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International Council for the
Exploration of the Sea

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*REPORT OF THE
HERRING ASSESSMENT WORKING GROUP FOR THE AREA SOUTH OF 62°N*

Copenhagen, 24 March - 3 April 1987

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PART 2

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DENMARK

Figure 1.4.1

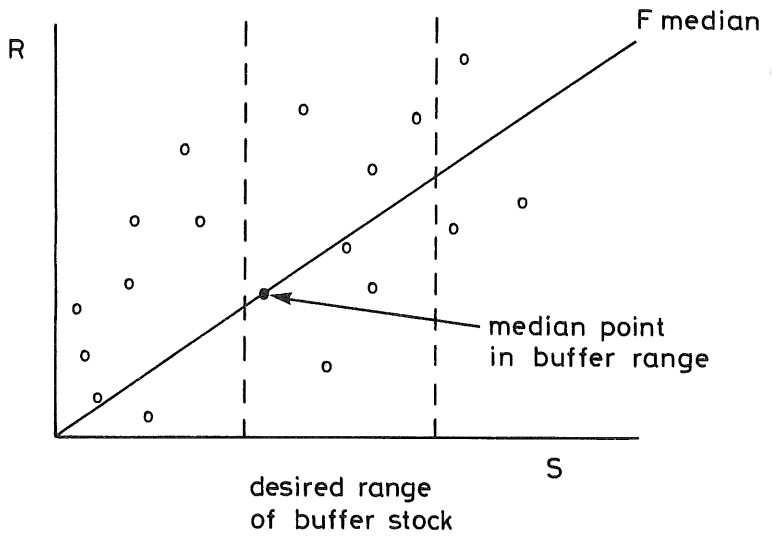


Figure 2.3.2. Placements of VPA 1-fingers on IVFS and IVFS 1-fingers. Points are plotted and labeled by assembly date and finger used in calibration. The regression line is indicated by a dashed line.

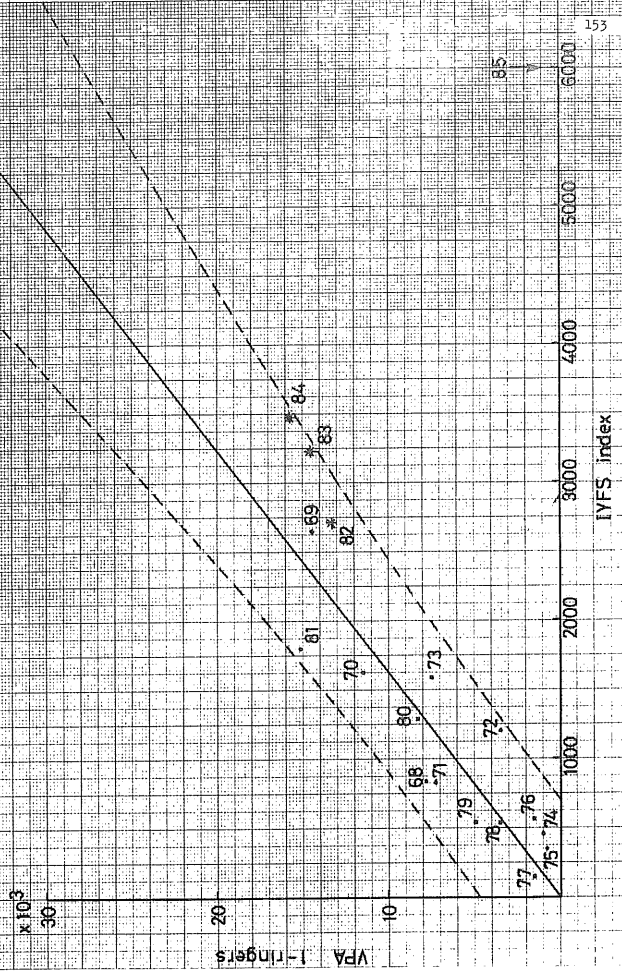


Figure 2.3.2 Plot of IVFS index as 1-group on IKMT indices as 0-group for total North Sea and Division IIIa.

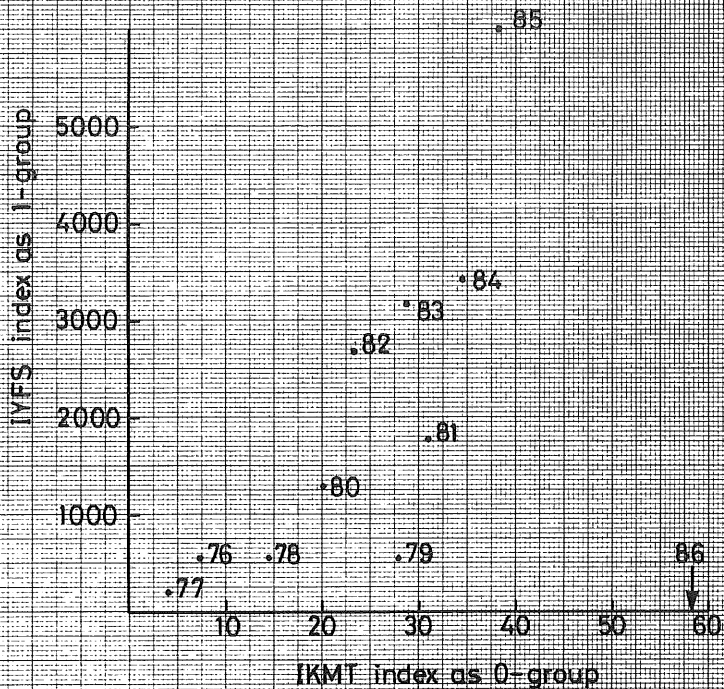
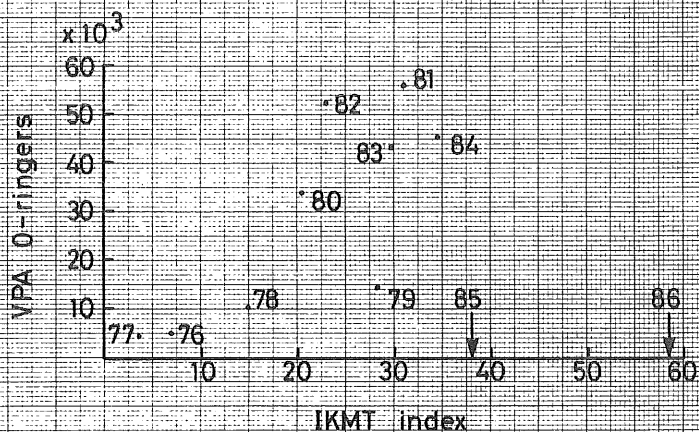


Figure 2.3.3 Plot of VPA 0-ringers on IKMT indices for total North Sea and Division TIIa.



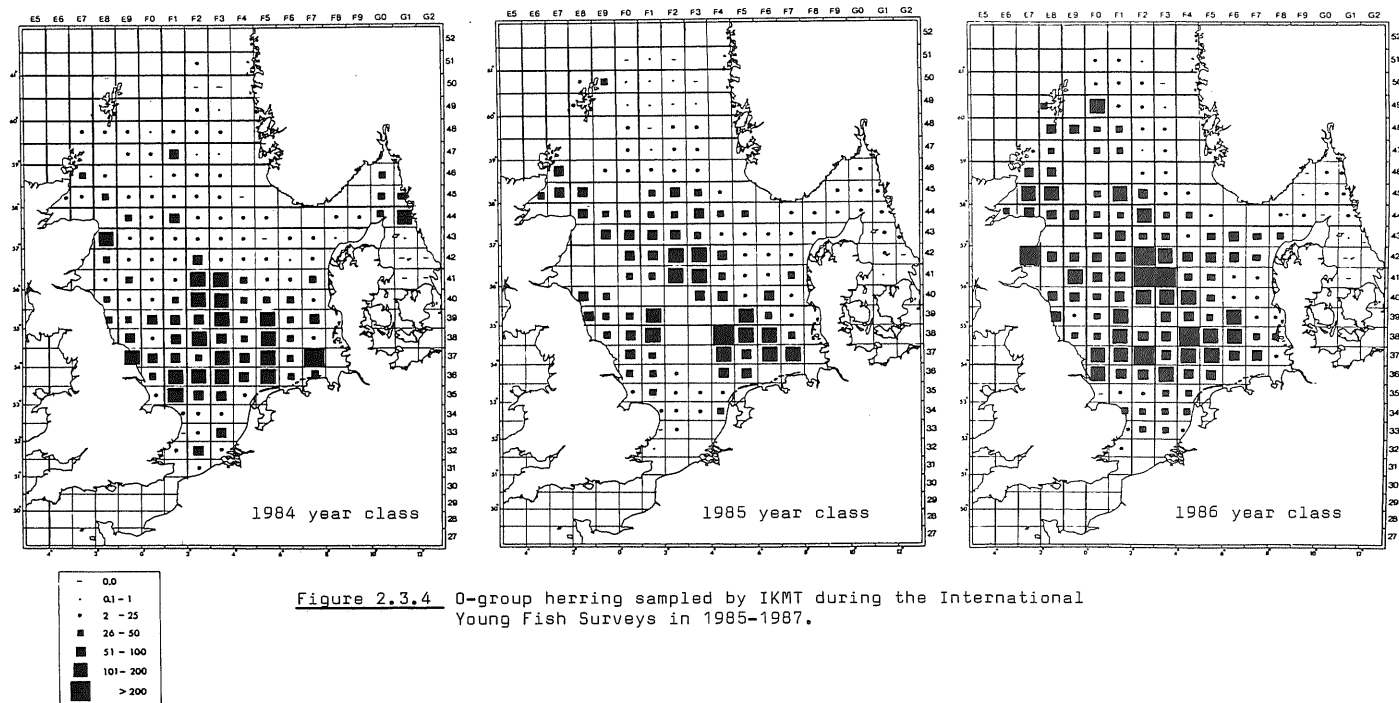


Figure 2.3.4 0-group herring sampled by IKMT during the International Young Fish Surveys in 1985-1987.

Figure 2.3.5

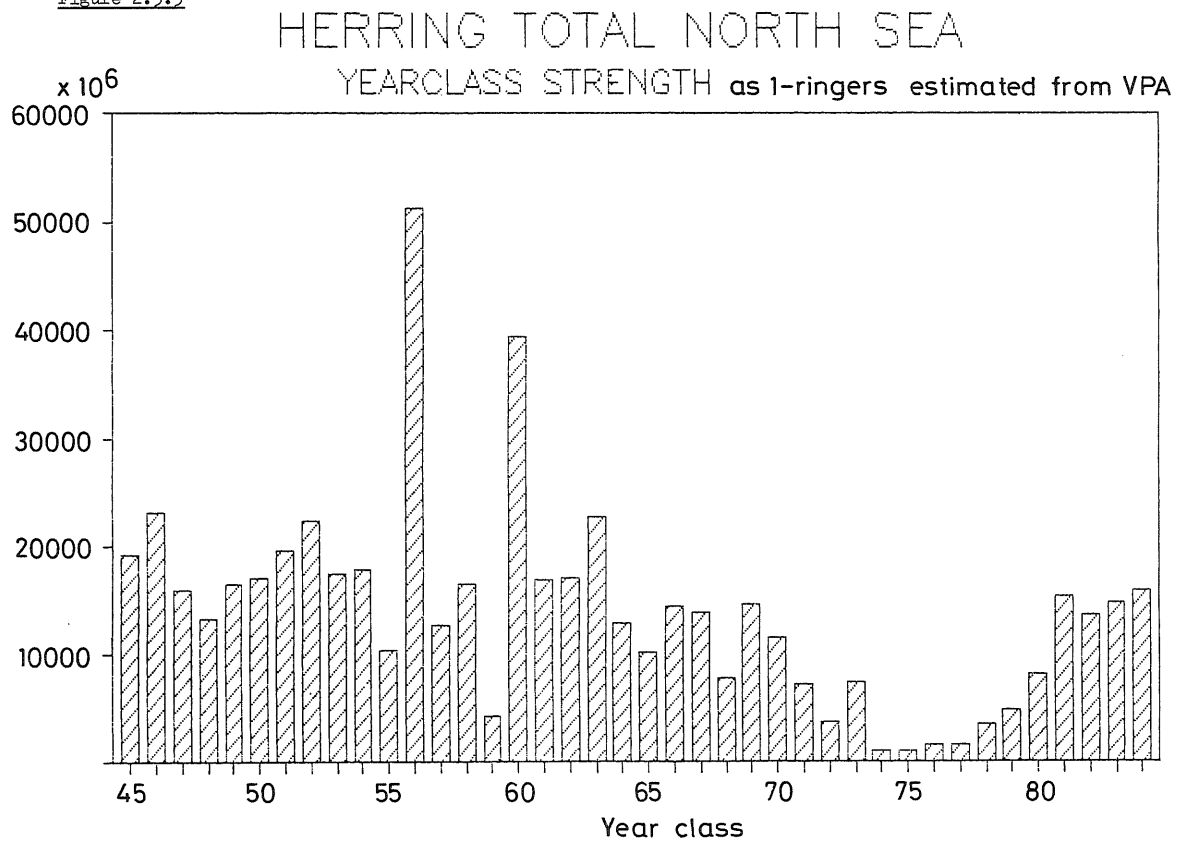
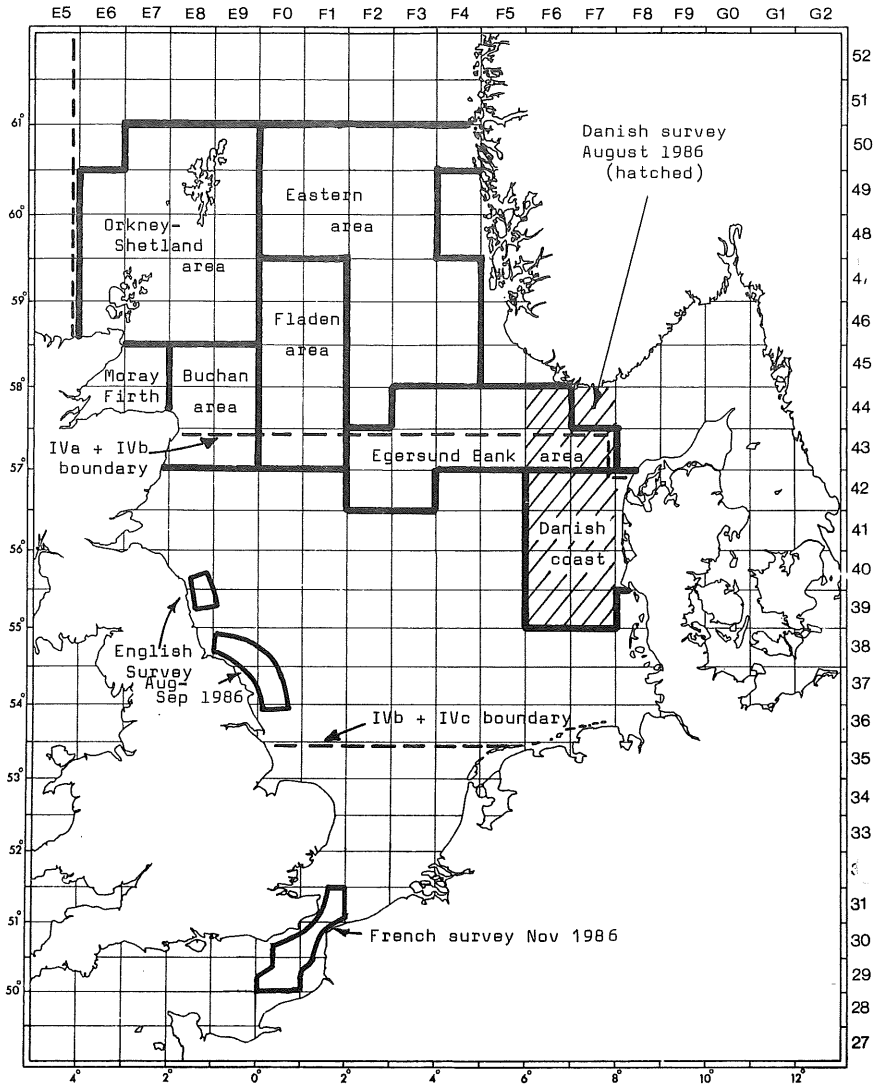


Figure 2.4.1 Area Sub-divisions used for presenting results of acoustic surveys (see Tables 2.4.1-2.4.7).



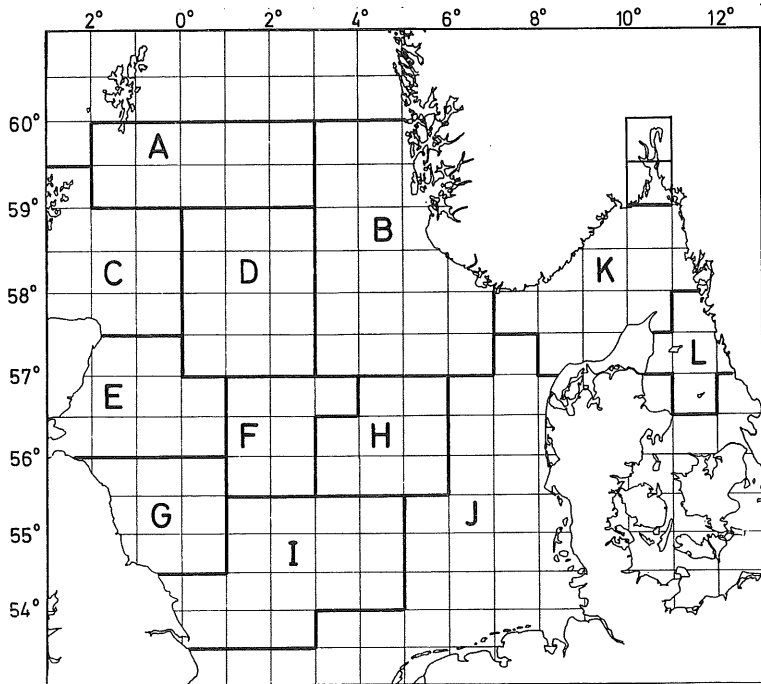


Figure 2.4.2 Definition of sub-areas, November-December, acoustic survey.

Divisions IVa + IVb

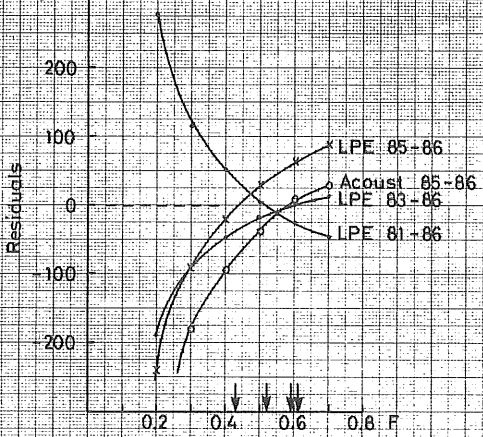


Figure 2.8.1.a Sum of residuals between SSB predicted from regressions of survey indices and SSB from the VPA plotted against F.

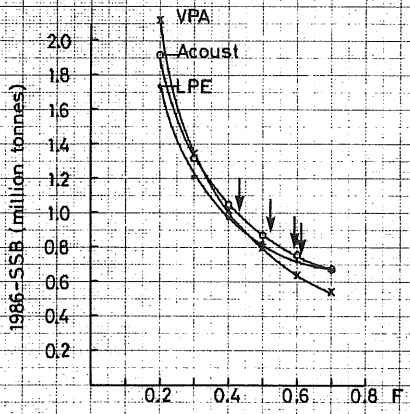
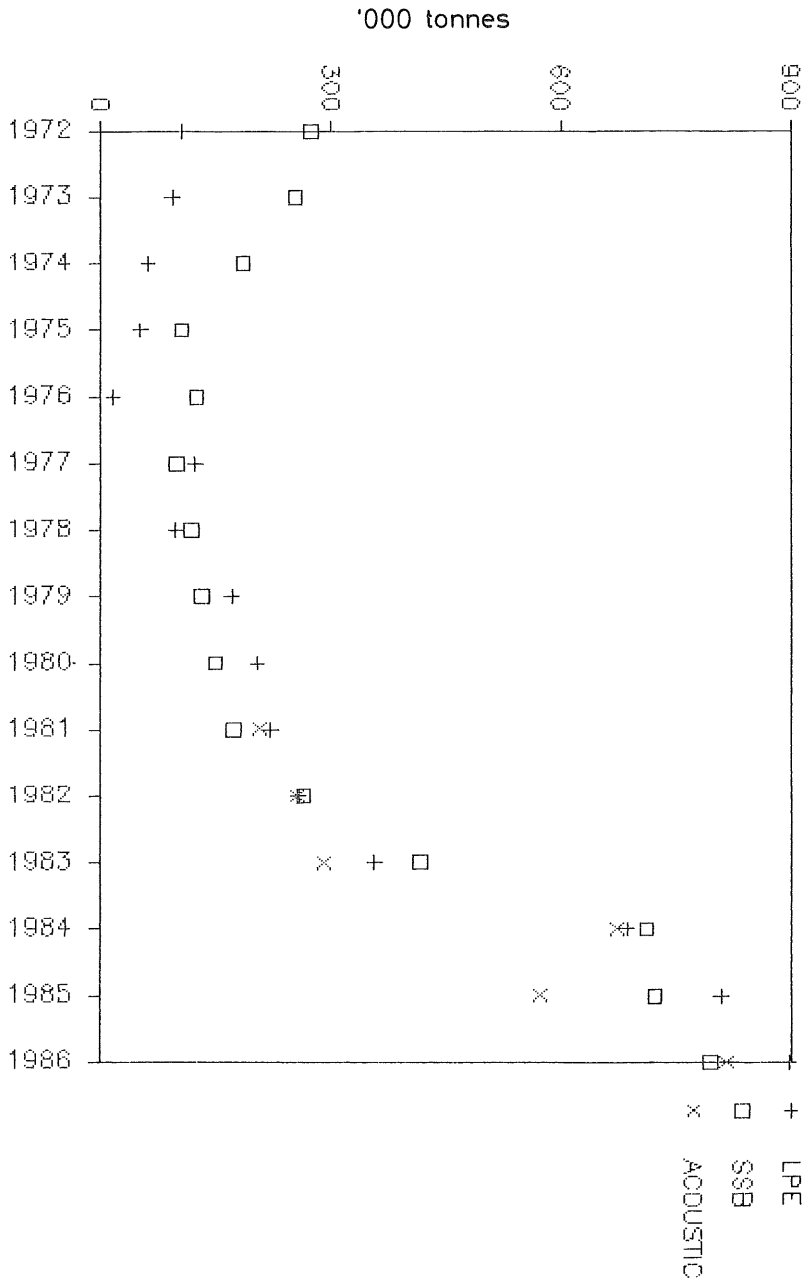


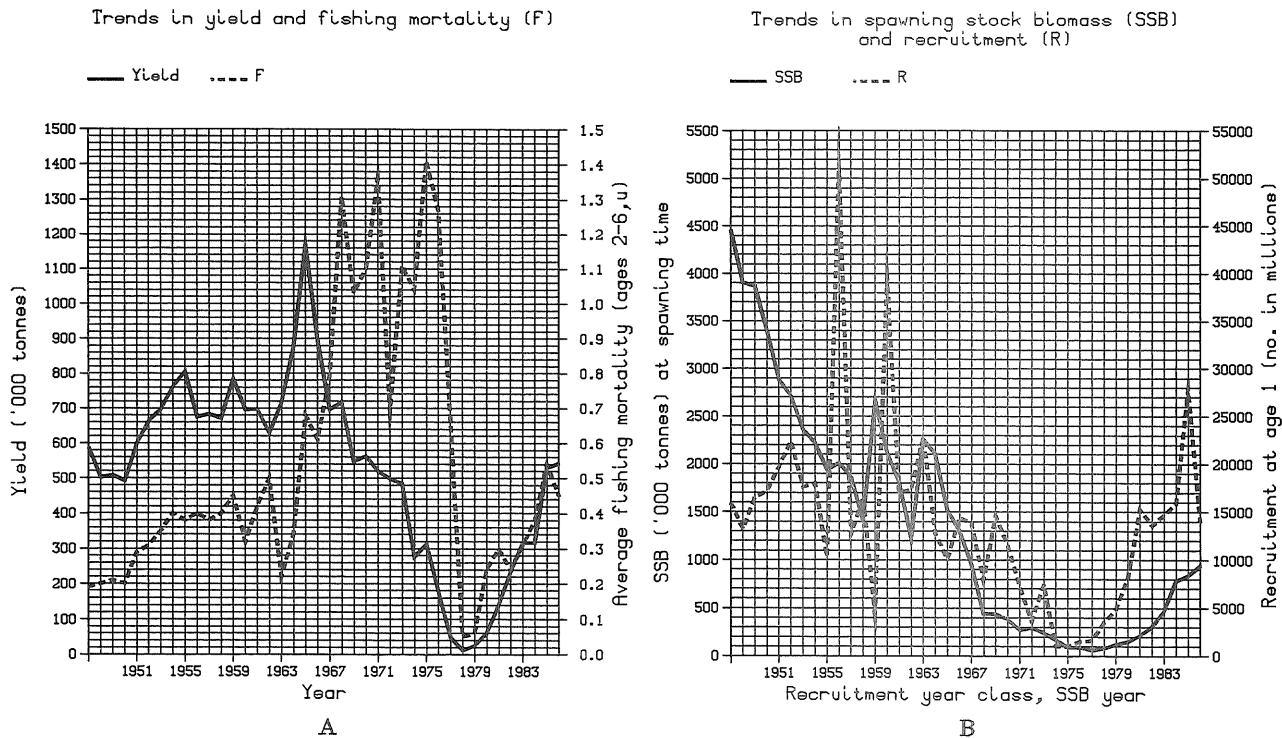
Figure 2.8.1.b Estimates of SSB ('000 t) for 1986 predicted from regressions of survey indices and SSB from the VPA plotted against F.

Figure 2.8.2 Estimates of spawning stock from VPA (SSB), larval surveys (LPE) and acoustic surveys (ACOUSTIC), VPA based on $F_{2-6} = 0.48$.



FISH STOCK SUMMARY
STOCK: Herring – North Sea (Sub-area IV)
13-04-1987

Figure 2.8.3

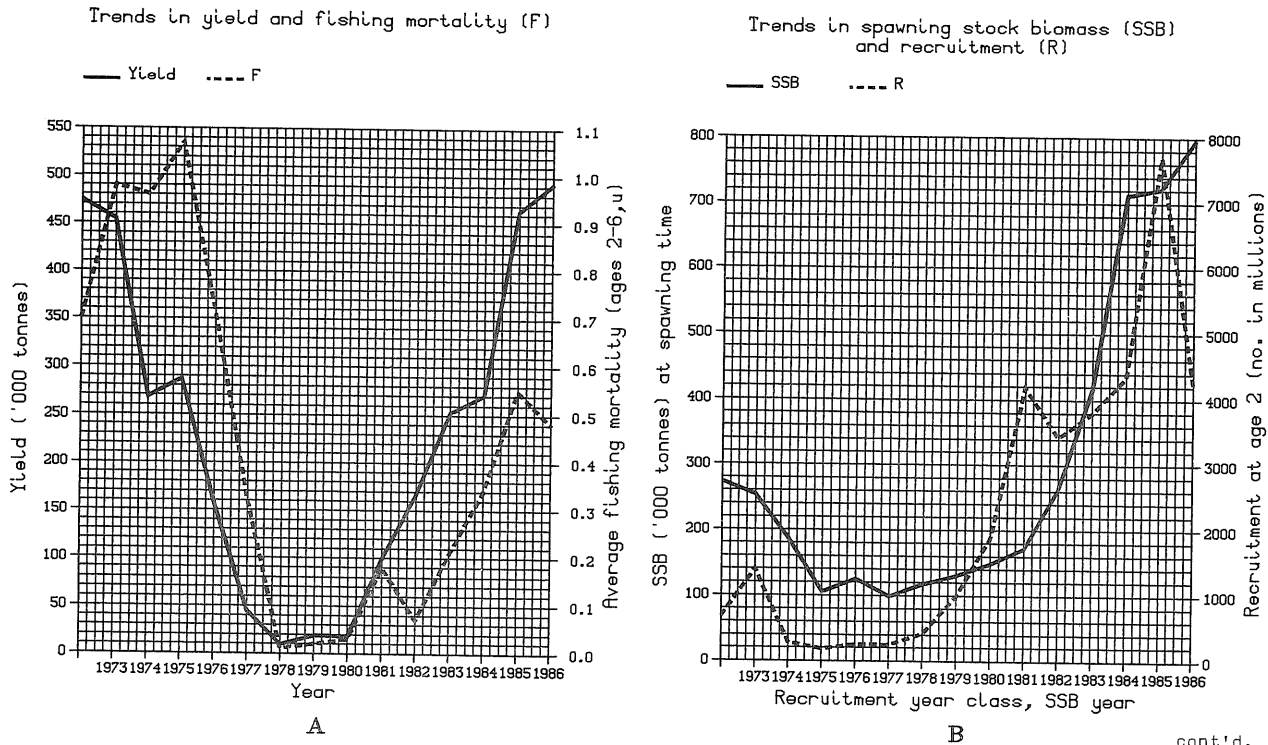


FISH STOCK SUMMARY

STOCK: Herring – IVA and IVB

13-04-1987

Figure 2.9.1



cont'd.

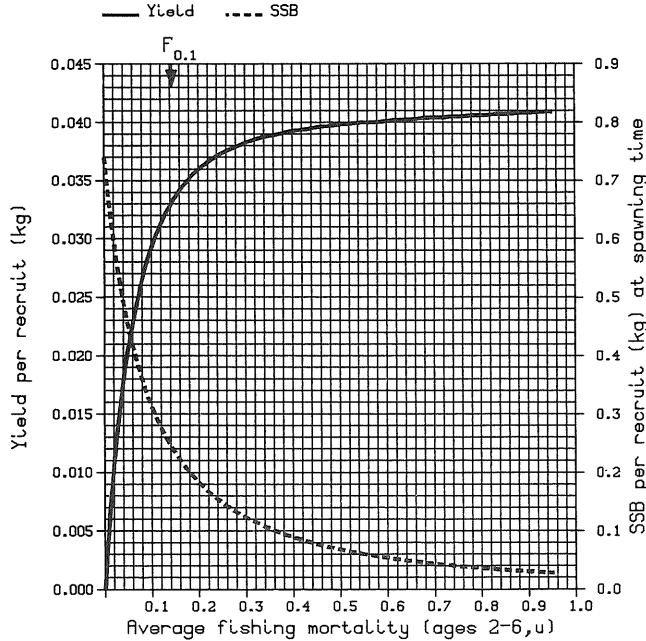
FISH STOCK SUMMARY

STOCK: Herring – IVA and IVB

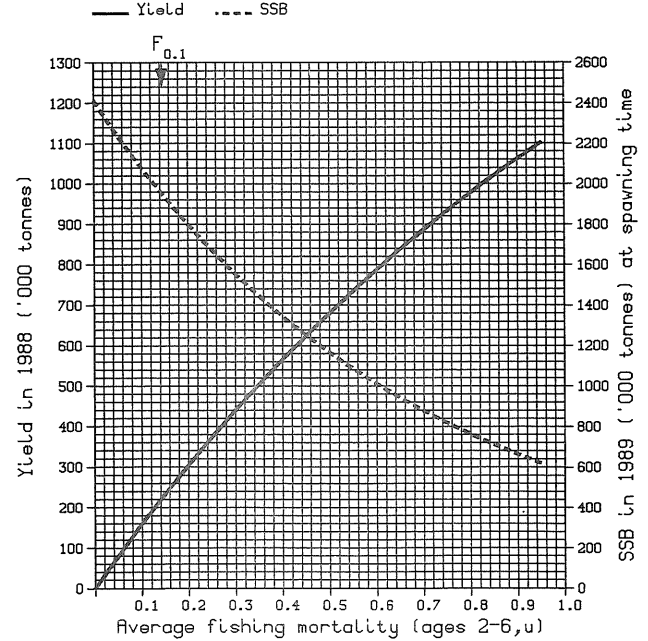
13-04-1987

Figure 2.9.1 cont'd.

Long-term yield and spawning stock biomass
assuming 20% exploitation on 1-ringers



Short-term yield and spawning stock biomass
assuming 20% exploitation on 1-ringers



cont'd

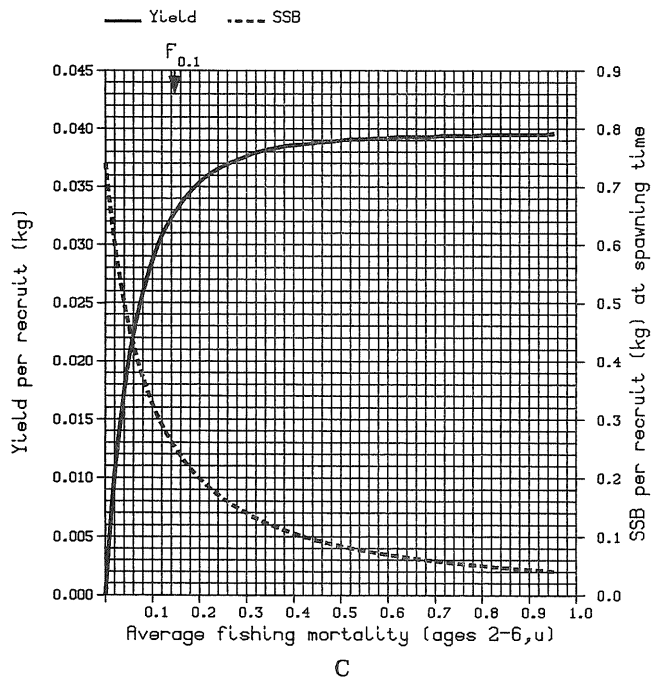
FISH STOCK SUMMARY

STOCK: Herring – IVA and IVB

13-04-1987

Figure 2.9.1 cont'd.

Long-term yield and spawning stock biomass
assuming no fishing on 4-ringers



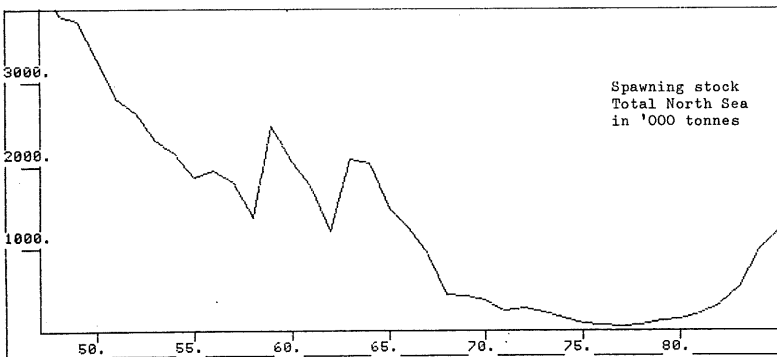
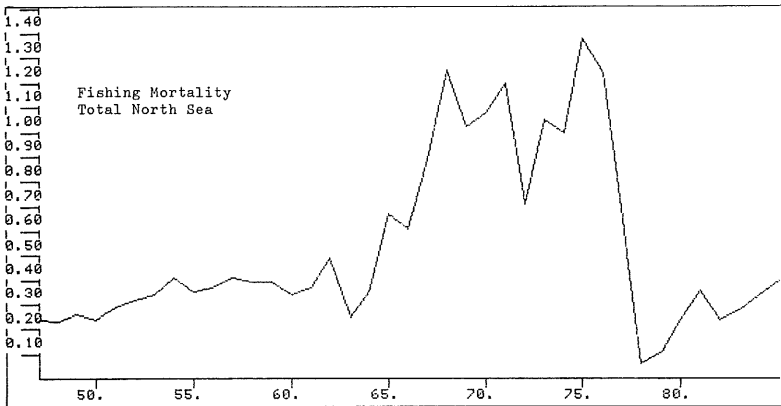
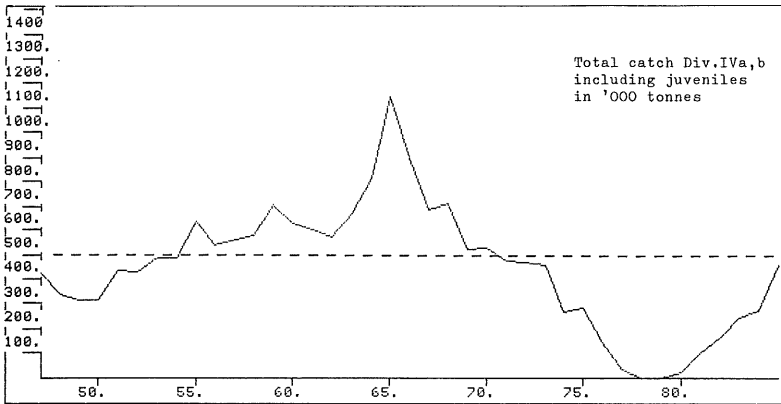


Figure 2.10.1 Catches in Divisions IVa,b, compared with spawning stock and F in total North Sea.

Figure 2.10.2

Herring catches
Divisions IVc, VIIId

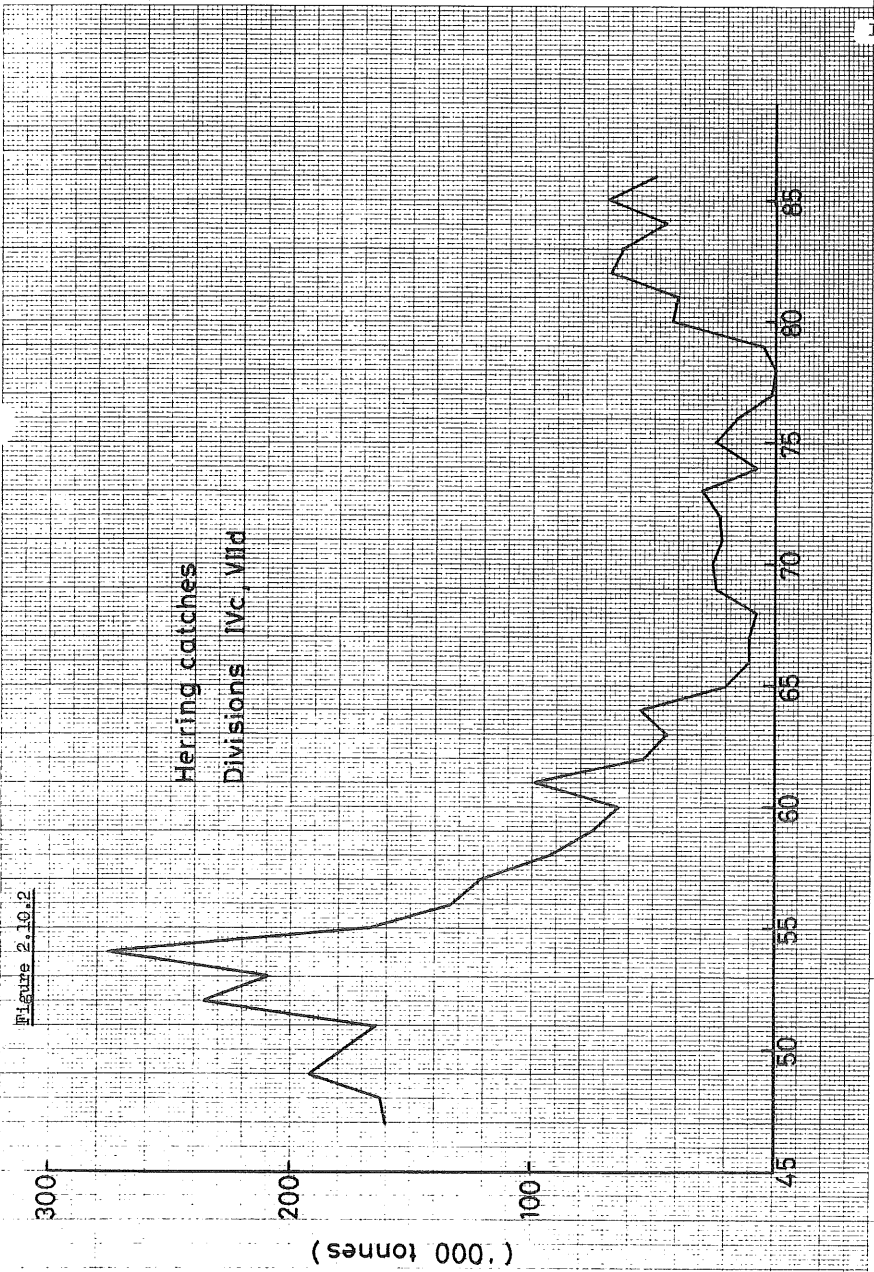


Figure 2.10.7 Herring in Divisions IIIa and IVb. Relationship between spawning stock biomass and recruitment (P-rings). Figures indicate years.

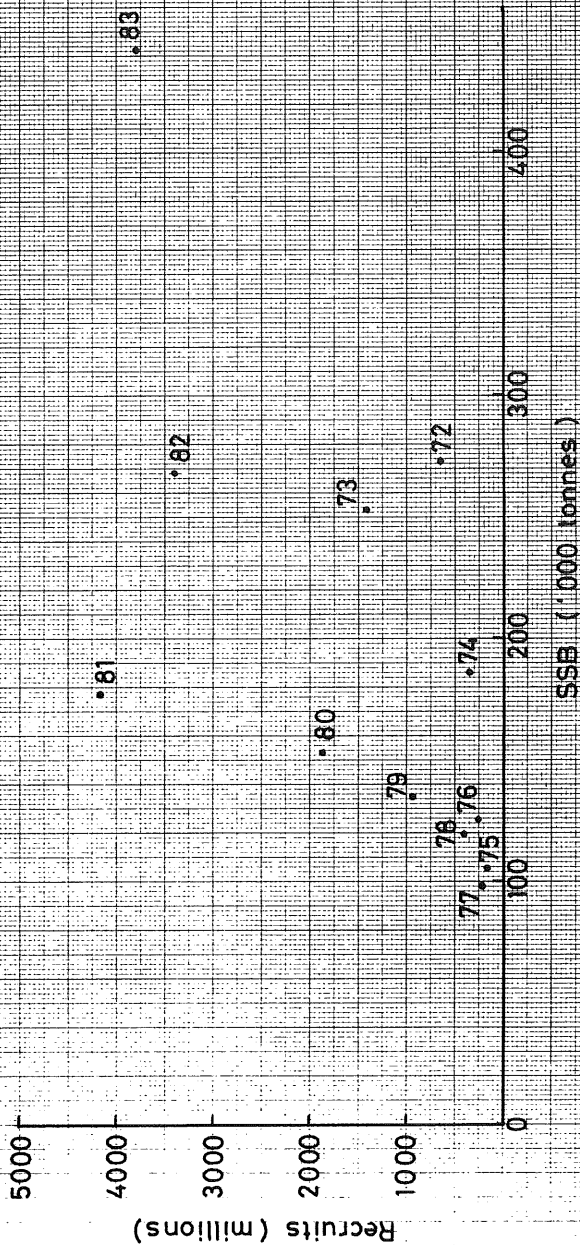
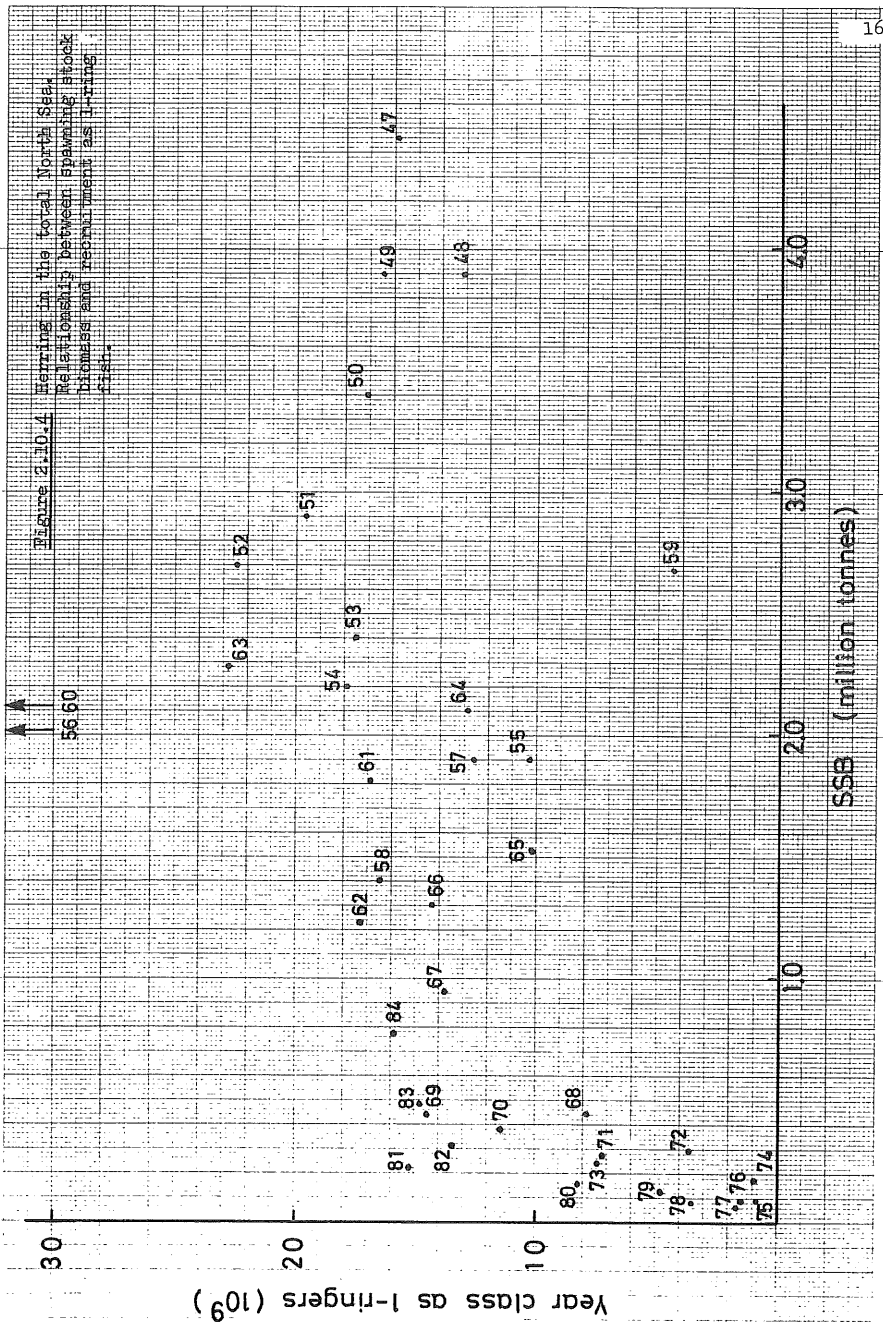
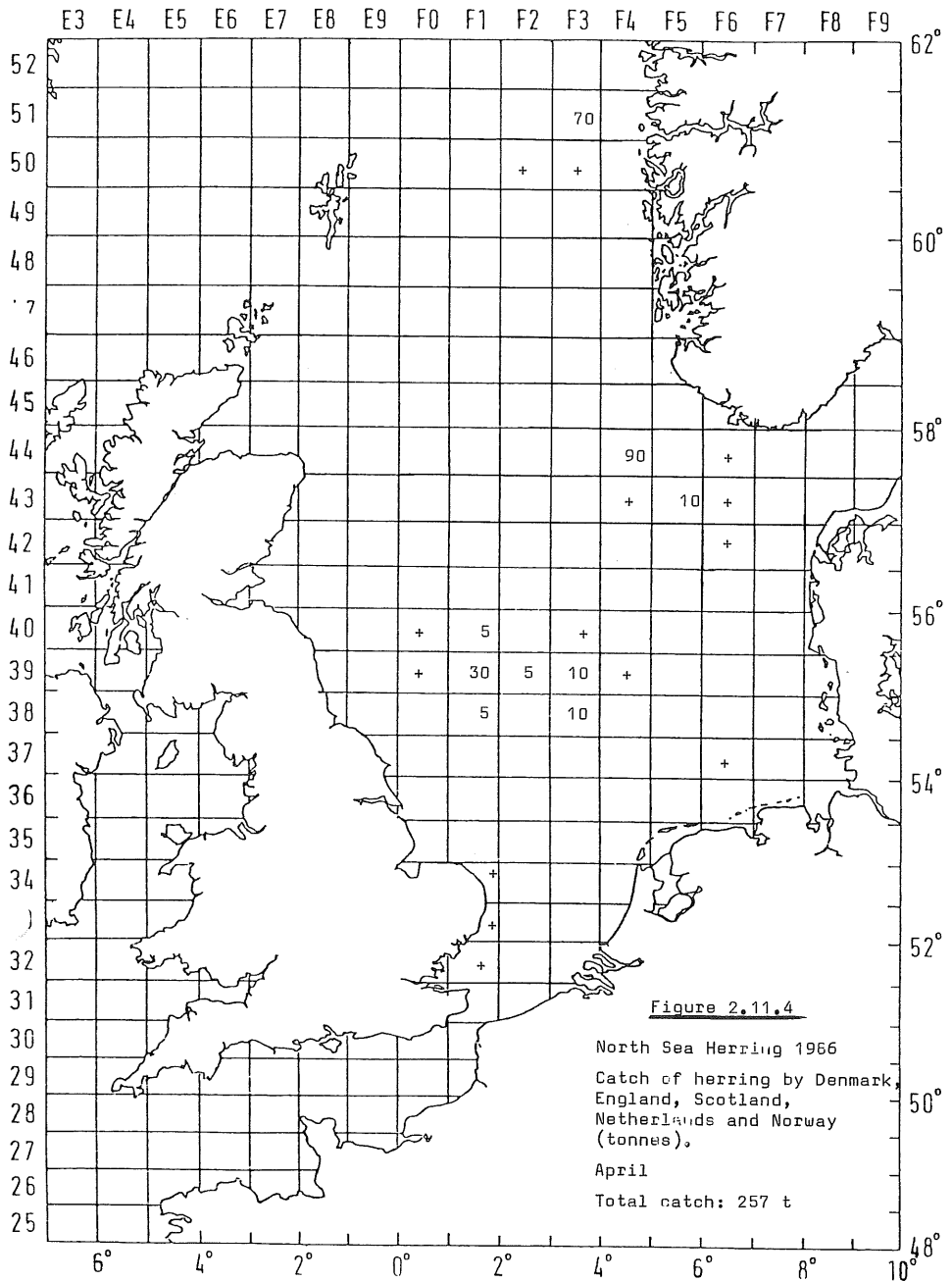
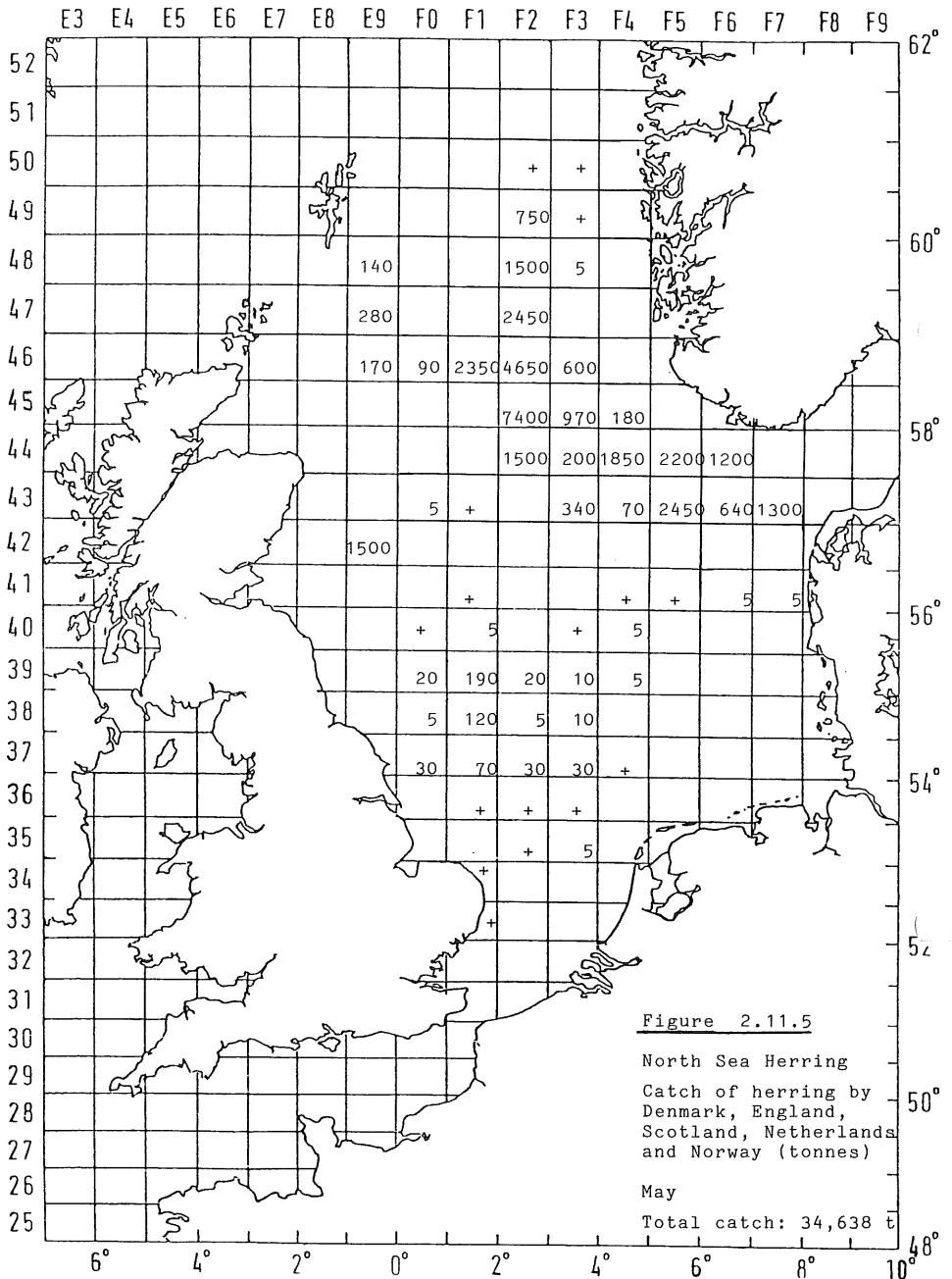
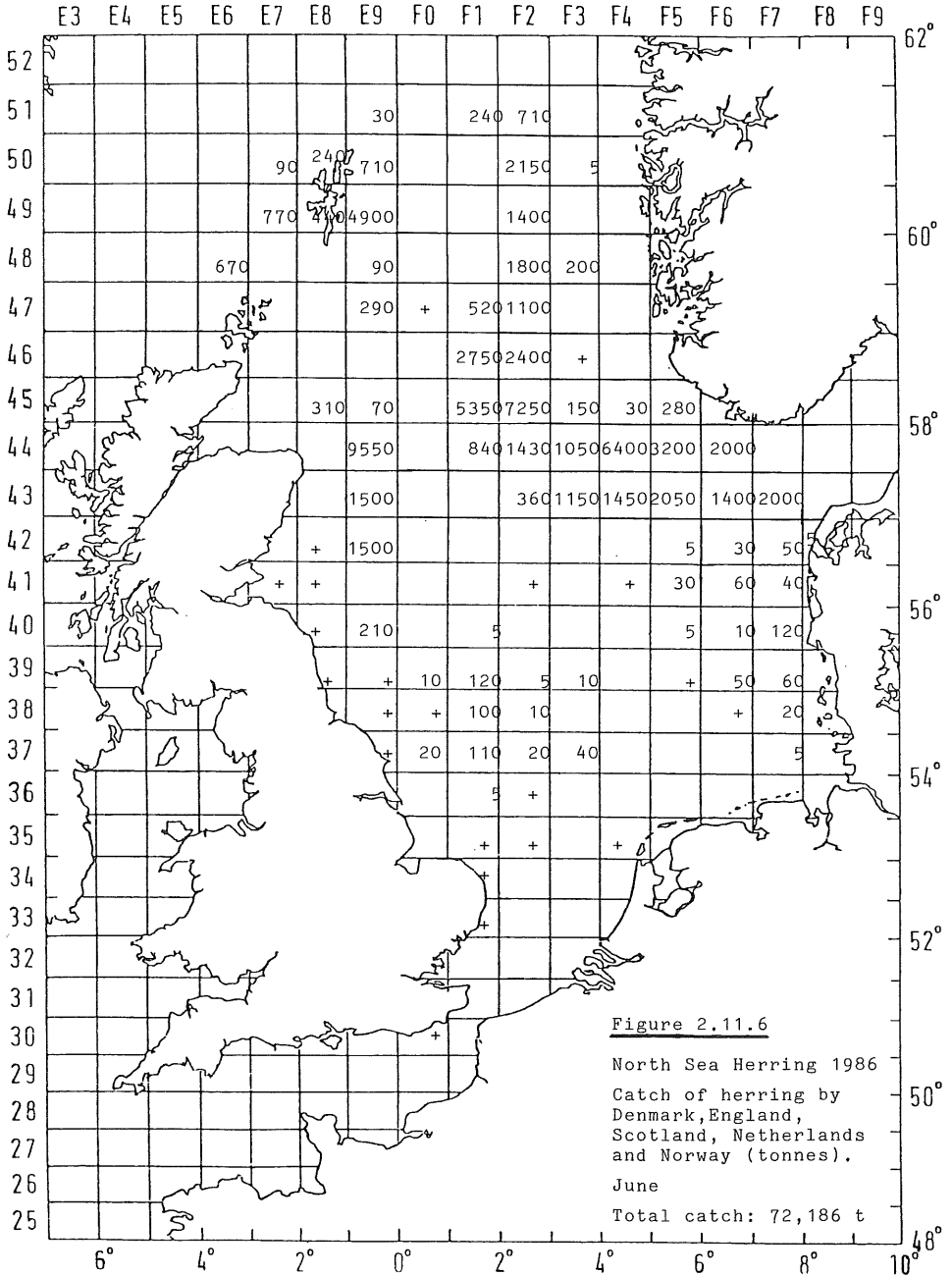


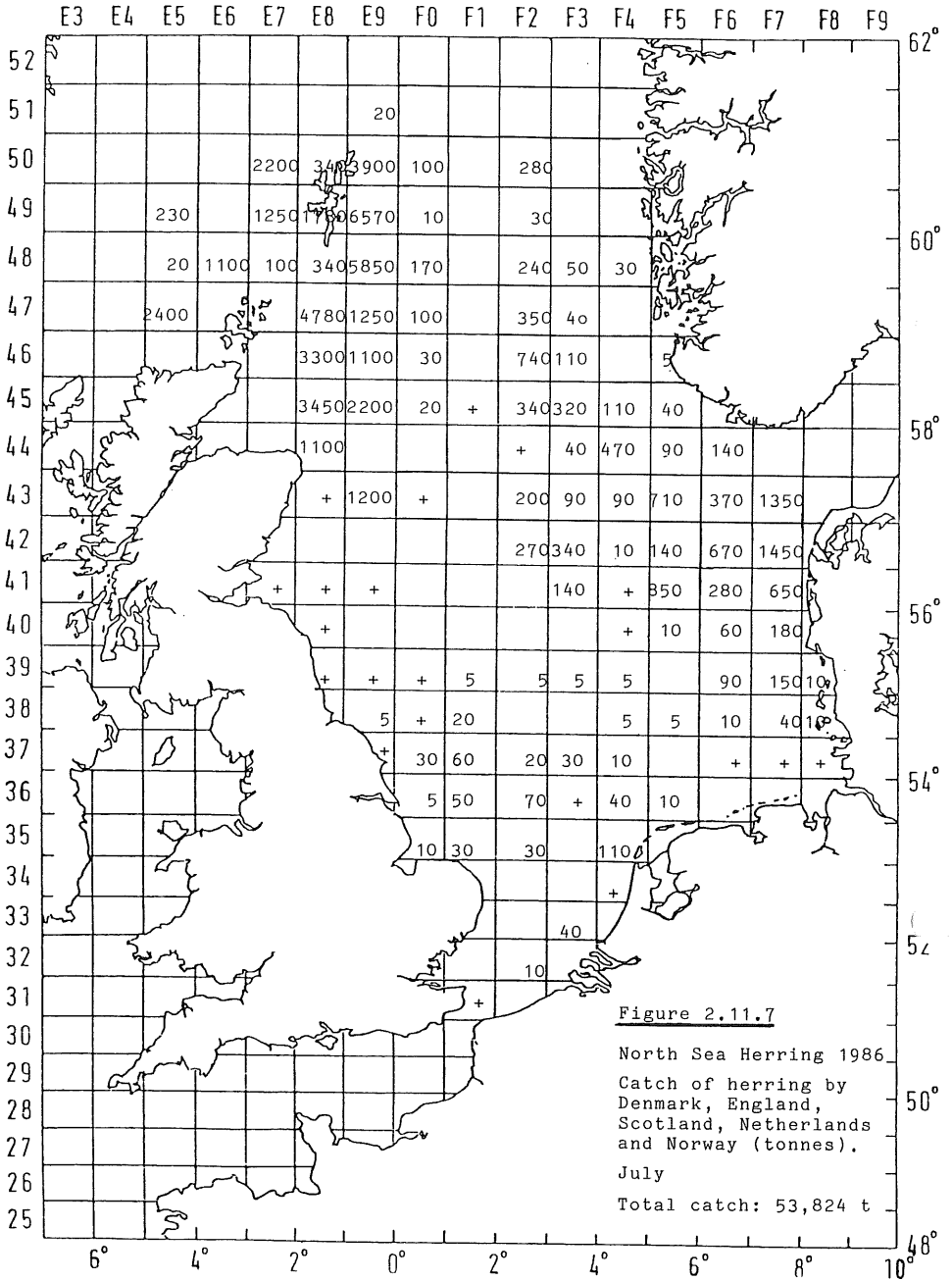
Figure 2.10.4 Error in the total North Sea Relationship between spawning stock biomass and recruitment as in 1981.

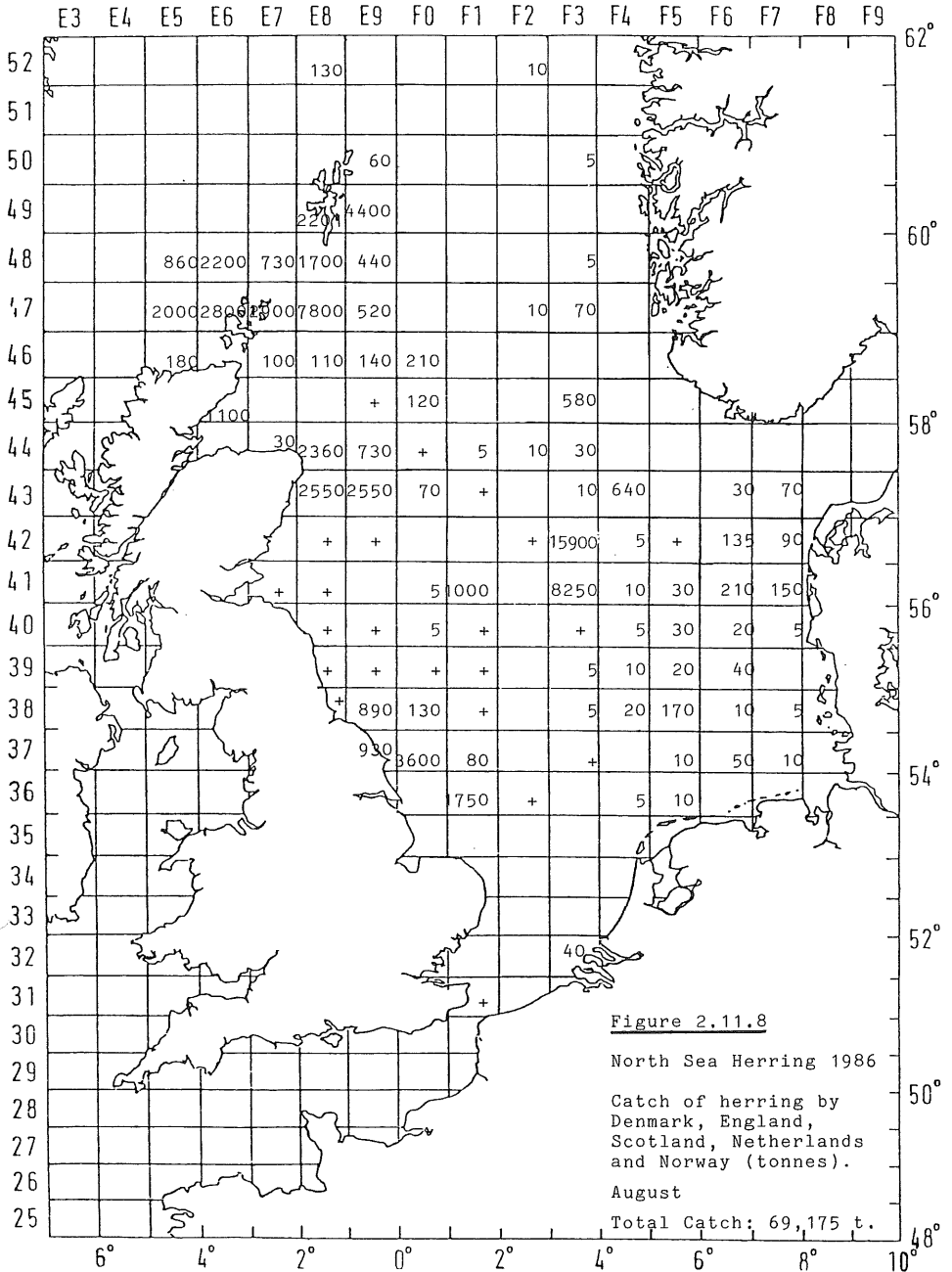












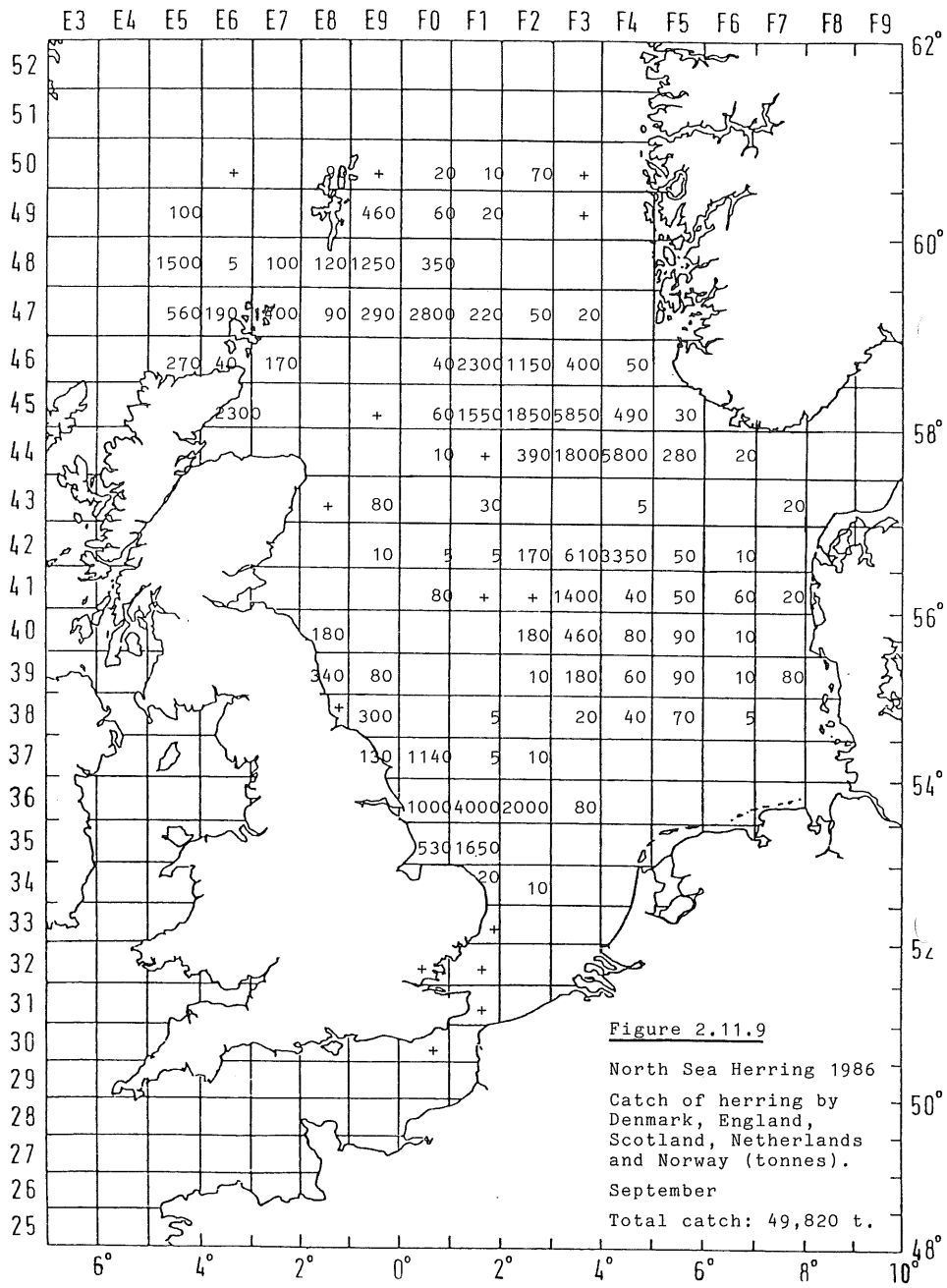


Figure 2.11.9
 North Sea Herring 1986
 Catch of herring by
 Denmark, England,
 Scotland, Netherlands
 and Norway (tonnes).
 September
 Total catch: 49,820 t.

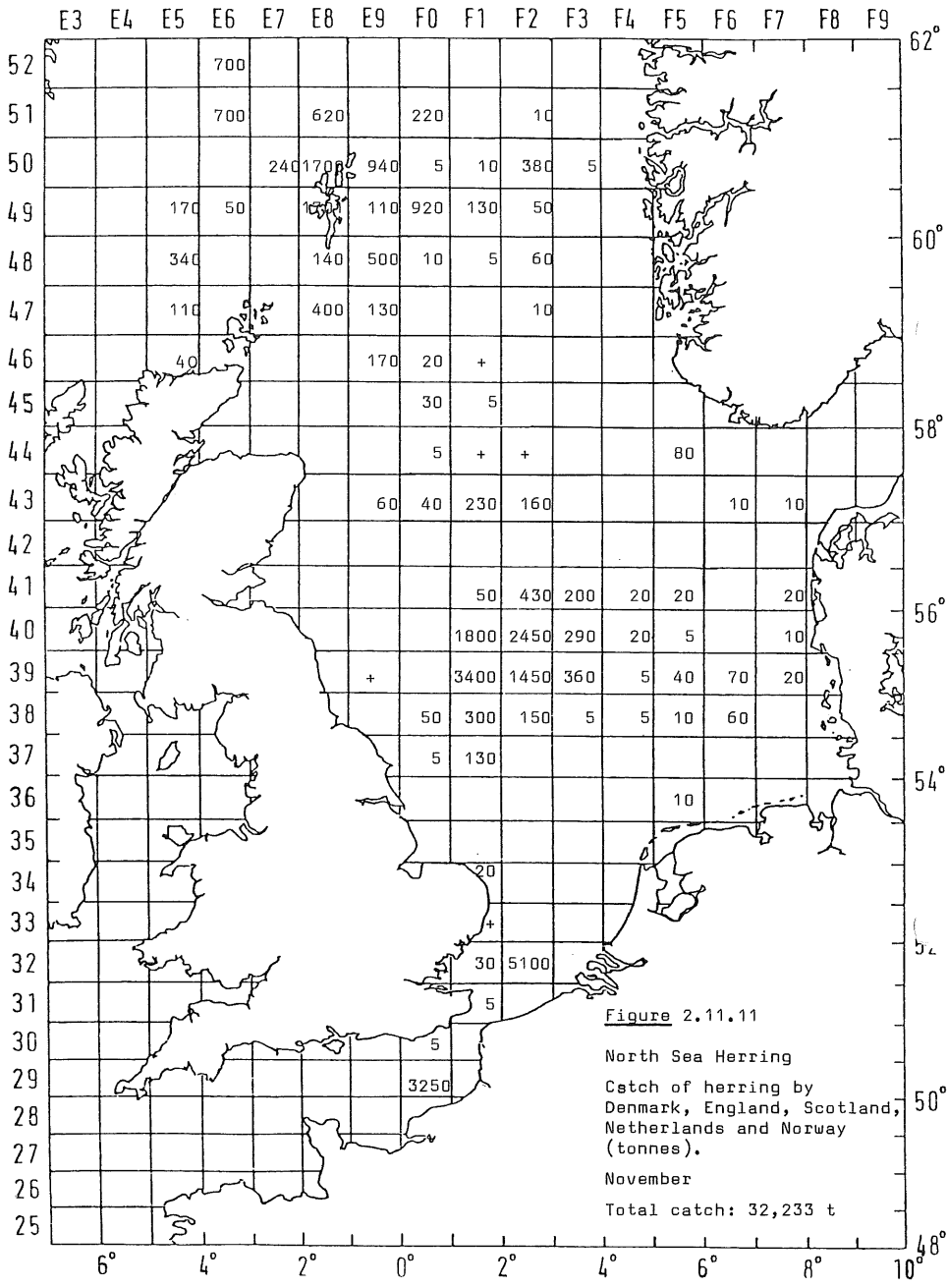
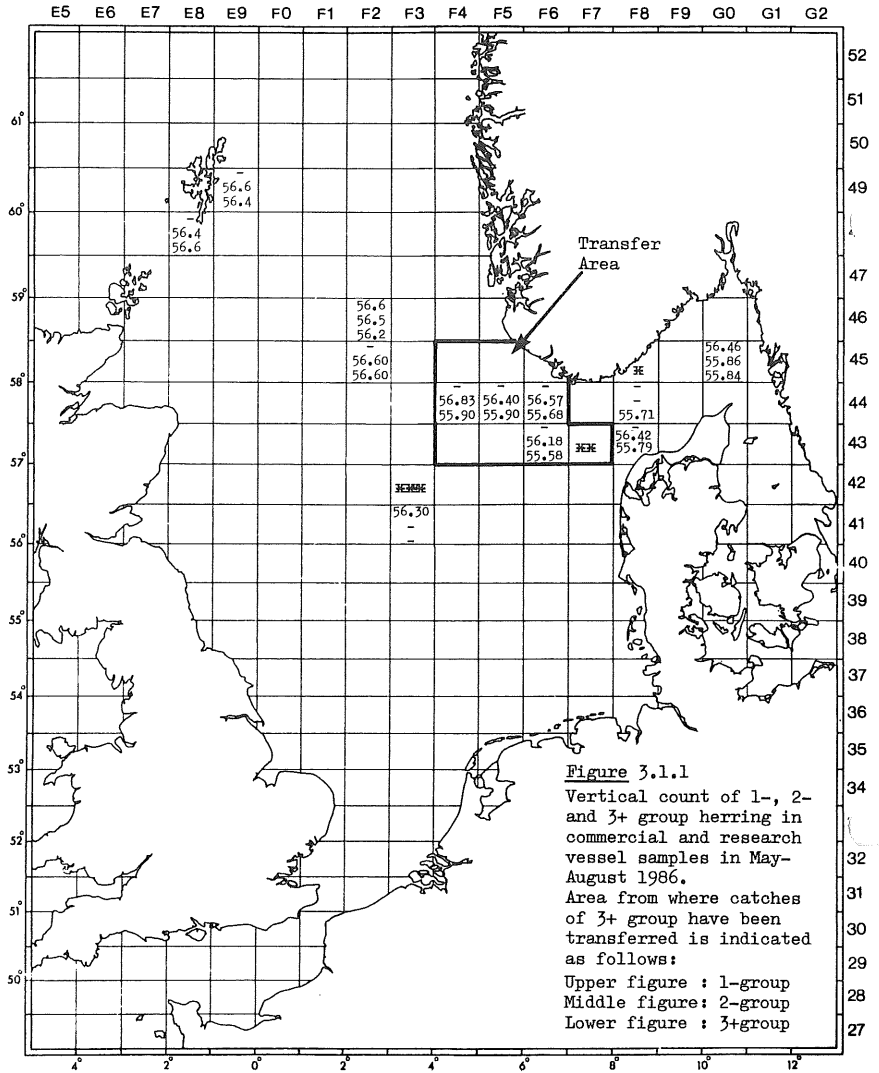


Figure 2.11.11
 North Sea Herring
 Catch of herring by
 Denmark, England, Scotland,
 Netherlands and Norway
 (tonnes).
 November
 Total catch: 32,233 t



⊕ 56.71
 55.44
 55.70

⊕⊕ - -
 56.20 55.7
 56.76 -

⊕⊕⊕ 56.40 56.90
 - -
 - -

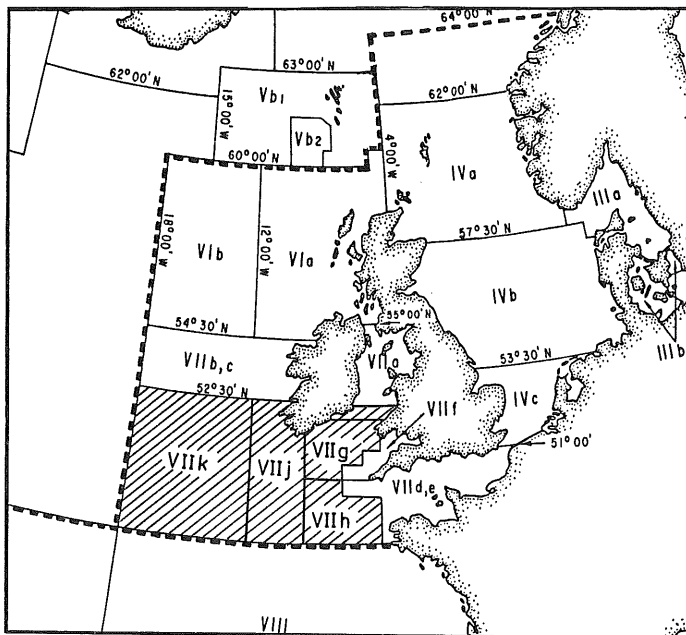
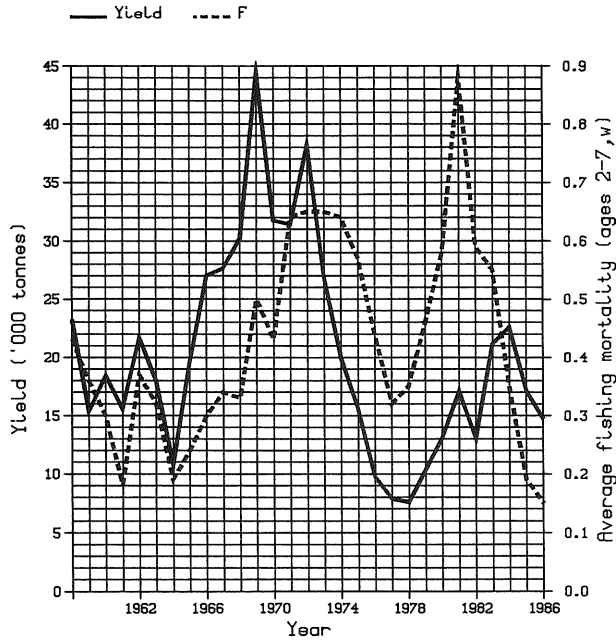


Figure 4.1.1 The assessment covers the area Divisions VIIj and VIIg and that part of Division VIIa below 52°30'. TAC is set by EC for Divisions VIIg-k and that section of Division VIIa below 52°30'.

FISH STOCK SUMMARY
STOCK: Herring – Celtic Sea and VIIj
14-04-1987

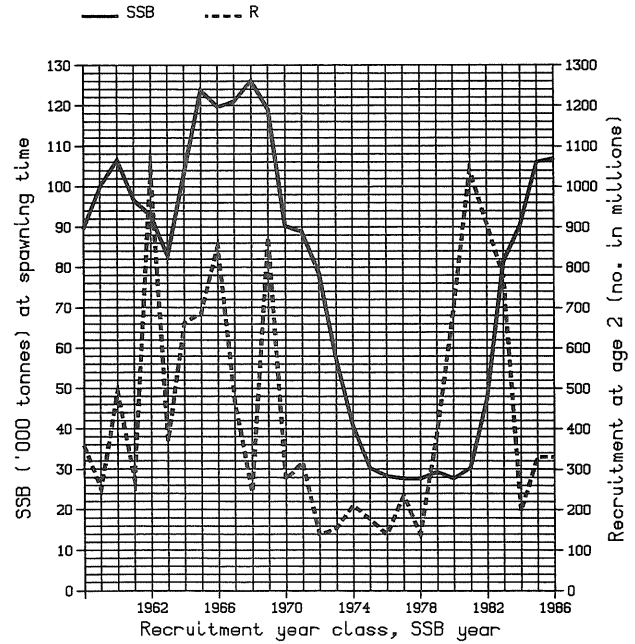
Figure 4.5.1

Trends in yield and fishing mortality (F)



A

Trends in spawning stock biomass (SSB) and recruitment (R)



B

Figure 4.8.1 Celtic Sea Division VIIj. Stock and recruitment plot.

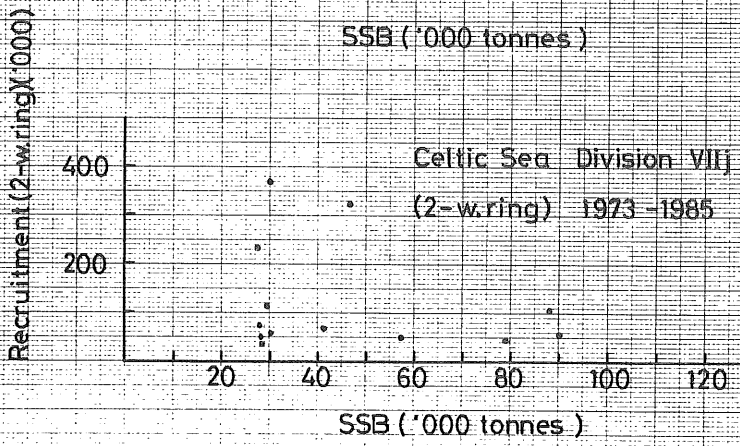
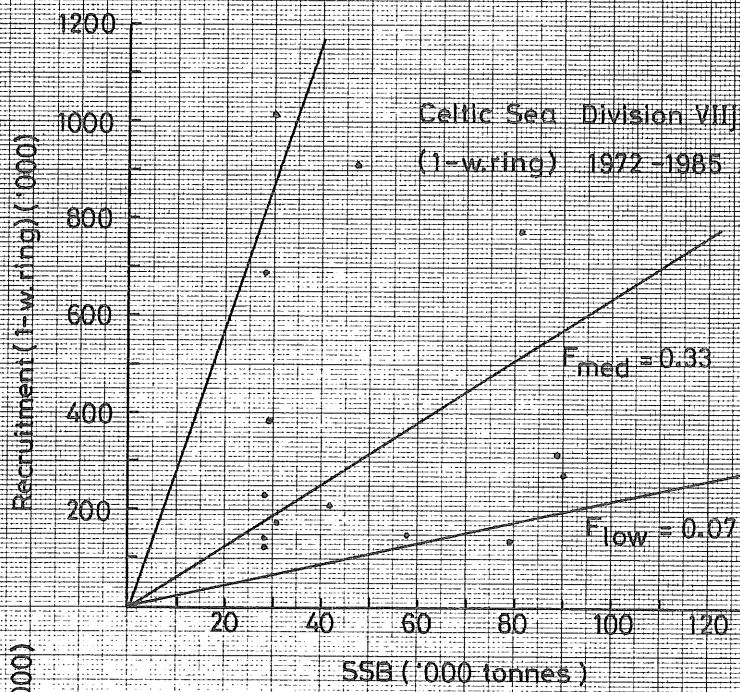


Figure 5.1.1 Herring in Division Via North.

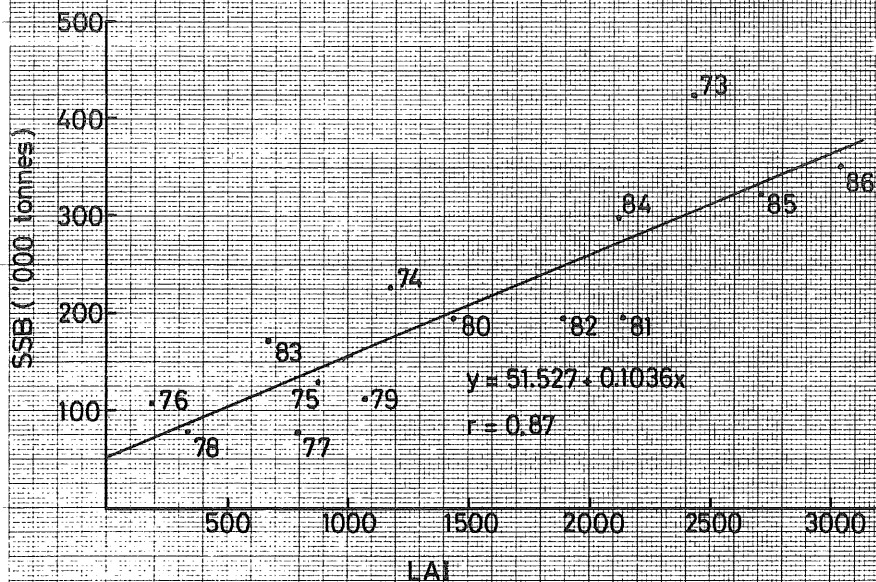
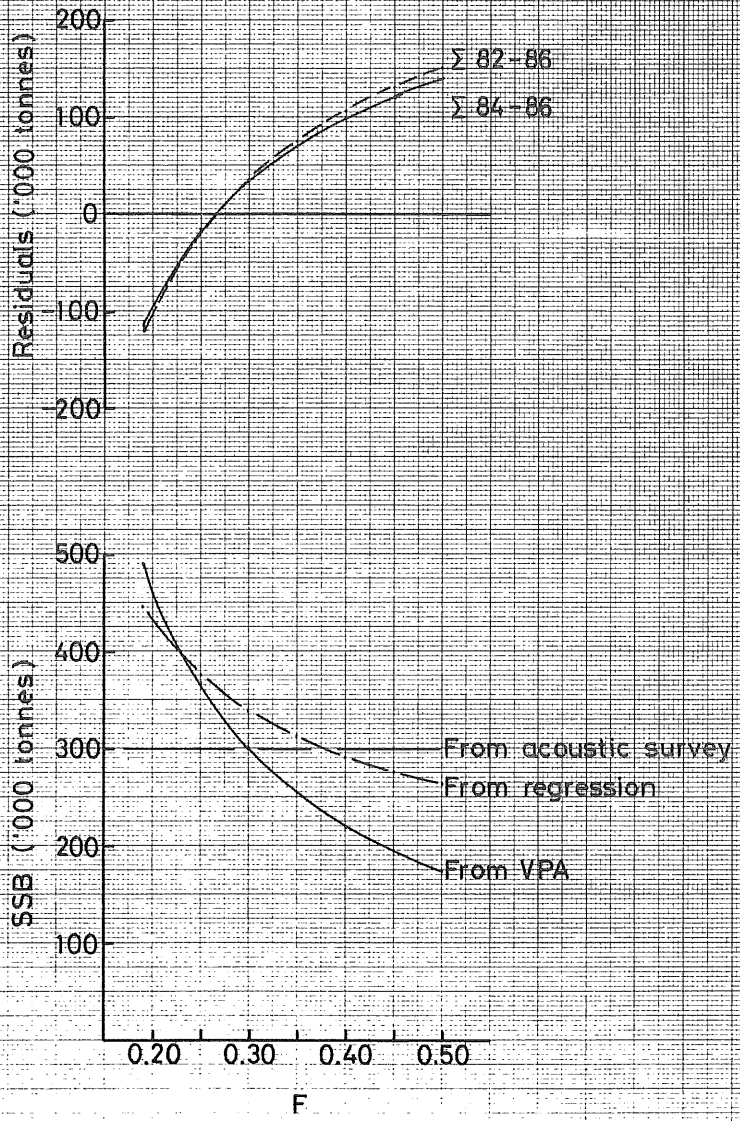


Figure 5.1.2 Herring in Division VIIa North.



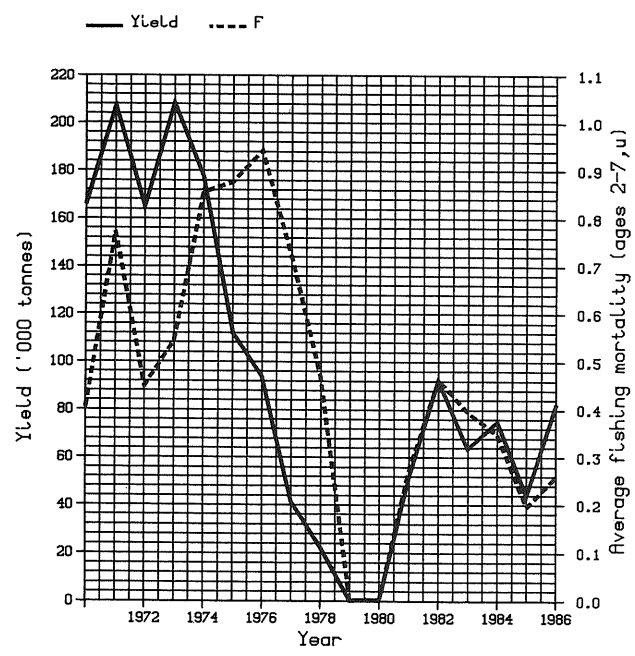
FISH STOCK SUMMARY

STOCK: Herring – VIa North

14-04-1987

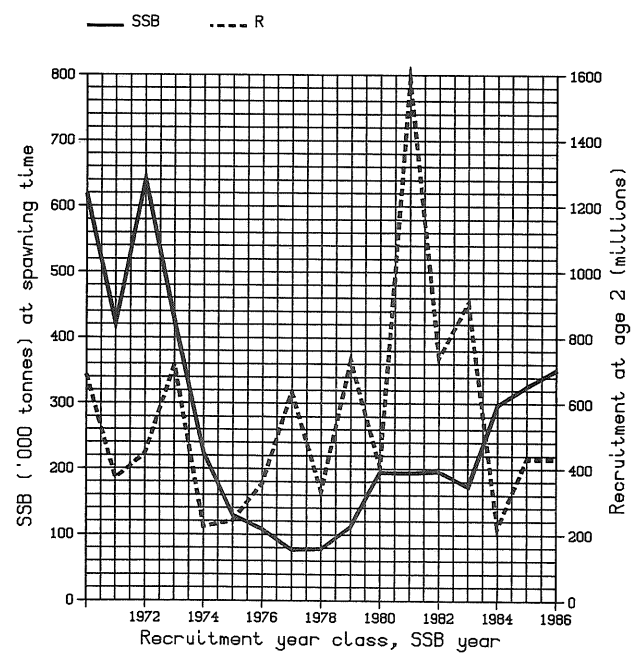
Figure 5.1.3

Trends in yield and fishing mortality (F)



A

Trends in spawning stock biomass (SSB) and recruitment (R)



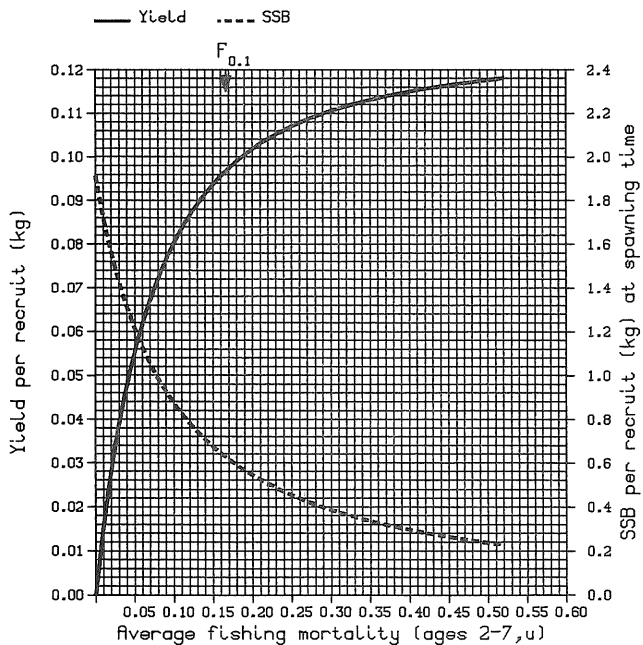
B

cont'd.

FISH STOCK SUMMARY
 STOCK: Herring - VIa North
 14-04-1987

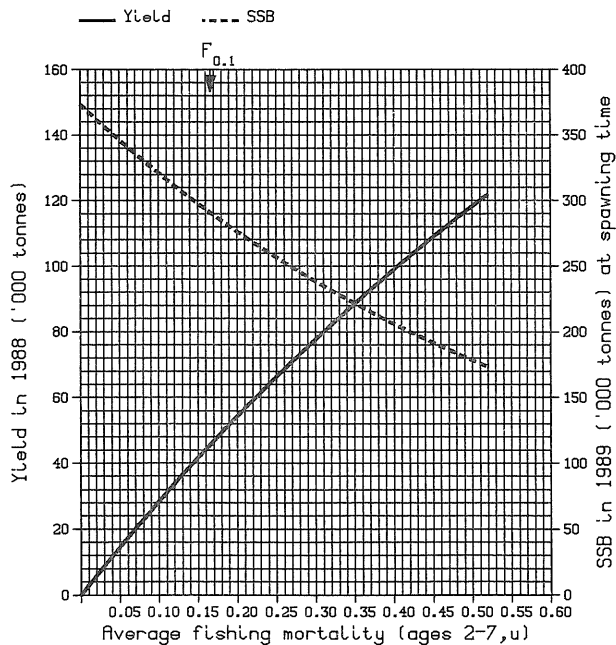
Figure 5.1.3 cont'd.

Long-term yield and spawning stock biomass



C

Short-term yield and spawning stock biomass



D

Figure 5.1.4 Herring in Division VIIa North. Stock-recruitment plot with biological reference lines.

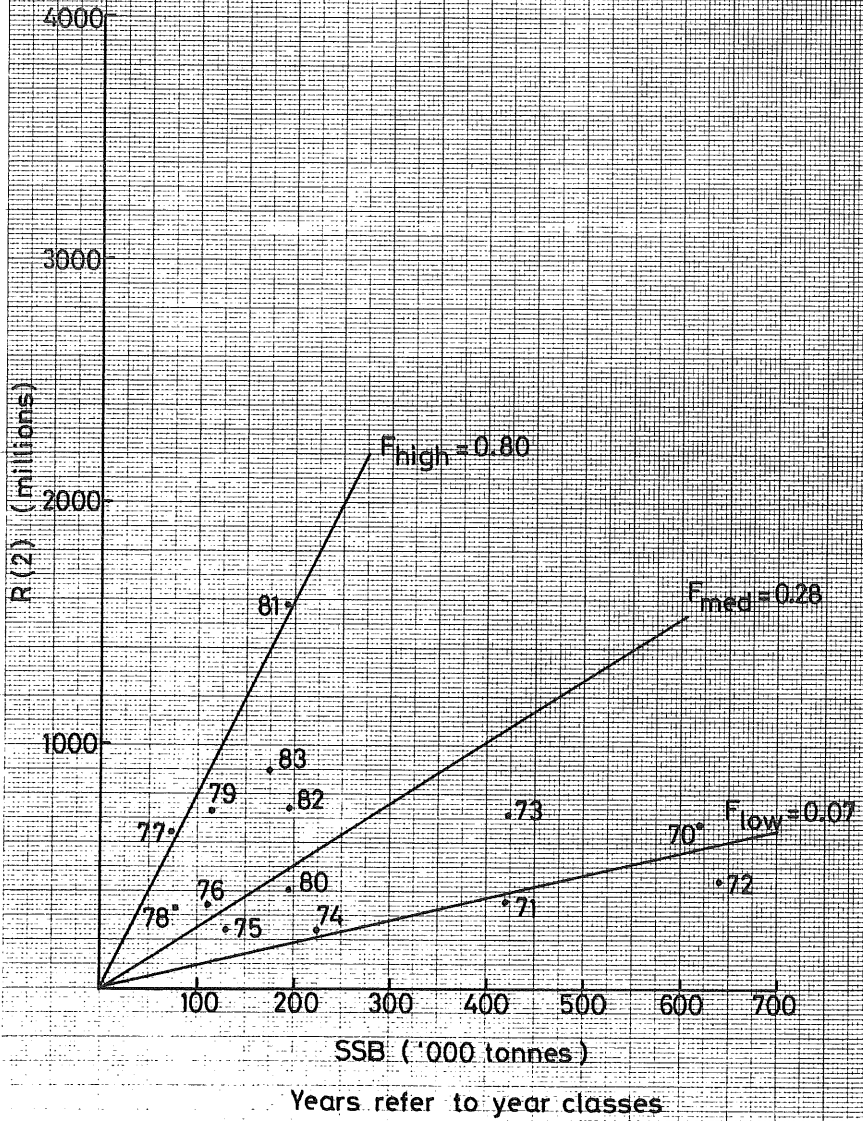
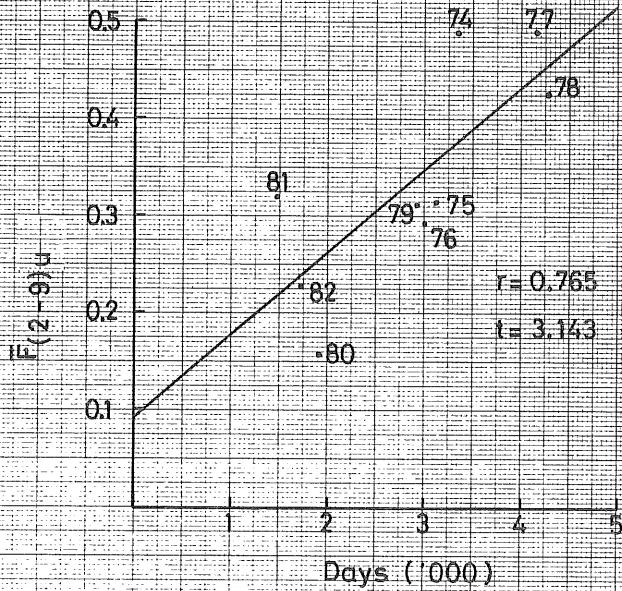


Figure 5.2.1 Scatter plot of estimated fishing mortality rates from VPA against number of days absent from port, 1974-1982.



$$F_{(2-9)} = 0.085(\text{Effort}) + 0.091$$

$$1986 \text{ Effort} = 1.375 \times 10^3 \text{ days}$$

$$F = 0.21$$

FISH STOCK SUMMARY

STOCK: Clyde Herring

14-04-1987

Figure 5.2.2

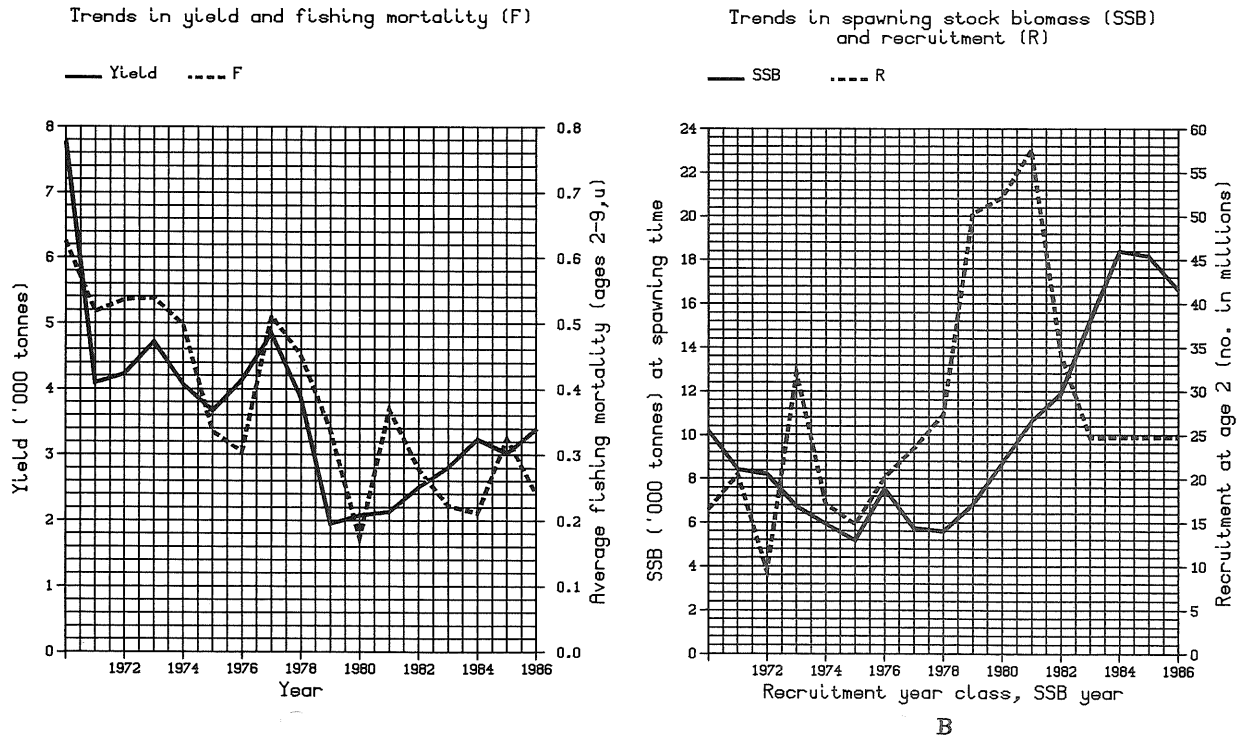
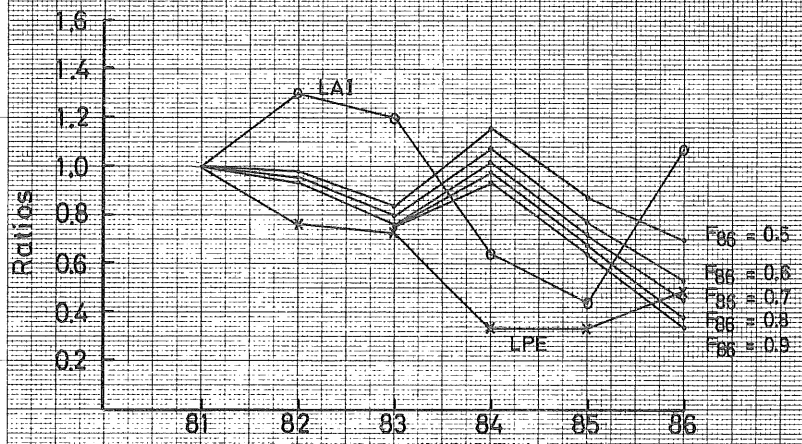


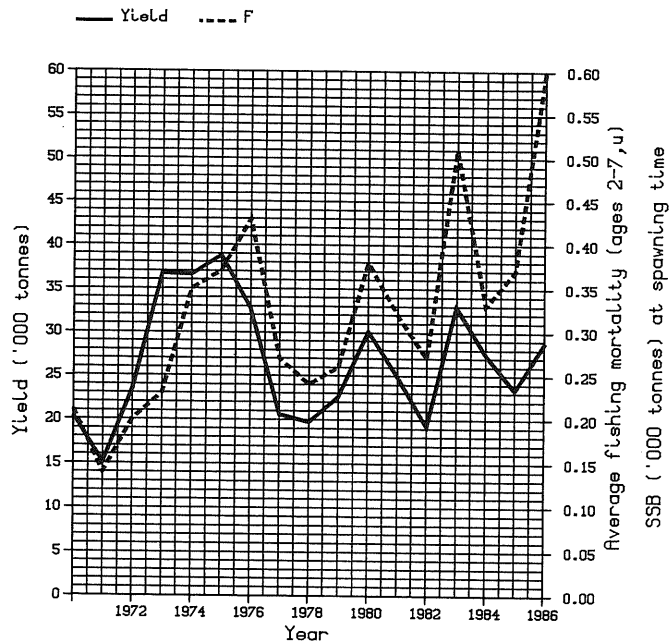
Figure 6.4.1 Comparison between trends of larval indices and SSB with different F values in 1986.



FISH STOCK SUMMARY
STOCK: Herring – VIaS and VIIb,c
14-04-1987

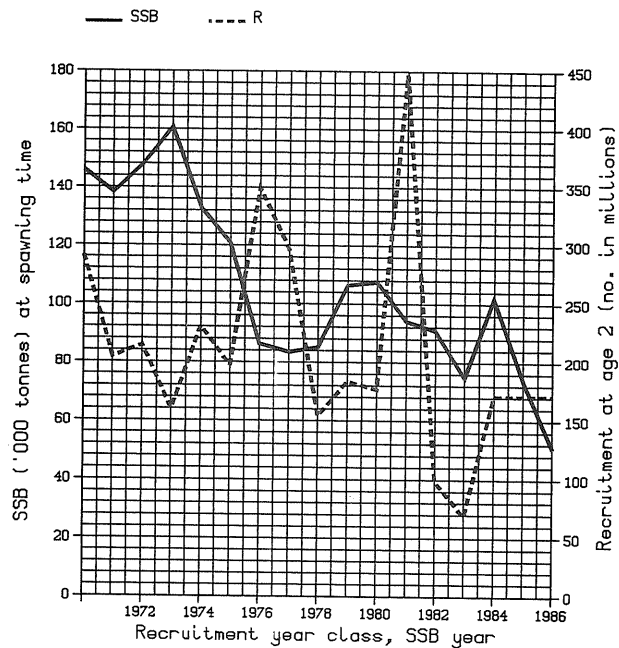
Figure 6.4.2

Trends in yield and fishing mortality (F)



A

Trends in spawning stock biomass (SSB) and recruitment (R)



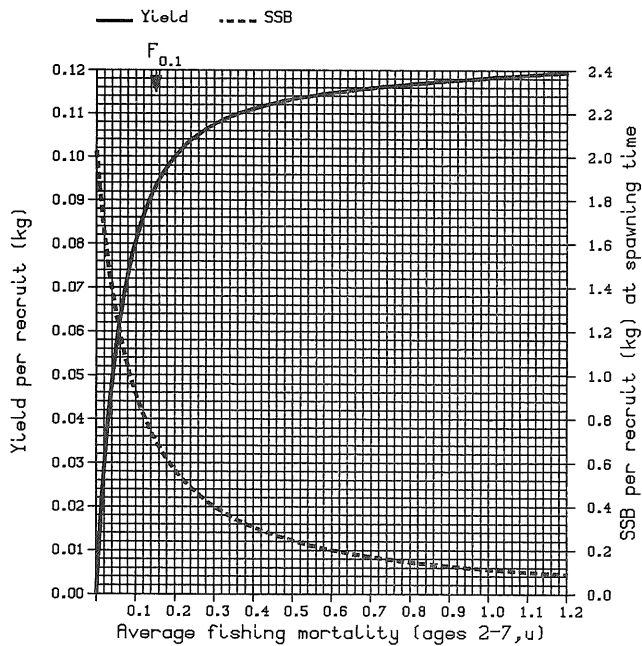
B

cont'd.

FISH STOCK SUMMARY
STOCK: Herring – VIaS and VIIb,c
14-04-1987

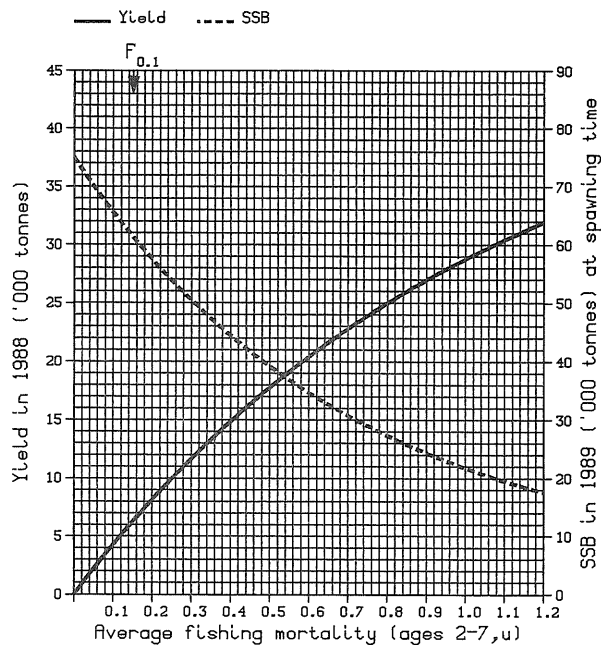
Figure 6.4.2 cont'd.

Long-term yield and spawning stock biomass



C

Short-term yield and spawning stock biomass
 assuming catch of 29,000 t in 1987

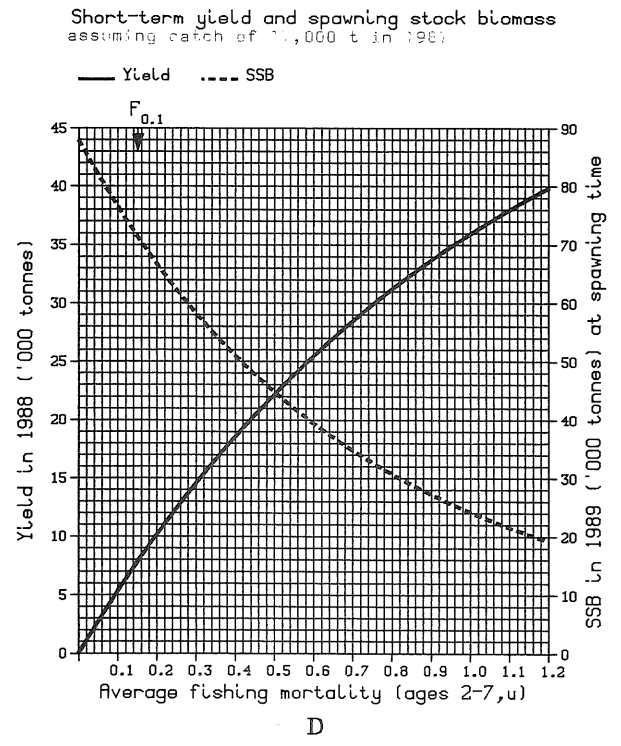


D

cont'd.

FISH STOCK SUMMARY
STOCK: Herring – VIaS and VIIb,c
14-04-1987

Figure 6.4.2 cont'd.



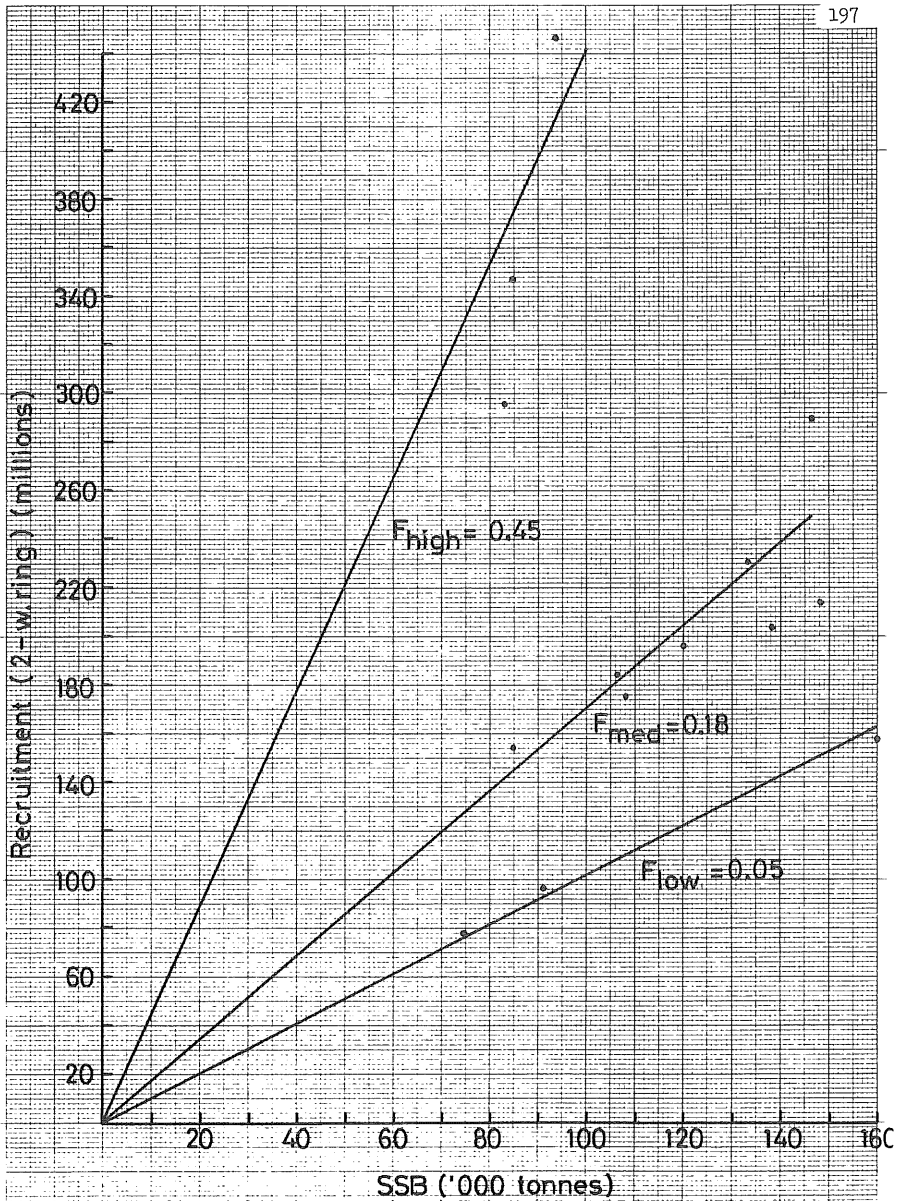


Figure 6.7.1 Divisions VIa and VIIb. Stock-recruitment scatter plot.

Figure 7.3.1 Irish Sea herring in Division VIIa. Trends in UK proportion of fishing mortality $F(2-7)_{UK}$ and UK landings.

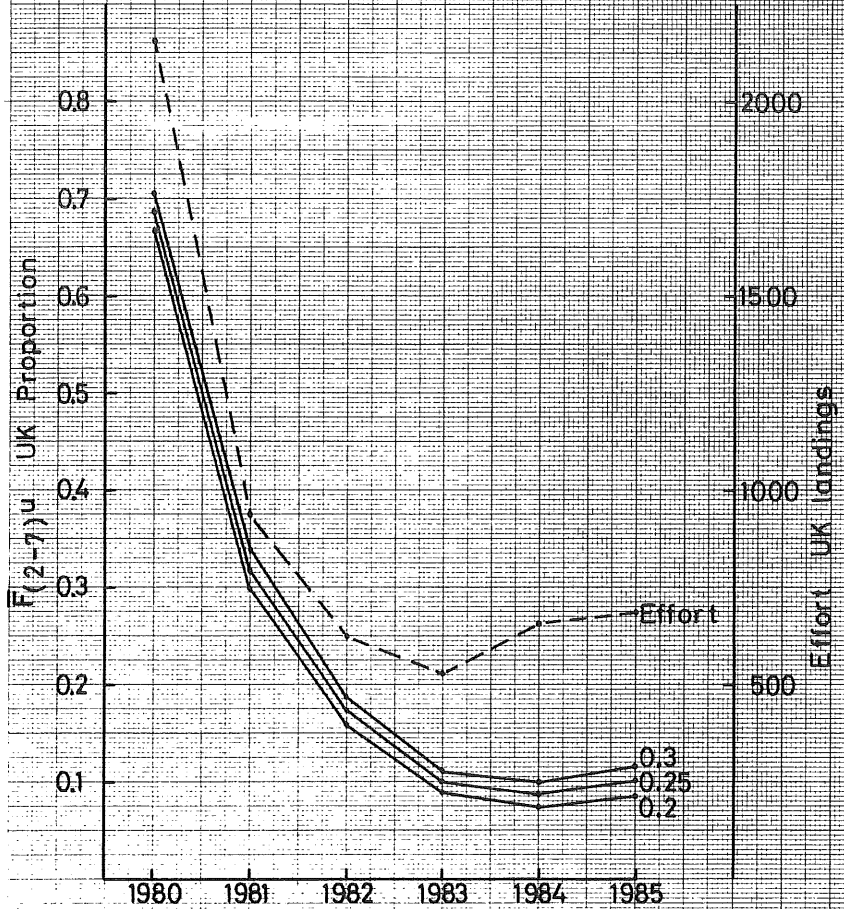
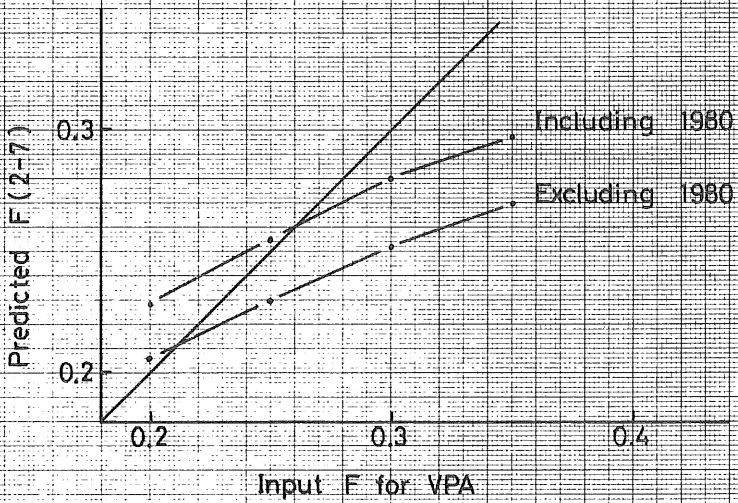
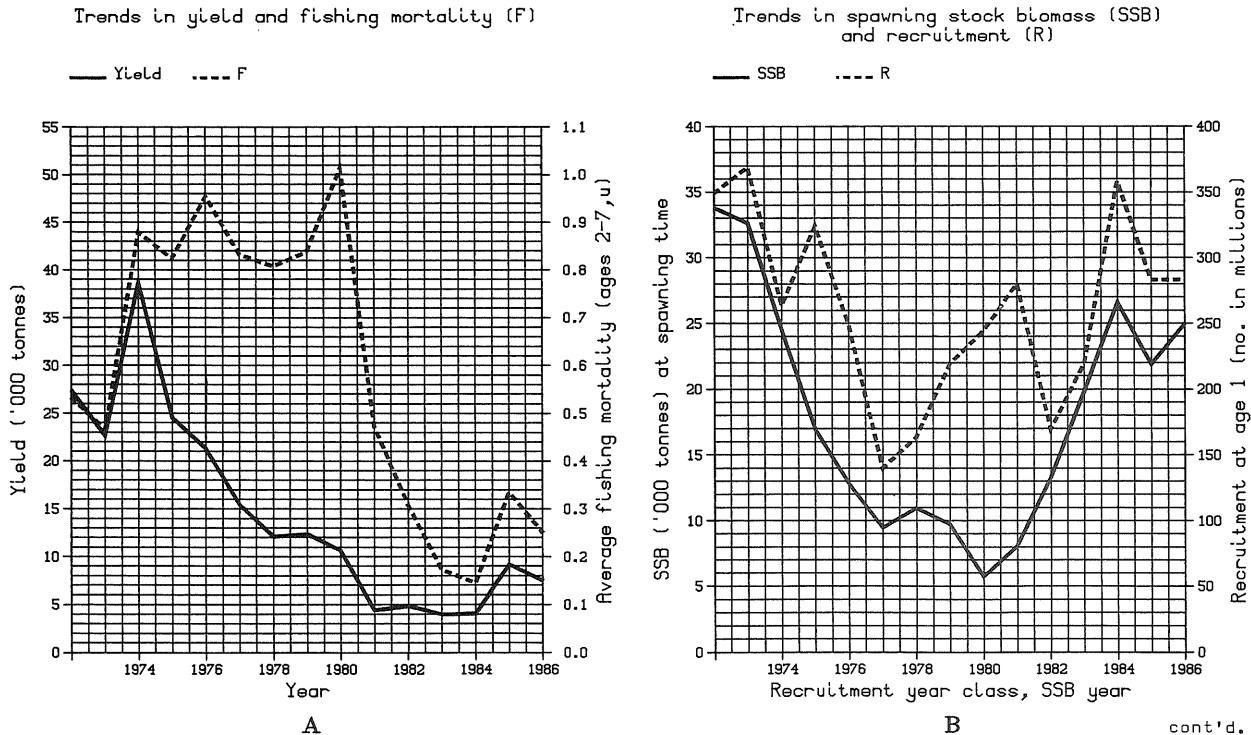


Figure 7.3.2. Trend of F_{66} predicted from effort regressions against F_{66} used to generate VPA.



FISH STOCK SUMMARY
STOCK: Herring – Northern Irish Sea
14-04-1987

Figure 7.3.3



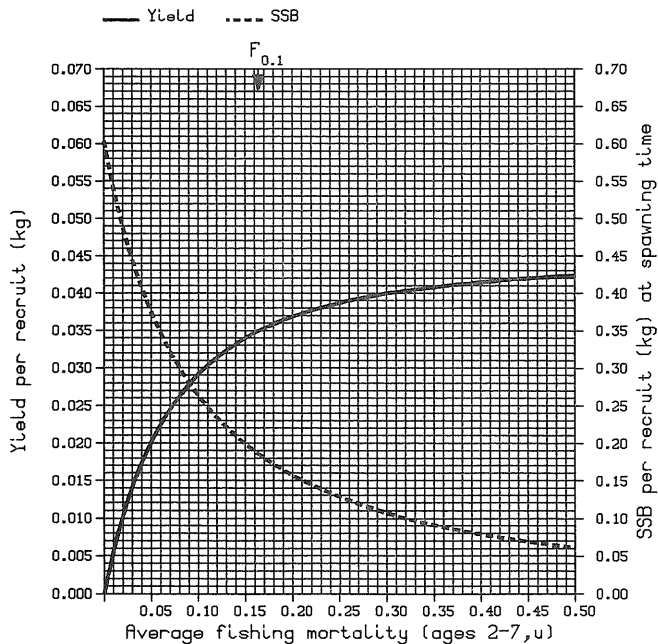
FISH STOCK SUMMARY

STOCK: Herring – Northern Irish Sea

14-04-1987

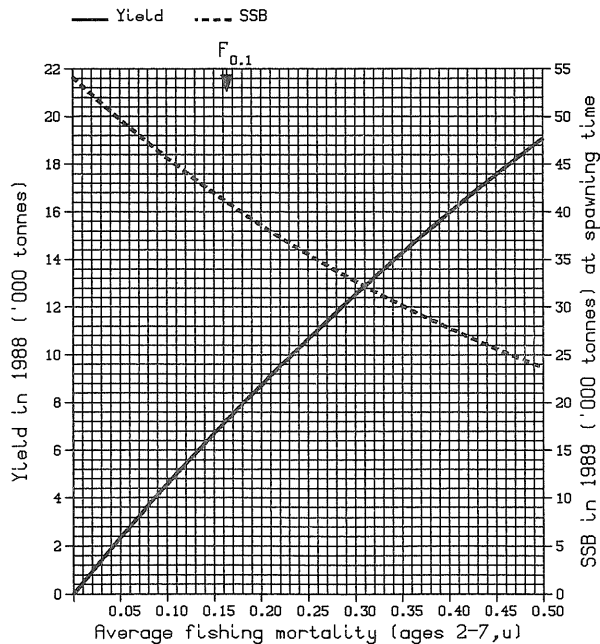
Figure 7.3.3 cont'd.

Long-term yield and spawning stock biomass



C

Short-term yield and spawning stock biomass
assuming catch at 4,500 t in 1987

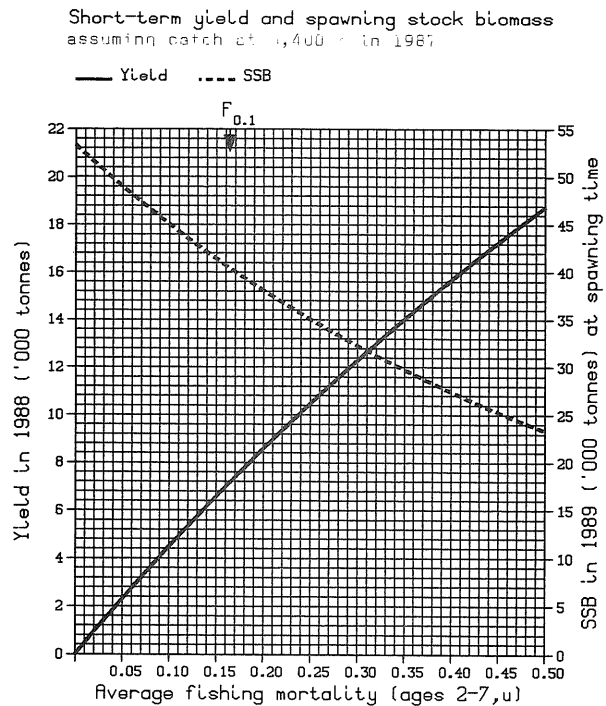


D

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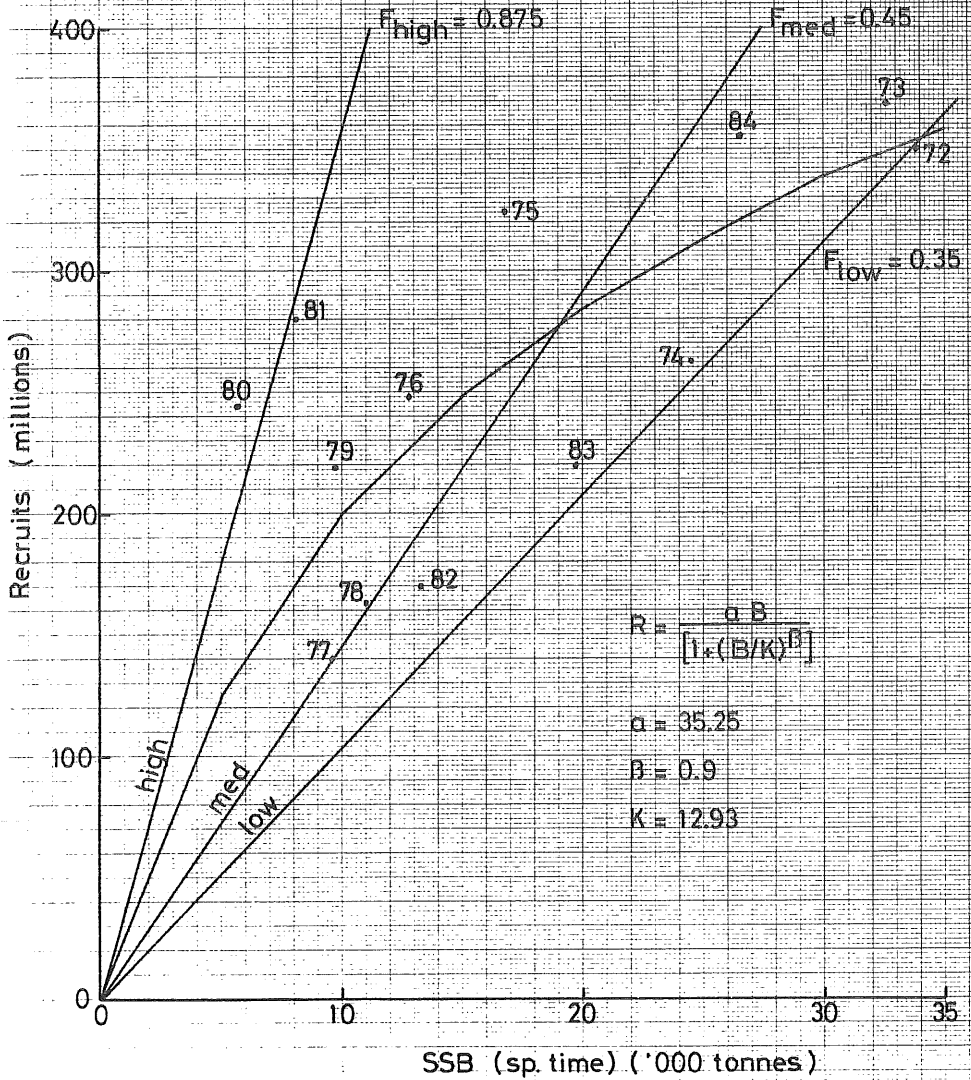
FISH STOCK SUMMARY

Figure 7.3.3 cont'd.

STOCK: Herring – Northern Irish Sea
14-04-1987

D

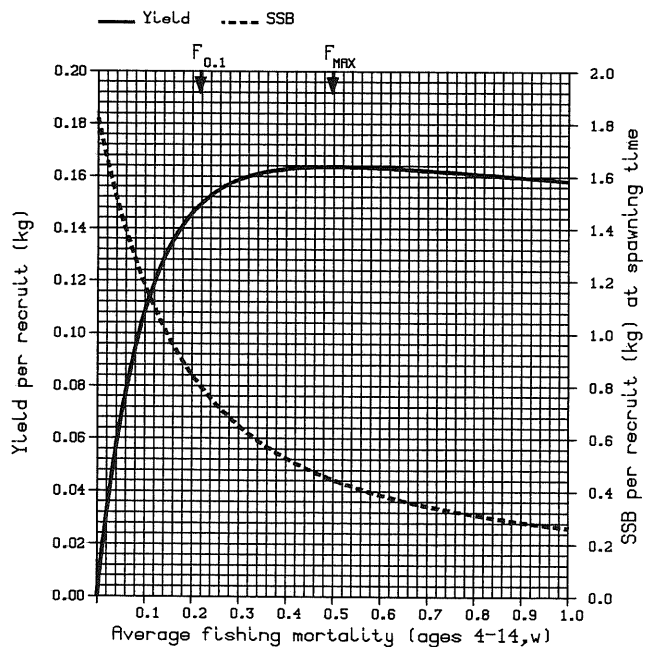
Figure 7.4.1 SSB:R curve for Irish Sea herring (Division VIIa) with biological reference lines. Derived from VPA with $F_{86} = 0.25$.



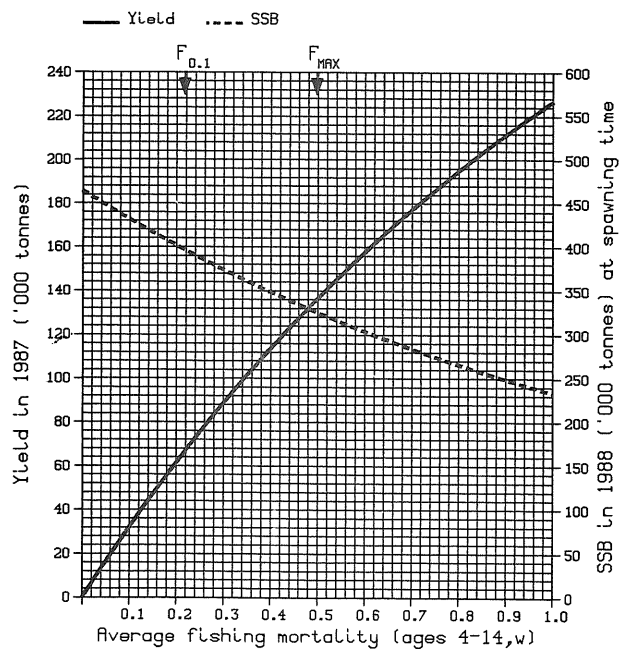
FISH STOCK SUMMARY
STOCK: Herring – Va (Summer)
13-04-1987

Figure 3.4.1

Long-term yield and spawning stock biomass



Short-term yield and spawning stock biomass



C

D

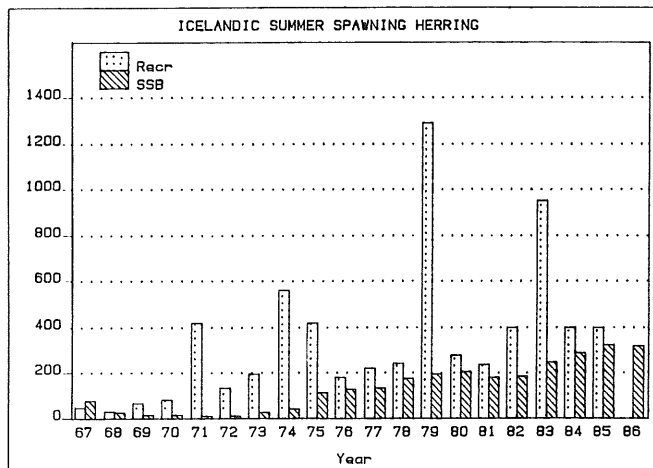
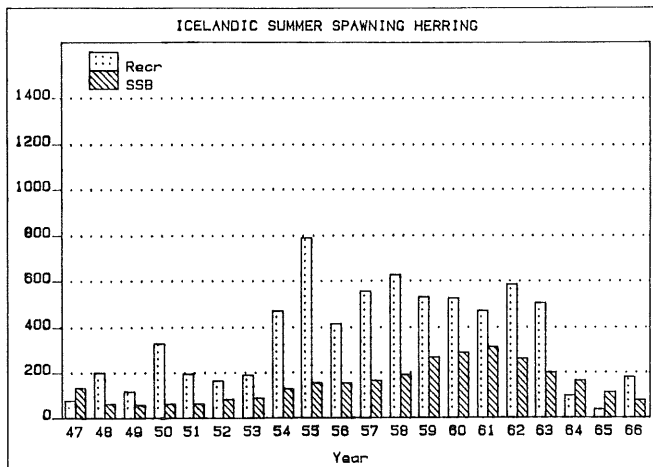


Figure 8.4.2. Trends in spawning stock biomass (SSB) and recruitment (Recr) for the Icelandic summer-spawning herring. Recruitment, year class as number 1-ringers $\times 10^{-6}$. SSB, year in '000 tonnes.

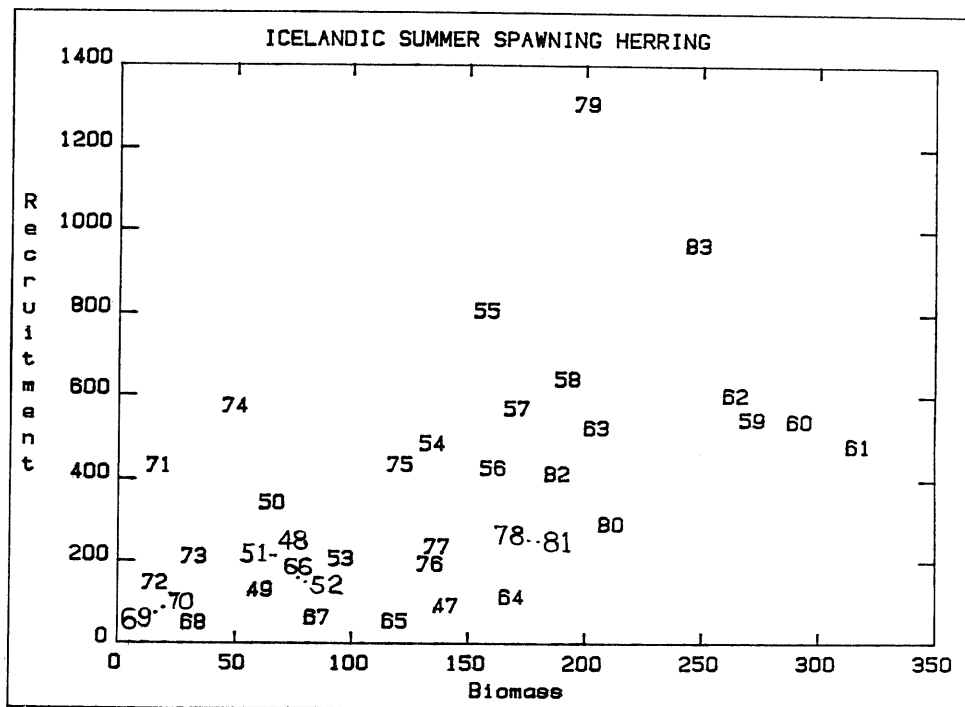


Figure 8.4.3. Stock-Recruitment plot for the Icelandic summer-spawning herring.

