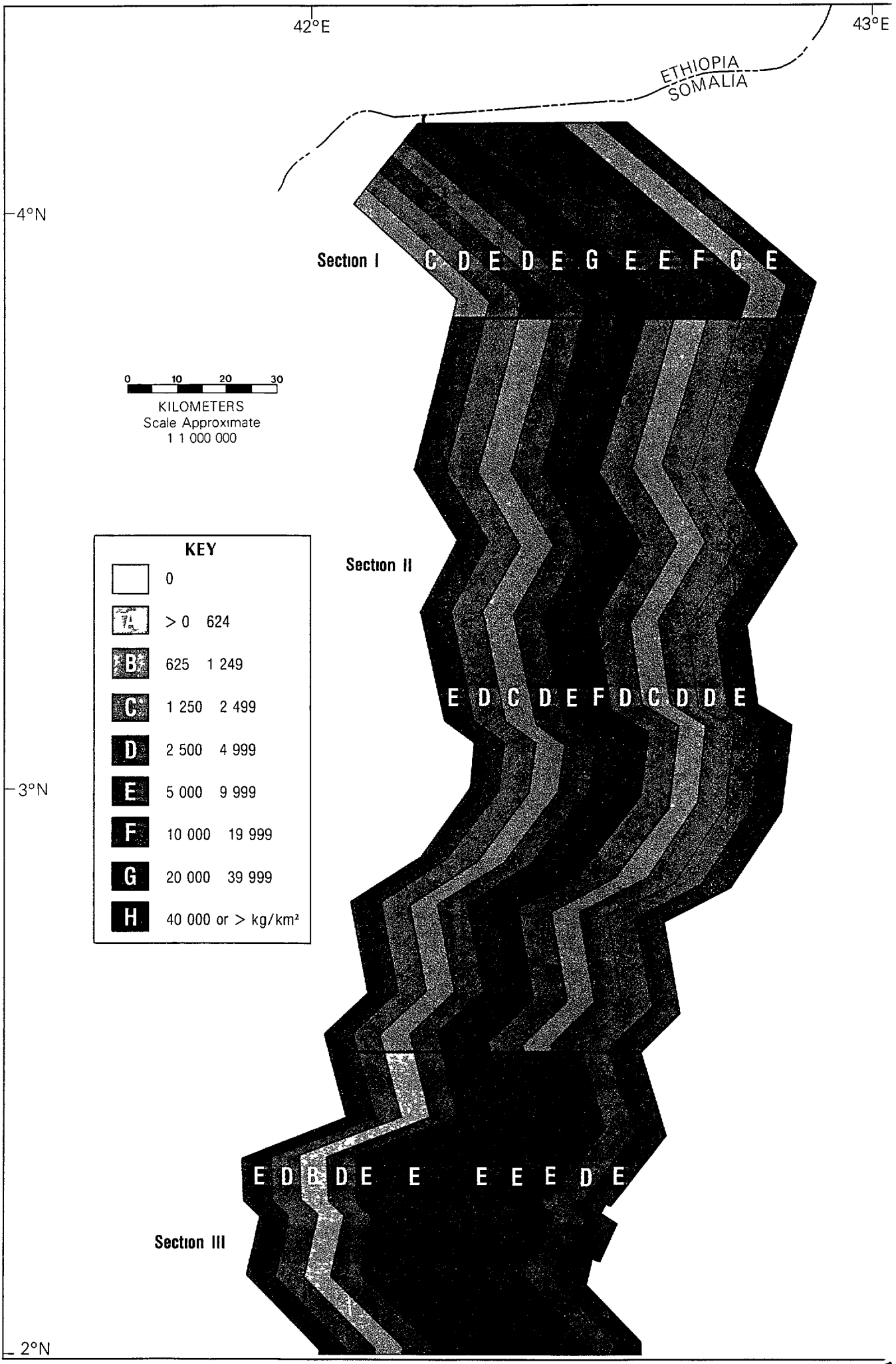


FIGURE 2 5
DISTRIBUTION OF LIVESTOCK BIOMASS
(KG/KM²)
2ND JILAAL SURVEY
MARCH/APRIL 1987
2°N
1°N
0°N
42°E
43°E
Section III
Section IV
B D D F E H E E D E E
Section V
D E D E G F E C F
Section VI
E C D C F F D E D C E
Sections VII
& VIII
G
C
D F E D E F E
G
Indian Ocean
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
C D E D E G E E F C E
Section II
E D C D E F D C D D E
Section III
E D B D E E E E E D E
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
A > 0 624
B 625 1 249
C 1 250 2 499
D 2 500 4 999
E 5 000 9 999
F 10 000 19 999
G 20 000 39 999
H 40 000 or > kg/km²

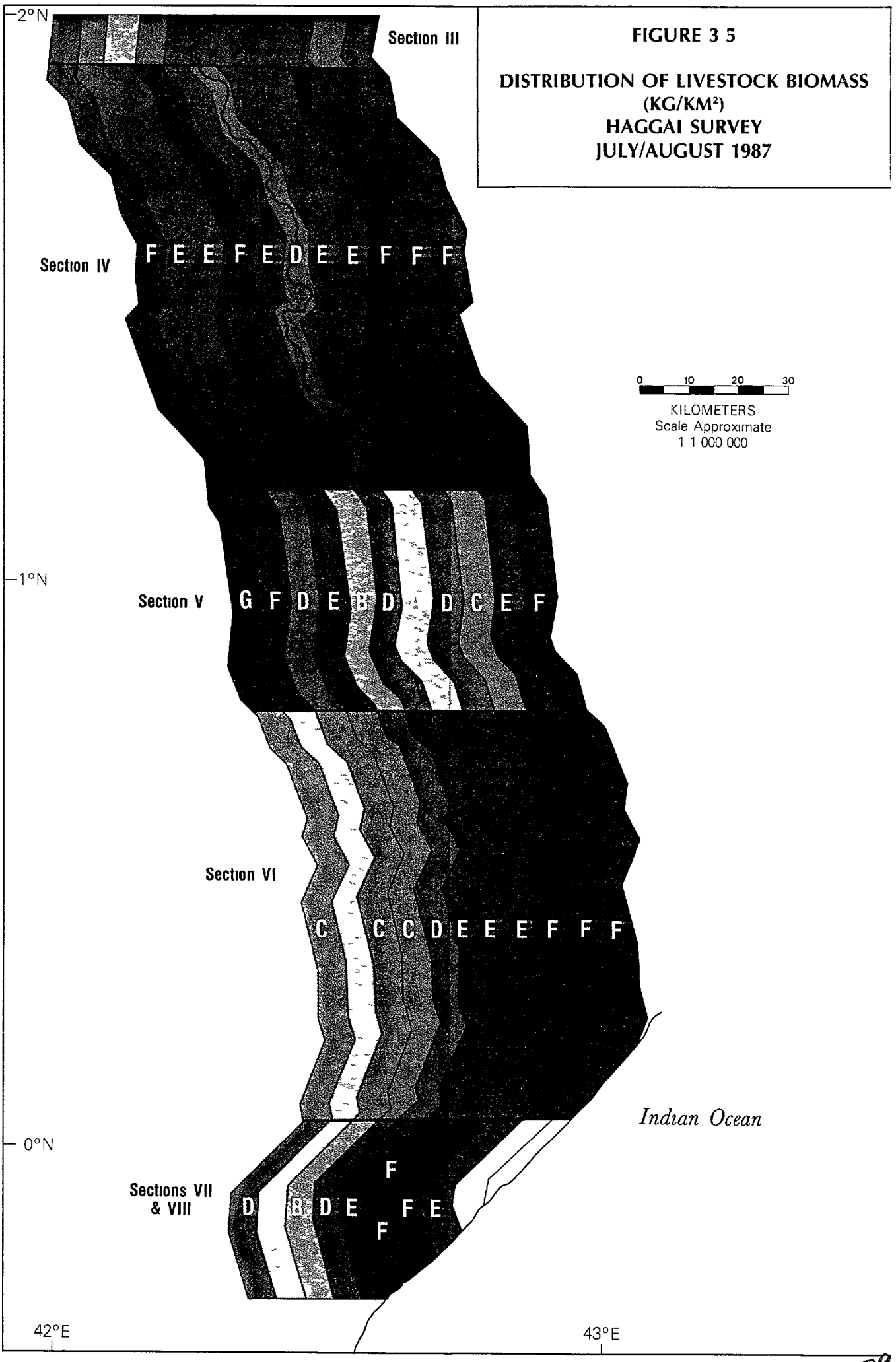
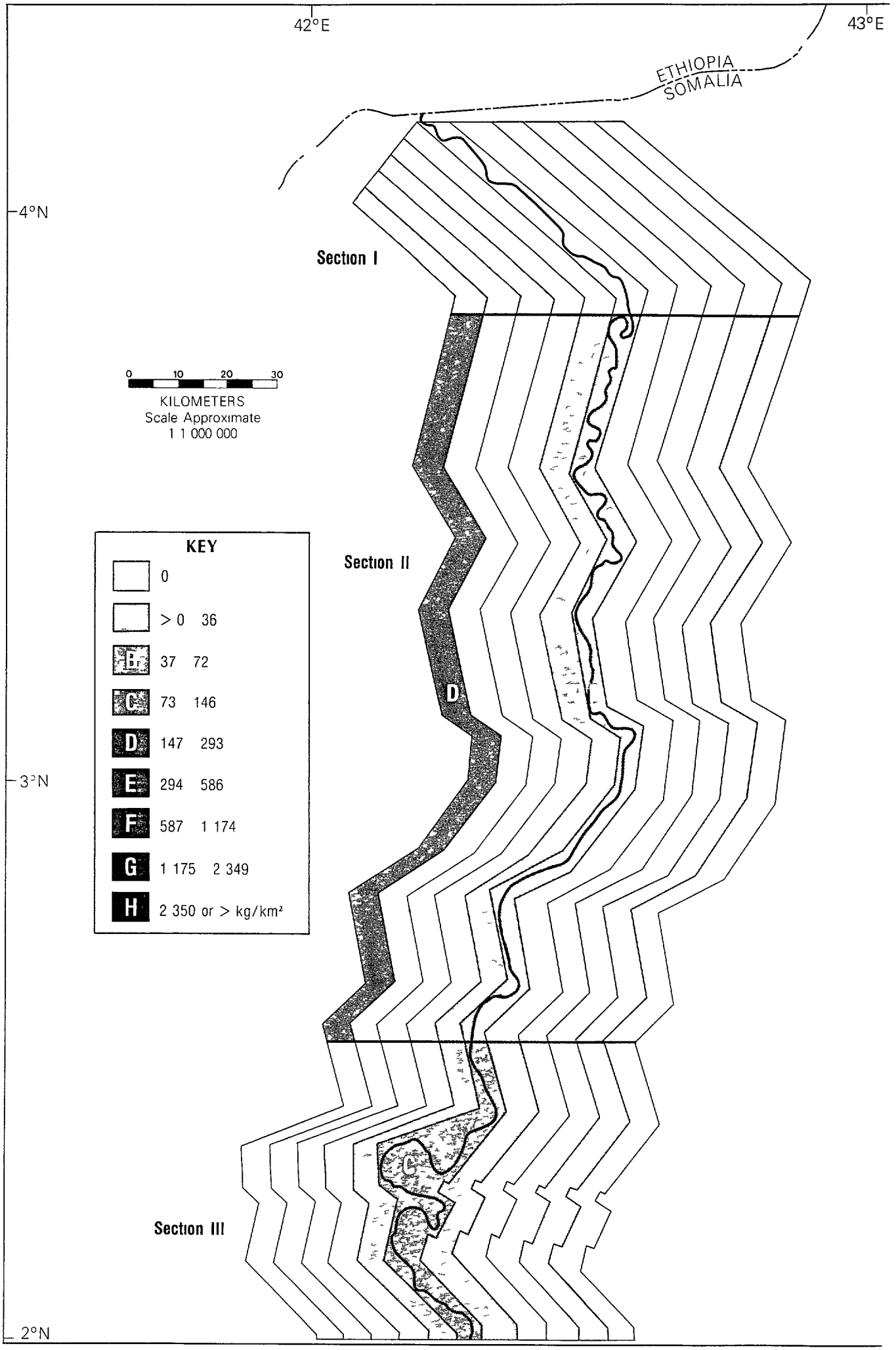


FIGURE 3 5

DISTRIBUTION OF LIVESTOCK BIOMASS
(KG/KM²)
HAGGAI SURVEY
JULY/AUGUST 1987


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
Section II
Section III
D
C
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
> 0 36
B 37 72
C 73 146
D 147 293
E 294 586
F 587 1 174
G 1 175 2 349
H 2 350 or > kg/km²

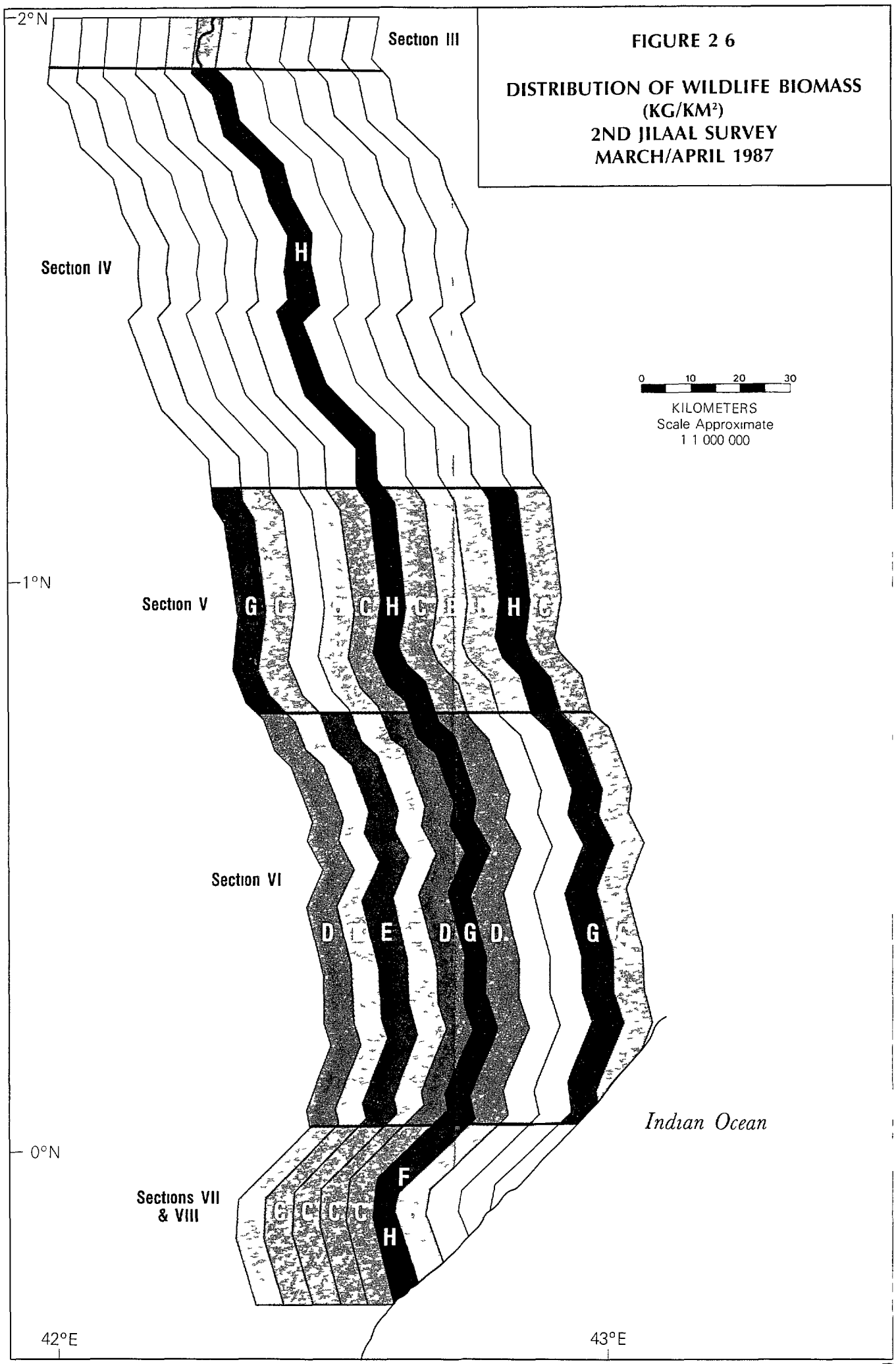
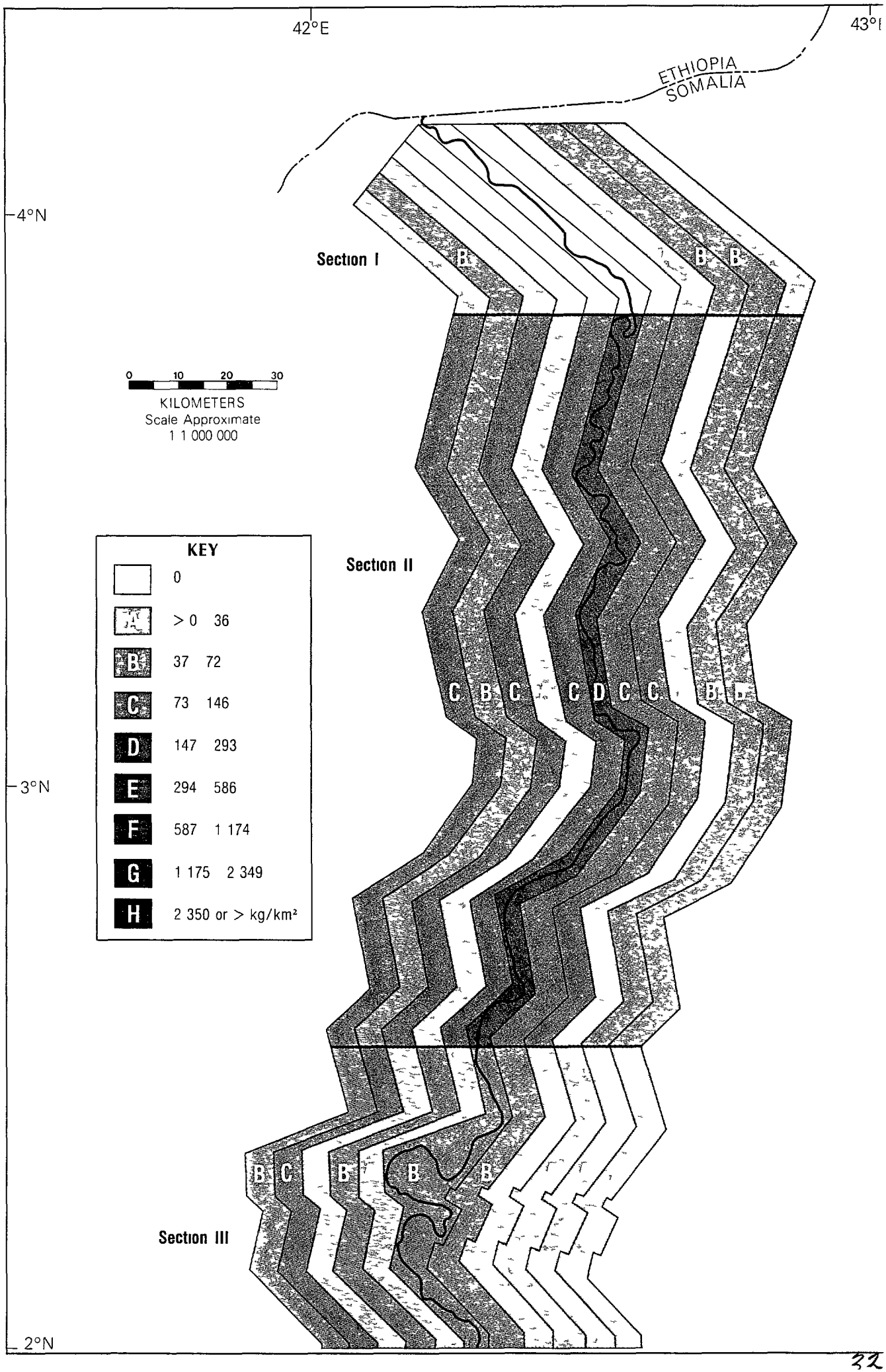


FIGURE 2 6

DISTRIBUTION OF WILDLIFE BIOMASS
(KG/KM²)
2ND JILAAL SURVEY
MARCH/APRIL 1987


42°E
43°E
ETHIOPIA
SOMALIA
4°N
3°N
2°N
Section I
Section II
Section III
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
KEY
0
> 0 36
37 72
73 146
147 293
294 586
587 1 174
1 175 2 349
2 350 or > kg/km²

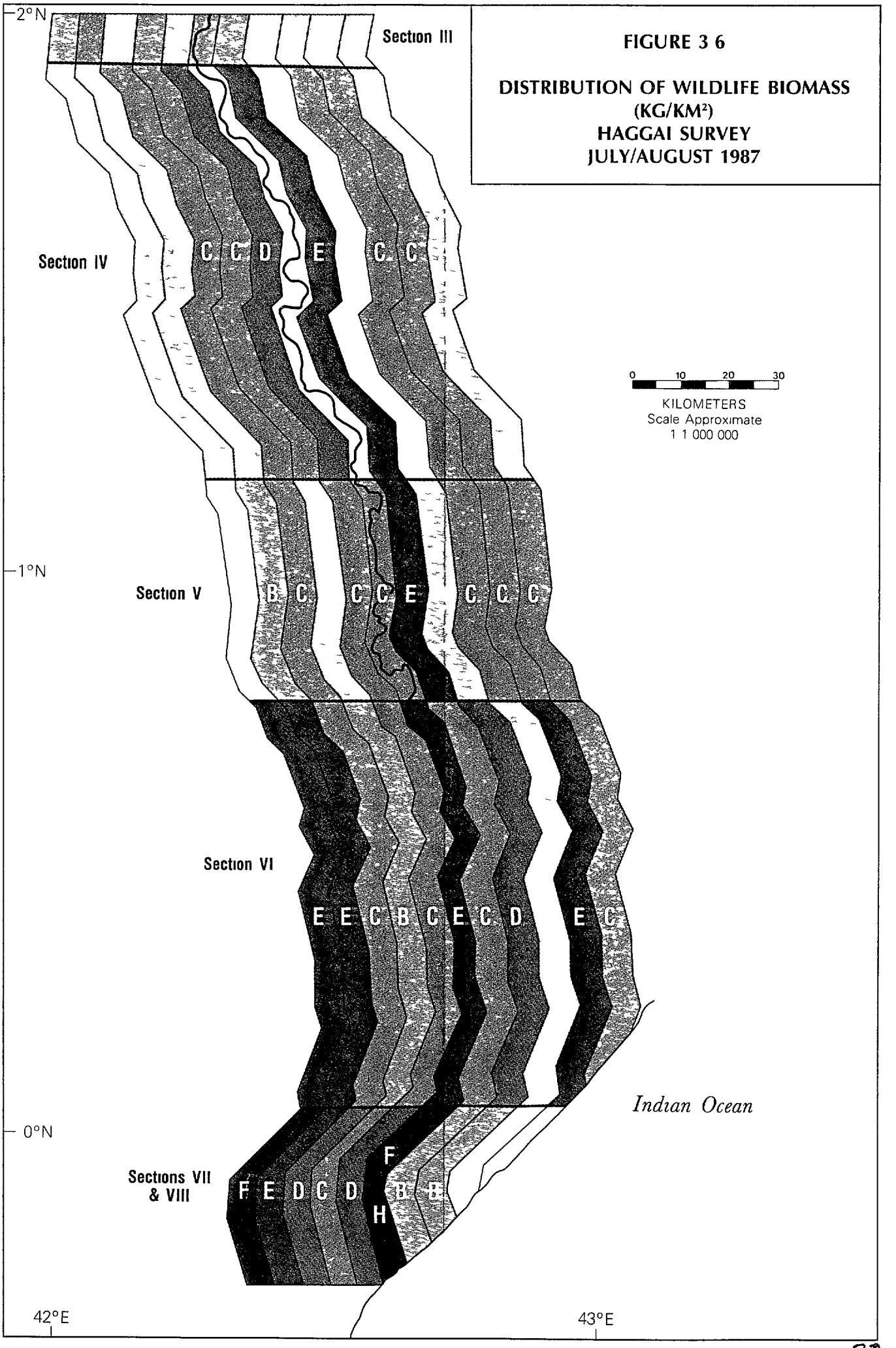


FIGURE 3 6
DISTRIBUTION OF WILDLIFE BIOMASS
(KG/KM²)
HAGGAI SURVEY
JULY/AUGUST 1987
2°N
1°N
0°N
42°E
43°E
Section III
Section IV
Section V
Section VI
Sections VII
& VIII
C C D E C C
B C C C E C C C
E E C B C E C D E C
F E D C D F B B H
0 10 20 30
KILOMETERS
Scale Approximate
1 1 000 000
Indian Ocean

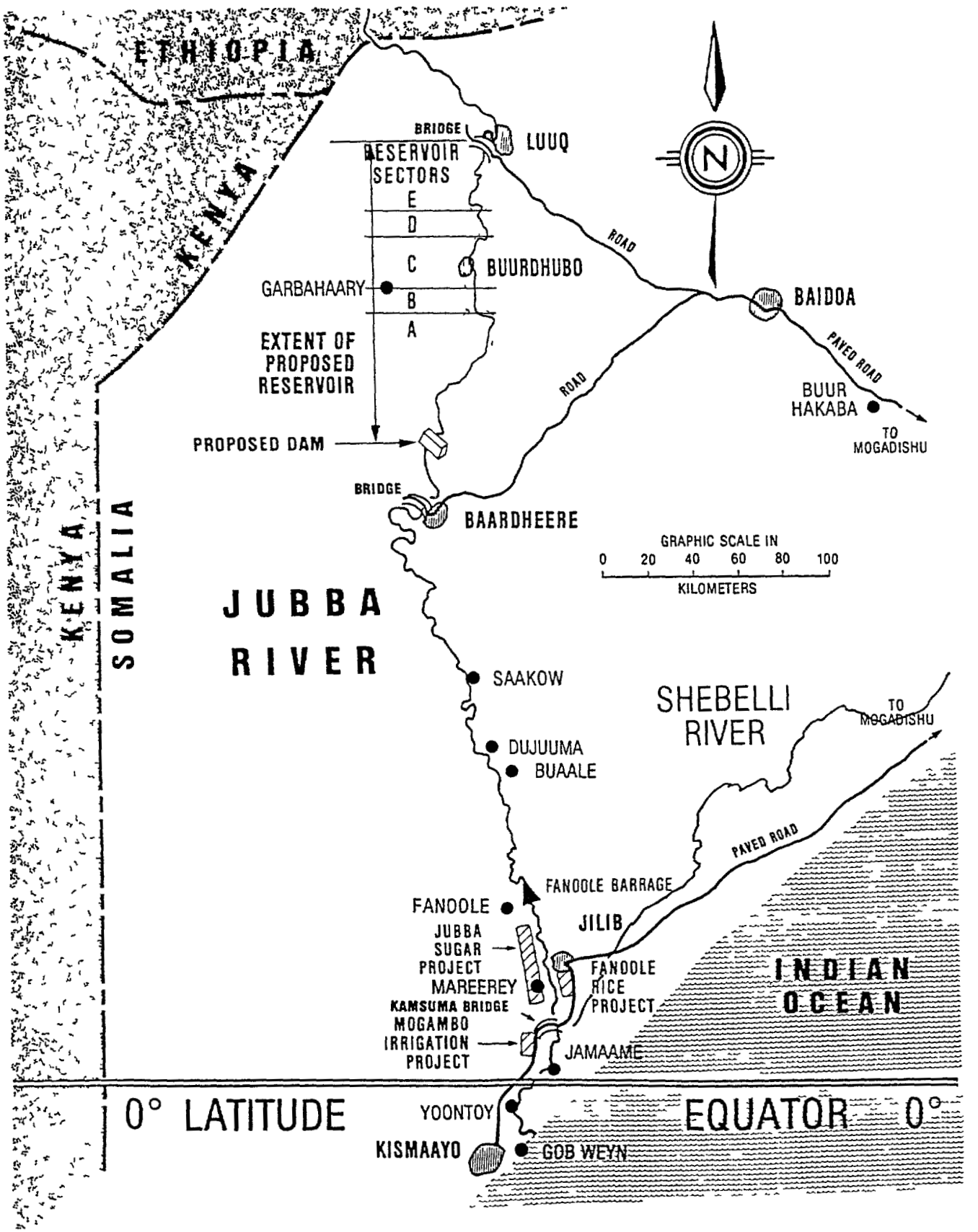


Figure II.1
Proposed Dam And Reservoir In Jubba Valley Of Somalia, With Existing Irrigation Schemes

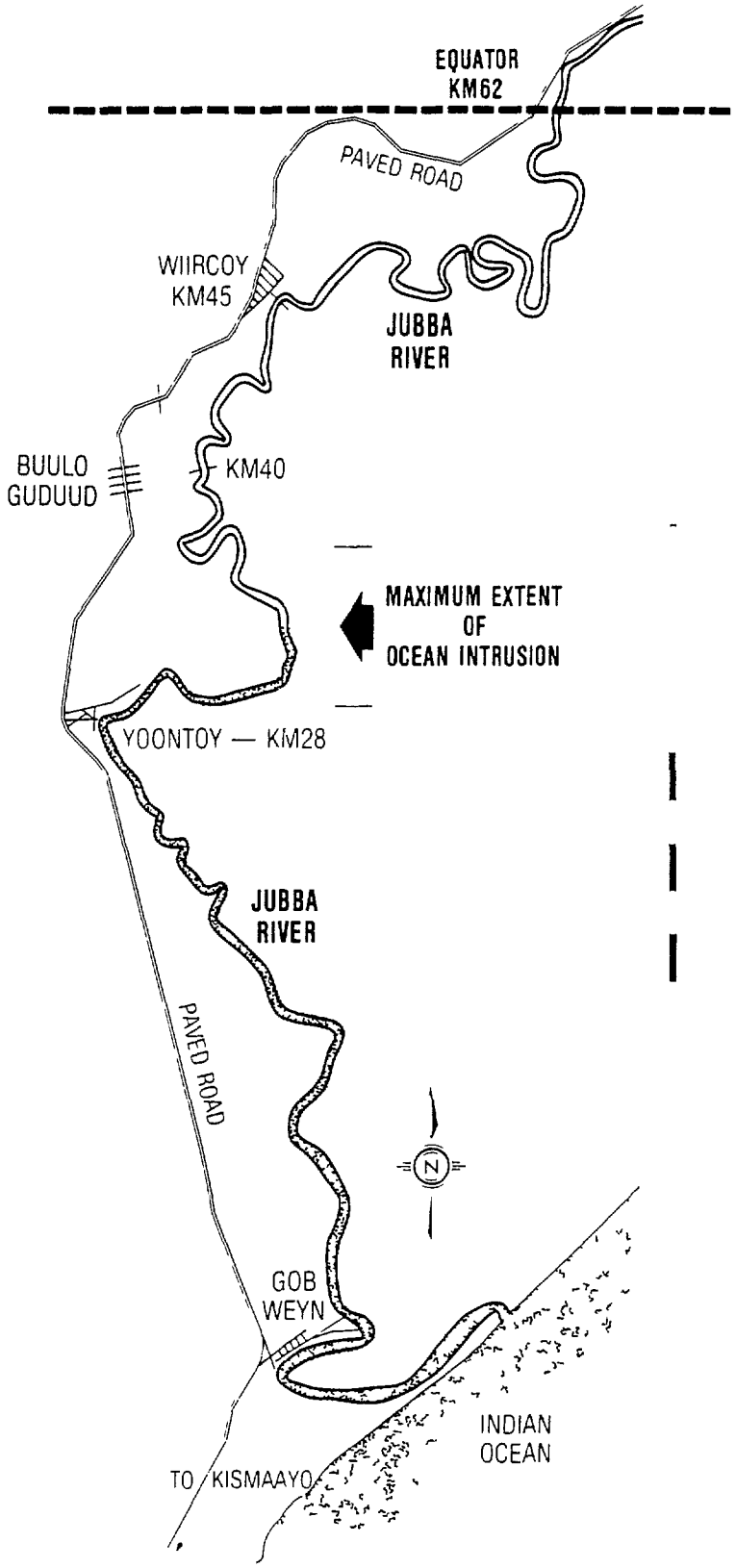


Figure III.A.6
Lower Reach Of Jubba River
Showing Extent Of Ocean Intrusion

Maximum ocean intrusion occurred at zero river flow in March 1987, reaching almost to Buulo Guduud

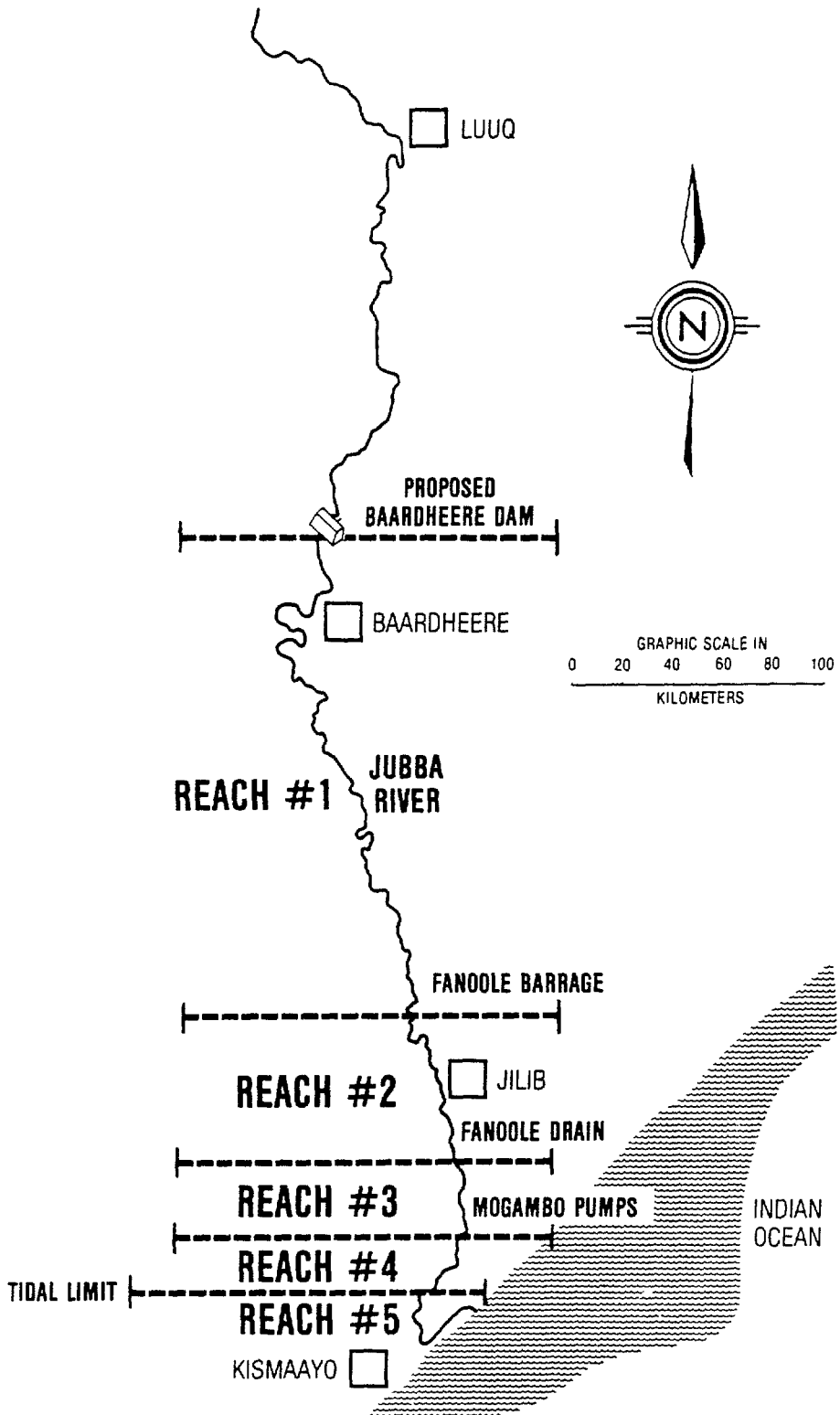


Figure V.B.1
Schematic Showing Location Of Stations For Water Quality Model Of Jubba River

SEBS MAP #1
SOCIO-ECOLOGICAL SAMPLING ZONES

0 5 10 20 30 40 50
SCALE IN KILOMETERS
R F = 1 1 000 000

LEGEND

- Surfaced Roads (Tarmac)
- Maintained Dirt Roads
- Bush Tracks (Alignment Approximate)
- Wetlands
- Inundation Area of Dam (C d s wth Ag c lt al R e b twe D m St a d L uq)
- District Boundary
- Regional Boundary

Socioeconomic Baseline Study
Socio Ecological Sampling Sectors

- 3 Urban
- Agricultural Riverine
- Agricultural Non Riverine
- Pastoral

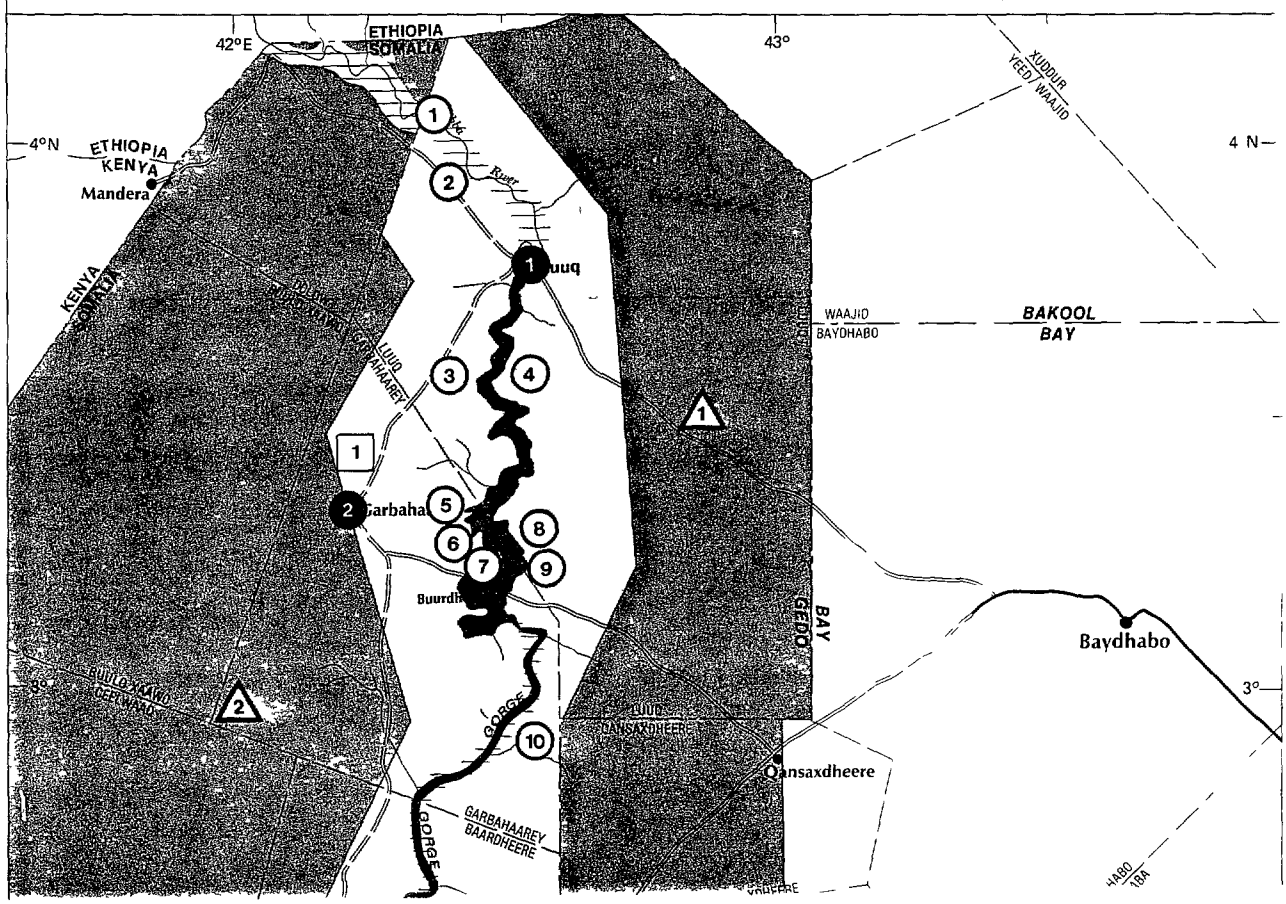
Socioeconomic Baseline Study
Sample Population Site Locations

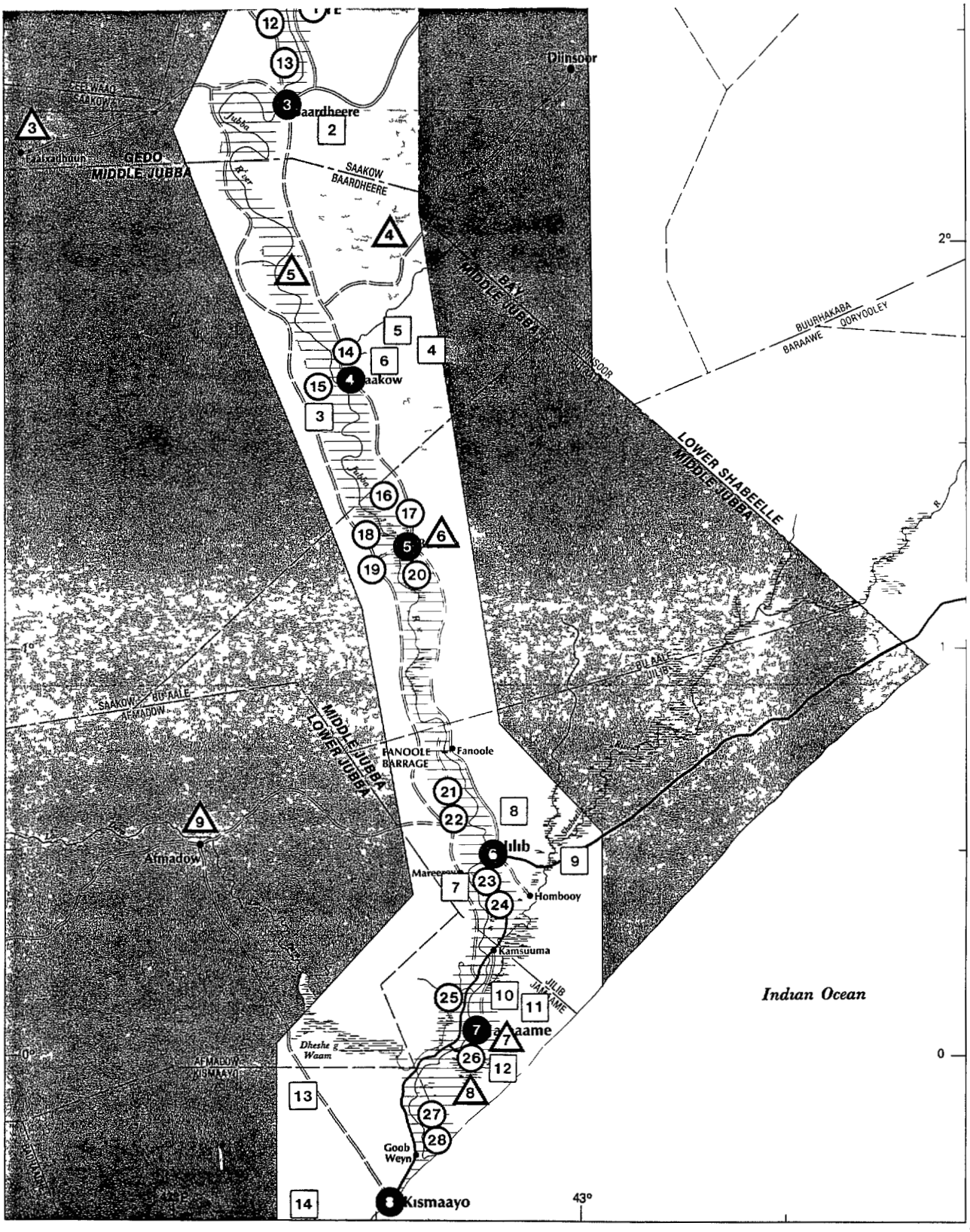
1 Urban
1 Luuq
2 Garbahaarey
3 Baardheere
4 Saakow
5 Bu aale
6 Jilib
Jamaame
8 Kismaayo

8 Riverine
1 Dhaysiyow
2 Garboolow
3 Qolayle
4 Marayle
5 Golweyn
6 Saarsar
Kuudka
8 Mariile
9 Hufay
10 Gorge Area
11 Dugsilow
12 Kudug
13 Mardha
14 Buur Fuule
15 Kulmis
16 Dujuuma
17 Dalahelay
18 Jabbi
19 Banta
20 Qarareerey
21 Haraawe
22 Kumbareera
23 Gomeeni Yare
24 Nasiib Buundo
25 Sheekh Cambuulo
26 Buulo Maamow
27 Mokomane
28 Goob Weyn

12 Non Riverine
1 Maykoreebe
2 Xagar Buulo
3 Nus Duniya
4 Labi Buul
5 Qayd Cajuuso
6 Marmarka
7 Gaduudey
8 Hiloshiid
9 Arbay Cabdi
10 Honqorre
11 Nyiireey
12 Janaale Jaay
13 Canjeel
14 Fuuma

4 Pastoral
1 Yurkut
2 Ceel Gaddud
3 Faafxadhuun
4 Banaada
5 Salagle
6 Dhesheeg Radiil
Qoraxey
8 Nafta Quur
9 Afmadow




Diinsoor
Baardheere
SAAKOW
BAARDHEERE
GEDO
MIDDLE JUBBA
MIDDLE JUBBA
BAY
BUURHAKABA
BARAAWE
QORYOOLEY
LOWER SHABEELLE
MIDDLE JUBBA
Saakow
SAAKOW
BU'AALE
AFMADOW
MIDDLE JUBBA
LOWER JUBBA
FANOOLE
BARRAGE
Fanoole
Afmadow
Jilib
Hombooy
Kamsuuma
JILIB
JAMAME
Jamaame
Dheshe g
Waam
AFMADOW
KISMAAYO
Goob
Weyn
Kismaayo
Indian Ocean
43°
2°
1°
0°
0

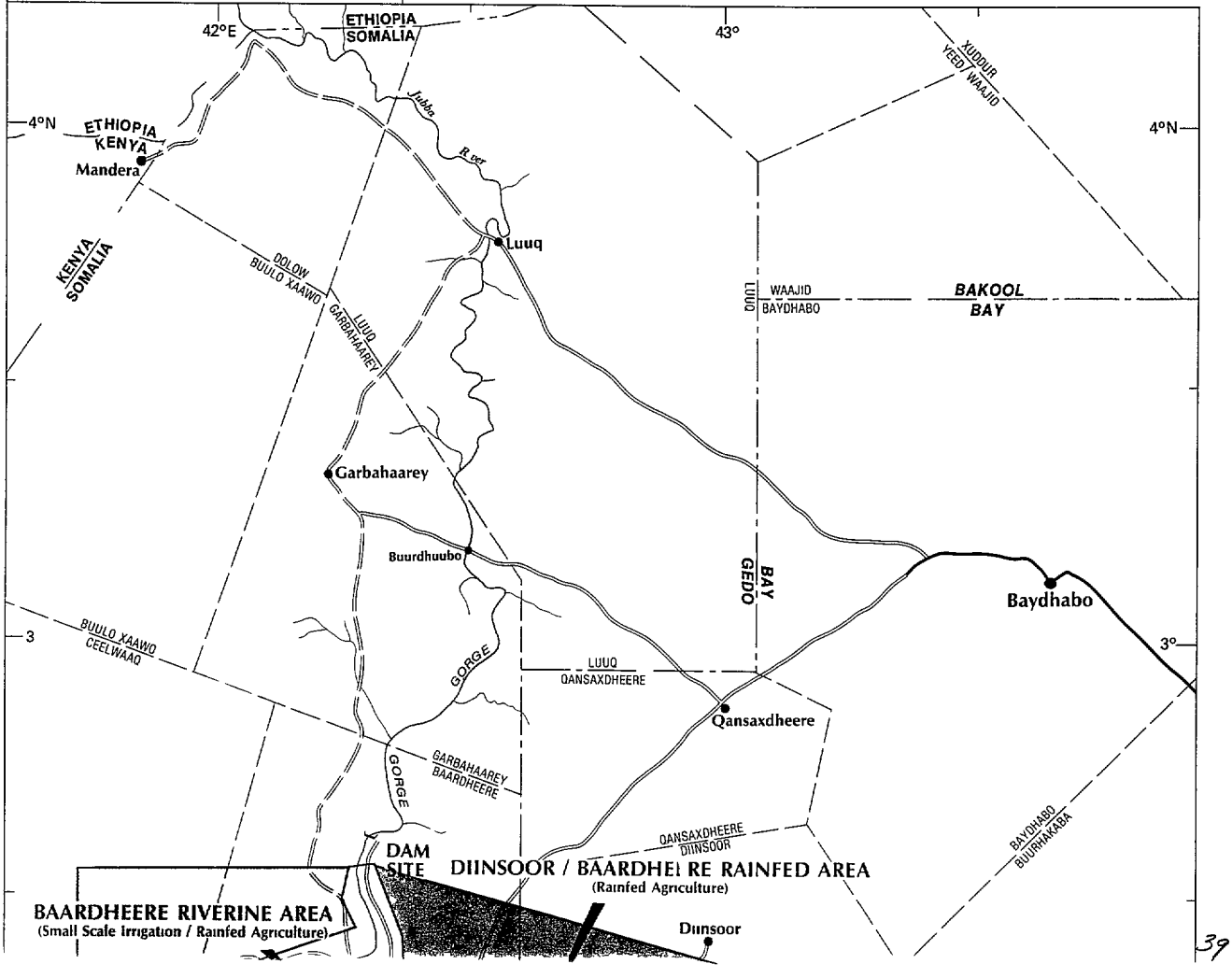
SEBS MAP #2
SOCIO-GEOGRAPHIC UNITS

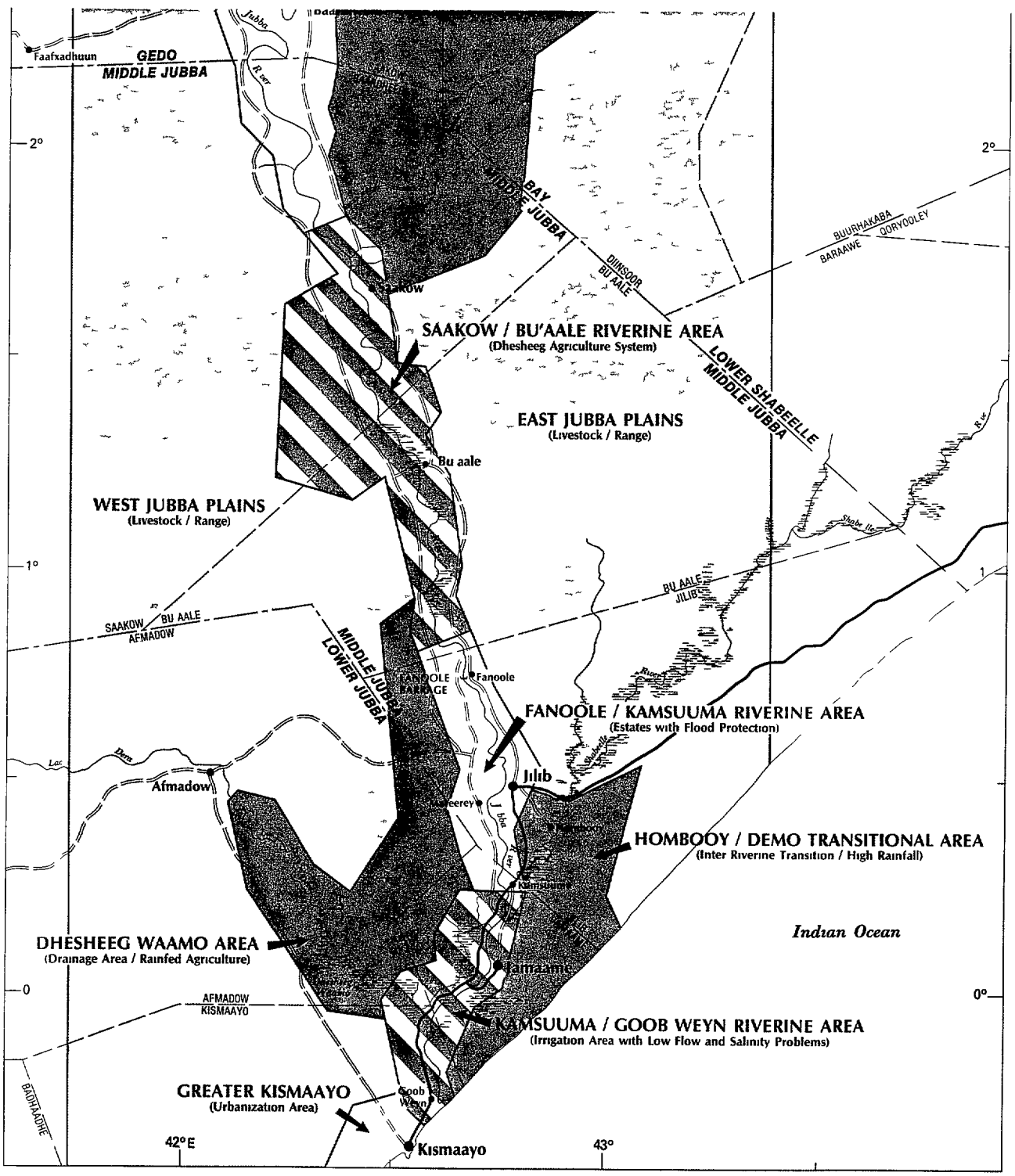
0 5 10 20 30 40 50
SCALE IN KILOMETERS
R F = 1 1 000 000

LEGEND

- Surfaced Roads (Tarmac)
- Maintained Dirt Roads
- Bush Tracks (Alignment Approximate)
- Wetlands
- Inundation Area of Dam
- District Boundary
- Regional Boundary

Source Agrar und Hyd otechnik GMBH Masterplan for J ba Vallev Development Volume ? (draft) Ju e 1988



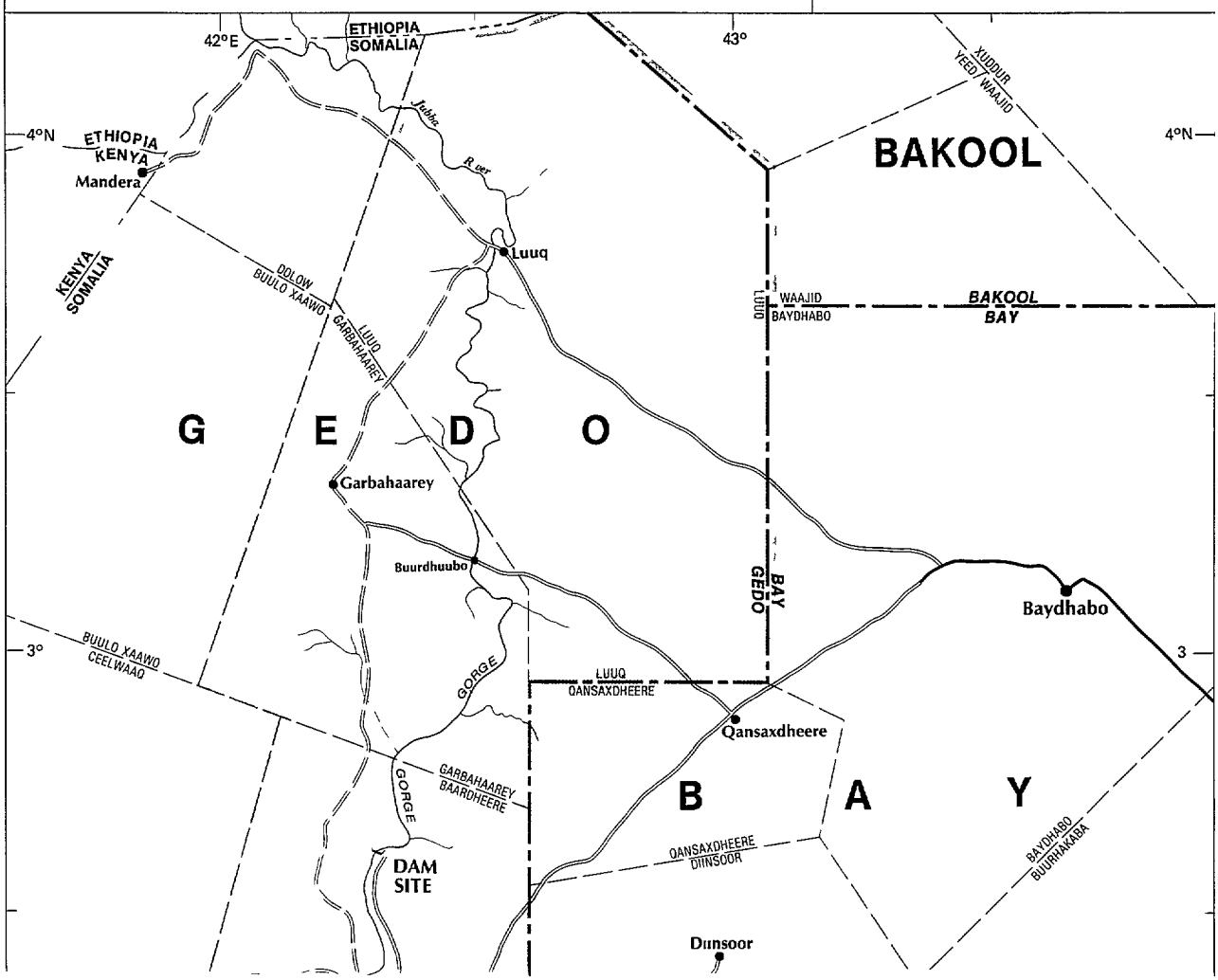

Faafxadhuun
GEDO
MIDDLE JUBBA
Jubba
River
2°
BAY
MIDDLE JUBBA
DUINSOOR
BU AALE
BUURHAKABA
BARAAWE
QORYOOLEY
SAAKOW / BU'AALE RIVERINE AREA
(Dhesheeg Agriculture System)
LOWER SHABEELLE
MIDDLE JUBBA
EAST JUBBA PLAINS
(Livestock / Range)
Bu aale
WEST JUBBA PLAINS
(Livestock / Range)
1°
BU AALE
JILIB
SAAKOW
BU AALE
AFMADOW
MIDDLE JUBBA
LOWER JUBBA
FANOOLE
BARRAGE
Fanoole
FANOOLE / KAMSUUMA RIVERINE AREA
(Estates with Flood Protection)
Afmadow
Jilib
HOMBOOY / DEMO TRANSITIONAL AREA
(Inter Riverine Transition / High Rainfall)
Indian Ocean
DHESHEEG WAAMO AREA
(Drainage Area / Rainfed Agriculture)
0
AFMADOW
KISMAAYO
KAMSUUMA / GOOB WEYN RIVERINE AREA
(Irrigation Area with Low Flow and Salinity Problems)
BADHAADHE
GREATER KISMAAYO
(Urbanization Area)
Goob Weyn
42°E
Kismaayo
43°
0°

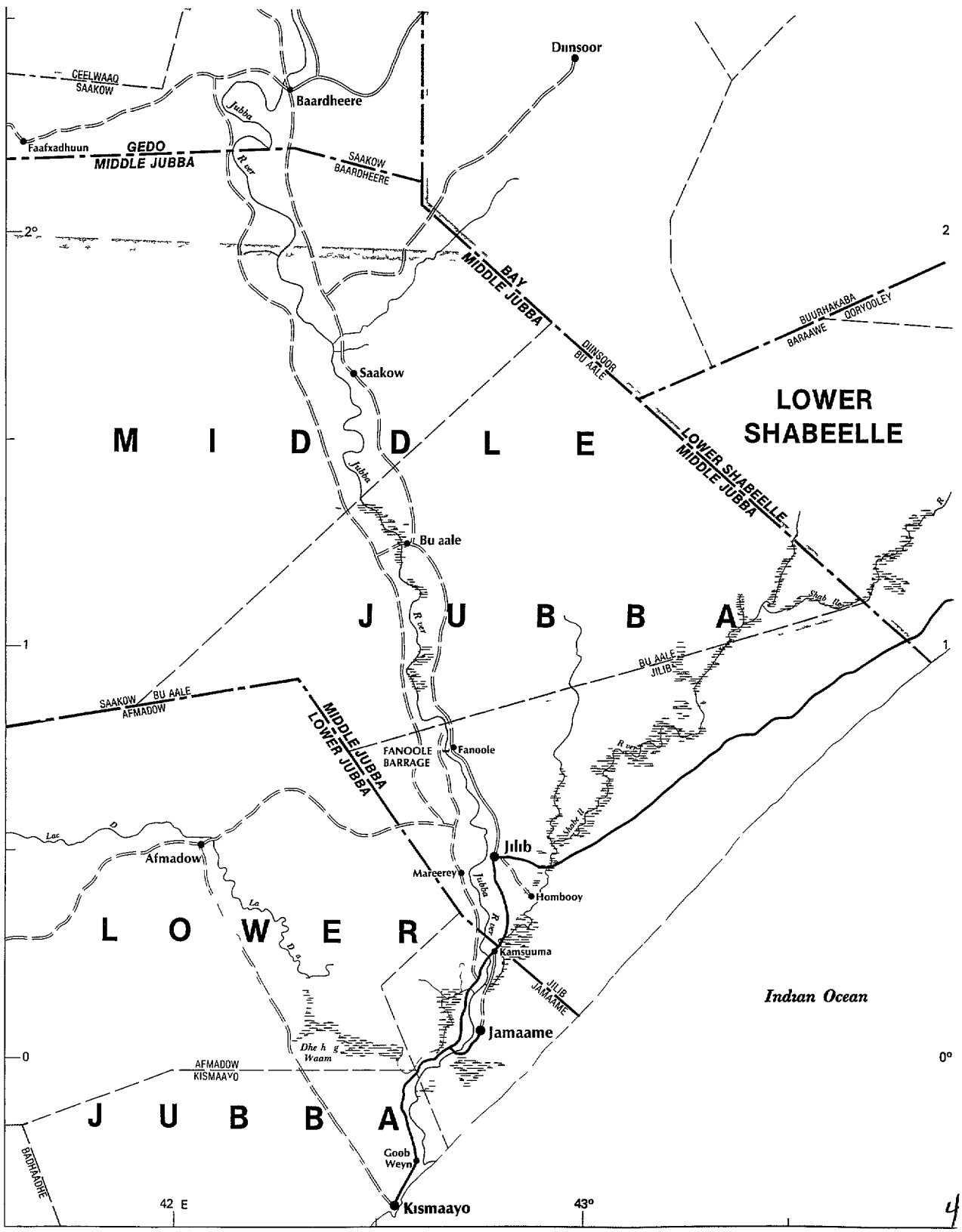
SEBS MAP #3
POLITICAL AND SOCIOECONOMIC REGIONS OF THE JUBBA VALLEY

0 5 10 20 30 40 50
SCALE IN KILOMETERS
R F = 1 1 000 000

LEGEND

- Surfaced Roads (Tarmac)
- Maintained Dirt Roads
- Bush Tracks (Alignment Approximate)
- Wetlands
- Inundation Area of Dam
- District Boundary
- Political Regions
- Socioeconomic Regions




Diinsoor
CEELWAAQ
SAAKOW
Baardheere
Jubba
Faafxadhuun
GEDO
MIDDLE JUBBA
River
SAAKOW
BAARDHEERE
2°
2
BAY
MIDDLE JUBBA
DIINSOOR
BU AALE
BUURHAKABA
BARAAWE
DORYOOLEY
Saakow
LOWER
SHABEELLE
M I D D L E
LOWER SHABEELLE
MIDDLE JUBBA
Bu aale
J U B B A
1
1
BU AALE
JILIB
SAAKOW
BU AALE
AFMADOW
MIDDLE JUBBA
LOWER JUBBA
FANOOLE
BARRAGE
Fanoole
Afmadow
Jilib
Mareerey
Hombooy
L O W E R
Kamsuuma
JILIB
JAMAAME
Indian Ocean
Jamaame
Dhe h g
Waam
0
0°
AFMADOW
KISMAAYO
J U B B A
Goob
Weyn
BADHAADHE
42 E
Kismaayo
43°

42

SEBS MAP #4
AGRICULTURAL ZONES IN JUBBA VALLEY

0 5 10 20 30 40 50
SCALE IN KILOMETERS
R F = 1 1 000 000

LEGEND

- Surfaced Roads (Tarmac)
- Maintained Dirt Roads
- Bush Tracks (Alignment Approximate)
- Wetlands
- Inundation Area of Dam
- District Boundary
- Regional Boundary

Area of Large Scale Projects

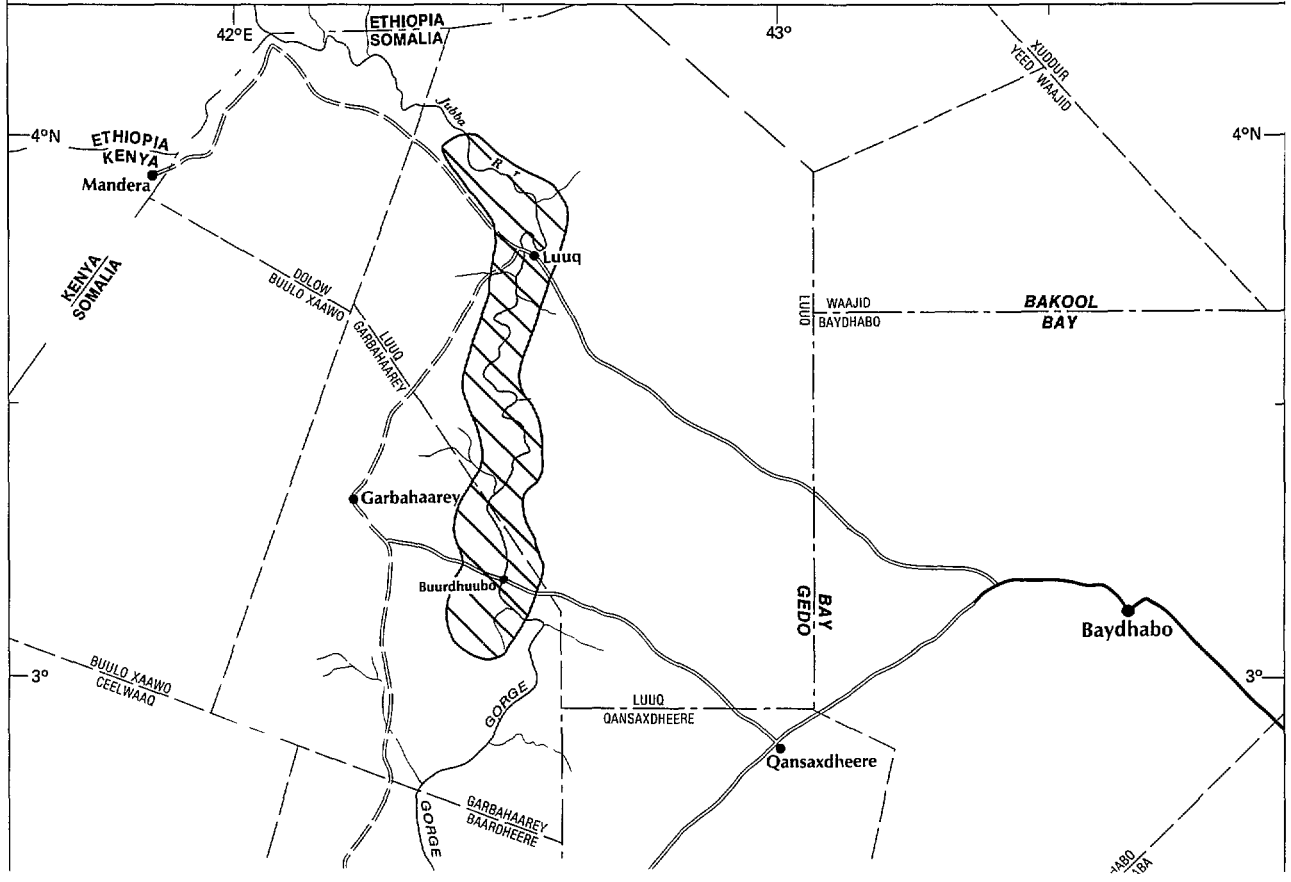
Maize Zone

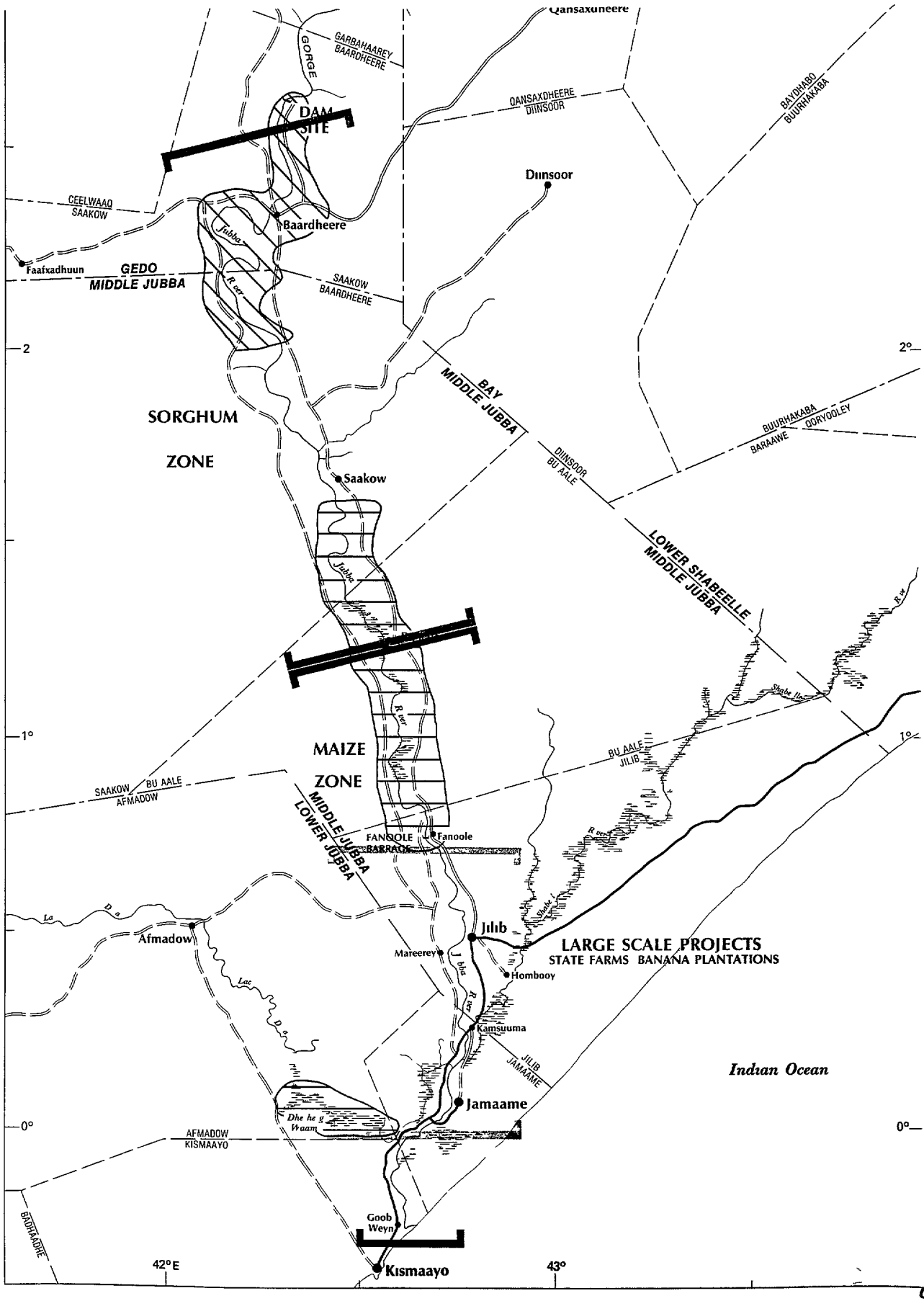
Sorghum Zone

Areas of Dhesheeg Agriculture

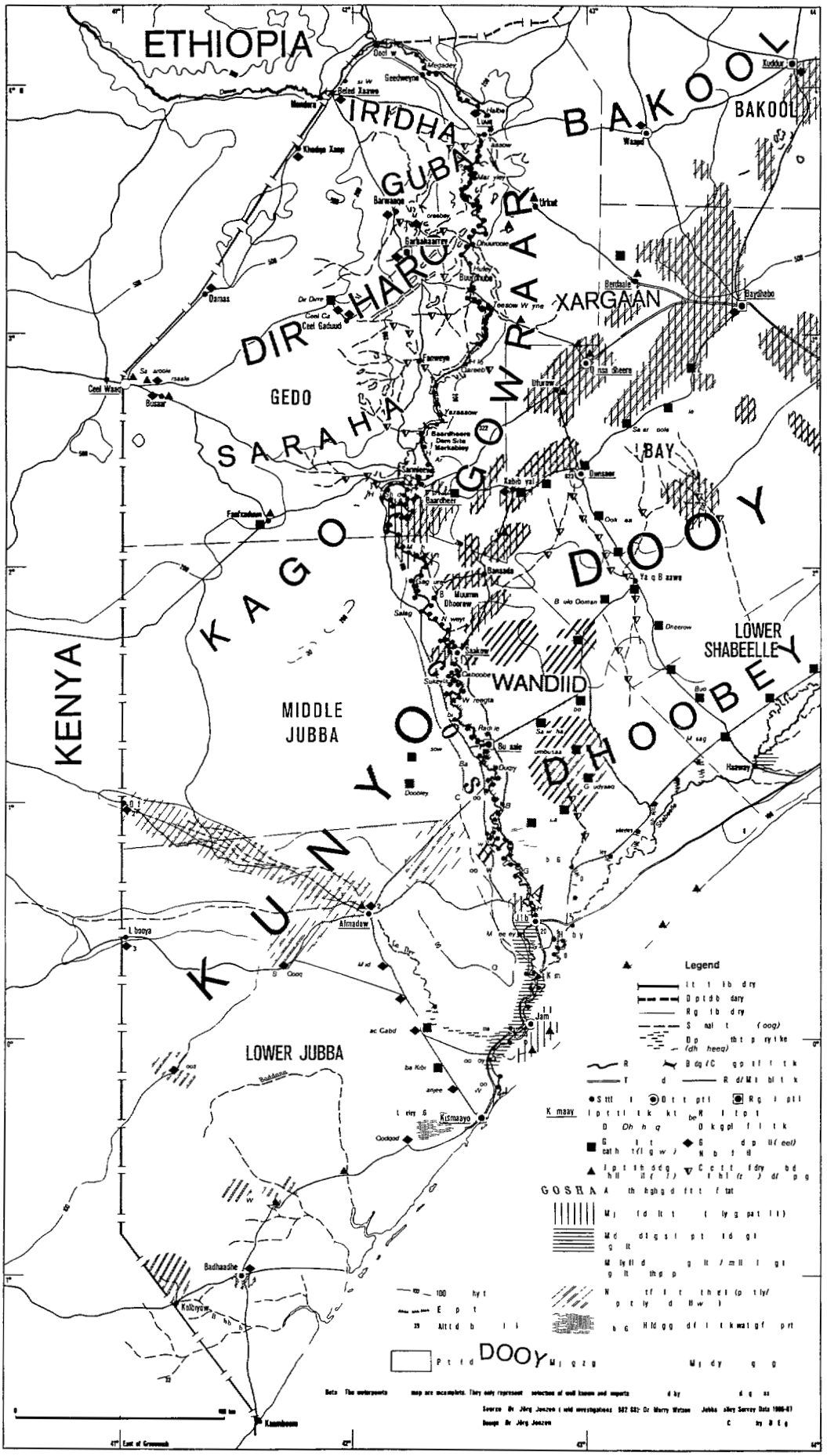
Areas of Small Scale Private Pumping

Sorghum and Maize Zones depict areas of greatest concentration Sorghum is grown up to the Ethiopian border but concentrated from the general area of the Baardheere Dam site to Bu aale District Maize is grown throughout the Valley under irrigation the zone of greatest production is from Bu aale District south




Qansaxdheere
GARBAHAAREY
BAARDHEERE
GORGE
DAM SITE
QANSAXDHEERE
DIINSOOR
BAYDHABO
BUURHAKABA
Diinsoor
CEELWAAQ
SAAKOW
Baardheere
Jubba
River
Faafxadhuun
GEDO
MIDDLE JUBBA
SAAKOW
BAARDHEERE
2
2°
BAY
MIDDLE JUBBA
SORGHUM
ZONE
BUURHAKABA
BARAAWE
OORYOOLEY
DIINSOOR
BU AALE
Saakow
LOWER SHABEELLE
MIDDLE JUBBA
Shabelle
River
1°
MAIZE
ZONE
BU AALE
JILIB
SAAKOW
BU AALE
AFMADOW
MIDDLE JUBBA
LOWER JUBBA
FANOOLE
BARRAGE
Fanoole
Afmadow
Mareerey
Jilib
LARGE SCALE PROJECTS
STATE FARMS BANANA PLANTATIONS
Hombooy
Kamsuuma
JILIB
JAMAAME
Indian Ocean
Jamaame
Dhe he g
Waam
0°
0°
AFMADOW
KISMAAYO
BADHAADHE
Goob
Weyn
42° E
43°
Kismaayo

Map 1 The Greater Jubba Valley - Infrastructure, Land Use and Water Resources -



Map 2 The Greater Jubba Valley - Spatial Pattern of Seasonal Livestock Movements -

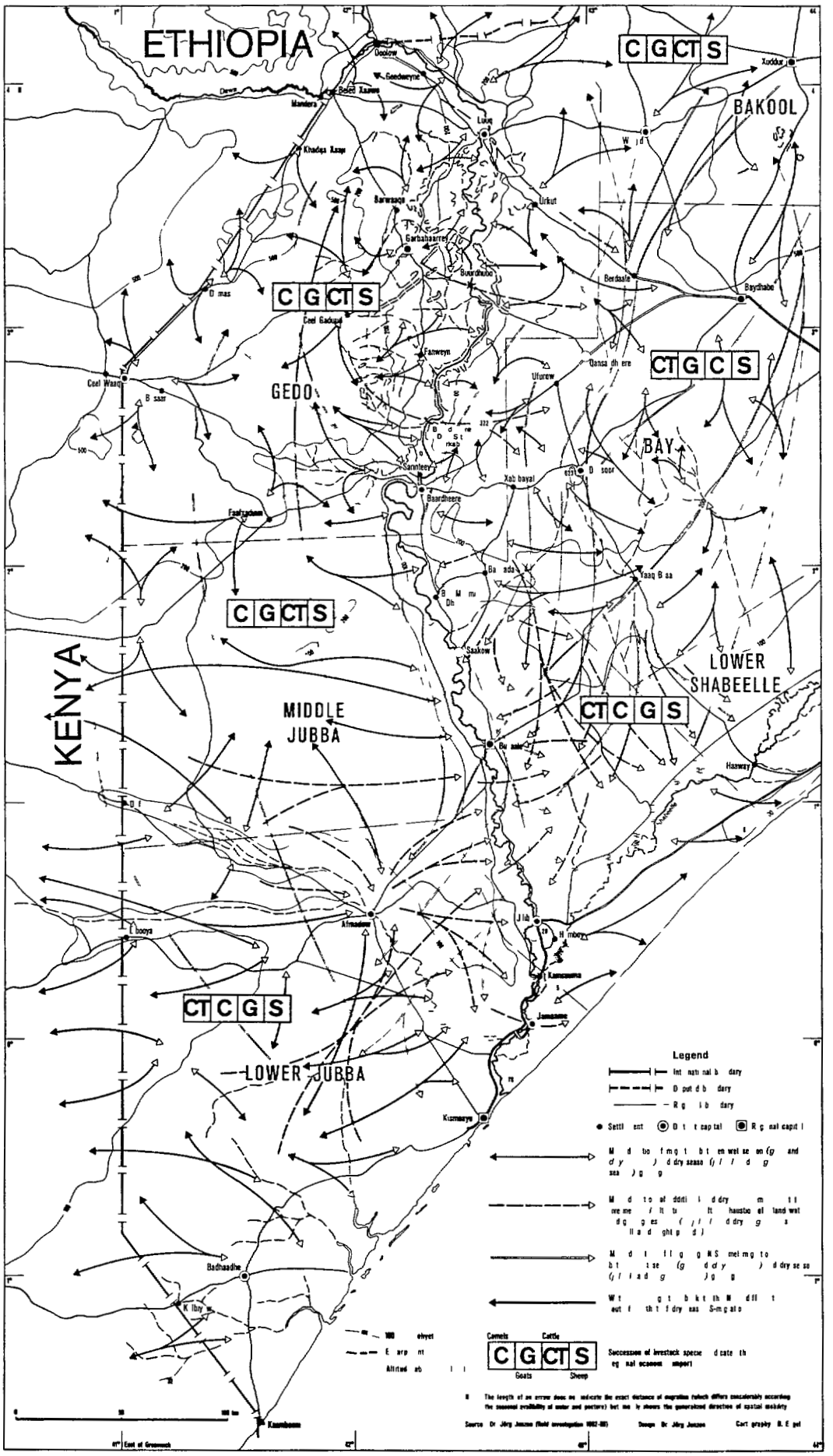
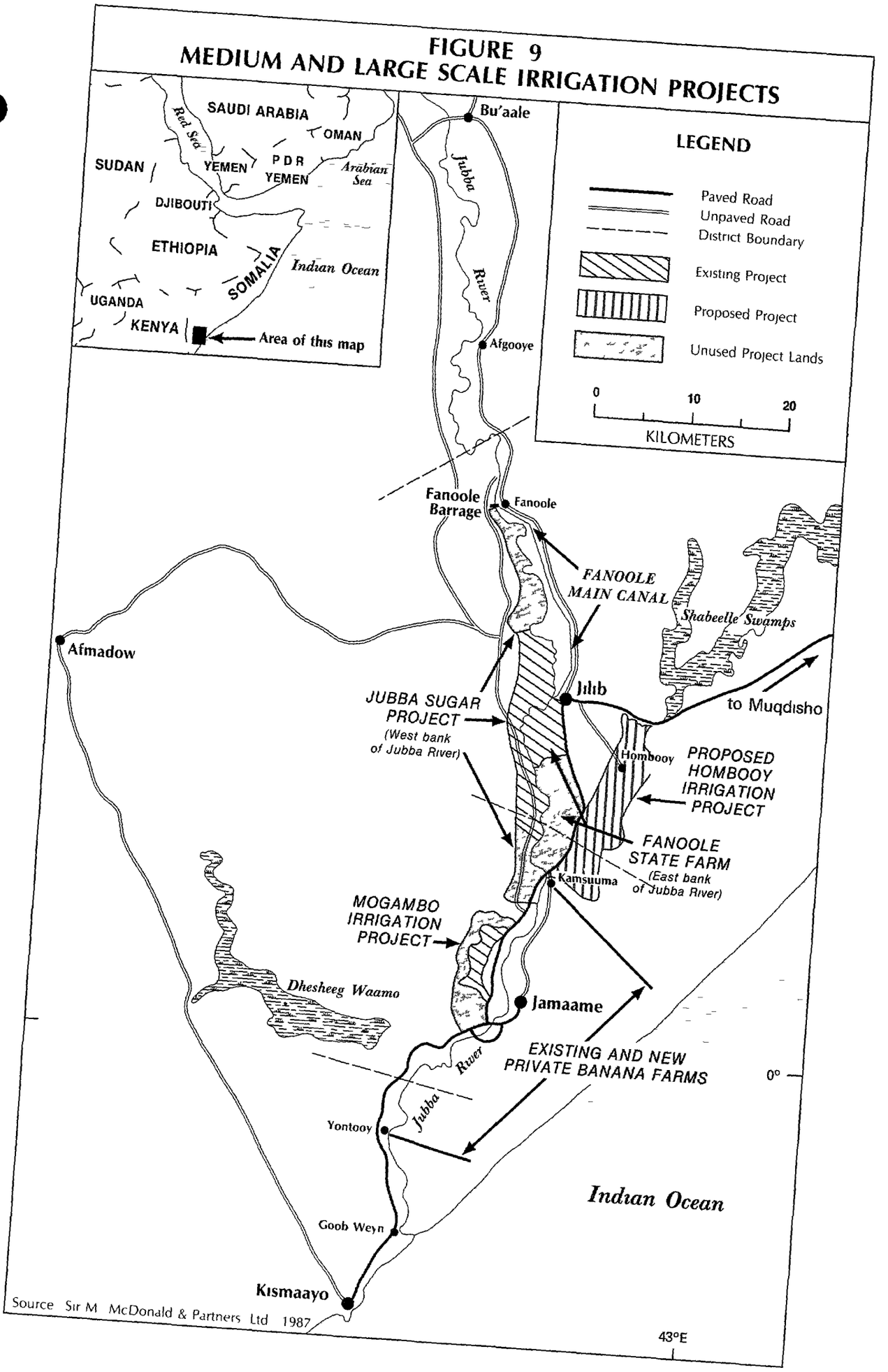


FIGURE 9
MEDIUM AND LARGE SCALE IRRIGATION PROJECTS



Source Sir M McDonald & Partners Ltd 1987