International Council for the
Exploration of the Sea

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PART 3

REPORT OF THE WORKING GROUP ON NEPHROPS STOCKS

Nantes, France, 21-28 March 1990

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Denmark

Figure 4.1. - Nephrops management units in ICES Division IIIa

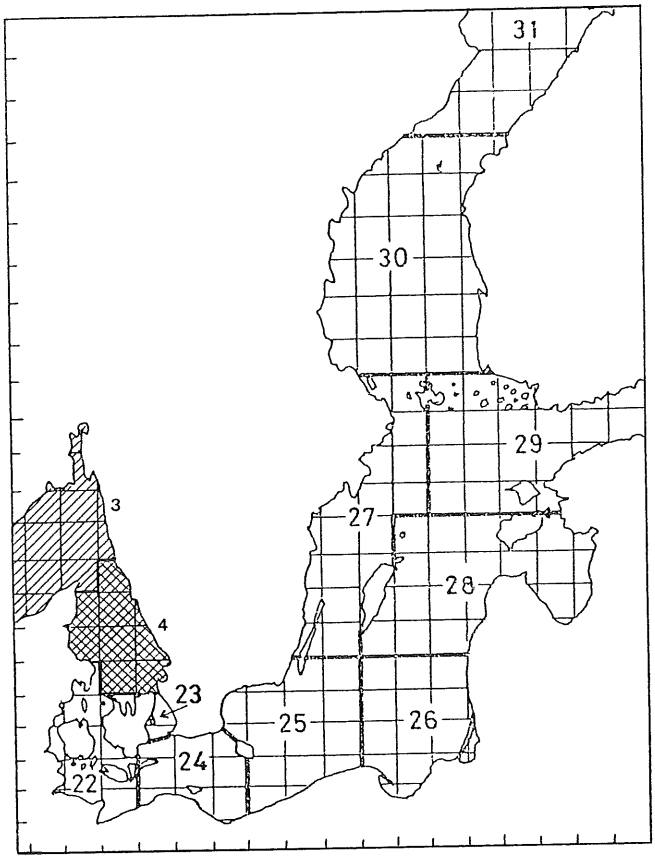


Figure 4.2. - Nephrops management units in ICES Sub-areas IV, VI and VII

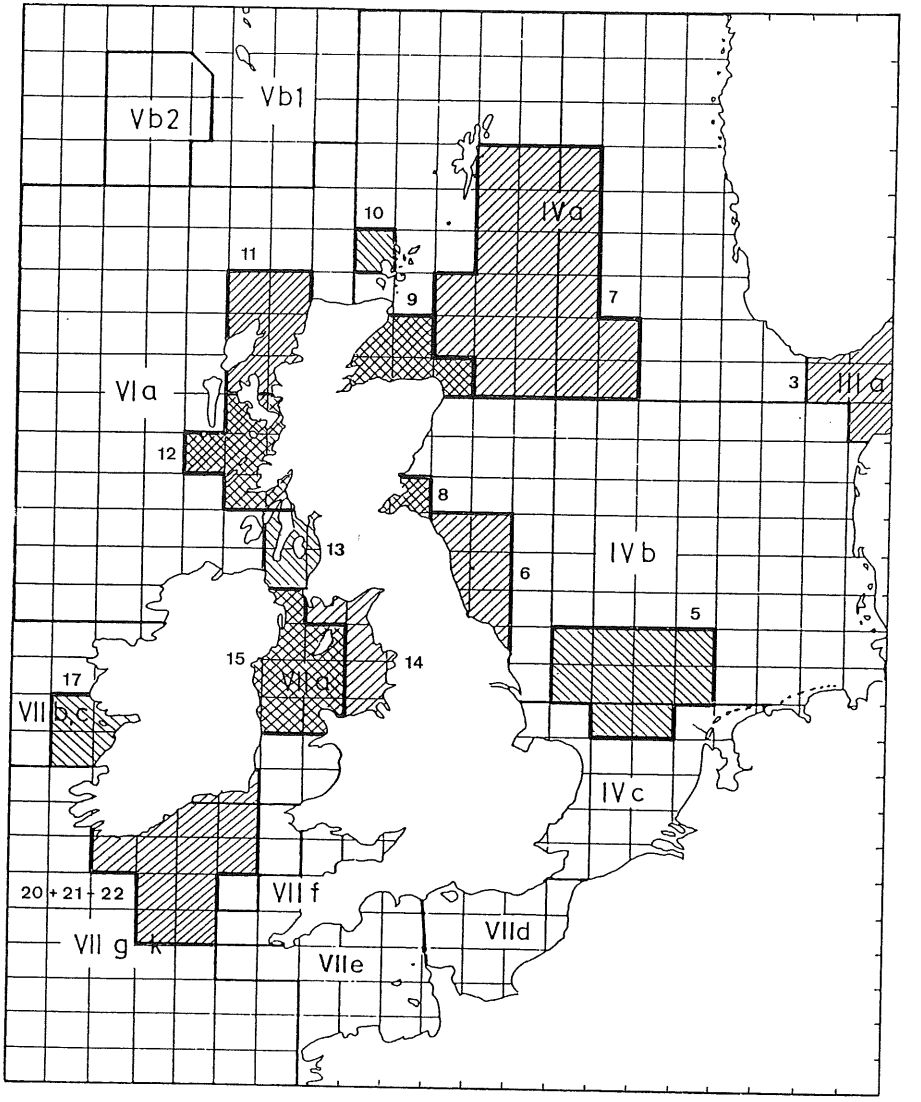


Figure 4.3. - Nephrops management units in ICES Sub-areas V, VI, VII, VIII and IX

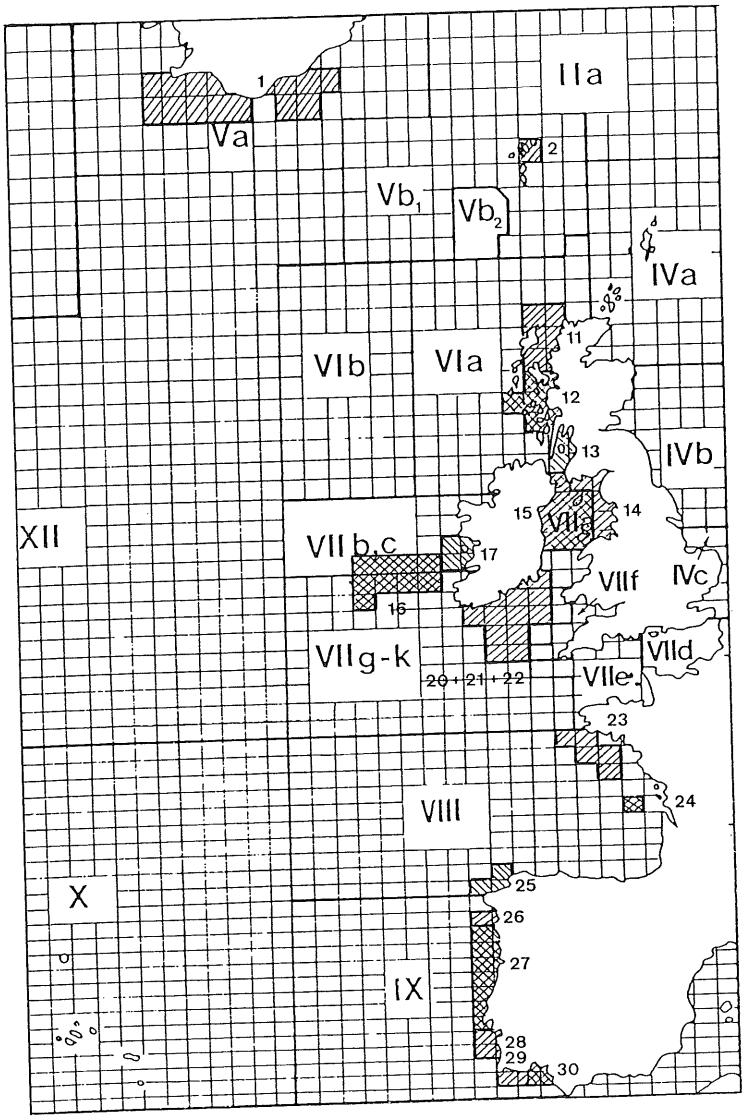


Figure 5.1. - Skagerrak and Kattegat (Management Units 3 and 4) : Swedish Nephrops landings, by area, 1960-89

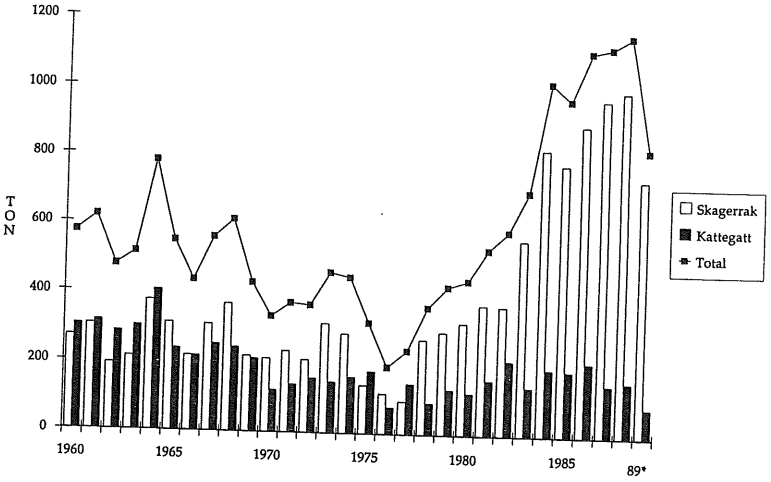


Figure 5.2. - Botney Gut - Silver Pit (Management Unit 5) : detrended monthly LPUEs of Belgian Nephrops trawlers, 1980-89

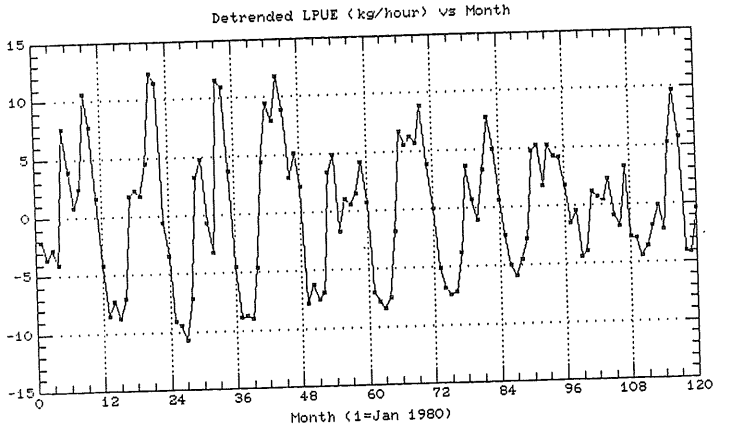


Figure 5.3. - Irish Sea East (Management Unit 14) : LPUE (in kg/hour trawling) of UK vessels, 1973-89

NEPQTY : quantity of Nephrops landed
TOTQTY : total quantity landed (per vessel)

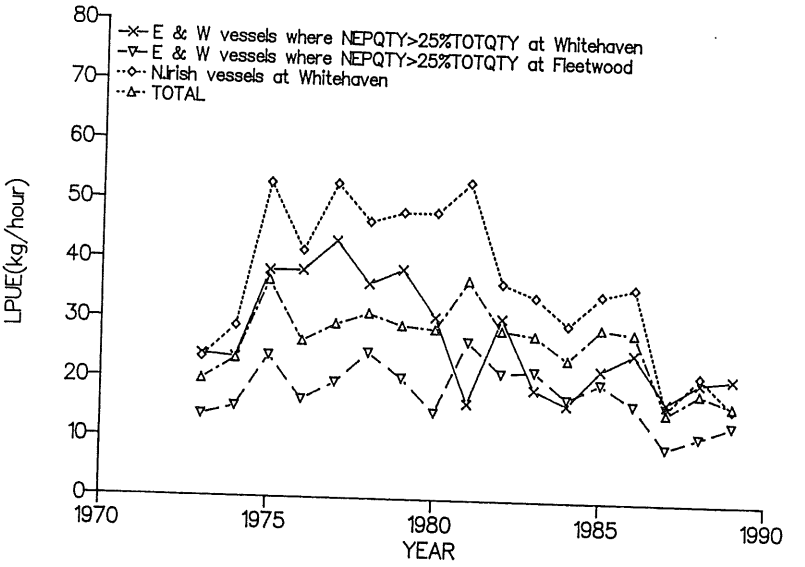


Figure 5.4. - Irish Sea East (Management Unit 14) : LPUE (in nos./hour trawling and in kg/hour trawling) of UK vessels, 1985-88

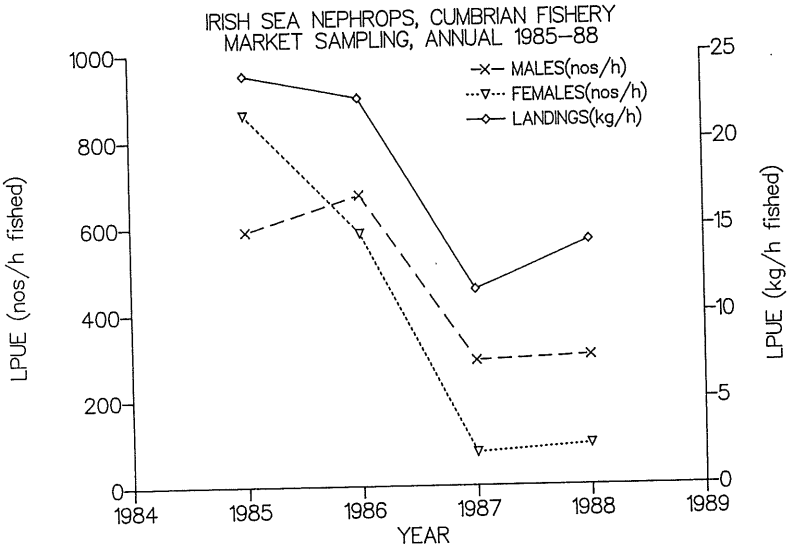


Figure 6.1. - Iceland (Management Unit 1) : trends in mean size (carapace length in mm) of male and female Nephrops in catches, 1960-89

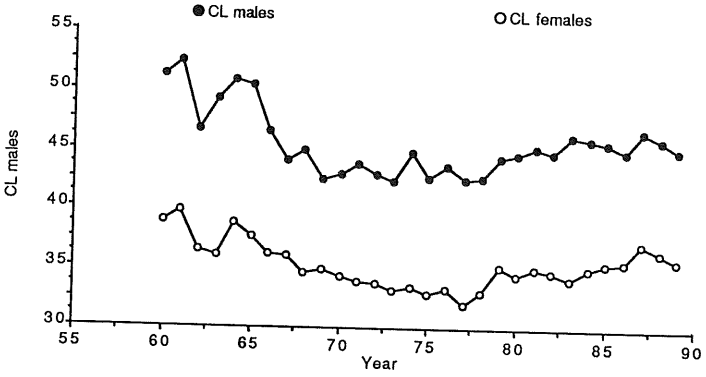


Figure 6.2. - Botney Gut - Silver Pit (Management Unit 5) : trends in mean size (carapace length in mm) of male Nephrops in landings, market category "small", 1980-89

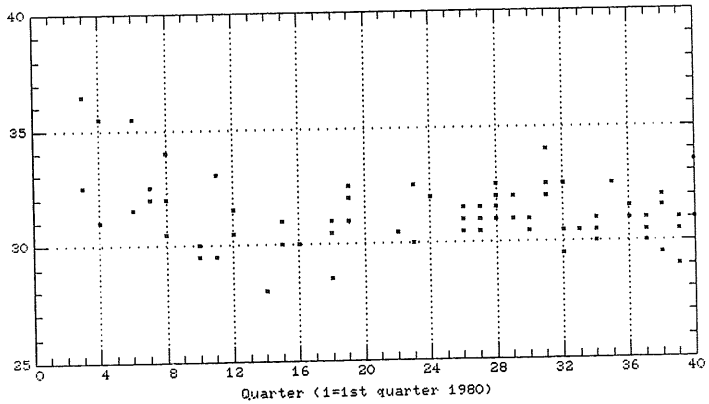


Figure 6.3. - Botney Gut - Silver Pit (Management Unit 5) : trends in mean size (carapace length in mm) of female Nephrops in landings, market category "small", 1980-89

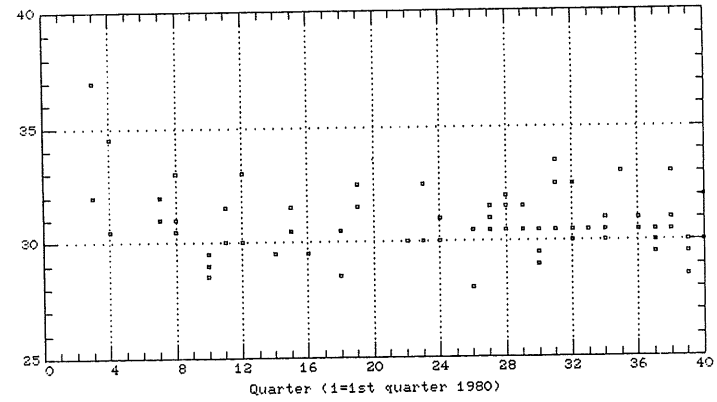


Figure 6.4. - Botney Gut - Silver Pit (Management Unit 5) : trends in mean size (carapace length in mm) of male Nephrops in landings, market categories "medium and large", 1980-89

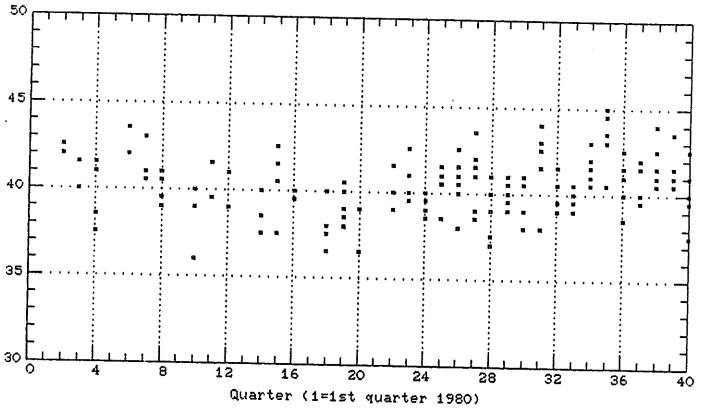


Figure 6.5. - Botney Gut - Silver Pit (Management Unit 5) : trends in mean size (carapace length in mm) of female Nephrops in landings, market categories "medium and large", 1980-89

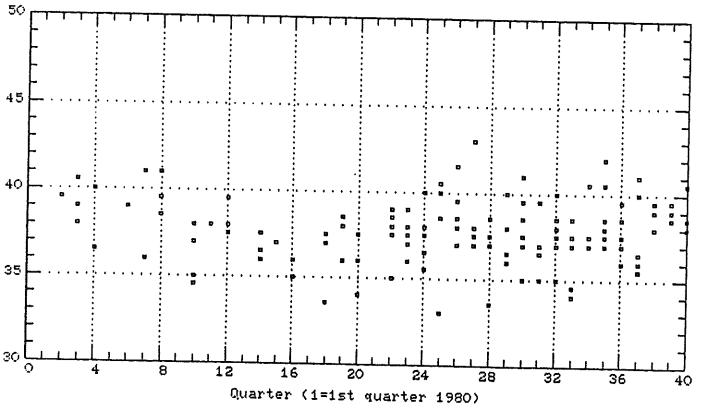


Figure 7.1. - Iceland - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

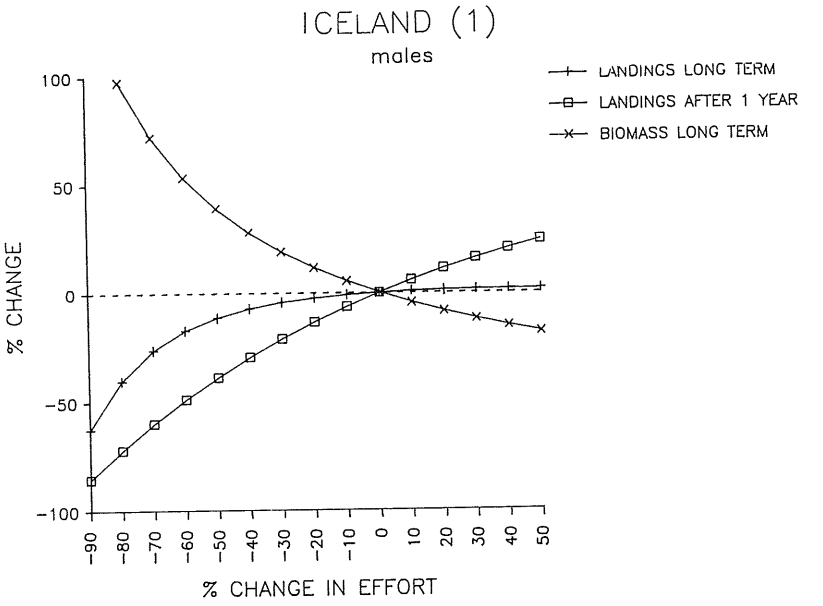


Figure 7.2. - Faroe Islands - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

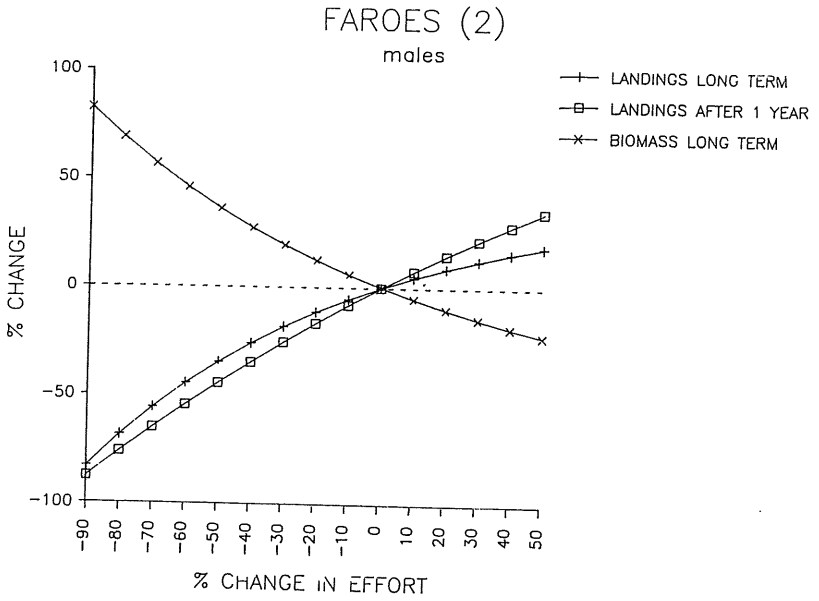


Figure 7.3. - Faroe Islands - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

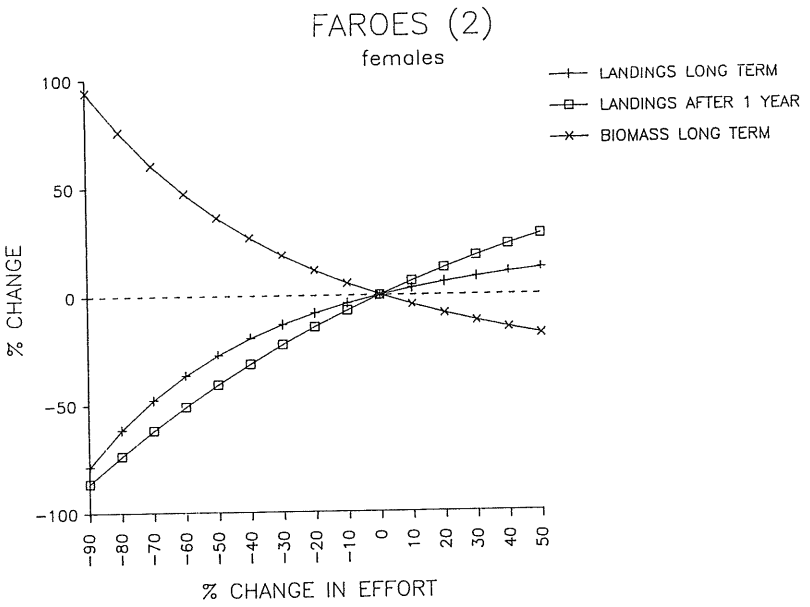


Figure 7.4. - Botney Gut and Silver Pit - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

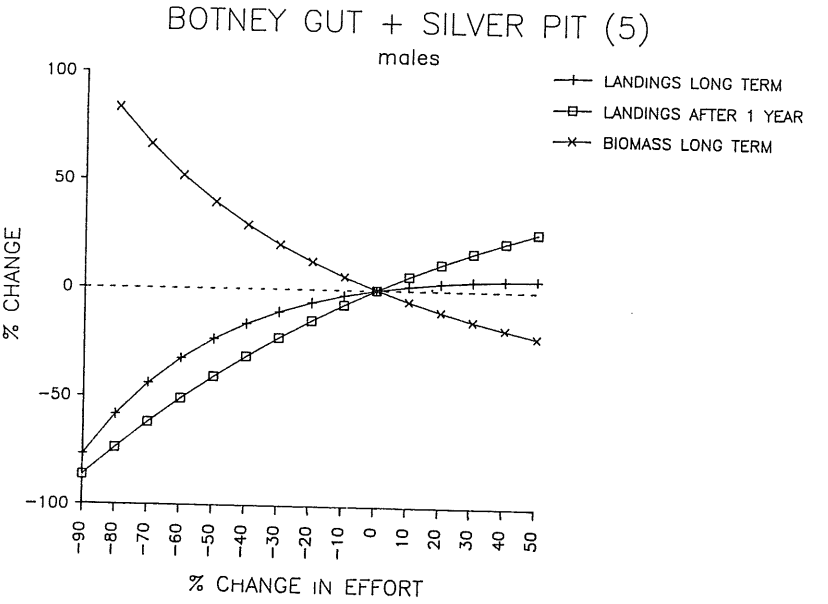


Figure 7.5. - Botney Gut and Silver Pit - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

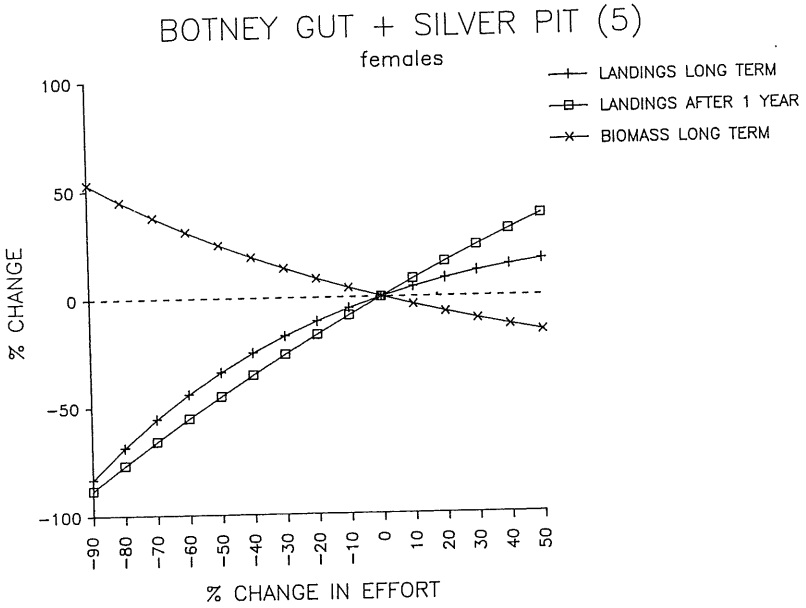


Figure 7.6. - Farn Deeps - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

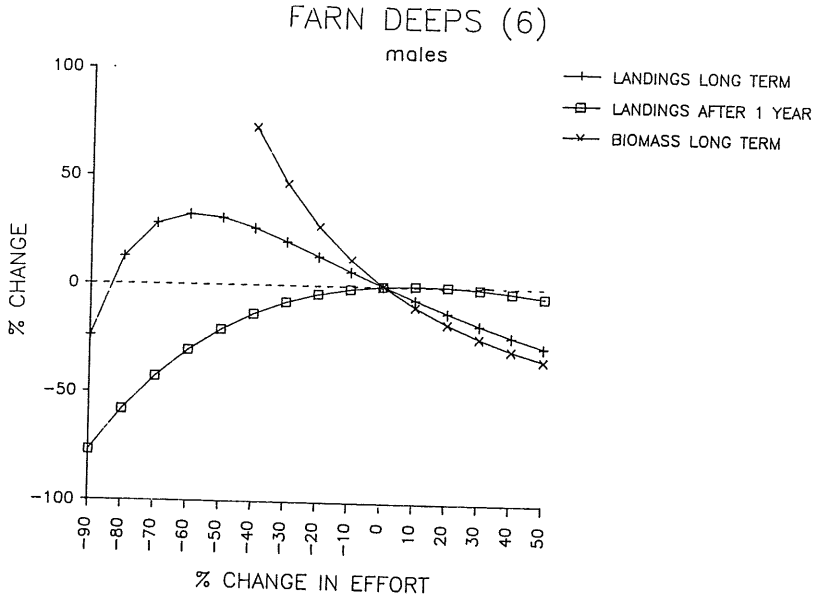


Figure 7.7. - Farn Deeps - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

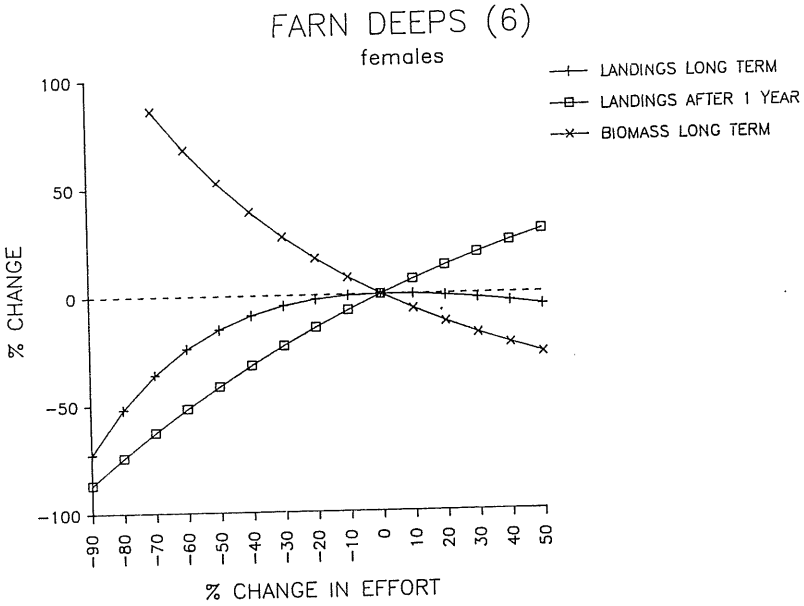


Figure 7.8. - Fladen Ground - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

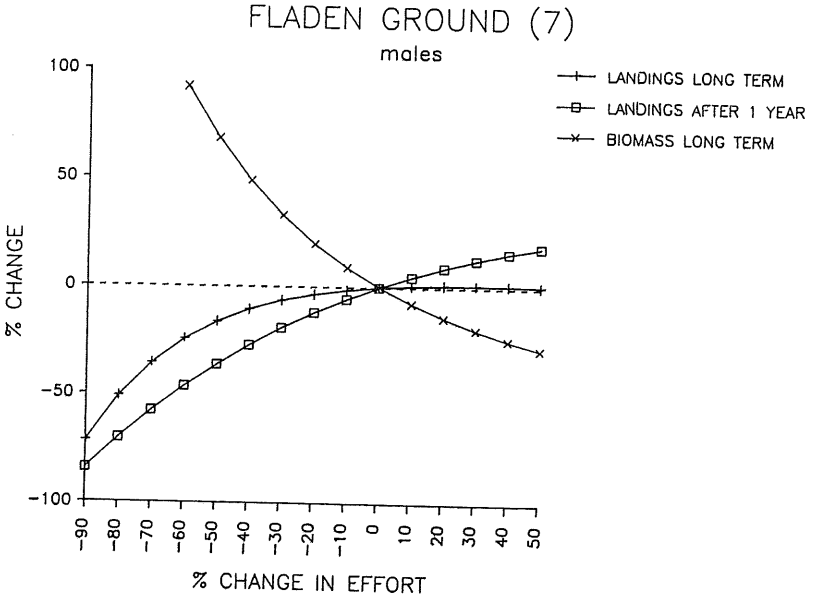


Figure 7.9. - Fladen Ground - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

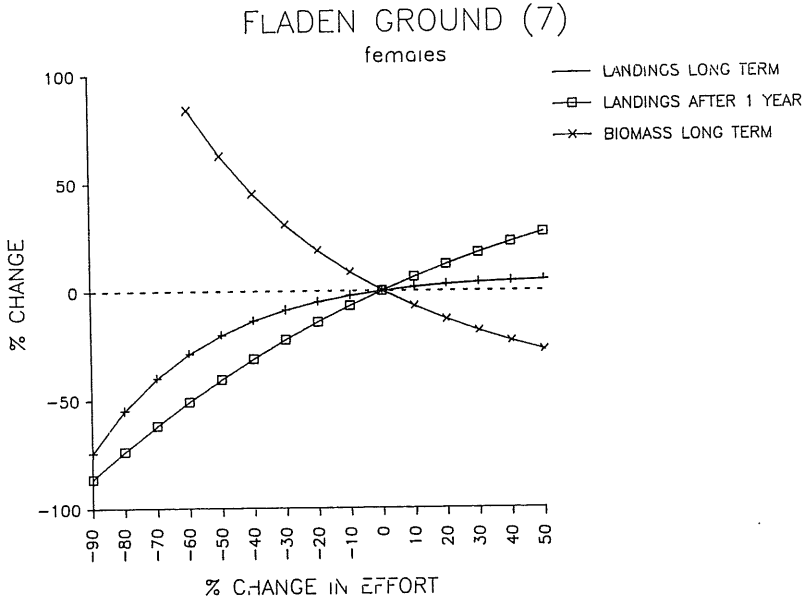


Figure 7.10. - Firth of Forth - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

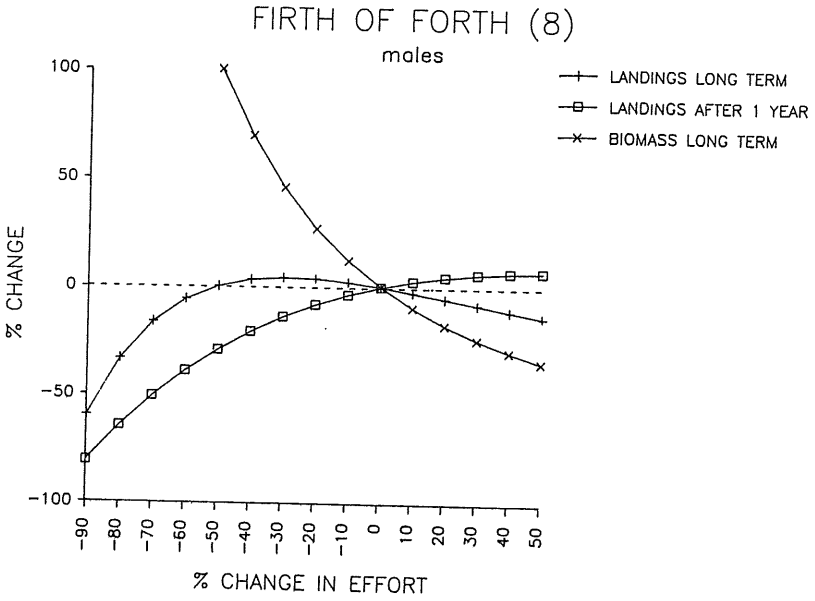


Figure 7.11. - Firth of Forth - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

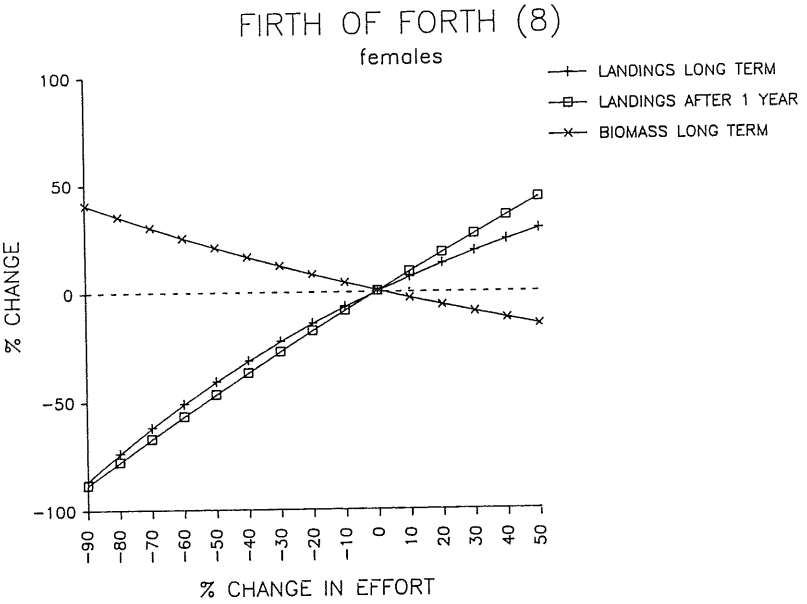


Figure 7.12. - Moray Firth - males (1st run) : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

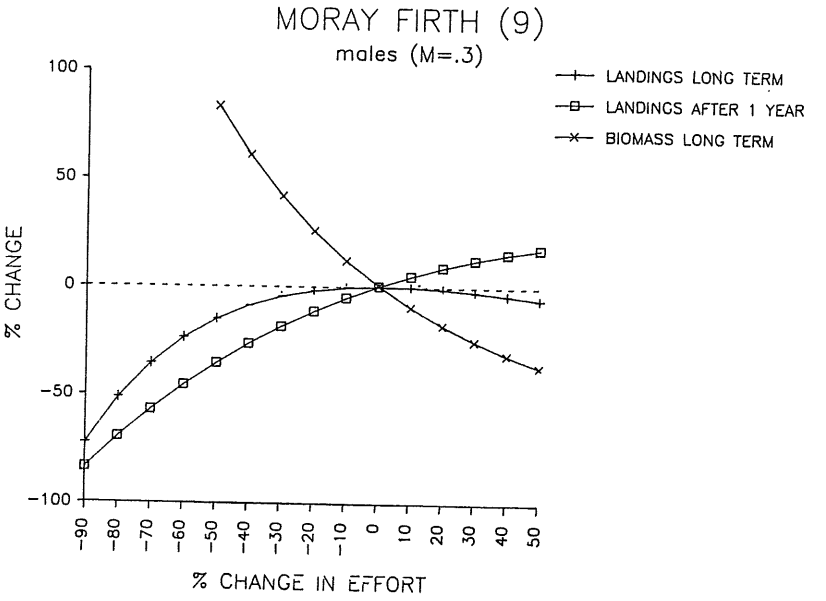


Figure 7.13. - Moray Firth - males (2nd run) : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

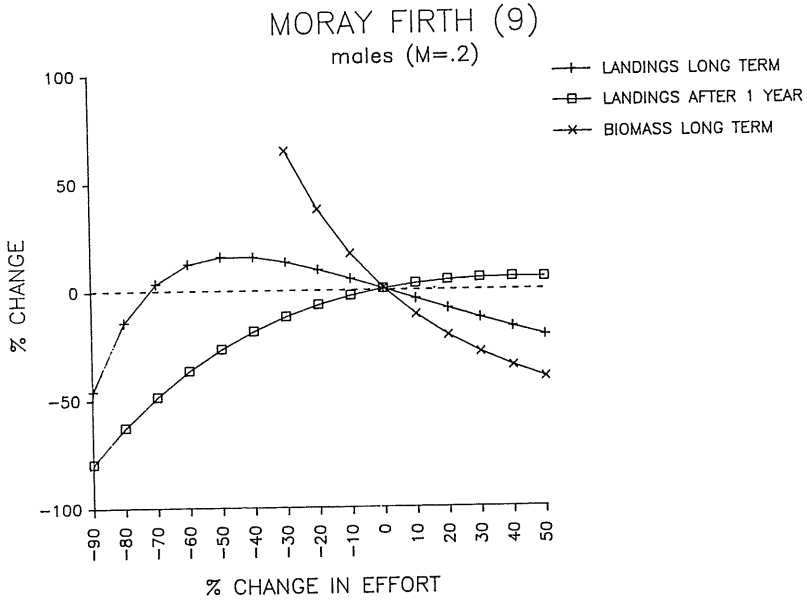


Figure 7.14. - Moray Firth - females (1st run) : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

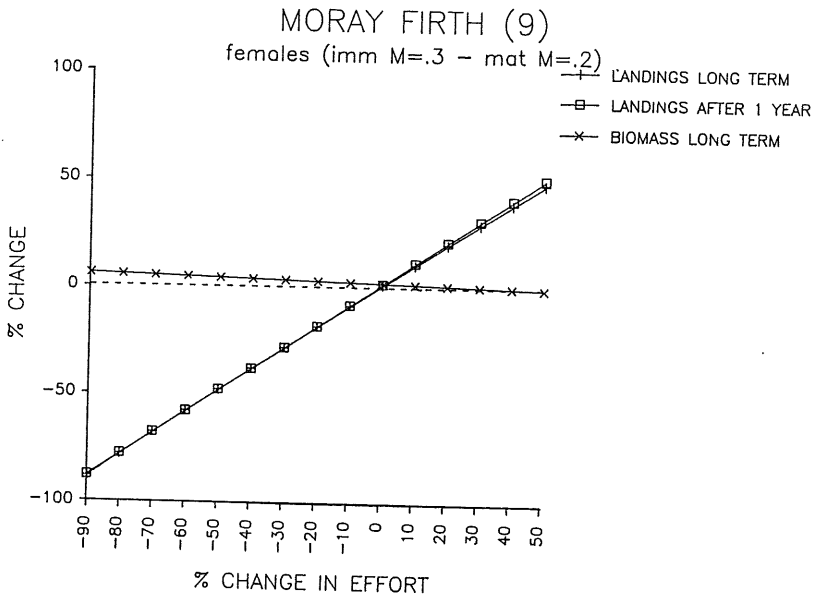


Figure 7.15. - Moray Firth - females (2nd run) : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

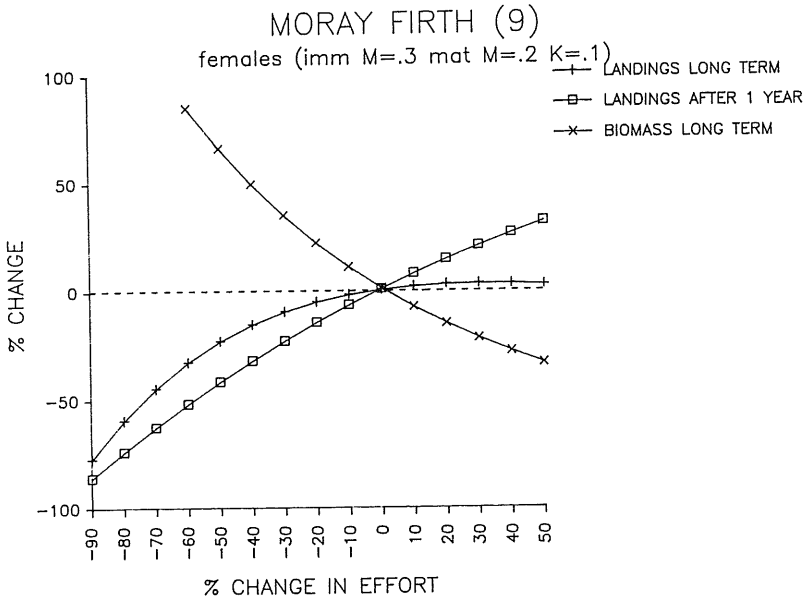


Figure 7.16. - Moray Firth - females (3rd run) : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

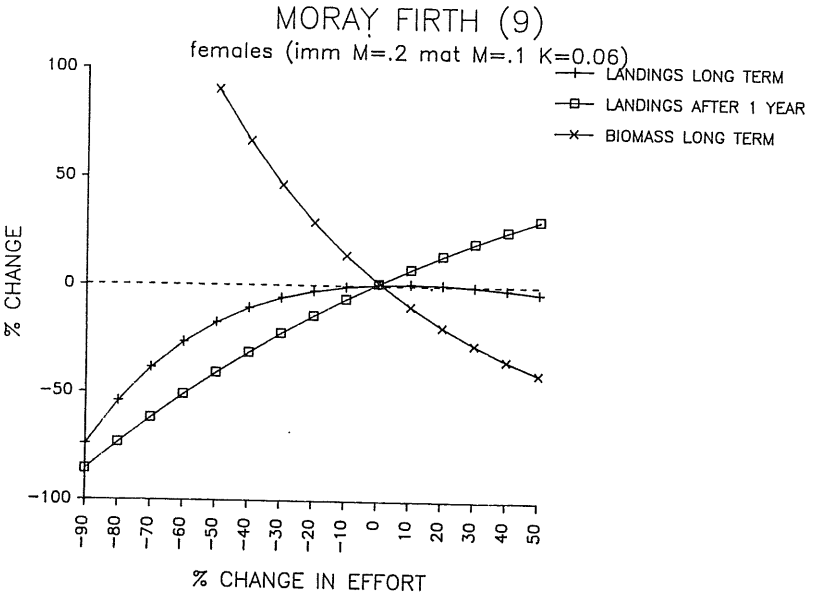


Figure 7.17. - North Minch - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

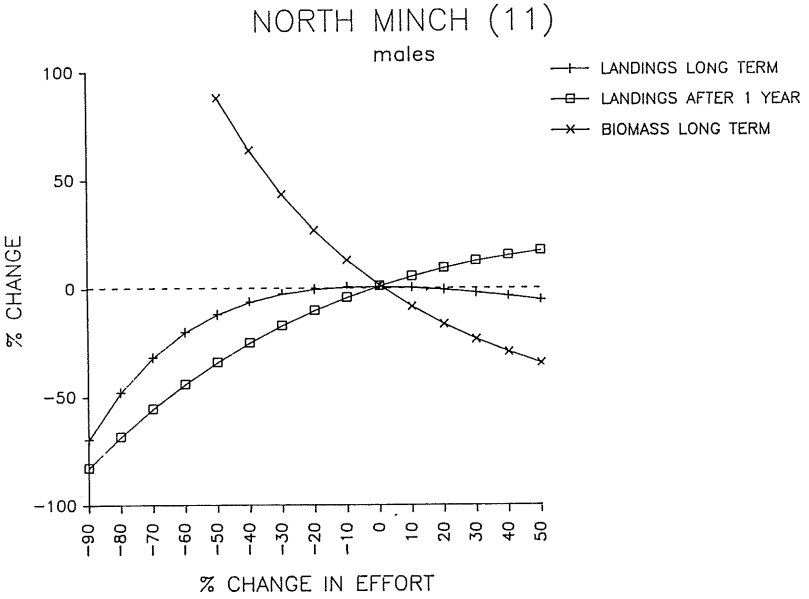


Figure 7.18. - North Minch - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

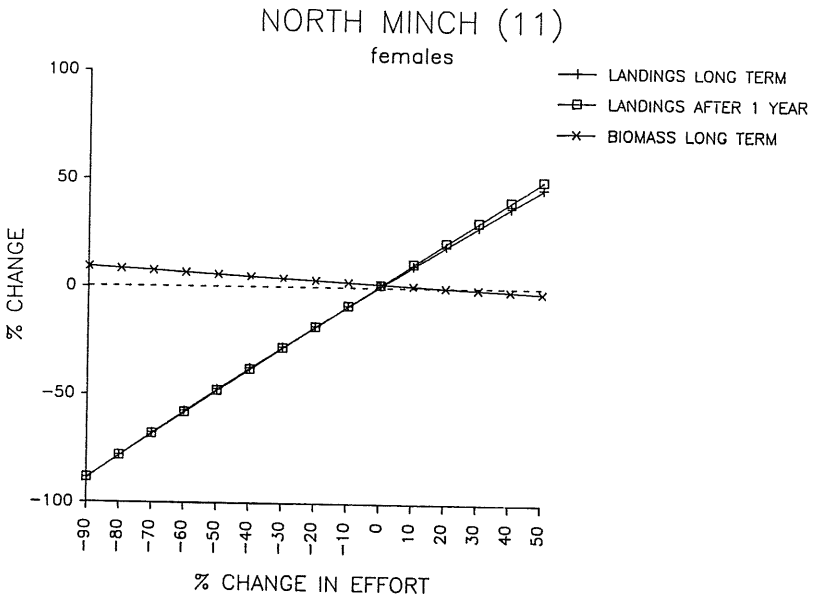


Figure 7.19. - South Minch - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

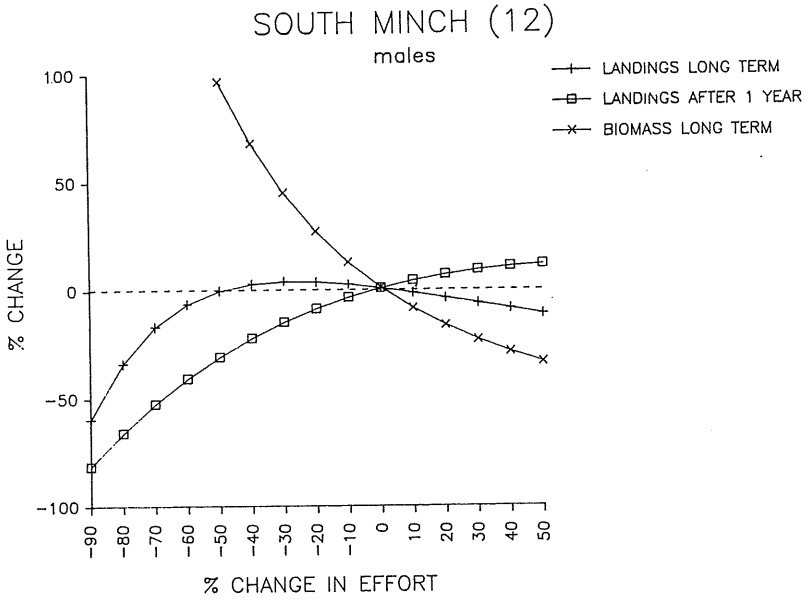


Figure 7.20. - South Minch - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

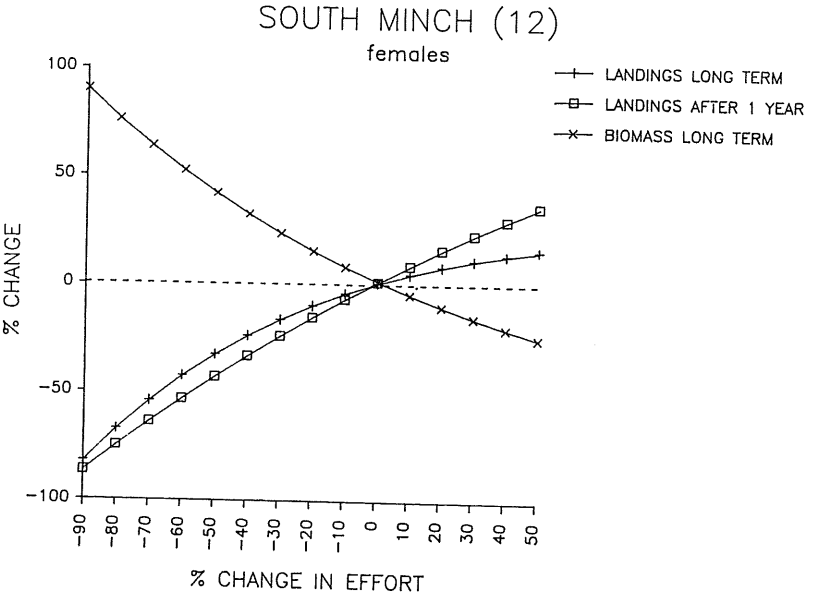


Figure 7.21. - Clyde - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

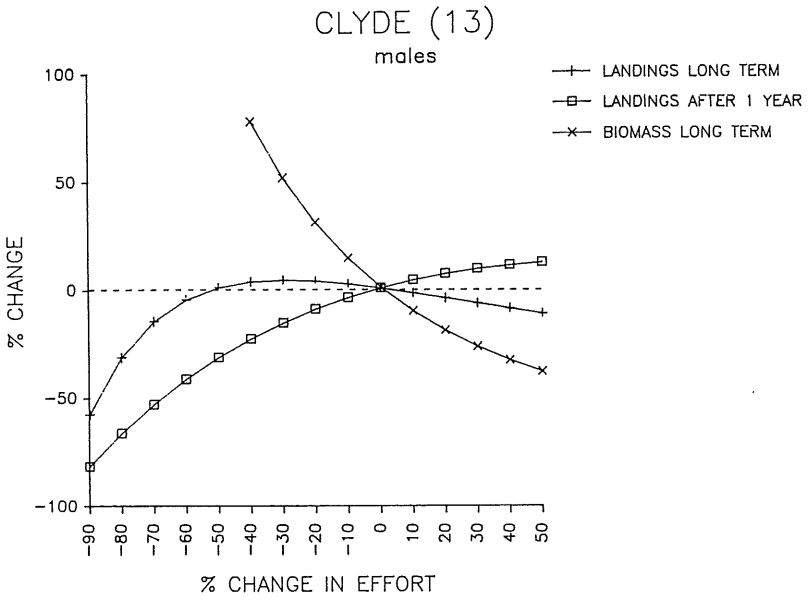


Figure 7.22. - Clyde - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

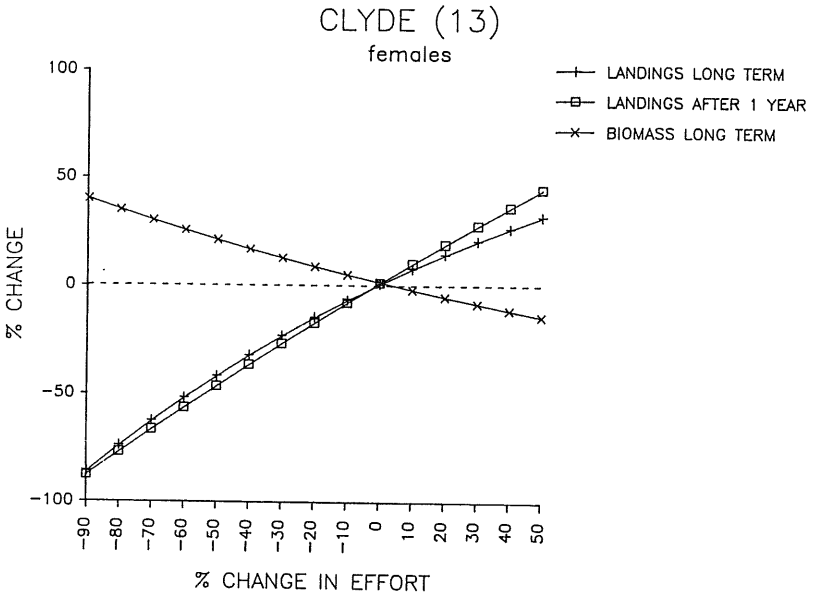


Figure 7.23. - Irish Sea East : cumulative length frequency distributions of market samples, annualized, 1985-88

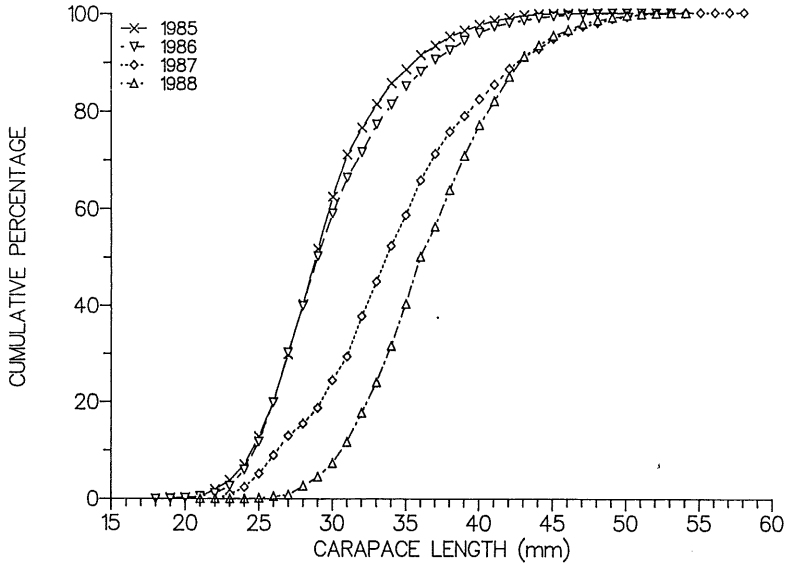


Figure 7.24. - Irish Sea East - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

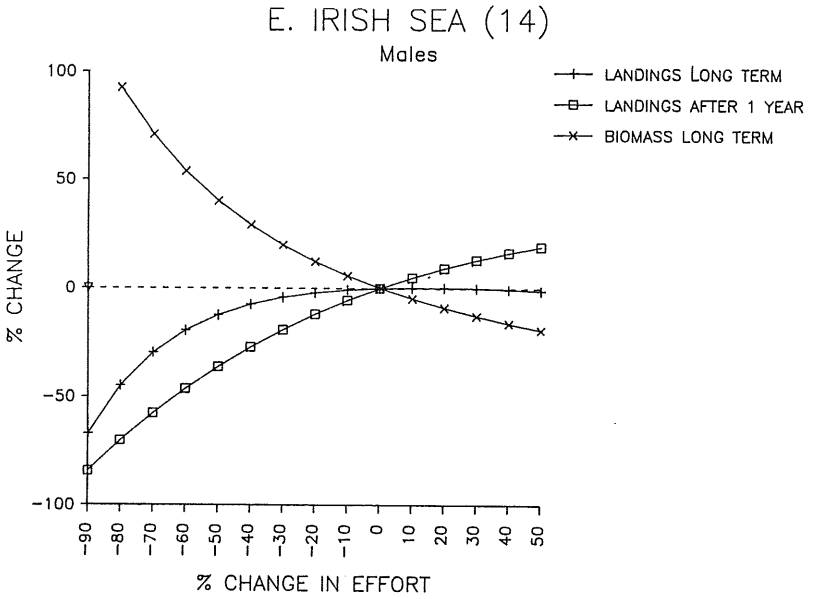


Figure 7.25. - Irish Sea East - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

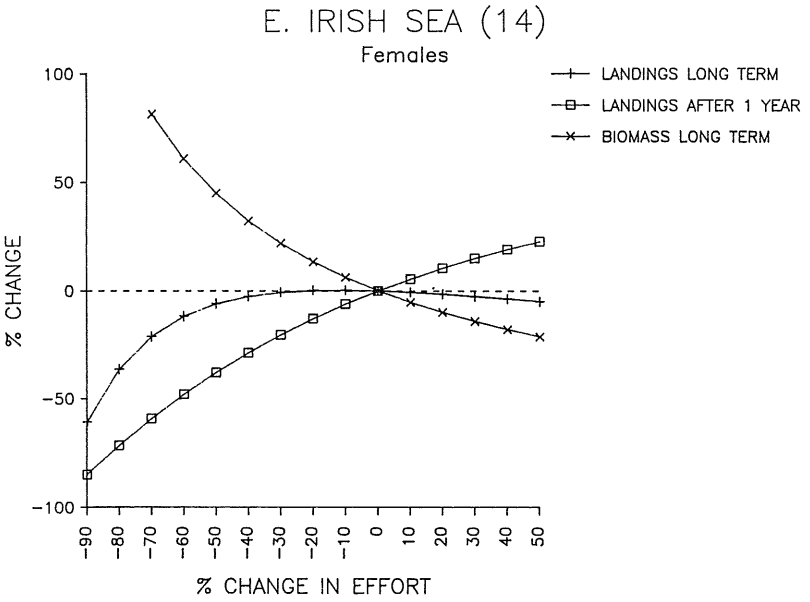


Figure 7.26. - Irish Sea West - males (M = 0.2) : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

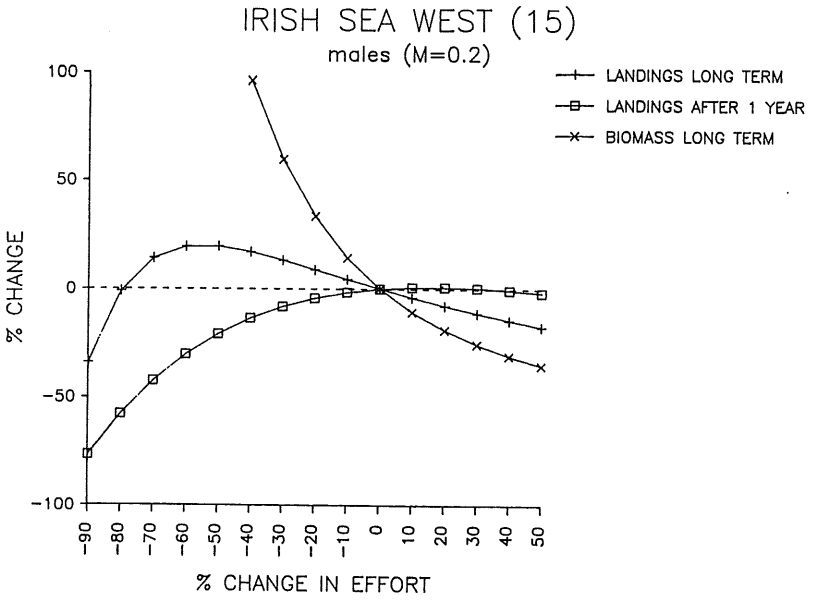


Figure 7.27. - Irish Sea West - males (M = 0.25) : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

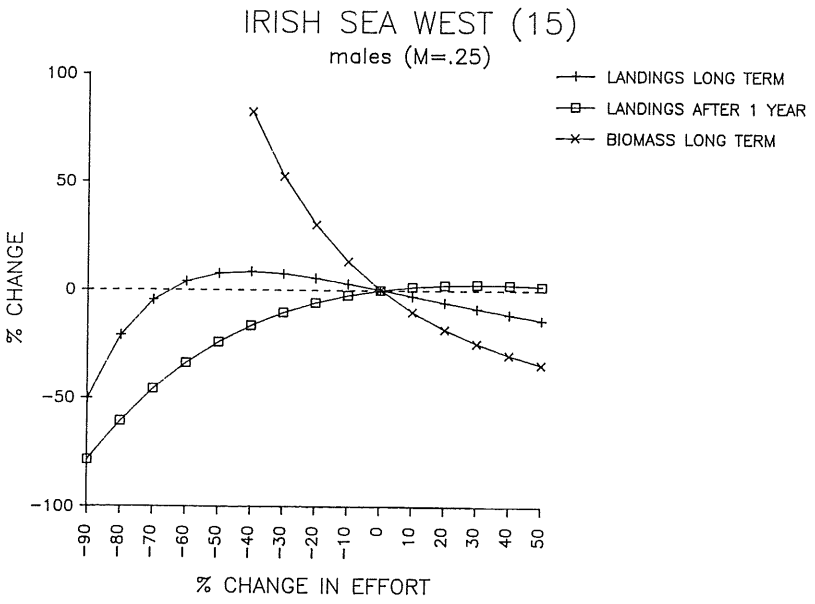


Figure 7.28. - Irish Sea West - males (M = 0.3) : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

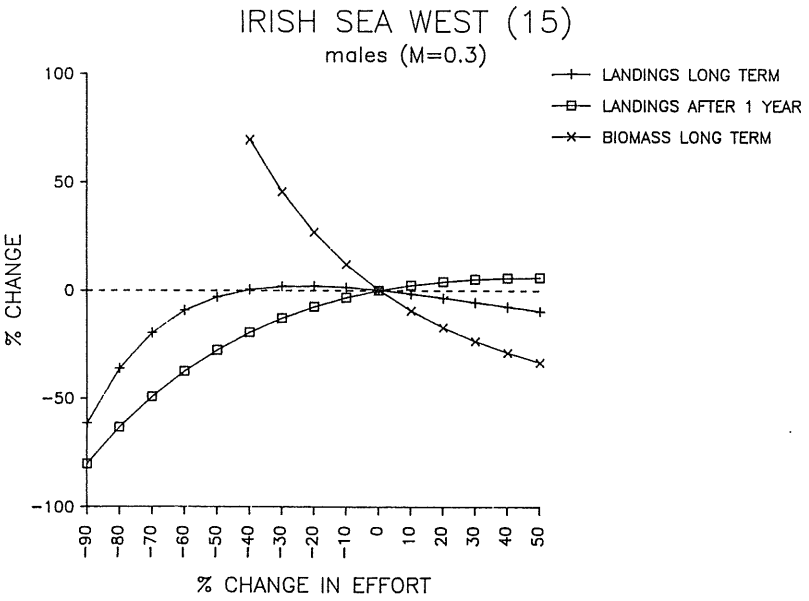


Figure 7.29. - Irish Sea West - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

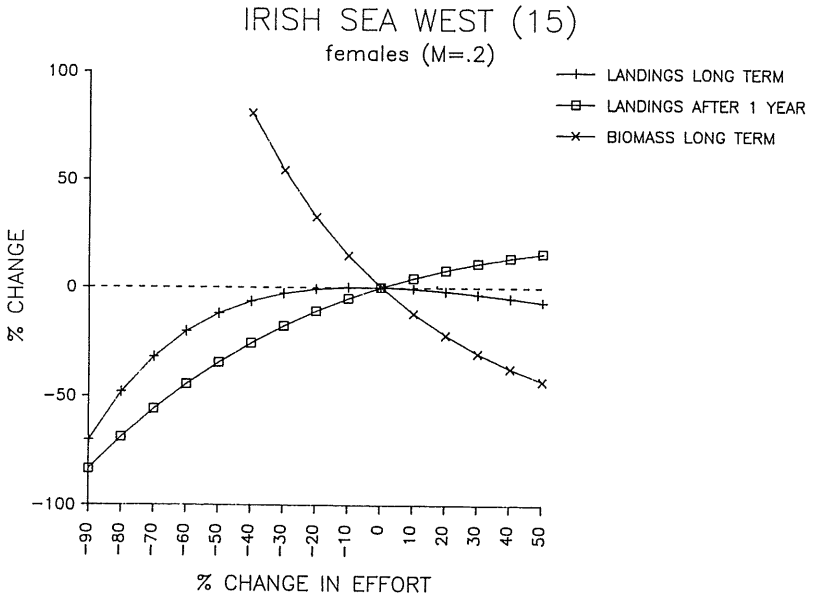


Figure 7.30. - Porcupine Bank - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

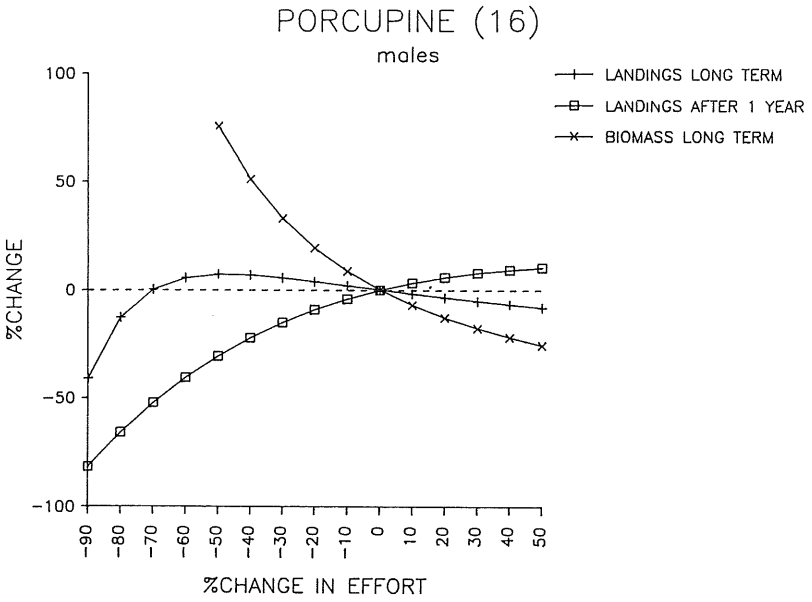


Figure 7.31. - Porcupine Bank - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

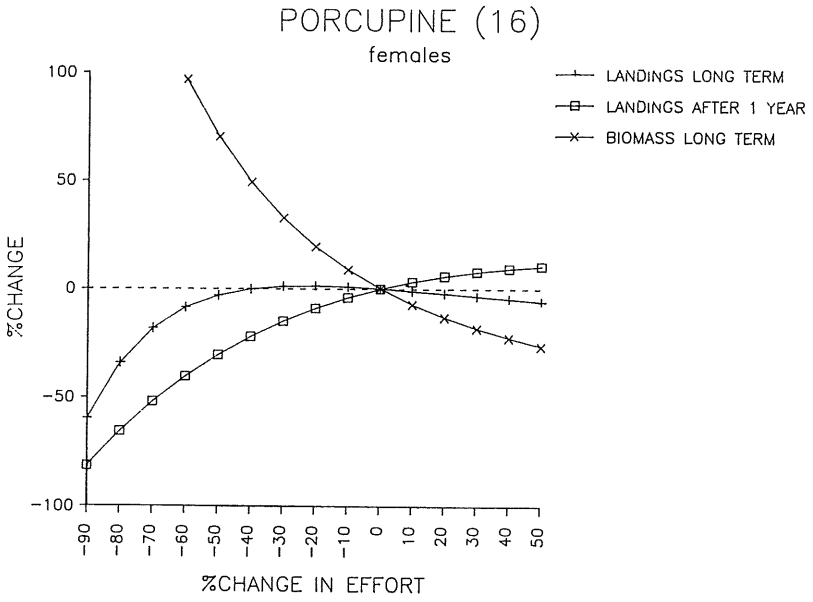


Figure 7.32. - Celtic Sea - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

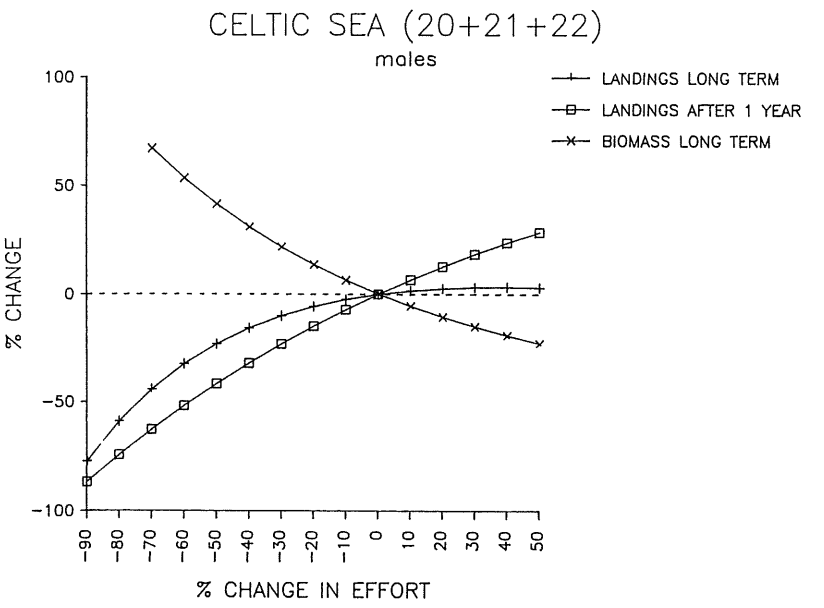


Figure 7.33. - Celtic Sea - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

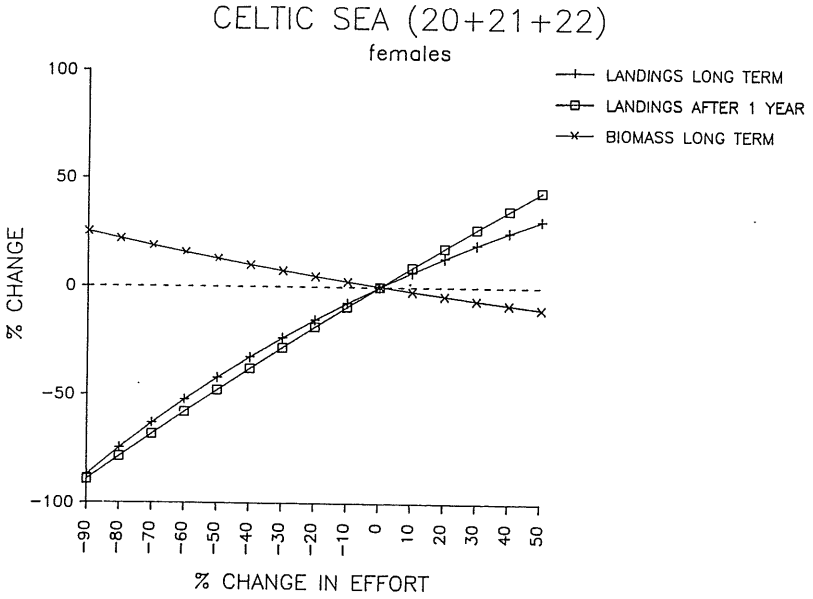


Figure 7.34. - Bay of Biscay - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

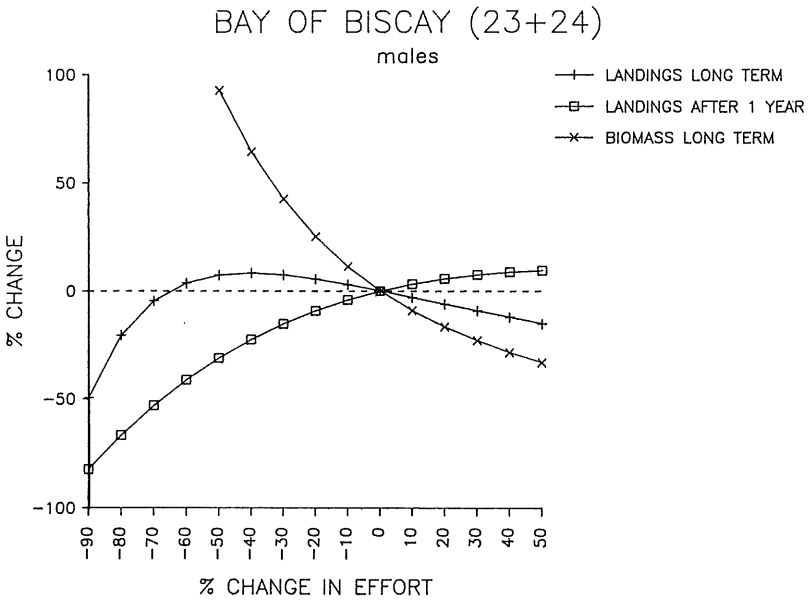


Figure 7.35. - Bay of Biscay - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

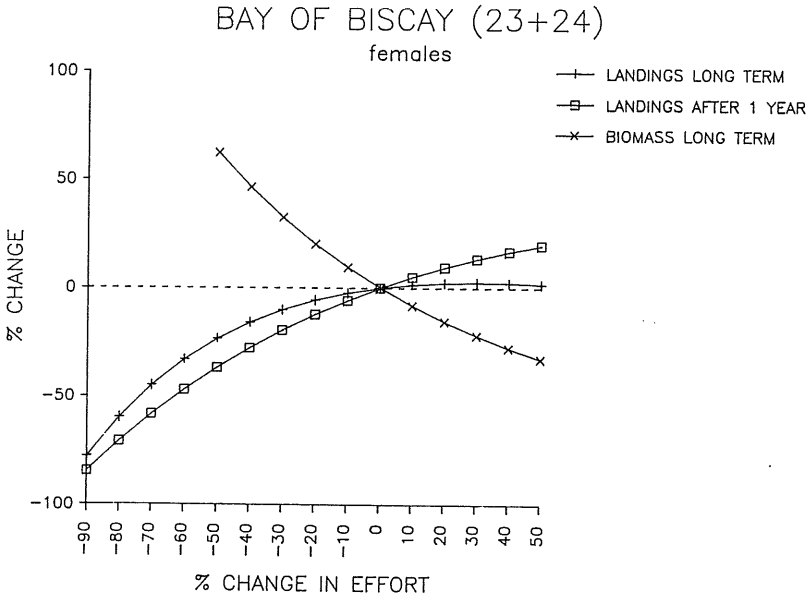


Figure 7.36. - North Galicia - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

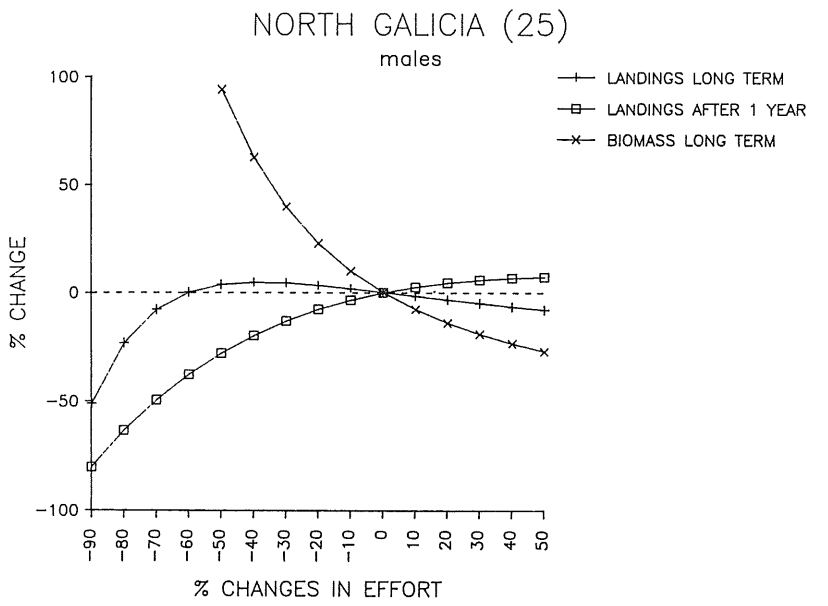


Figure 7.37. - North Galicia - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

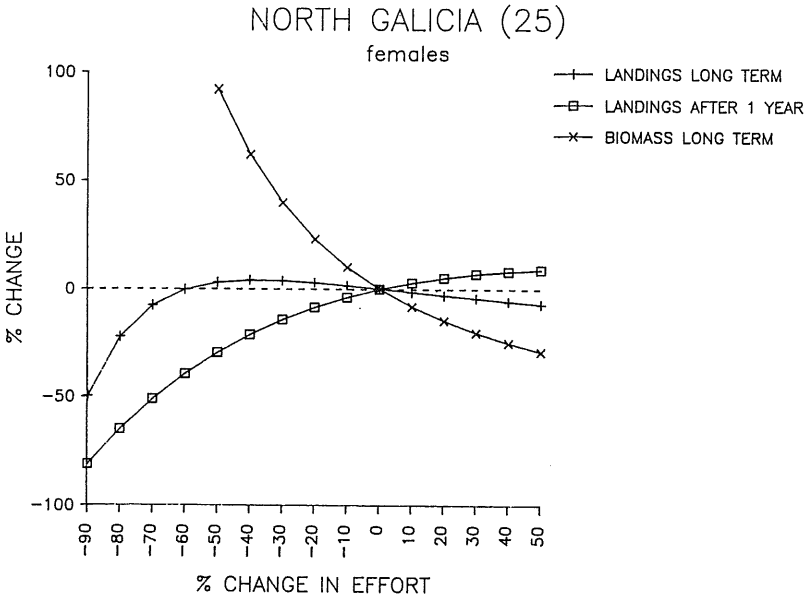


Figure 7.38. - West Galicia - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

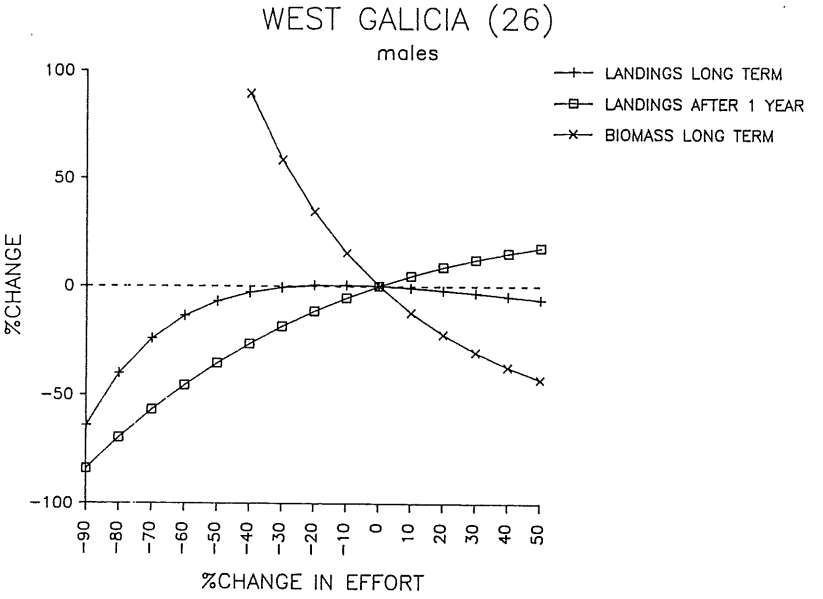


Figure 7.39. - West Galicia - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

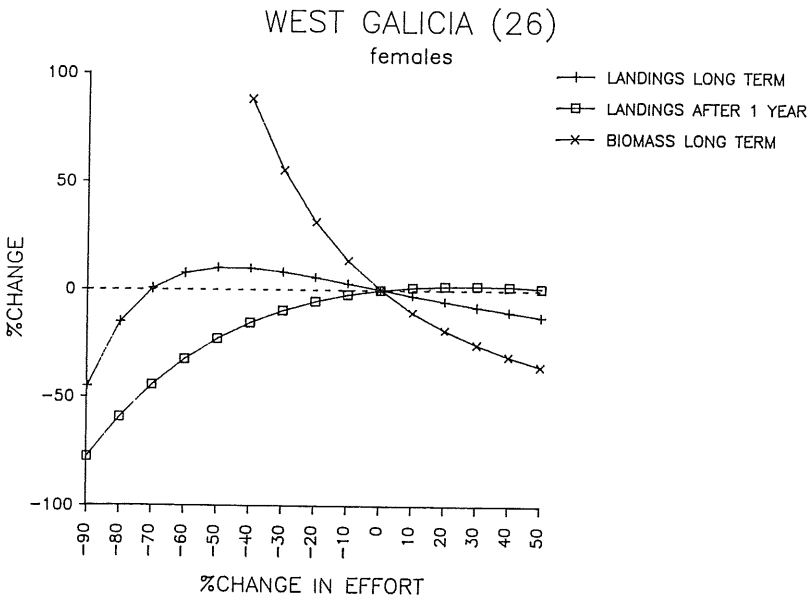


Figure 7.40. - SW and S Portugal - males : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

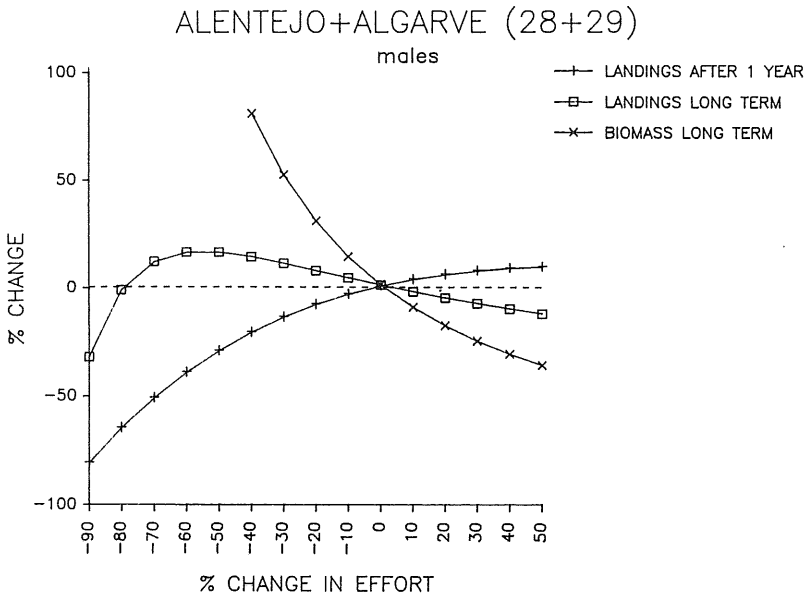


Figure 7.41. - SW and S Portugal - females : relative changes in long-term landings and biomass, and short-term landings (i.e. after one year) in response to relative changes in effort

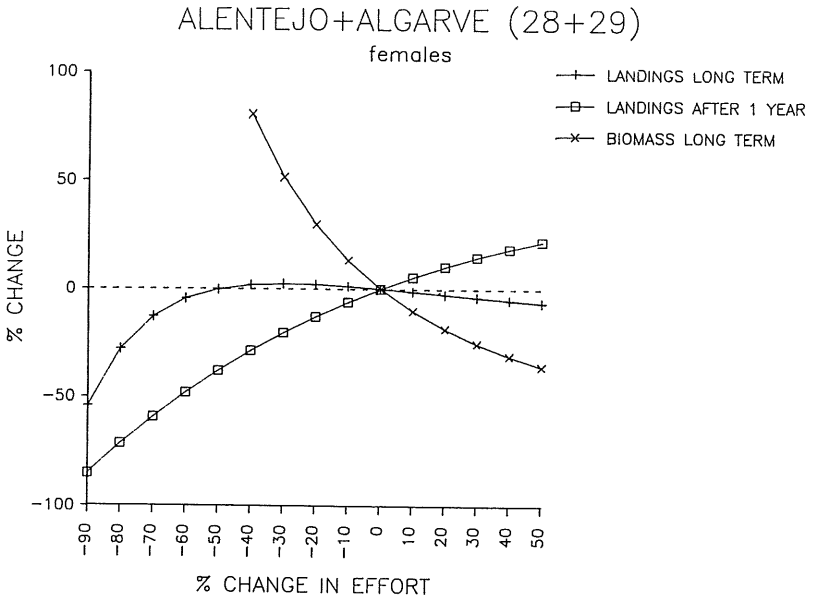


Figure 7.42. - Iceland - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 80 mm)

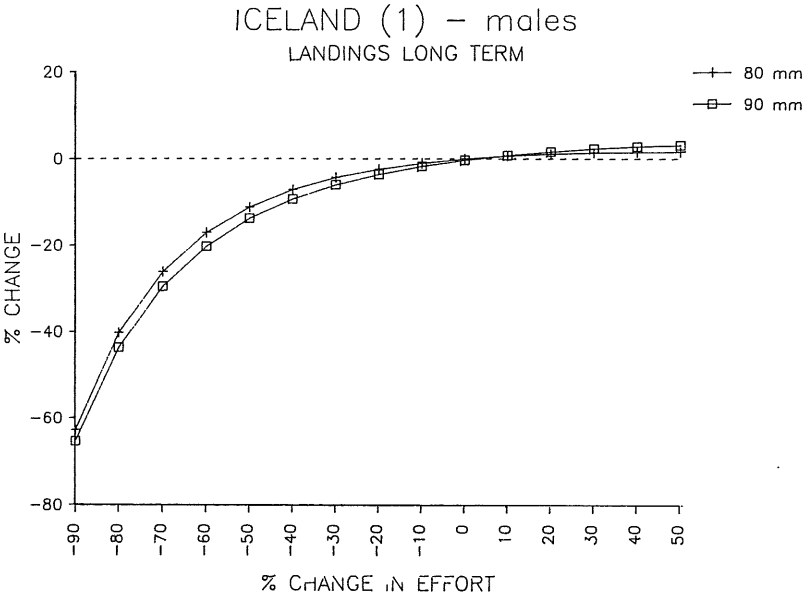


Figure 7.43. - Botney Gut and Silver Pit - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

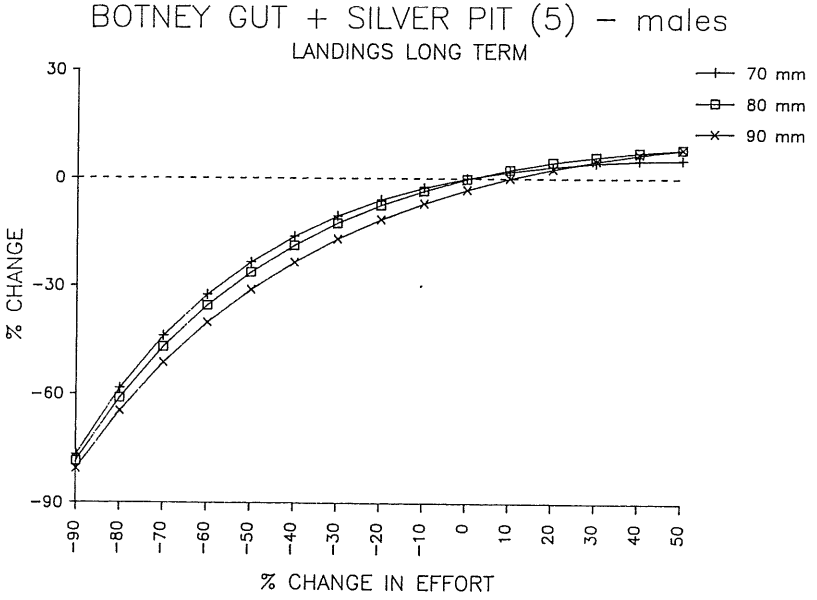


Figure 7.44. - Botney Gut and Silver Pit - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

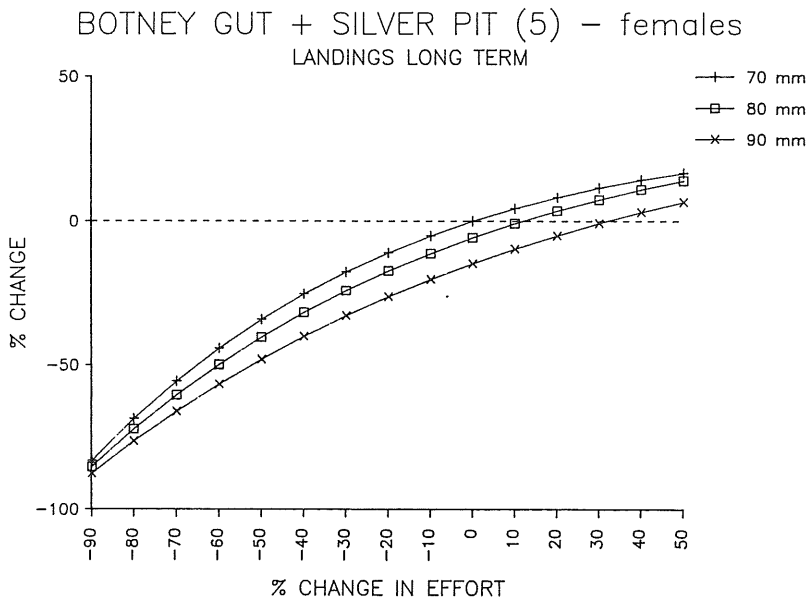


Figure 7.45. - Farn Deeps - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

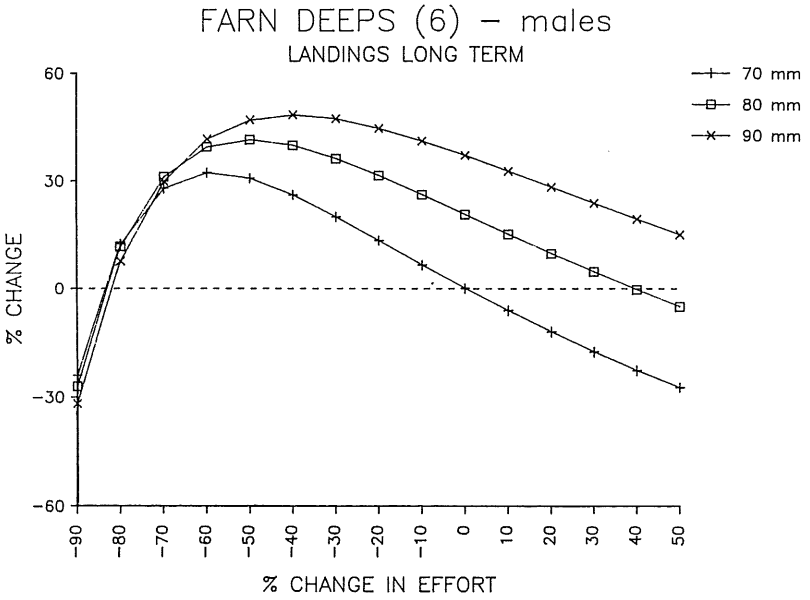


Figure 7.46. - Farn Deeps - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

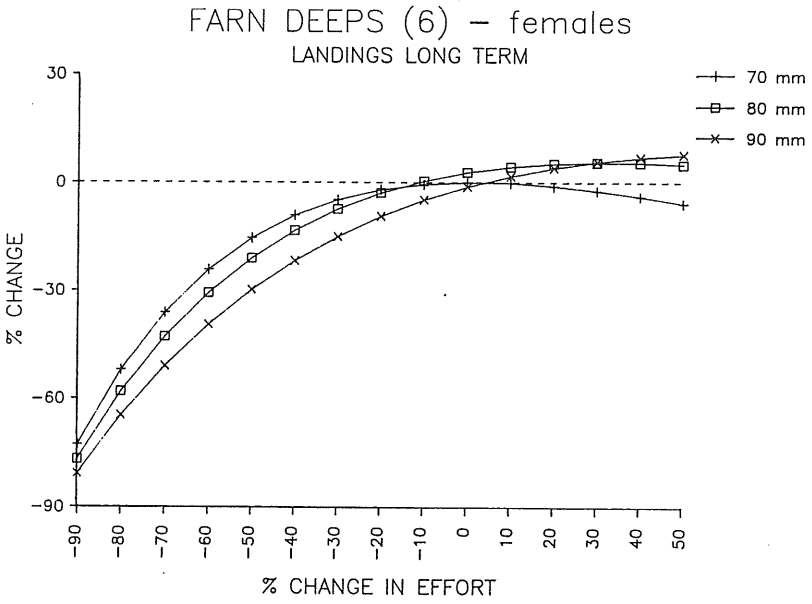


Figure 7.47. - Fladen Ground - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

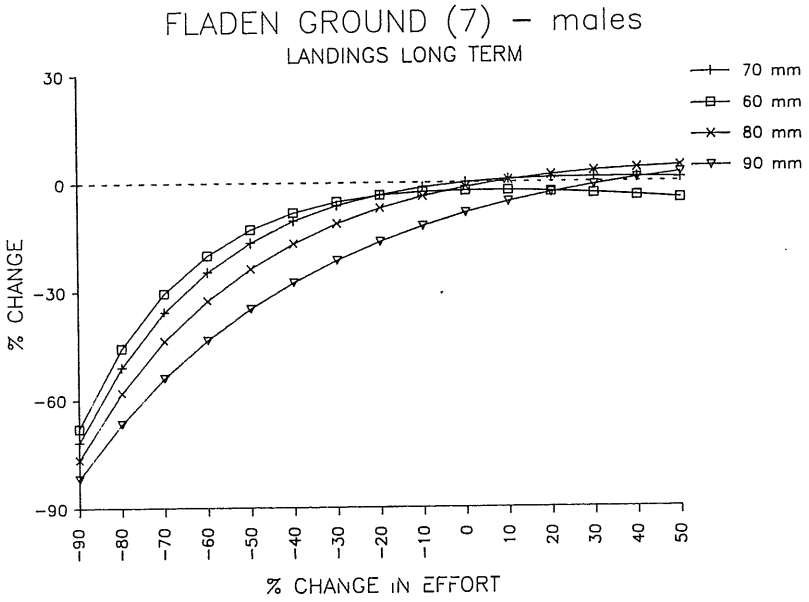


Figure 7.48. - Fladen Ground - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

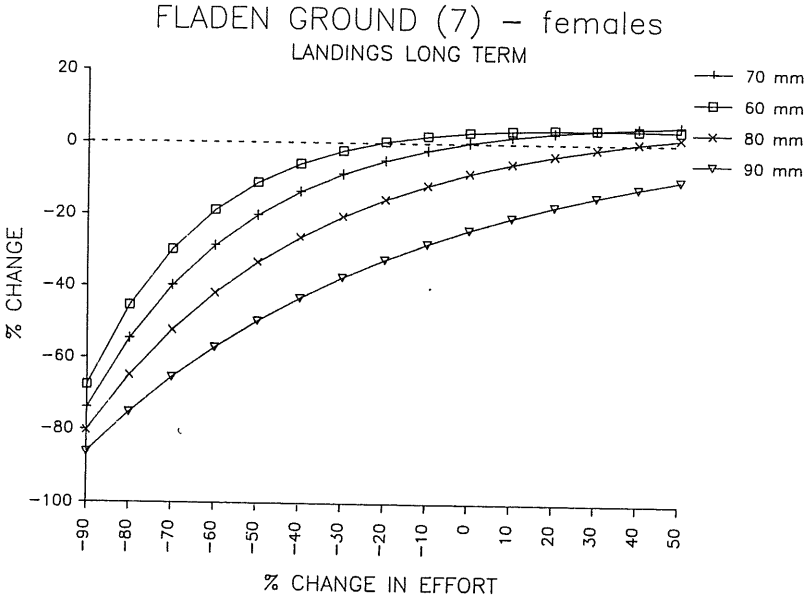


Figure 7.49. - Firth of Forth - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

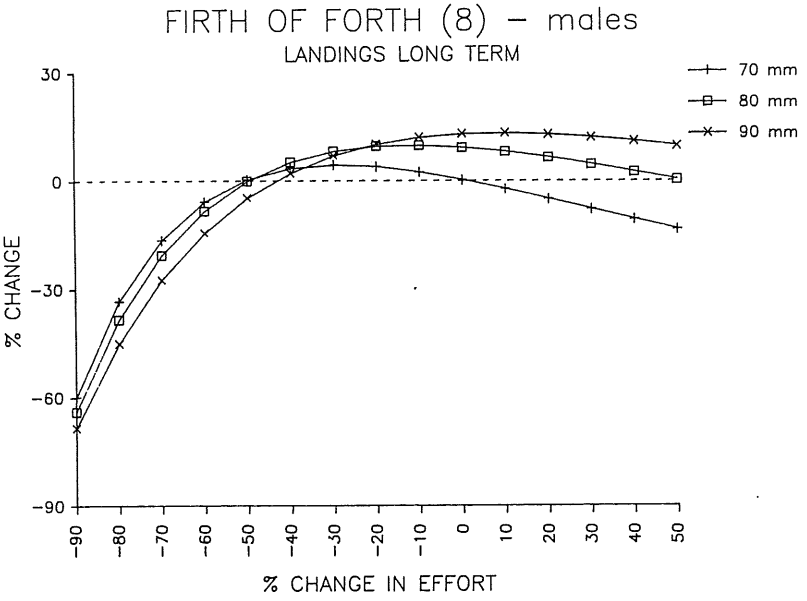


Figure 7.50. - Firth of Forth - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

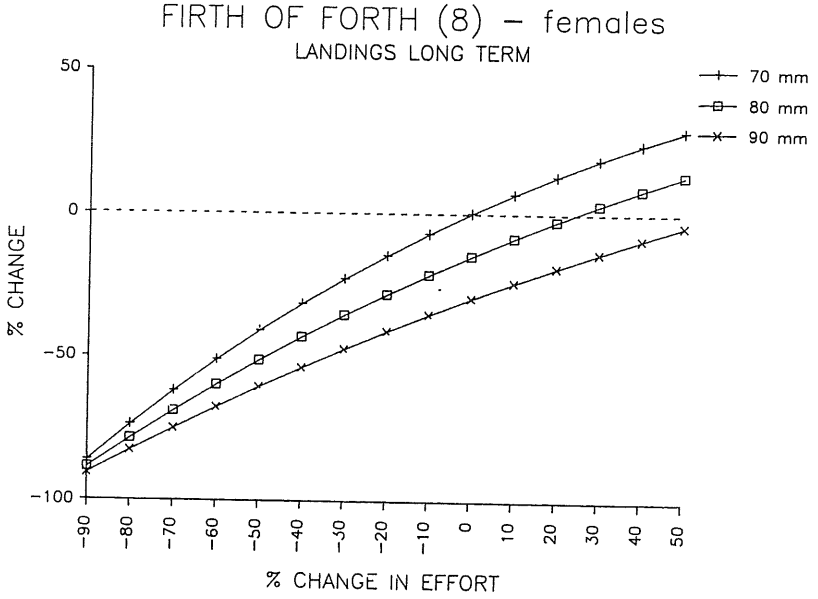


Figure 7.51. - Moray Firth - males (1st run) : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

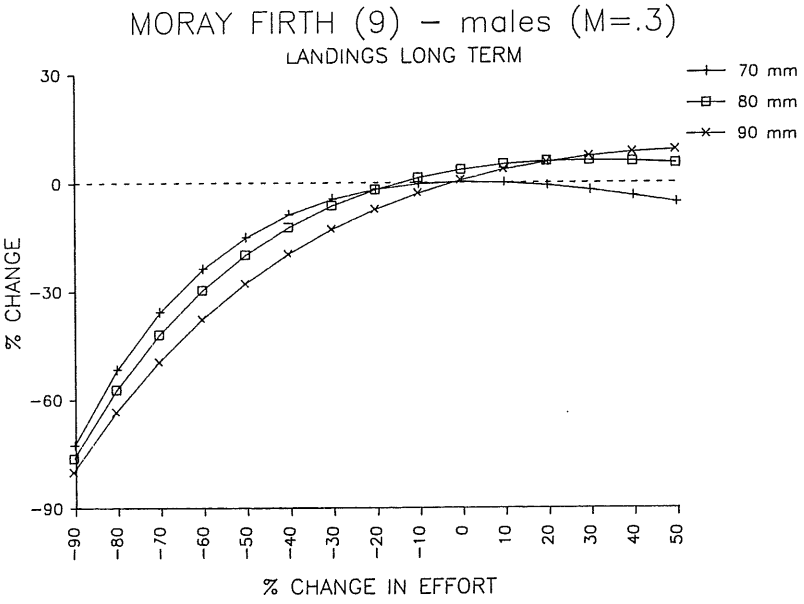


Figure 7.52. - Moray Firth - males (2nd run) : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

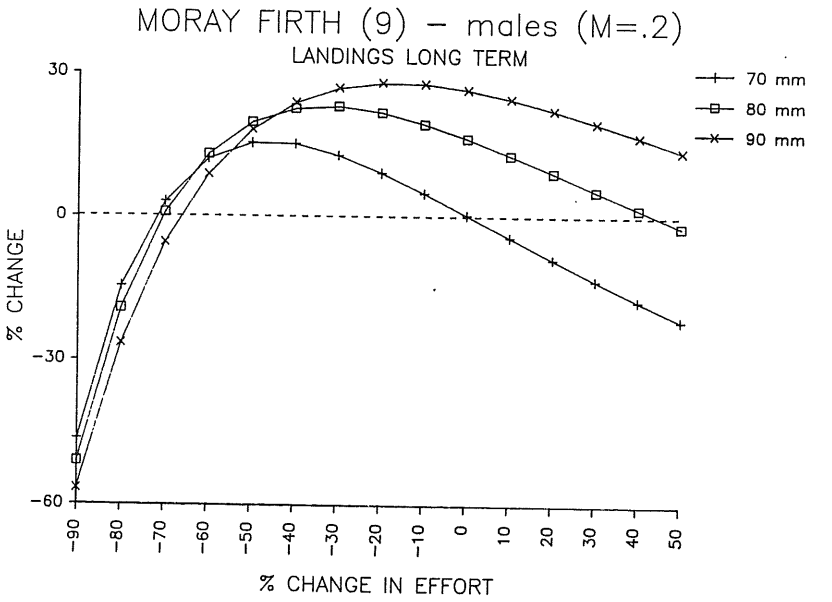


Figure 7.53. - Moray Firth - females (1st run) : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

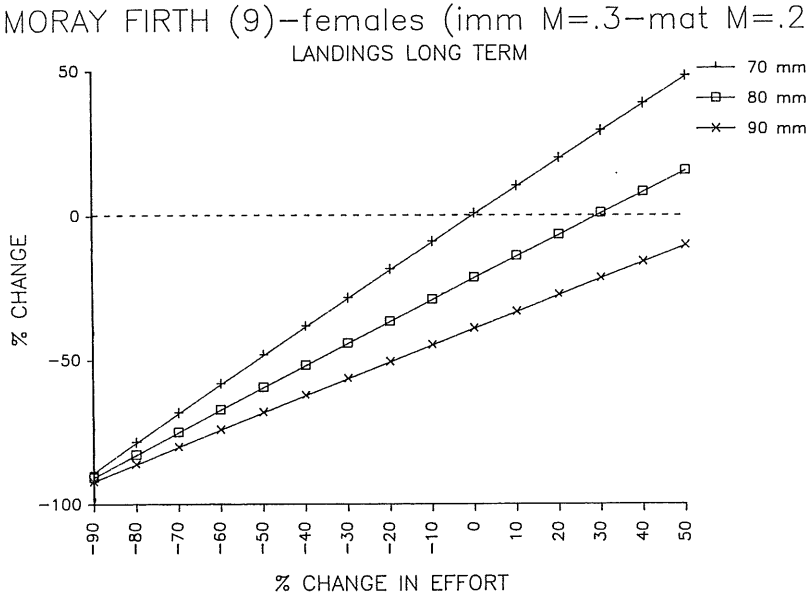


Figure 7.54. - Moray Firth - females (2nd run) : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

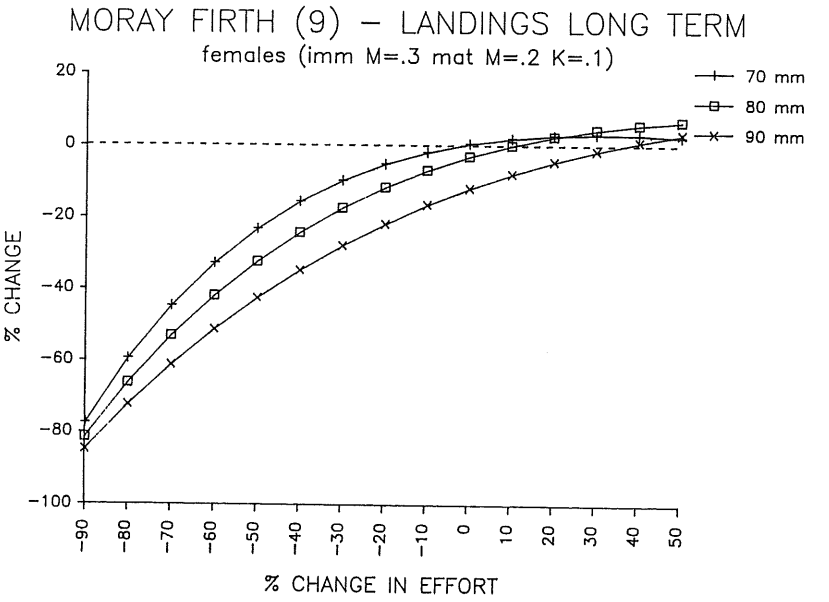


Figure 7.55. - Moray Firth - females (3rd run) : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

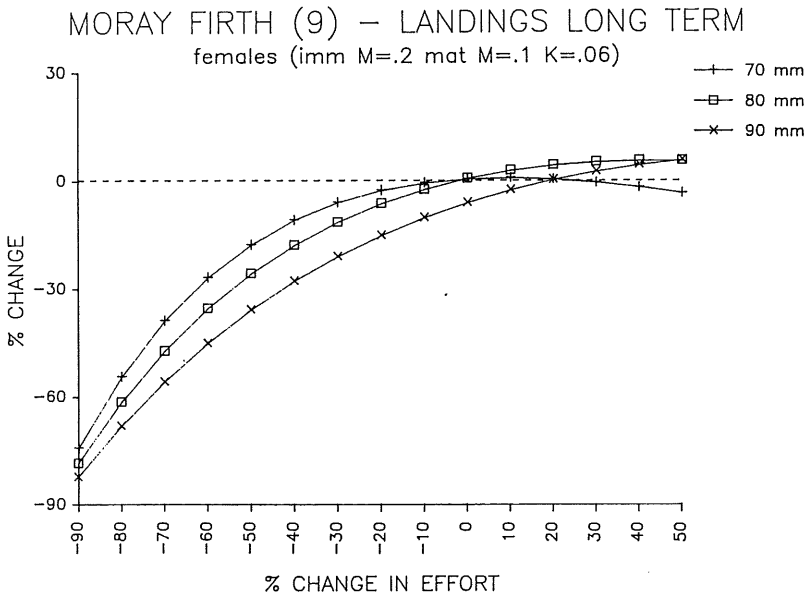


Figure 7.56. - North Minch - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

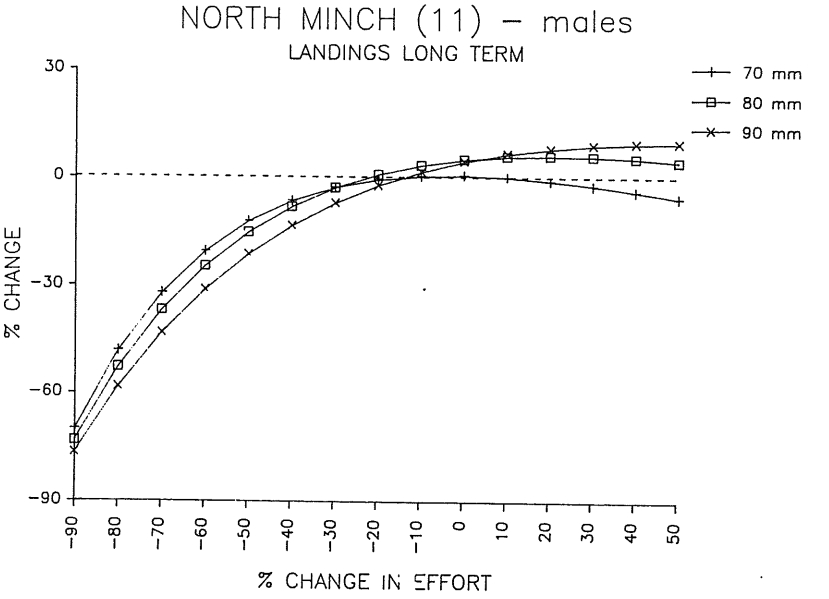


Figure 7.57. - North Minch - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

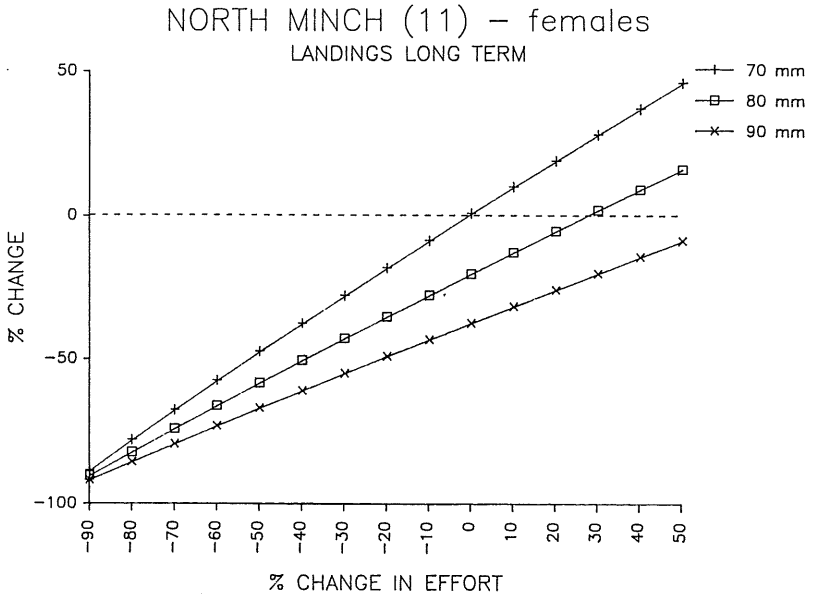


Figure 7.58. - South Minch - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

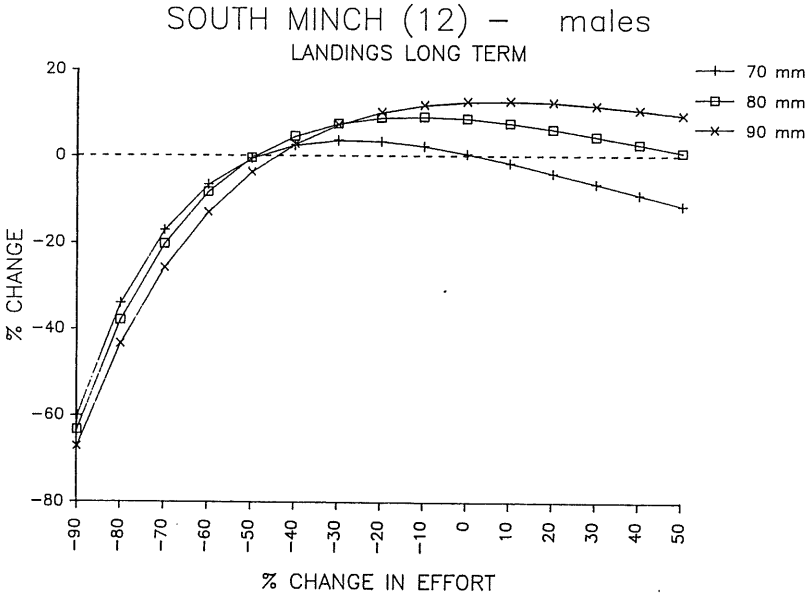


Figure 7.59. - South Minch - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

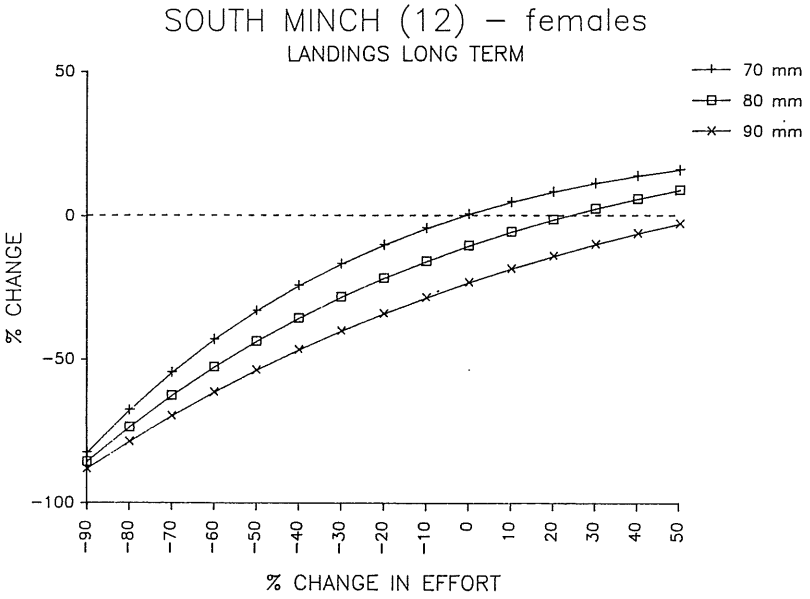


Figure 7.60. - Clyde - males :
relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

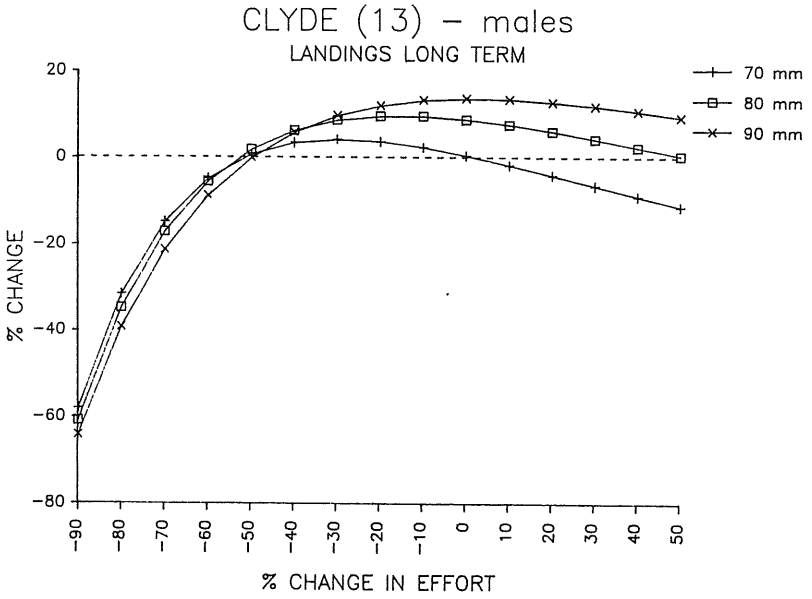


Figure 7.61. - Clyde - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

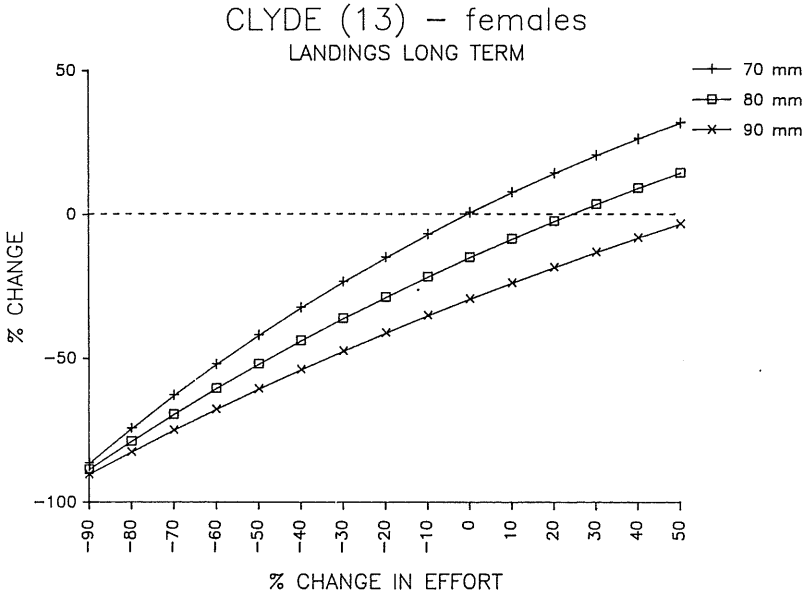


Figure 7.62. - Irish Sea East - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

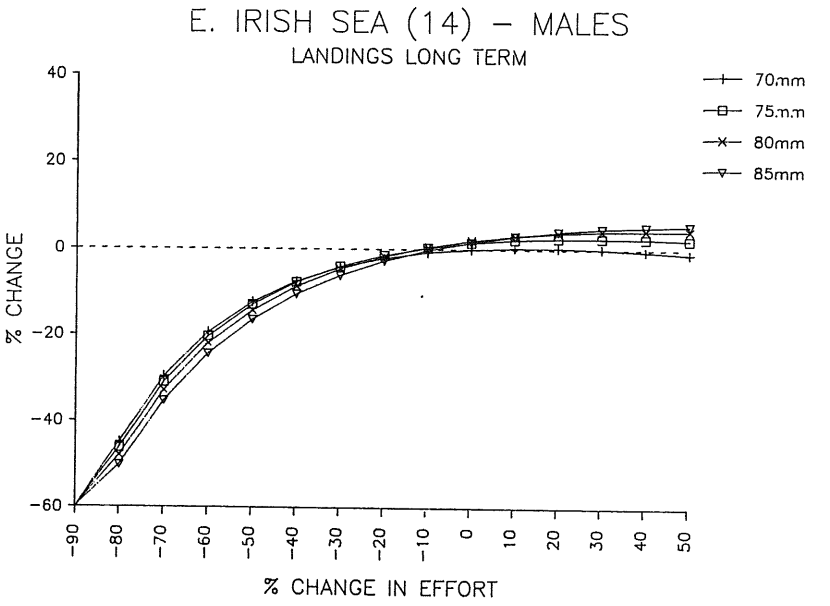


Figure 7.63. - Irish Sea East - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 70 mm)

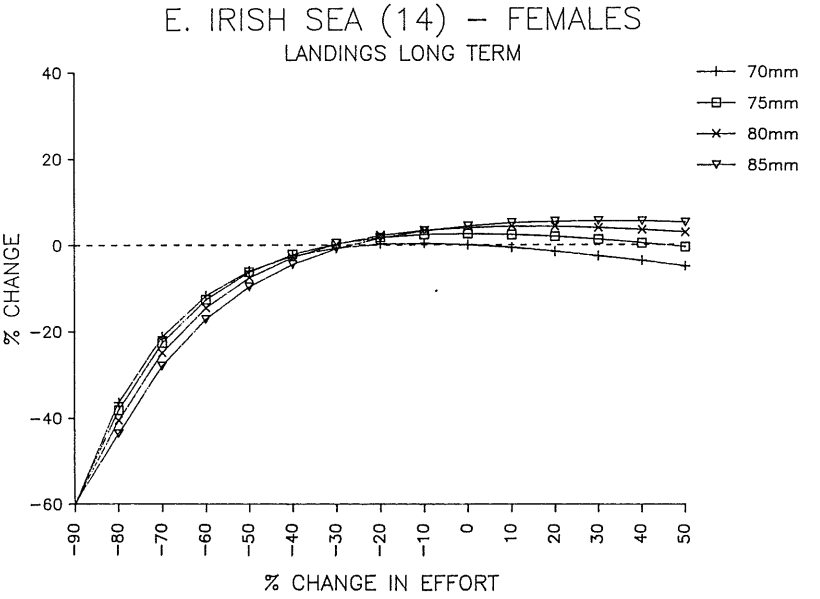


Figure 7.64. - Irish Sea West - males (M = 0.25) relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 68 mm)

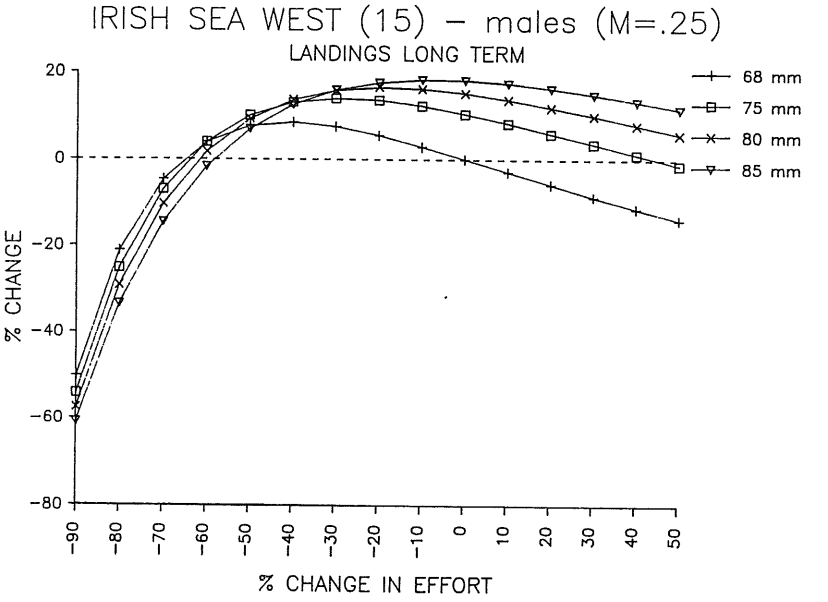


Figure 7.65. - Irish Sea West - males (M = 0.3) : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 68 mm)

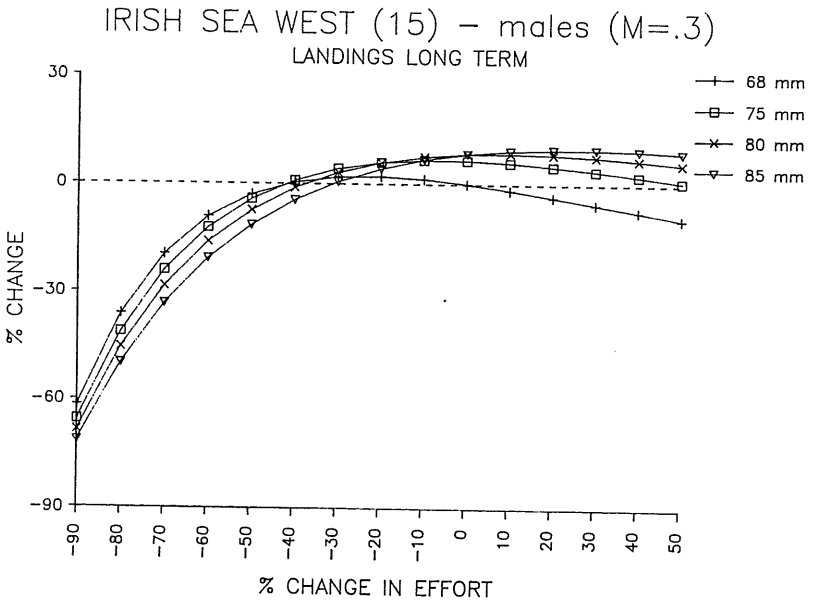


Figure 7.66. - Irish Sea West - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 68 mm)

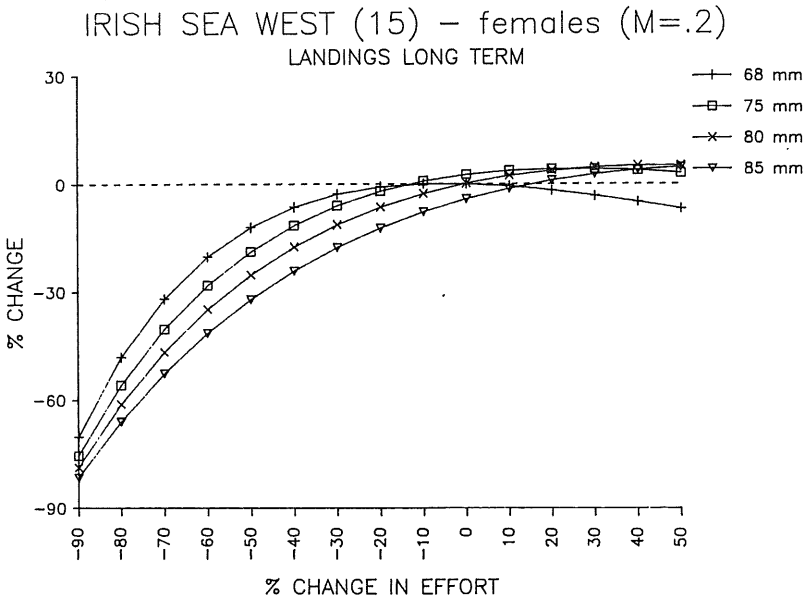


Figure 7.67. - Porcupine Bank - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 74 mm)

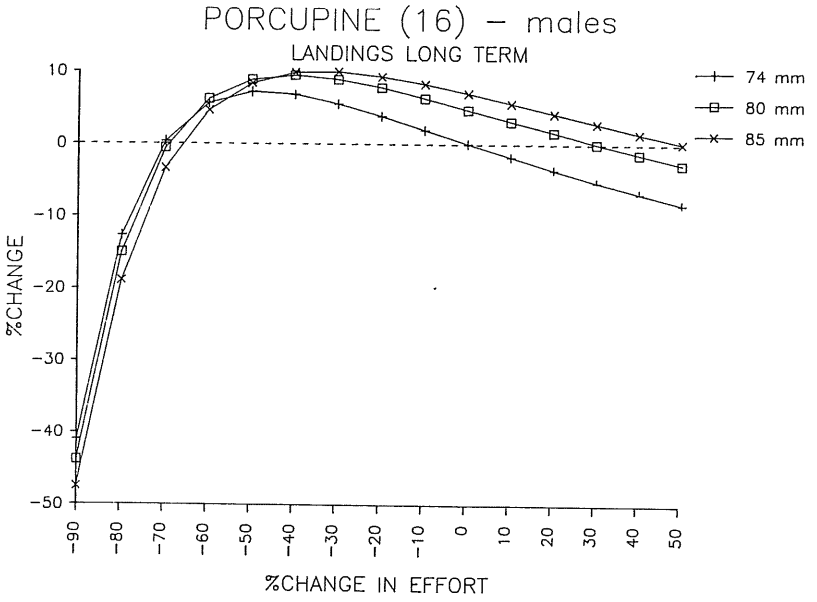


Figure 7.68. - Porcupine Bank - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 74 mm)

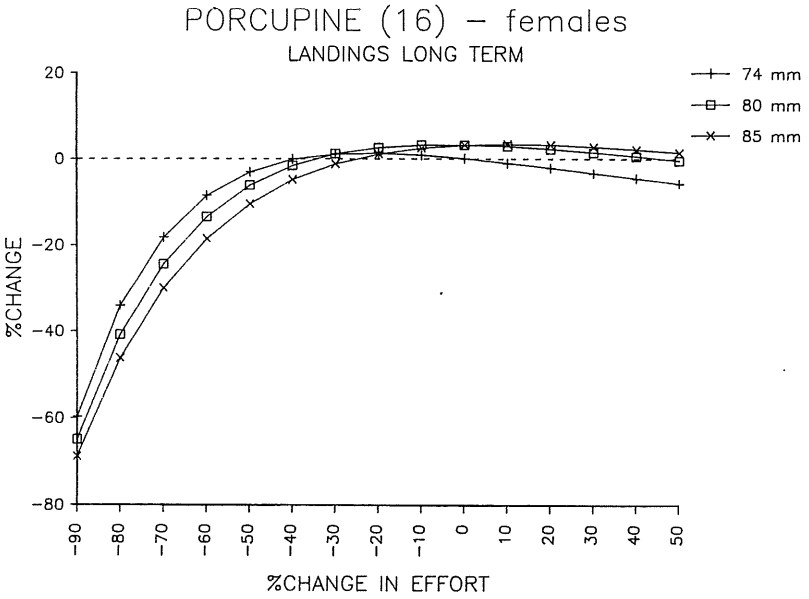


Figure 7.69. - Celtic Sea - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 80 mm)

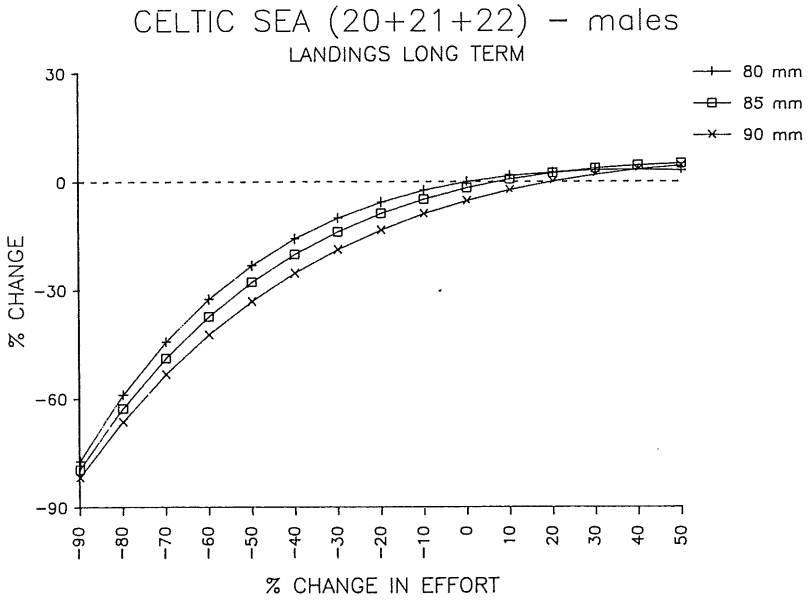


Figure 7.70. - Celtic Sea - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 80 mm)

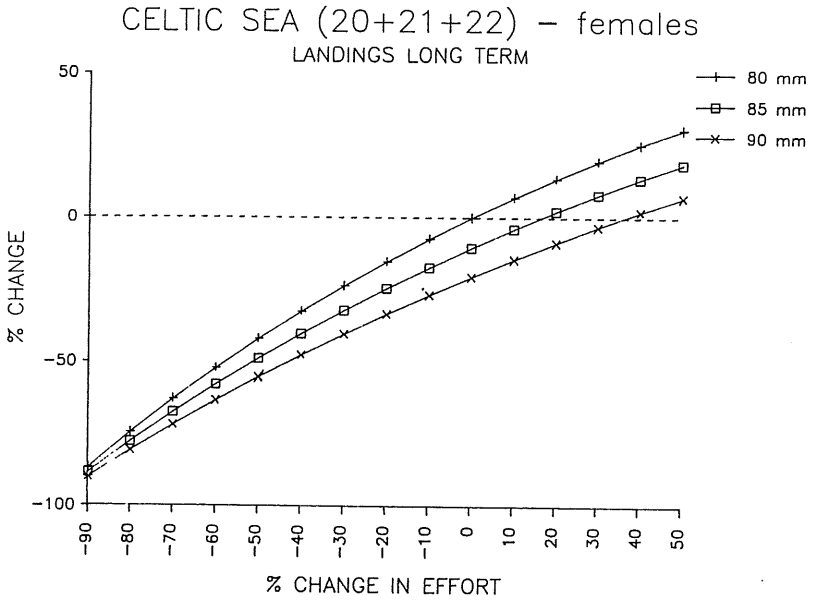


Figure 7.71. - Bay of Biscay - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 50 mm)

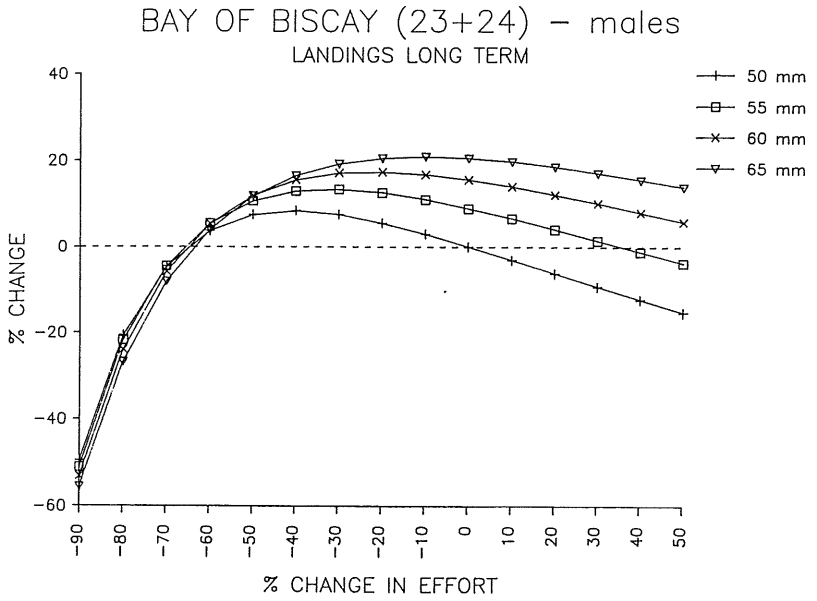


Figure 7.72. - Bay of Biscay - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 50 mm)

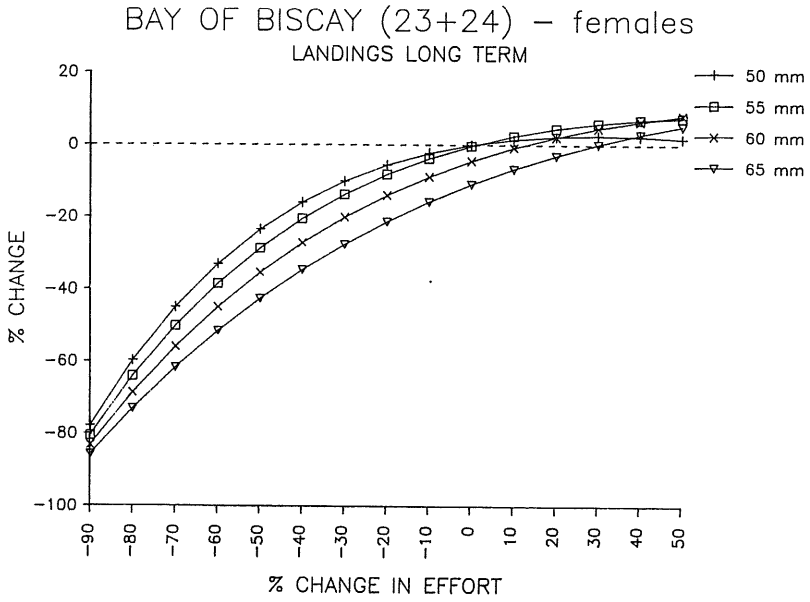


Figure 7.73. - North Galicia - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 40 mm)

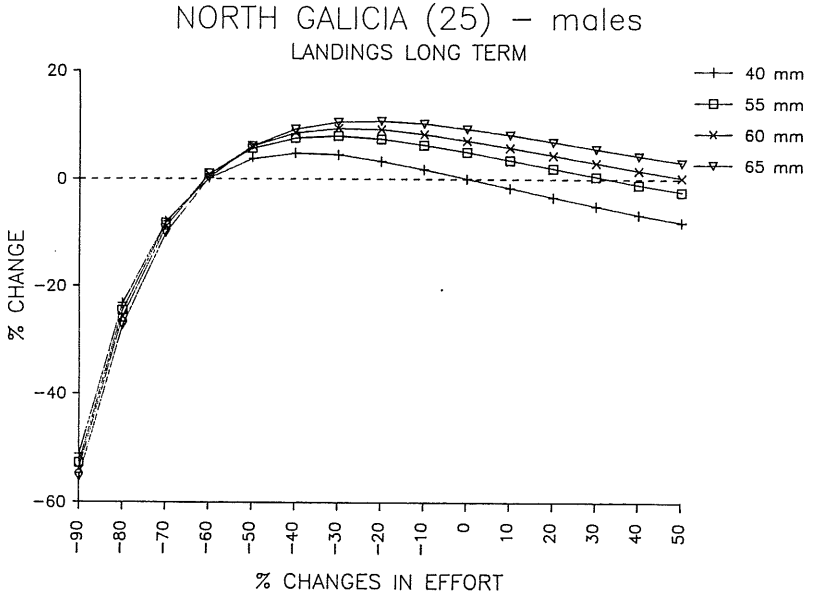


Figure 7.74. - North Galicia - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 40 mm)

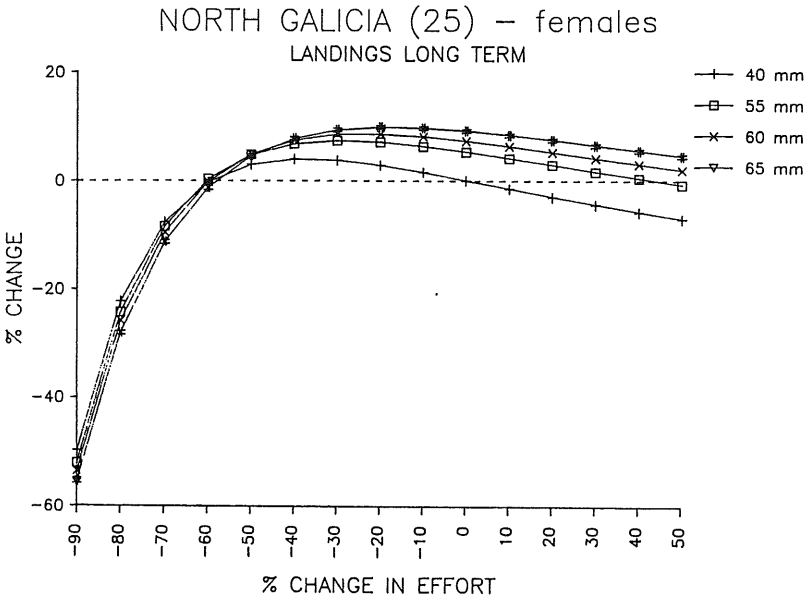


Figure 7.75. - West Galicia - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 40 mm)

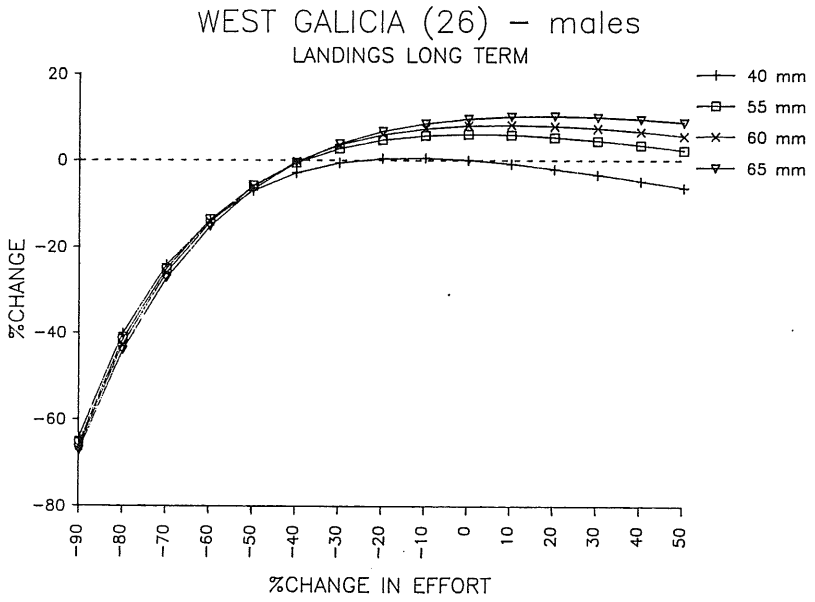


Figure 7.76. - West Galicia - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 40 mm)

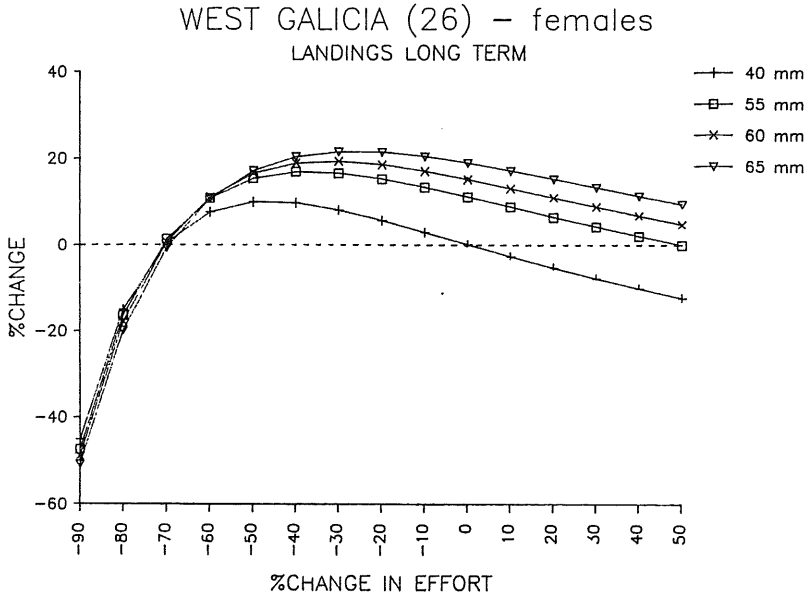


Figure 7.77. - SW and S Portugal - males : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 50 mm)

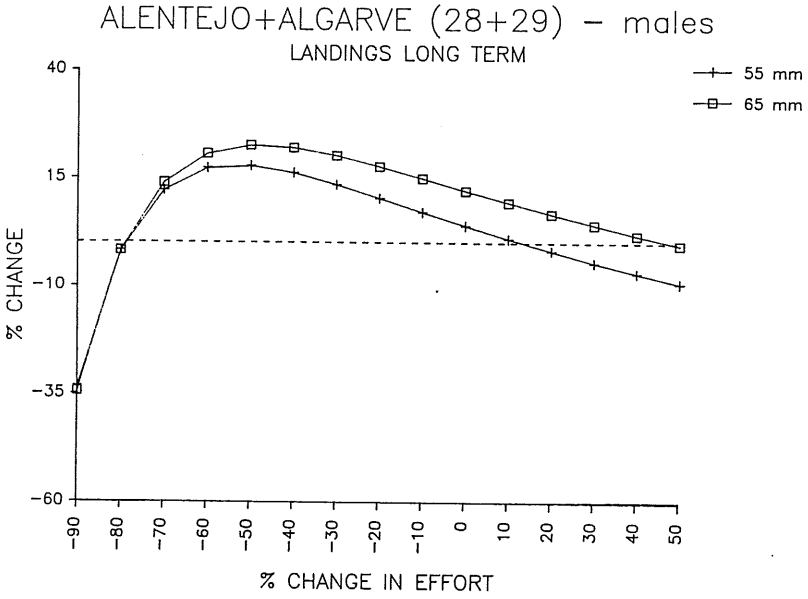
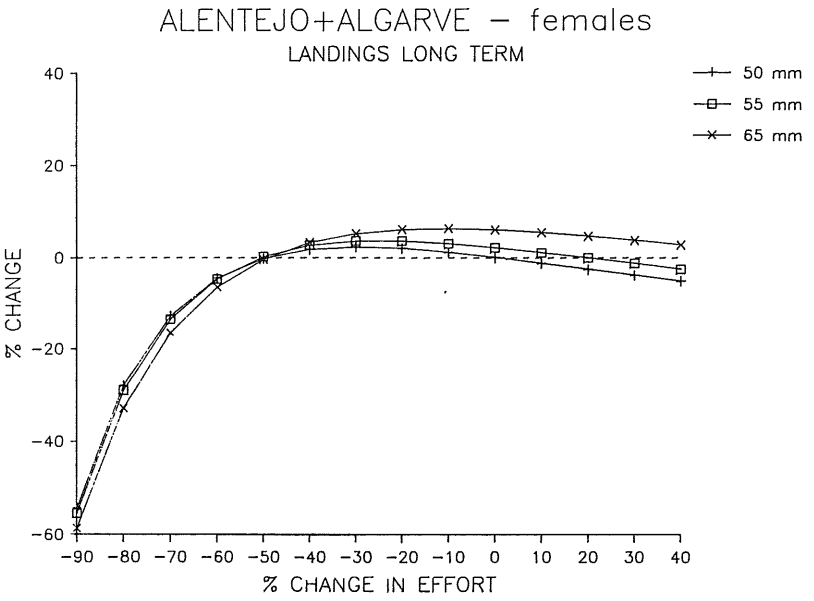


Figure 7.78. - SW and S Portugal - females : relative changes in long-term landings in response to relative changes in effort, for various mesh sizes (current mesh : 50 mm)



D A T A a n d R E S U L T S I N V E N T O R Y

Management unit : 1 - Iceland

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably contains several sub-units

TAC area
- current TAC area : national TAC

Fleet units
- countries : Iceland
- ports : 7 major ports
- gear : trawl

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : Iceland (trawl)
- units : hours trawling
- nominal trend : stable until 1984, decrease in 1985-86, since then return to pre-1985 levels
- efficiency changes : likely, but data not corrected for these changes
- other external influences : unknown

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : Iceland (trawl)
- whole/tail factor : 3.3 (increased landings of whole Nephrops in 1988-89
- nominal trend : stable until 1987, decrease in 1988-89
- discards : yes (soft females, males and females < 35 mm)

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : Iceland (trawl)
- units : kg/hour trawling
- nominal trend : high peak in 1985-86, decrease in 1988-89

Mean size data
- reference period : 1980-89 (longer data series available)
- countries/gear : Iceland (trawl)
- source of data : research vessel data
- sub area sampled : whole area
- season sampled : May-July (i.e. main fishing season)
- trend : fairly stable
- corr. with landings/effort : not investigated
- other external influences : none

Research vessel surveys
- abundance data : yes

Management unit : 1 - Iceland

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1988-89
- source length data : % length distribution, raised and weighted by area and catches
- steady state ? :
- sexes : males only (see Section 7.2.)

Growth data

	K	L_∞
♂♂	0.11	80 mm

- source of data : annual modal deviations from a mean length distribution for 1975-88
- reference period : 1975-88
- data range : 22.5 - 70.5 mm
- type of plot : Ford-Walford
- goodness of fit : $r^2 \geq 0.9$

- length-weight : ♂♂ : $W = 0.00113 * CL^{2.867}$ (W = total weight, CL = carapace length)

Selectivity data

- current mesh size : 80 mm
- selection factor : 0.5
- selection range : 12 mm

- mesh assessment : increase from 80 mm to 90 mm

Discard data

- discard corrected : no
- discard ogive :
- discard survival :

Management unit : 1 - Iceland

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 20-70 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.2

- max. F * delta T : 0.40 (over lower 75 % of length range)
- mean F * delta T : 0.11 (averaged across lower 75 % of length range)
- maximum F : 0.46 (over lower 75 % of length range)
- mean F : 0.17 (averaged across lower 75 % of length range)
- F_{max} : occurs at ≈ 50 % above current F

- % increment in Y/R from F to F_{max} : ≈ 2 % at 50 % increase in effort
- % increment in B/R from F to F_{max} : minus 18 % at 50 % increase in effort

FEMALES

- length range :
- length interval :
- % distribution/raised distribution :

- terminal F : range tried :
  value chosen :
- M : range tried :
  value chosen :

- max. F * delta T :
- mean F * delta T :
- maximum F :
- mean F :
- F_{max} :

- % increment in Y/R from F to F_{max} :
- % increment in B/R from F to F_{max} :

Management unit : 2 - Faroe Islands

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : national TAC
- proposed TAC area :

Fleet units
- countries : Faroe Islands
- ports : several
- gear : creel

Effort
- reference period : seasons 1980/81-1988/89 (longer data series available)
- countries/gear : Faroes (creel)
- units : number of creeldays
- nominal trend : decreasing in most recent years
- efficiency changes : ban on trawling in 1980, occasional changes in duration of fishing season
- other external influences : none

Landings
- reference period : seasons 1980/81-1988/89 (longer data series available)
- countries/gear : Faroes (creel)
- whole/tail factor : landed whole
- nominal trend : fluctuating without obvious trend
- discards : unknown

CPUE/LPUE
- reference period : seasons 1980/81-1988/89 (longer data series available)
- countries/gear : Faroes (creel)
- units : g/creelday
- nominal trend : increase from 1980/81 to 1987/88, decrease in 1988/89

Mean size data
- reference period : season 1988/89
- countries/gear : Faroes (creel)
- source of data : market samples
- sub area sampled :
- season sampled : winter fishing season
- trend : time series too short to allow trend analysis
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : yes

Management unit : 2 - Faroe Islands

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : season 1989/90
- source length data : market samples (Faroe Islands)
- steady state ? : unknown
- sexes : separate

Growth data

	K	L_∞
♂♂	0.11	80 mm
♀♀	0.13	55 mm

- source of data : Icelandic growth data (see Management Unit 1)
- reference period :
- data range :
- type of plot :
- goodness of fit :

- length-weight : ♂♂ : $W = 0.00113 * CL^{2.867}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.00111 * CL^{2.795}$

Selectivity data

- current mesh size : not applicable (creel fishery)
- selection factor : not applicable (creel fishery)
- selection range : not applicable (creel fishery)

- mesh assessment :

Discard data

- discard corrected : no
- discard ogive :
- discard survival :

Management unit : 2 - Faroe Islands

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 39-77 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.2

- max. F * delta T : 0.13 (over lower 75 % of length range)
- mean F * delta T : 0.08 (averaged across lower 75 % of length range)
- maximum F : 0.22 (over lower 75 % of length range)
- mean F : 0.11 (averaged across lower 75 % of length range)
- F_{max} : current F is far below F_{max}

- % increment in Y/R from F to F_{max} : current F is far below F_{max}
- % increment in B/R from F to F_{max} : current F is far below F_{max}

FEMALES

- length range : 35-58 mm
- length interval : 1 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.2

- max. F * delta T : 0.20 (over lower 75 % of length range)
- mean F * delta T : 0.09 (averaged across lower 75 % of length range)
- maximum F : 0.45 (over lower 75 % of length range)
- mean F : 0.18 (averaged across lower 75 % of length range)
- F_{max} : current F is far below F_{max}

- % increment in Y/R from F to F_{max} : current F is far below F_{max}
- % increment in B/R from F to F_{max} : current F is far below F_{max}

Management unit : 3 - Skagerrak

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : no TAC in force
- proposed TAC area : IIIa

Fleet units
- countries : Denmark, Norway, Sweden
- ports : 7 major ports
- gear : Nephrops trawl (single and twin trawls), finfish trawl, creel (Sweden only)

Effort
- reference period : 1987-89 (Denmark), 1980-89 (Sweden) (longer data series available)
- countries/gear : Denmark (trawl), Sweden (trawl)
- units : days fishing (Denmark), hours trawling (Sweden)
- nominal trend : steadily increasing (Denmark and Sweden)
- efficiency changes : from single to twin trawl
- other external influences :

Landings
- reference period : 1980-89 (Denmark, Norway and Sweden) (longer data series available)
- countries/gear : Denmark (trawl), Norway (trawl), Sweden (trawl and creel)
- whole/tail factor : landed whole
- nominal trend : increasing in most recent years
- discards : yes

CPUE/LPUE
- reference period : 1987-89 (Denmark), 1980-89 (Sweden) (longer data series available)
- countries/gear : Denmark (trawl), Sweden (trawl)
- units : kg/day fishing (Denmark), kg/hour trawling (Sweden)
- nominal trend : no trend (Denmark), increase to 1984, then falling (Sweden)

Mean size data
- reference period : 1986 and 1989 (Sweden)
- countries/gear : Sweden (trawl and creel)
- source of data : research vessel samples, market samples
- sub area sampled : whole area
- season sampled : autumn
- trend : no trend (trawl catches), small decrease (creel catches)
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : yes

Management unit : 4 - Kattegat

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : no TAC in force
- proposed TAC area : IIIa

Fleet units
- countries : Denmark, Sweden
- ports : 6 major ports
- gear : Nephrops trawl, creel (Sweden only)

Effort
- reference period : 1980-89
- countries/gear : Denmark (trawl), Sweden (trawl and creel)
- units : days fishing (Denmark), hours trawling (Sweden), creeldays (Sweden)
- nominal trend : fairly constant until 1985, since then increasing
- efficiency changes : from single to twin trawl
- other external influences : hypoxia in bottom water layers (July-November)

Landings
- reference period : 1980-89
- countries/gear : Denmark (trawl), Sweden (trawl and creel)
- whole/tail factor : 3.33 (almost 95 % landed whole)
- nominal trend : decreasing in most recent years
- discards : yes

CPUE/LPUE
- reference period : 1980-89
- countries/gear : Denmark (trawl), Sweden (trawl)
- units : kg/day fishing (Denmark), kg/hour fishing (Sweden)
- nominal trend : sharply decreasing in most recent years

Mean size data
- reference period : 1986 and 1989 (Sweden)
- countries/gear : Sweden (trawl)
- source of data : research vessel samples, market samples
- sub area sampled : whole area
- season sampled : 1st and 3rd quarter
- trend : almost stable
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : yes (1980-89)

Management unit : 5 - Botney Gut and Silver Pit

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : no TAC in force
- proposed TAC area : IVb,c east of 1° E

Fleet units
- countries : Belgium, Denmark, UK
- ports : Zeebrugge, Ostend (Belgium)
- gear : trawl

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : Belgium (trawl)
- units : no. of trips, hours trawling
- nominal trend : slight drop in 1986, since then slowly increasing
- efficiency changes : unknown
- other external influences : unknown

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : Belgium (trawl), Denmark (trawl), UK (trawl)
- whole/tail factor : 3.0 (mainly landed whole)
- nominal trend : sharp drop in 1986, since then slowly increasing
- discards : yes (estimates for 1986-89 only)

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : Belgium (trawl)
- units : kg/trip, kg/hour trawling
- nominal trend : sharp decrease from 1983 to 1986, since then slowly increasing

Mean size data
- reference period : 1980-89
- countries/gear : Belgium (trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : slightly increasing (males) or stable (females)
- corr. with landings/effort : not investigated
- other external influences : no known changes in market preference or discarding practice

Research vessel surveys
- abundance data : none

Management unit : 5 - Botney Gut and Silver Pit

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1986-89
- source length data : market samples (Belgium)
- steady state ? : no (changes in effort)
- sexes : separate

Growth data

	K	L_∞
♂♂	0.165	62 mm
♀♀	0.08	60 mm

- source of data : based on data for Moray Firth Nephrops
- reference period :
- data range :
- type of plot :
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000452 * CL^{3.117}$ (W = total weight, CL = carapace length)
  ♀♀ : $W = 0.001076 * CL^{2.849}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.4
- selection range : 13 mm

- mesh assessment : increases from 70 mm to 80 and 90 mm

Discard data

- discard corrected : yes (with partial estimates of nos. discarded)
- discard ogive :
- discard survival : 0.25

Management unit : 5 - Botney Gut and Silver Pit

B. - ASSESSMENT DATA (continued)

Length cohort analysis

M A L E S

- length range : 24-60 mm
- length interval : 2 mm
- % distribution/raised distribution : raised to total weight landed, discards estimated

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3

- max. F * delta T : 0.27 (over lower 75 % of length range)
- mean F * delta T : 0.12 (averaged across lower 75 % of length range)
- maximum F : 0.27 (over lower 75 % of length range)
- mean F : 0.18 (averaged across lower 75 % of length range)
- F_{max} : current F is far below F_{max}

- % increment in Y/R from F to F_{max} : current F is far below F_{max}
- % increment in B/R from F to F_{max} : current F is far below F_{max}

F E M A L E S

- length range : 24-58 mm
- length interval : 2 mm
- % distribution/raised distribution : raised to total weight landed, discards estimated

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.2

- max. F * delta T : 0.15 (over lower 75 % of length range)
- mean F * delta T : 0.09 (averaged across lower 75 % of length range)
- maximum F : 0.13 (over lower 75 % of length range)
- mean F : 0.07 (averaged across lower 75 % of length range)
- F_{max} : current F is far below F_{max}

- % increment in Y/R from F to F_{max} : current F is far below F_{max}
- % increment in B/R from F to F_{max} : current F is far below F_{max}

Management unit : 6 - Farn Deeps

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : no TAC in force
- proposed TAC area : IVb,c west of 1° E

Fleet units
- countries : UK (England and Scotland)
- ports : North Shields, Eyemouth, Amble, Seahouses, Blyth, Hartlepool
- gear : trawl, pots (minor importance)

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (trawl)
- units : hours fishing
- nominal trend : increasing
- efficiency changes : unknown, but no large changes in GRT
- other external influences : diversion of effort from quota-restricted finfish fisheries to Nephrops

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (trawl)
- whole/tail factor : mainly landed whole
- nominal trend : increasing
- discards : yes (data collected since 1984)

CPUE/LPUE
- reference period : 1984-89 (CPUE), 1980-89 (LPUE - longer data series available)
- countries/gear : UK (trawl)
- units : kg/hour fishing
- nominal trend : fluctuating without obvious trend, LPUE has declined since 1983 but is still above historical minimum

Mean size data
- reference period : 1984-89 (catches), 1980-89 (landings)
- countries/gear : UK (trawl)
- source of data : market samples
- sub area sampled : central area (catches), whole area (landings)
- season sampled : October-March (catches), all seasons (landings)
- trend : decreasing in most recent years
- corr. with landings/effort : not investigated
- other external influences : changes in market preference

Research vessel surveys
- abundance data : none

Management unit : 6 - Farn Deeps

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1984-89
- source length data : market and discard samples (UK - England)
- steady state ? : no
- sexes : separate

Growth data

	K	L_∞
♂♂	0.18	70 mm
♀♀ immatures	0.18	70 mm
♀♀ matures	0.06	62 mm

- source of data : research vessel data, market sample data, data from other stocks in Sub-area VIa
- reference period : 1984-89
- data range : 14-70 mm
- type of plot : Ford-Walford
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000385 * CL^{3.1749}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.000907 * CL^{2.8948}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.4
- selection range : 13 mm

- mesh assessment : increases from 70 mm to 80 and 90 mm

Discard data

- discard corrected : yes
- discard ogive : yes
- discard survival : 0.25

Management unit : 6 - Farn Deeps

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 14-66 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3

- max. F * delta T : 0.33 (over lower 75 % of length range)
- mean F * delta T : 0.20 (averaged across lower 75 % of length range)
- maximum F : 0.84 (over lower 75 % of length range)
- mean F : 0.52 (averaged across lower 75 % of length range)
- F_{max} : occurs at 60 % less than current F

- % increment in Y/R from F to F_{max} : 32 %
- % increment in B/R from F to F_{max} : 158 %

FEMALES

- length range : 14-58 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried : 0.1-0.3
  value chosen : 0.1
- M : range tried :
  value chosen : 0.3 (immatures) and 0.2 (matures)

- max. F * delta T : 0.25 (over lower 75 % of length range)
- mean F * delta T : 0.14 (averaged across lower 75 % of length range)
- maximum F : 0.42 (over lower 75 % of length range)
- mean F : 0.14 (averaged across lower 75 % of length range)
- F_{max} : current F $\simeq$ F_{max}

- % increment in Y/R from F to F_{max} : current F $\simeq$ F_{max}
- % increment in B/R from F to F_{max} : current F $\simeq$ F_{max}

Management unit : 7 - Fladen Ground

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : no TAC in force
- proposed TAC area : IVa (excluding rectangles 47E6, 45E6-7 and 44E6-8)

Fleet units
- countries : UK (Scotland), Denmark
- ports : several
- gear : Nephrops trawl (UK, Denmark), light trawl (UK), shrimp trawl (UK, Denmark)

Effort
- reference period : 1980-89
- countries/gear : UK (Nephrops trawl)
- units : hours fished
- nominal trend : increasing since mid-1980s
- efficiency changes : probable, but data not corrected for these changes
- other external influences :

Landings
- reference period : 1980-89
- countries/gear : UK (Nephrops trawl)
- whole/tail factor : 3.0
- nominal trend : increasing since early 1980s
- discards : yes, but not quantified

CPUE/LPUE
- reference period : 1980-89
- countries/gear : UK (Nephrops trawl)
- units : kg/hour fished
- nominal trend : fluctuating without obvious trend

Mean size data
- reference period : 1980-89
- countries/gear : UK (Nephrops and light trawl)
- source of data : market samples
- sub area sampled : data probably relate to SW quadrant of ground
- season sampled : all seasons
- trend : fluctuating without obvious trend
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : none

Management unit : 7 - Fladen Ground

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1980-89
- source length data : market samples (UK - Scotland)
- steady state ? : probably not
- sexes : separate

Growth data

	K	L_∞
♂♂	0.16	65 mm
♀♀ immatures	0.16	65 mm
♀♀ matures	0.10	56 mm

- source of data : based on Bailey and Chapman (1983) and Chapman (1982)
- reference period : 1975-82
- data range : from 7 mm to over 50 mm
- type of plot : various
- goodness of fit :

- length-weight : ♂♂ : $W = 0.00030 * CL^{3.25}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.00074 * CL^{2.91}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.48
- selection range : 14 mm

- mesh assessment : changes from 70 mm to 60, 80 and 90 mm

Discard data

- discard corrected : not discard corrected
- discard ogive :
- discard survival :

Management unit : 7 - Fladen Ground

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 17-63 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3

- max. F * delta T : 0.25 (over lower 75 % of length range)
- mean F * delta T : 0.14 (averaged across lower 75 % of length range)
- maximum F : 0.49 (over lower 75 % of length range)
- mean F : 0.27 (averaged across lower 75 % of length range)
- F_{max} : occurs at ≈ 30 % above current F

- % increment in Y/R from F to F_{max} : 1 %
- % increment in B/R from F to F_{max} : minus 20 %

FEMALES

- length range : 17-53 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3 (immatures) and 0.2 (matures)

- max. F * delta T : 0.31 (over lower 75 % of length range)
- mean F * delta T : 0.17 (averaged across lower 75 % of length range)
- maximum F : 0.30 (over lower 75 % of length range)
- mean F : 0.18 (averaged across lower 75 % of length range)
- F_{max} : occurs at 40-50 % above current F

- % increment in Y/R from F to F_{max} : 5 %
- % increment in B/R from F to F_{max} : minus ≈ 25 %

Management unit : 8 - Firth of Forth

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably contains several sub-units

TAC area
- current TAC area : no TAC in force
- proposed TAC area : IVb,c west of 1° E

Fleet units
- countries : UK (Scotland)
- ports : 6 major ports
- gear : Nephrops trawl, light trawl

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : hours fished
- nominal trend : increasing until 1984, since then fluctuating
- efficiency changes : yes, but data not corrected for these changes
- other external influences :

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- whole/tail factor : 3.0
- nominal trend : increasing until 1984, since then fluctuating
- discards : discarding likely, but only limited data available

CPUE/LPUE
- reference period : 1981-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : kg/hour fished
- nominal trend : fluctuating without obvious trend

Mean size data
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops and light trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : slightly declining in most recent years
- corr. with landings/effort : not investigated
- other external influences : market acceptance of smaller Nephrops in early 1980s

Research vessel surveys
- abundance data : available for limited area

Management unit : 8 - Firth of Forth

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1980-89
- source length data : market samples (UK - Scotland)
- steady state ? : probably not
- sexes : separate

Growth data

	K	L_∞
♂♂	0.163	66 mm
♀♀ immatures	0.163	66 mm
♀♀ matures	0.065	58 mm

- source of data : based on Bailey and Chapman (1983) and Chapman (1982)
- reference period : 1975-82
- data range : from 7 mm to over 50 mm
- type of plot : various
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000283 * CL^{3.24}$ (W = total weight, CL = carapace length)
  ♀♀ : $W = 0.000847 * CL^{2.91}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.4
- selection range : 13 mm

- mesh assessment : increases from 70 mm to 80 and 90 mm

Discard data

- discard corrected : yes
- discard ogive : assumed (based on limited data)
- discard survival : 0.25

Management unit : 8 - Firth of Forth

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 17-65 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3

- max. F * delta T : 0.32 (over lower 75 % of length range)
- mean F * delta T : 0.18 (averaged across lower 75 % of length range)
- maximum F : 0.65 (over lower 75 % of length range)
- mean F : 0.40 (averaged across lower 75 % of length range)
- F_{max} : occurs at 30 % below current F

- % increment in Y/R from F to F_{max} : 4 %
- % increment in B/R from F to F_{max} : 45 %

FEMALES

- length range : 17-57 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3 (immatures) and 0.2 (matures)

- max. F * delta T : 0.07 (over lower 75 % of length range)
- mean F * delta T : 0.04 (averaged across lower 75 % of length range)
- maximum F : 0.17 (over lower 75 % of length range)
- mean F : 0.05 (averaged across lower 75 % of length range)
- F_{max} : current F is <u>far below</u> F_{max}

- % increment in Y/R from F to F_{max} : unrealistic
- % increment in B/R from F to F_{max} : unrealistic

Management unit : 9 - Moray Firth

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably contains several sub-units

TAC area
- current TAC area : no TAC in force
- proposed TAC area : IVa (rectangles 47E6, 45E6-7 and 44E6-8)

Fleet units
- countries : UK (Scotland)
- ports : 3-4 major ports
- gear : Nephrops trawl, light trawl

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : hours fishing
- nominal trend : increasing since mid-1980s
- efficiency changes : yes, but data not corrected for these changes
- other external influences :

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- whole/tail factor : 3.0
- nominal trend : sharp increase in mid-1980s, since then fluctuating
- discards : yes, but quantities not accurately estimated

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : kg/hour fishing
- nominal trend : fall in 1984-87, since then slightly increasing

Mean size data
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : slight decrease from early to mid-1980s, since then fairly stable (males) or fairly stable throughout reference period (females)
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : available for limited areas

Management unit : 9 - Moray Firth

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1980-89
- source length data : market samples (UK - Scotland)
- steady state ? : probably not
- sexes : separate

Growth data

	K	L_∞
♂♂	0.165	62 mm
♀♀ immatures	0.165	62 mm
♀♀ matures	0.06	56 mm

- source of data : based on Bailey and Chapman (1983) and Chapman (1982)
- reference period : 1975-82
- data range : from 7 mm to over 50 mm
- type of plot : various
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000284 * CL^{3.24}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.000739 * CL^{2.91}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.4
- selection range : 13 mm

- mesh assessment : increases from 70 mm to 80 and 90 mm

Discard data

- discard corrected : yes
- discard ogive : assumed (based on limited data)
- discard survival : 0.25

Management unit : 9 - Moray Firth

B. - ASSESSMENT DATA (continued)

Length cohort analysis

M A L E S

- length range : 17-61 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried : 0.2 and 0.3
  value chosen : 0.3 (comments on 0.2 included in text)

- max. F * delta T : 0.20 (over lower 75 % of length range)
- mean F * delta T : 0.12 (averaged across lower 75 % of length range)
- maximum F : 0.43 (over lower 75 % of length range)
- mean F : 0.27 (averaged across lower 75 % of length range)
- F_{max} : current F ≈ F_{max}

- % increment in Y/R from F to F_{max} : current F ≈ F_{max}
- % increment in B/R from F to F_{max} : current F ≈ F_{max}

F E M A L E S

- length range : 17-55 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried : 0.2 and 0.1 (immatures), 0.3 and 0.2 (matures)
  value chosen : 0.3 (immatures) and 0.2 (matures)

- max. F * delta T : 0.008 (over lower 75 % of length range)
- mean F * delta T : 0.004 (averaged across lower 75 % of length range)
- maximum F : 0.017 (over lower 75 % of length range)
- mean F : 0.005 (averaged across lower 75 % of length range)
- F_{max} : current F is <u>far below</u> F_{max}

- % increment in Y/R from F to F_{max} : unrealistic
- % increment in B/R from F to F_{max} : unrealistic

Management unit : 10 - Noup

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : no TAC in force
- proposed TAC area : IVa (rectangles 47E6, 45E6-7 and 44E6-8)

Fleet units
- countries : UK (Scotland)
- ports :
- gear : Nephrops trawl, light trawl

Effort
- reference period : 1980-89
- countries/gear : UK (Nephrops trawl)
- units : hours fishing
- nominal trend : fluctuating without obvious trend
- efficiency changes :
- other external influences :

Landings
- reference period : 1980-89
- countries/gear : UK (Nephrops trawl)
- whole/tail factor : 3.0
- nominal trend : fluctuating without obvious trend
- discards :

CPUE/LPUE
- reference period : 1980-89
- countries/gear : UK (Nephrops trawl)
- units : kg/hour fishing
- nominal trend : strongly fluctuating

Mean size data
- reference period : no data available
- countries/gear :
- source of data :
- sub area sampled :
- season sampled :
- trend :
- corr. with landings/effort :
- other external influences :

Research vessel surveys
- abundance data :

Management unit : 11 - North Minch

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably more than one

TAC area
- current TAC area : part of Sub-area VI TAC
- proposed TAC area : Vb(EC) + VI

Fleet units
- countries : UK (Scotland)
- ports : at least 12 ports
- gear : Nephrops trawl, light trawl, creel

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : hours fishing
- nominal trend : increasing until mid-1980s, levelling off in most recent years
- efficiency changes : yes, but data not corrected for these changes
- other external influences :

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- whole/tail factor : 3.0
- nominal trend : increasing until mid-1980s, levelling off in most recent years
- discards : probably substantial, but not sampled regularly

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : kg/hour fishing
- nominal trend : fluctuating without obvious trend

Mean size data
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl, light trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : slightly declining in most recent years (males) or fairly stable (females)
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : available for limited area

Management unit : 11 - North Minch

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1980-89
- source length data : market samples (UK - Scotland)
- steady state ? : probably not
- sexes : separate

Growth data

	K	L_∞
♂♂	0.163	66 mm
♀♀ immatures	0.163	66 mm
♀♀ matures	0.06	58 mm

- source of data : based on Bailey and Chapman (1983) and Chapman (1982)
- reference period : 1975-82
- data range : from 7 mm to over 50 mm
- type of plot : various
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000279 * CL^{3.24}$ (W = total weight, CL = carapace length)
  ♀♀ : $W = 0.000836 * CL^{2.91}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.4
- selection range : 13 mm

- mesh assessment : increases from 70 mm to 80 and 90 mm

Discard data

- discard corrected : yes
- discard ogive : assumed (based on limited data)
- discard survival : 0.25

Management unit : 11 - North Minch

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 17-65
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3

- max. F * delta T : 0.20 (over lower 75 % of length range)
- mean F * delta T : 0.13 (averaged across lower 75 % of length range)
- maximum F : 0.49 (over lower 75 % of length range)
- mean F : 0.29 (averaged across lower 75 % of length range)
- F_{max} : current F ≈ F_{max}

- % increment in Y/R from F to F_{max} : current F ≈ F_{max}
- % increment in B/R from F to F_{max} : current F ≈ F_{max}

FEMALES

- length range : 17-57 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3 (immatures) and 0.2 (matures)

- max. F * delta T : 0.016 (over lower 75 % of length range)
- mean F * delta T : 0.008 (averaged across lower 75 % of length range)
- maximum F : 0.035 (over lower 75 % of length range)
- mean F : 0.010 (averaged across lower 75 % of length range)
- F_{max} : current F is far below F_{max}

- % increment in Y/R from F to F_{max} : unrealistic
- % increment in B/R from F to F_{max} : unrealistic

Management unit : 12 - South Minch

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably contains several sub-units

TAC area
- current TAC area : part of Sub-area VI TAC
- proposed TAC area : Vb(EC) + VI

Fleet units
- countries : UK
- ports : at least 12
- gear : Nephrops trawl, light trawl, creel

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : hours fishing
- nominal trend : increasing until mid-1980s, levelling off in most recent years
- efficiency changes : yet, but data not corrected for these changes
- other external influences :

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- whole/tail factor : 3.0
- nominal trend : fluctuating without obvious trend
- discards : yes, but not sampled regularly

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : kg/hour fishing
- nominal trend : fluctuating without obvious trend

Mean size data
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl, light trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : fluctuating without obvious trend
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : available for limited area

Management unit : 12 - South Minch

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1980-89
- source length data : market samples (UK - Scotland)
- steady state ? : probably not
- sexes : separate

Growth data

	K	L_∞
♂♂	0.161	68 mm
♀♀ immatures	0.161	68 mm
♀♀ matures	0.06	59 mm

- source of data : based on Bailey and Chapman (1983) and Chapman (1982)
- reference period : 1975-82
- data range : from 7 mm to over 50 mm
- type of plot : various
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000290 * CL^{3.24}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.000888 * CL^{2.91}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.4
- selection range : 13 mm

- mesh assessment : increases from 70 mm to 80 and 90 mm

Discard data

- discard corrected : yes
- discard ogive : assumed (based on limited data)
- discard survival : 0.25

Management unit : 12 - South Minch

B. - ASSESSMENT DATA (continued)

Length cohort analysis

M A L E S

- length range : 17-67 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3

- max. F * delta T : 0.27 (over lower 75 % of length range)
- mean F * delta T : 0.18 (averaged across lower 75 % of length range)
- maximum F : 0.56 (over lower 75 % of length range)
- mean F : 0.38 (averaged across lower 75 % of length range)
- F_{max} : occurs at 30 % below current F

- % increment in Y/R from F to F_{max} : 3 %
- % increment in B/R from F to F_{max} : 44 %

F E M A L E S

- length range : 17-57 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3 (immatures) and 0.2 (matures)

- max. F * delta T : 0.14 (over lower 75 % of length range)
- mean F * delta T : 0.08 (averaged across lower 75 % of length range)
- maximum F : 0.36 (over lower 75 % of length range)
- mean F : 0.10 (averaged across lower 75 % of length range)
- F_{max} : current F is <u>far below</u> F_{max}

- % increment in Y/R from F to F_{max} : current F is <u>far below</u> F_{max}
- % increment in B/R from F to F_{max} : current F is <u>far below</u> F_{max}

Management unit : 13 - Clyde

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably contains several sub-units

TAC area
- current TAC area : part of Sub-area VI TAC
- proposed TAC area : Vb(EC) + VI

Fleet units
- countries : UK
- ports : 6-8 ports
- gear : Nephrops trawl, light trawl, creel

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : hours fished
- nominal trend : increasing until mid-1980s, levelling off in most recent years
- efficiency changes : yes, but data not corrected for these changes
- other external influences :

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- whole/tail factor : 3.0
- nominal trend : fluctuating until 1988, 25 % fall in 1989
- discards : yes, but not sampled regularly

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl)
- units : kg/hour fishing
- nominal trend : fluctuating until 1988, 25 % fall in 1989 to lowest figure in data series

Mean size data
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (Nephrops trawl, light trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : decrease in early 1980s, clearly rising in most recent years
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : available for limited area

Management unit : 13 - Clyde

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1980-89
- source length data : market samples (UK - Scotland)
- steady state ? : probably not
- sexes : separate

Growth data

	K	L_∞
♂♂	0.16	73 mm
♀♀ immatures	0.16	73 mm
♀♀ matures	0.06	62 mm

- source of data : Bailey and Chapman (1983)
- reference period : 1979-82
- data range : from 7 mm to over 50 mm
- type of plot : various
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000280 * CL^{3.24}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.000845 * CL^{2.91}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.4
- selection range : 13 mm

- mesh assessment : increases from 70 mm to 80 and 90 mm

Discard data

- discard corrected : yes
- discard ogive : assumed (based on limited data)
- discard survival : 0.25

Management unit : 13 - Clyde

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 17-67 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3

- max. F * delta T : 0.20 (over lower 75 % of length range)
- mean F * delta T : 0.15 (averaged across lower 75 % of length range)
- maximum F : 0.64 (over lower 75 % of length range)
- mean F : 0.38 (averaged across lower 75 % of length range)
- F_{max} : occurs at 30 % <u>below</u> current F

- % increment in Y/R from F to F_{max} : 4 %
- % increment in B/R from F to F_{max} : 51 %

FEMALES

- length range : 17-59 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.3 (immatures) and 0.2 (matures)

- max. F * delta T : 0.05 (over lower 75 % of length range)
- mean F * delta T : 0.04 (averaged across lower 75 % of length range)
- maximum F : 0.19 (over lower 75 % of length range)
- mean F : 0.06 (averaged across lower 75 % of length range)
- F_{max} : current F is <u>far below</u> F_{max}

- % increment in Y/R from F to F_{max} : unrealistic
- % increment in B/R from F to F_{max} : unrealistic

Management unit : 14 - Irish Sea East

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : part of Sub-area VII TAC
- proposed TAC area : VIIa

Fleet units
- countries : UK (English and visiting Northern Irish vessels), France
- ports : Fleetwood, Whitehaven (UK)
- gear : trawl

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (trawl)
- units : no. of trips, days at sea, hours fishing
- nominal trend : decreasing (England & Wales), increasing (Northern Ireland)
- efficiency changes : unknown
- other external influences : fish/Nephrops catch rates determine directedness of trips

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (trawl), France (by-catch of finfish fisheries)
- whole/tail factor : 3.0
- nominal trend : decreasing in most recent years
- discards : yes, but no recent information

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : UK (trawl)
- units : kg/hour trawling
- nominal trend : decrease since 1986, now stabilised at lower level

Mean size data
- reference period : 1985-88 (insufficient sampling in 1989)
- countries/gear : UK (trawl)
- source of data : research vessel samples (1980-81), market samples (1985-89)
- sub area sampled : whole area (by ICES rectangle)
- season sampled : April-September
- trend : increasing in most recent years
- corr. with landings/effort : inverse correlation
- other external influences : market driven change in discarding practice

Research vessel surveys
- abundance data : stock abundance surveys (1980-81), larval surveys (1982 and 1985)

Management unit : 14 - Irish Sea East

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1985-88
- source length data : market samples (UK - England)
- steady state ? : most likely
- sexes : separate

Growth data

	K	L_∞
♂♂	0.16	60 mm
♀♀ immatures	0.16	60 mm
♀♀ matures	0.10	56 mm

- source of data : based on available growth data from Irish Sea West and comparison with Scottish growth data
- reference period :
- data range :
- type of plot :
- goodness of fit :

- length-weight : ♂♂ : $TW = 0.000285 * CL^{2.936}$ (TW = tail weight, CL = carapace length)
  ♀♀ : $TW = 0.000287 * CL^{2.923}$

Selectivity data

- current mesh size : 70 mm
- selection factor : 0.4
- selection range : 10 mm

- mesh assessment : increases from 70 mm to 75, 80 and 85 mm

Discard data

- discard corrected : yes
- discard ogive :
- discard survival : 0.25

Management unit : 14 - Irish Sea East

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 18-52 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried : aimed to stabilise F at largest lengths
  value chosen : 0.5
- M : range tried :
  value chosen : 0.3 (based on Brander and Bennett, 1986)

- max. F * delta T : 0.34 (over lower 75 % of length range)
- mean F * delta T : 0.12 (averaged across lower 75 % of length range)
- maximum F : 0.46 (over lower 75 % of length range)
- mean F : 0.21 (averaged across lower 75 % of length range)
- F_{max} : current F is close to F_{max}

- % increment in Y/R from F to F_{max} : ≈ 0.5 %
- % increment in B/R from F to F_{max} : minus 7 %

FEMALES

- length range : 18-48 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried : aimed to stabilise F at largest lengths
  value chosen : 0.5
- M : range tried :
  value chosen : 0.3 (immatures) and 0.2 (matures) (based on Brander and Bennett, 1986)

- max. F * delta T : 0.42 (over lower 75 % of length range)
- mean F * delta T : 0.14 (averaged across lower 75 % of length range)
- maximum F : 0.31 (over lower 75 % of length range)
- mean F : 0.15 (averaged across lower 75 % of length range)
- F_{max} : occurs at 10 % less than current F

- % increment in Y/R from F to F_{max} : ≈ 0.5 %
- % increment in B/R from F to F_{max} : 6 %

Management unit : 15 - Irish Sea West

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : part of Sub-area VII TAC
- proposed TAC area : VIIa

Fleet units
- countries : UK (Northern Ireland, Isle of Man, England & Wales), Rep. of Ireland
- ports : Portagovie, Ardglass, Kilkeel, Clogherhead, Balbriggan, Skerries, Howth
- gear : trawl

Effort
- reference period : 1981-89
- countries/gear : Northern Ireland (trawl)
- units : hours * Hp index
- nominal trend : fairly stable until 1986, slight increase in 1987-88
- efficiency changes : none
- other external influences : none

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : Northern Ireland (trawl), Rep. of Ireland (trawl)
- whole/tail factor : 3.0
- nominal trend : increasing (Northern Ireland) and decreasing (Rep. of Ireland) in most recent years
- discards : yes (quantities decreasing)

CPUE/LPUE
- reference period : 1981-89
- countries/gear : Northern Ireland (trawl)
- units : kg/hours * Hp index
- nominal trend : fairly stable

Mean size data
- reference period : 1980-89 (Northern Ireland), 1984-89 (Rep. of Ireland)
- countries/gear : Northern Ireland (trawl), Rep. of Ireland (trawl)
- source of data : catch samples at sea, market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : increasing since early 1980s to peak in 1988 (Northern Ireland)
- corr. with landings/effort : none detected
- other external influences : none

Research vessel surveys
- abundance data : yes

Management unit : 15 - Irish Sea West

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1987-89
- source length data : catch, landings and discard samples (UK - Northern Ireland and Rep. of Ireland)
- steady state ? : assumed
- sexes : separate

Growth data

	K	L_∞
♂♂	0.16	60 mm
♀♀ immatures	0.16	60 mm
♀♀ matures	0.10	56 mm

- source of data : tagging, fitted normal curves
- reference period : 1985-87 (tagging), 1989 (fitted normal curves)
- data range : 20-40 mm
- type of plot : Ford-Walford
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000322 * CL^{3.207}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.000684 * CL^{2.963}$

Selectivity data

- current mesh size : 68 mm (average of 65 mm for Rep. of Ireland and 70 mm for Northern Ireland)
- selection factor : 0.4
- selection range : 10 mm

- mesh assessment : increases from current mesh to 75, 80 and 85 mm

Discard data

- discard corrected : yes
- discard ogive :
- discard survival : 0.1

Management unit : 15 - Irish Sea West

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 10-56 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried : 0.2-0.3
  value chosen : 0.2, 0.25 and 0.3

	M = 0.2	M = 0.25	M = 0.3
- max. F * delta T :	0.45	0.40	0.34
- mean F * delta T :	0.22	0.19	0.16
- maximum F :	0.93	0.86	0.77
- mean F :	0.46	0.41	0.35
- F_{max} occurs at .. below current F :	50 %	40 %	20 %
- % increment in Y/R from F to F_{max} :	20 %	8 %	2 %
- % increment in B/R from F to F_{max} :	148 %	82 %	27 %

FEMALES

- length range : 10-54 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.3
- M : range tried :
  value chosen : 0.2

- max. F * delta T : 0.36 (over lower 75 % of length range)
- mean F * delta T : 0.14 (averaged across lower 75 % of length range)
- maximum F : 1.00 (over lower 75 % of length range)
- mean F : 0.24 (averaged across lower 75 % of length range)
- F_{max} : current F ≈ F_{max}

- % increment in Y/R from F to F_{max} : current F ≈ F_{max}
- % increment in B/R from F to F_{max} : current F ≈ F_{max}

Management unit : 16 - Porcupine Bank

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one

TAC area
- current TAC area : part of Sub-area VII TAC
- proposed TAC area : VIIb,c,k + VIIj west of 10° W

Fleet units
- countries : Spain, France, Republic of Ireland, UK
- ports : 7 major ports
- gear : trawl

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : Spain (trawl), France (trawl)
- units : days fishing, effort index (days fishing * average BHP * 100^{-2}) (Spain)
- nominal trend : decreasing until mid-1980s, no obvious trend since then (Spain), continuously decreasing since mid-1980s (France)
- efficiency changes : none
- other external influences : none

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : Spain (trawl), France (trawl), Rep. of Ireland (trawl), UK (trawl)
- whole/tail factor : mainly landed whole
- nominal trend : decreasing since mid-1980s
- discards : no discarding (Spain)

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : Spain (trawl - La Coruña fleet), France (trawl - Saint Guénolé fleet)
- units : kg/effort index (Spain), kg/day fishing (France)
- nominal trend : decreasing since early 1980s

Mean size data
- reference period : 1980-89
- countries/gear : Spain (trawl - La Coruña fleet)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : fairly stable (males) or increasing in most recent years (females)
- corr. with landings/effort : none detected
- other external influences : none

Research vessel surveys
- abundance data : none

Management unit : 16 - Porcupine Bank

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1980-89
- source length data : market samples (Spain)
- steady state ? :
- sexes : separate

Growth data

	K	L_∞
♂♂	0.14	75 mm
♀♀	0.16	60 mm

- source of data : assumed
- reference period :
- data range :
- type of plot :
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000095 * CL^{3.55}$ (W = total weight, CL = carapace length)
  ♀♀ : $W = 0.000095 * CL^{3.55}$

Selectivity data

- current mesh size : 74-80 mm (74 mm assumed)
- selection factor : 0.58
- selection range : 25 mm

- mesh assessment : increases from 74 mm to 80 and 85 mm

Discard data

- discard corrected : no (no discarding in this fishery)
- discard ogive : not applicable
- discard survival : not applicable

Management unit : 16 - Porcupine Bank

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 16-68 mm
- length interval : 2 mm
- % distribution/raised distribution : raised to Spanish landings

- terminal F : range tried :
  value chosen : 0.4
- M : range tried : 0.2-0.3
  value chosen : 0.2

- max. F * delta T : 0.48 (over lower 75 % of length range)
- mean F * delta T : 0.16 (averaged across lower 75 % of length range)
- maximum F : 0.67 (over lower 75 % of length range)
- mean F : 0.32 (averaged across lower 75 % of length range)
- F_{max} : occurs at 50 % less than current F

- % increment in Y/R from F to F_{max} : 7 %
- % increment in B/R from F to F_{max} : 75 %

FEMALES

- length range : 18-50 mm
- length interval : 2 mm
- % distribution/raised distribution : raised to Spanish landings

- terminal F : range tried :
  value chosen : 0.3
- M : range tried : 0.2-0.3
  value chosen : 0.2

- max. F * delta T : 0.42 (over lower 75 % of length range)
- mean F * delta T : 0.18 (averaged across lower 75 % of length range)
- maximum F : 0.65 (over lower 75 % of length range)
- mean F : 0.32 (averaged across lower 75 % of length range)
- F_{max} : occurs at 20 % less than current F

- % increment in Y/R from F to F_{max} : 1 %
- % increment in B/R from F to F_{max} : 19 %

Management unit : 17 - Aran Islands

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks :

TAC area
- current TAC area : part of Sub-area VII TAC
- proposed TAC area : VIIb,c,k + VIIj west of 10° W

Fleet units
- countries : France, Republic of Ireland
- ports :
- gear : trawl

Effort
- reference period : no data available
- countries/gear :
- units :
- nominal trend :
- efficiency changes :
- other external influences :

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : France (trawl), Rep. of Ireland (trawl - pooled with landings from Porcupine Bank)
- whole/tail factor : landed whole (France)
- nominal trend : strongly decreasing since mid-1980s (France)
- discards : yes

CPUE/LPUE
- reference period : no data available
- countries/gear :
- units :
- nominal trend :

Mean size data
- reference period : no data available
- countries/gear :
- source of data :
- sub area sampled :
- season sampled :
- trend :
- corr. with landings/effort :
- other external influences :

Research vessel surveys
- abundance data :

Management unit : 18+19 - Irish coast

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : contains several sub-units

TAC area
- current TAC area : part of Sub-area VII TAC
- proposed TAC area : VIIb,c,k + VIIj West of 10° W

Fleet units
- countries : Rep. of Ireland
- ports :
- gear : trawl

Effort
- reference period : no data available
- countries/gear :
- units :
- nominal trend :
- efficiency changes :
- other external influences :

Landings
- reference period : 1980-89
- countries/gear : Rep. of Ireland (trawl)
- whole/tail factor : 3.0
- nominal trend : fluctuating without obvious trend
- discards : yes

CPUE/LPUE
- reference period : no data available
- countries/gear :
- units :
- nominal trend :

Mean size data
- reference period : no data available
- countries/gear :
- source of data :
- sub area sampled :
- season sampled :
- trend :
- corr. with landings/effort :
- other external influences :

Research vessel surveys
- abundance data :

Management unit : 20+21+22 - Celtic Sea

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably contains several sub-units

TAC area
- current TAC area : part of Sub-area VII TAC
- proposed TAC area : VIIf,g,h and VIIj east of 10° W

Fleet units
- countries : France, Republic of Ireland
- ports : at least 5 main ports
- gear : trawl

Effort
- reference period : 1983-89
- countries/gear : France (trawl)
- units : no. of days fishing
- nominal trend : declining from high levels of 1987-88 to level recorded in 1984-86
- efficiency changes : none
- other external influences : seasonal shift of effort to finfish, tuna (summer), and other Nephrops fisheries (Porcupine Bank)

Landings
- reference period : 1980-89
- countries/gear : France (trawl)
- whole/tail factor : landed whole
- nominal trend : fluctuating without obvious trend
- discards : yes

CPUE/LPUE
- reference period : 1981-89
- countries/gear : France (trawl)
- units : kg/day fishing
- nominal trend : fluctuating around 260 kg/day fishing, peak values in 1985 and 1989

Mean size data
- reference period : 1984-89
- countries/gear : France (trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : fluctuating without obvious trend
- corr. with landings/effort : none detected
- other external influences : unknown

Research vessel surveys
- abundance data : none

Management unit : 20+21+22 - Celtic Sea

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1987-89
- source length data : market samples (France)
- steady state ? : yes (no major changes in effort or mesh size)
- sexes : separate

Growth data

	K	L_∞
♂♂	0.12	68 mm
♀♀	0.17	49 mm

- source of data : tagging, length composition analysis
- reference period : 1982-86
- data range :
- type of plot : Powell's method (Powell, 1979)
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000095 * CL^{3.55}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.000095 * CL^{3.55}$

Selectivity data

- current mesh size : 80 mm
- selection factor : 0.5
- selection range : 17.2 mm

- mesh assessment : increases from 80 mm to 85 and 90 mm

Discard data

- discard corrected : yes
- discard ogive : yes
- discard survival : 0.2

Management unit : 20+21+22 - Celtic Sea

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 20-66 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.2
- M : range tried :
  value chosen : 0.3 (Morizur, 1982)

- max. F * delta T : 0.18 (over lower 75 % of length range)
- mean F * delta T : 0.10 (averaged across lower 75 % of length range)
- maximum F : 0.24 (over lower 75 % of length range)
- mean F : 0.14 (averaged across lower 75 % of length range)
- F_{max} : occurs at 30-40 % above current F

- % increment in Y/R from F to F_{max} : 3 %
- % increment in B/R from F to F_{max} : minus 18 %

FEMALES

- length range : 20-48 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.2
- M : range tried :
  value chosen : 0.3 (Morizur, 1982)

- max. F * delta T : 0.06 (over lower 75 % of length range)
- mean F * delta T : 0.03 (averaged across lower 75 % of length range)
- maximum F : 0.07 (over lower 75 % of length range)
- mean F : 0.04 (averaged across lower 75 % of length range)
- F_{max} : current F is far below F_{max}

- % increment in Y/R from F to F_{max} : current F is far below F_{max}
- % increment in B/R from F to F_{max} : current F is far below F_{max}

Management unit : 23+24 - Bay of Biscay

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably contains several sub-units

TAC area
- current TAC area : part of Sub-area VIII TAC
- proposed TAC area : VIIIa,b

Fleet units
- countries : France
- ports : 10 main ports
- gear : trawl

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : France (trawl - Lesconil fleet)
- units : no. of days fishing
- nominal trend : slowly decreasing
- efficiency changes : shift from single to twin trawl by small part of the fleet
- other external influences : seasonal shift of effort from Nephrops to finfish fisheries

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : France (trawl)
- whole/tail factor : landed whole
- nominal trend : increasing from mid-1980s to peak in 1988, 15 % drop in 1989
- discards : yes, but decreasing with successive increases in mesh size

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : France (trawl - Lesconil fleet)
- units : kg/day fishing
- nominal trend : increasing from mid-1980s to peak in 1988, 20 % drop in 1989

Mean size data
- reference period : 1987-89
- countries/gear : France (trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : slowly increasing (males) or fairly stable (females)
- corr. with landings/effort : none detected
- other external influences : mesh size increases

Research vessel surveys
- abundance data :

Management unit : 23+24 - Bay of Biscay

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1987-89
- source length data : market samples (France)
- steady state ? : yes (effort stable, most recent mesh size increase in 1986)
- sexes : separate

Growth data

	K	L_∞
♂♂	0.11	76 mm
♀♀	0.14	56 mm

- source of data : modal analysis (Conan and Morizur, 1979)
- reference period : 1975-78
- data range : 15-60 mm
- type of plot : NORMSEP program
- goodness of fit :

- length-weight : ♂♂ : $W = 0.00039 * CL^{3.184}$ (W = total weight, CL = carapace length)
  ♀♀ : $W = 0.00081 * CL^{2.973}$

Selectivity data

- current mesh size : 50 mm
- selection factor : 0.5 (Charuau, 1978)
- selection range : 11 mm

- mesh assessment : increases from 50 mm to 55, 60 and 65 mm

Discard data

- discard corrected : yes
- discard ogive : yes
- discard survival : 0.3 (Gueguen and Charuau, 1975)

Management unit : 23+24 - Bay of Biscay

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 14-64 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.5
- M : range tried :
  value chosen : 0.3 (Morizur, 1982)

- max. F * delta T : 0.25 (over lower 75 % of length range)
- mean F * delta T : 0.18 (averaged across lower 75 % of length range)
- maximum F : 0.56 (over lower 75 % of length range)
- mean F : 0.37 (averaged across lower 75 % of length range)
- F_{max} : occurs at 40 % less than current F

- % increment in Y/R from F to F_{max} : 8 %
- % increment in B/R from F to F_{max} : 64 %

FEMALES

- length range : 16-54 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.4
- M : range tried :
  value chosen : 0.3 (Morizur, 1982)

- max. F * delta T : 0.22 (over lower 75 % of length range)
- mean F * delta T : 0.10 (averaged across lower 75 % of length range)
- maximum F : 0.41 (over lower 75 % of length range)
- mean F : 0.19 (averaged across lower 75 % of length range)
- F_{max} : occurs at 30 % above current F

- % increment in Y/R from F to F_{max} : 3 %
- % increment in B/R from F to F_{max} : minus 22 %

Management unit : 25 - North Galicia

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : probably only one (see Section 5.14. for comments on Cantabrian Sea)

TAC area
- current TAC area : part of Sub-area VIII TAC
- proposed TAC area : VIIIc

Fleet units
- countries : Spain
- ports : La Coruña
- gear : trawl

Effort
- reference period : 1980-89 (longer data series available)
- countries/gear : Spain (trawl - La Coruña fleet)
- units : no. of trips, effort index (days fishing * average HP * 100^{-2})
- nominal trend : decreasing from early 1980s to 1987, since then increasing
- efficiency changes : none
- other external influences : none

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : Spain (trawl - La Coruña fleet)
- whole/tail factor : landed whole
- nominal trend : fluctuating until 1988, 20 % drop in 1989
- discards : no discarding

CPUE/LPUE
- reference period : 1980-89 (longer data series available)
- countries/gear : Spain (trawl - La Coruña fleet)
- units : kg/trip, kg/effort index
- nominal trend : fluctuating without obvious trend until 1987, since then falling

Mean size data
- reference period : 1980-89
- countries/gear : Spain (trawl - La Coruña fleet)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : increasing in most recent years
- corr. with landings/effort : none detected
- other external influences : none

Research vessel surveys
- abundance data : none

Management unit : 25 - North Galicia

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1984-89
- source length data : market samples (Spain)
- steady state ? :
- sexes : separate

Growth data

	K	L_∞
♂♂	0.12	80 mm
♀♀	0.15	65 mm

- source of data : assumed
- reference period :
- data range :
- type of plot :
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000428 * CL^{3.1577}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.000428 * CL^{3.1577}$

Selectivity data

- current mesh size : 40 mm
- selection factor : 0.49
- selection range : 9.7 mm

- mesh assessment : increases from 40 mm to 55, 60 and 65 mm

Discard data

- discard corrected : no (no discarding in this fishery)
- discard ogive : not applicable
- discard survival : not applicable

Management unit : 25 - North Galicia

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 18-70 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried : 0.4 and 0.8
  value chosen : 0.4
- M : range tried : 0.1 and 0.2
  value chosen : 0.2

- max. F * delta T : 0.56 (over lower 75 % of length range)
- mean F * delta T : 0.20 (averaged across lower 75 % of length range)
- maximum F : 1.04 (over lower 75 % of length range)
- mean F : 0.43 (averaged across lower 75 % of length range)
- F_{max} : occurs at 40 % less than current F

- % increment in Y/R from F to F_{max} : 5 %
- % increment in B/R from F to F_{max} : 60-65 %

FEMALES

- length range : 22-60 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.4
- M : range tried :
  value chosen : 0.2

- max. F * delta T : 0.58 (over lower 75 % of length range)
- mean F * delta T : 0.27 (averaged across lower 75 % of length range)
- maximum F : 0.73 (over lower 75 % of length range)
- mean F : 0.47 (averaged across lower 75 % of length range)
- F_{max} : occurs at 40 % less than current F

- % increment in Y/R from F to F_{max} : 4 %
- % increment in B/R from F to F_{max} : 60-65 %

Management unit : 26 - West Galicia

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks :

TAC area
- current TAC area : part of Sub-area IX TAC
- proposed TAC area : IX

Fleet units
- countries : Spain
- ports : Muros, Riveira, Marin
- gear : trawl

Effort
- reference period : 1984-89
- countries/gear : Spain (trawl - Muros and Riveira fleets)
- units : no. of trips
- nominal trend : fluctuating without obvious trend
- efficiency changes : none
- other external influences : none

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : Spain (trawl)
- whole/tail factor : landed whole
- nominal trend : fluctuating without obvious trend
- discards : no discards

CPUE/LPUE
- reference period : 1984-89
- countries/gear : Spain (trawl - Muros and Riveira fleets)
- units : kg/trip
- nominal trend : fluctuating without obvious trend

Mean size data
- reference period : 1981-83, 1985-86 and 1988-89
- countries/gear : Spain (trawl)
- source of data : market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : sharp decrease in 1989
- corr. with landings/effort : none detected
- other external influences : none

Research vessel surveys
- abundance data : yes

Management unit : 26 - West Galicia

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1981-83, 1985-86 and 1988-89
- source length data : market samples (Spain)
- steady state ? :
- sexes : separate

Growth data

	K	L_∞
♂♂	0.12	85 mm
♀♀	0.15	70 mm

- source of data : assumed
- reference period :
- data range :
- type of plot :
- goodness of fit :

- length-weight : ♂♂ : $W = 0.000428 * CL^{3.1577}$ (W = total weight, CL = carapace length)
  ♀♀ : $W = 0.000428 * CL^{3.1577}$

Selectivity data

- current mesh size : 40 mm
- selection factor : 0.49
- selection range : 9.7 mm

- mesh assessment : increases from 40 mm to 55, 60 and 65 mm

Discard data

- discard corrected : no (no discarding in this fishery)
- discard ogive : not applicable
- discard survival : not applicable

Management unit : 26 - West Galicia

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 10-80 mm
- length interval : 5 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.4
- M : range tried :
  value chosen : 0.2

- max. F * delta T : 0.48 (over lower 75 % of length range)
- mean F * delta T : 0.20 (averaged across lower 75 % of length range)
- maximum F : 0.54 (over lower 75 % of length range)
- mean F : 0.20 (averaged across lower 75 % of length range)
- F_{max} : occurs at 10 % less than current F

- % increment in Y/R from F to F_{max} : ≈ 0.5 %
- % increment in B/R from F to F_{max} : 15 %

FEMALES

- length range : 10-65 mm
- length interval : 5 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.4
- M : range tried :
  value chosen : 0.2

- max. F * delta T : 0.92 (over lower 75 % of length range)
- mean F * delta T : 0.45 (averaged across lower 75 % of length range)
- maximum F : 0.75 (over lower 75 % of length range)
- mean F : 0.38 (averaged across lower 75 % of length range)
- F_{max} : occurs at 50 % less than current F

- % increment in Y/R from F to F_{max} : 10 %
- % increment in B/R from F to F_{max} : 134 %

Management unit : 27 - North Portugal

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks :

TAC area
- current TAC area : part of Sub-area IX TAC
- proposed TAC area : IX

Fleet units
- countries : Portugal
- ports : Cascais, Matosinhos
- gear : trawl

Effort
- reference period : no data available
- countries/gear :
- units :
- nominal trend :
- efficiency changes :
- other external influences :

Landings
- reference period : 1980-89
- countries/gear : Portugal (trawl)
- whole/tail factor : landed whole
- nominal trend : fluctuating without obvious trend
- discards : no discards

CPUE/LPUE
- reference period : no data available
- countries/gear :
- units :
- nominal trend :

Mean size data
- reference period : 1984-88, data not presented at the meeting
- countries/gear : Portugal
- source of data : research vessel samples
- sub area sampled : whole area
- season sampled : April-December
- trend :
- corr. with landings/effort :
- other external influences :

Research vessel surveys
- abundance data :

Management unit : 28+29 - SW and S Portugal

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks : two different biological stocks (Alentejo and Algarve)

TAC area
- current TAC area : part of Sub-area IX TAC
- proposed TAC area : IX

Fleet units
- countries : Portugal (from 1982 onwards), Spain (until 1982)
- ports : Portimao, Olhao, Vila Real de Santo António
- gear : trawl

Effort
- reference period : 1983-89
- countries/gear : Portugal (trawl)
- units : no. of vessels
- nominal trend : sharply increasing until 1987, since then slightly decreasing
- efficiency changes :
- other external influences : Spain ceased fishing these Nephrops stocks in 1982

Landings
- reference period : 1980-89 (longer data series available)
- countries/gear : Portugal (trawl), Spain (trawl)
- whole/tail factor : landed whole
- nominal trend : sharply increasing until 1987, since then decreasing (Portugal)
- discards : no discards

CPUE/LPUE
- reference period : no data available
- countries/gear :
- units :
- nominal trend :

Mean size data
- reference period : 1983-89
- countries/gear : Portugal (trawl)
- source of data : research vessel samples, market samples
- sub area sampled : whole area
- season sampled : all seasons
- trend : fairly stable
- corr. with landings/effort : not investigated
- other external influences :

Research vessel surveys
- abundance data : none

Management unit : 28+29 - SW and S Portugal

B. - ASSESSMENT DATA

Length cohort analysis

- reference period : 1984-89
- source length data : market samples (Portugal)
- steady state ? :
- sexes : separate

Growth data

	K	L_∞
♂♂	0.20	70 mm
♀♀ immatures	0.20	70 mm
♀♀ matures	0.068	65 mm

- source of data : tagging (females), modal analysis (Bhattacharya method)
- reference period : 1987-88 (tagging), 1981-88 (modal analysis)
- data range : 9-68 mm (males), 18-56 mm (females)
- type of plot : Ford-Walford
- goodness of fit :

- length-weight : ♂♂ : $W = 0.00028 * CL^{3.2229}$ (W = total weight, CL = carapace length)
♀♀ : $W = 0.00056 * CL^{3.0288}$

Selectivity data

- current mesh size : 50 mm
- selection factor : 0.46
- selection range : 11.5 mm

- mesh assessment : increases from 50 mm to 55 and 65 mm

Discard data

- discard corrected : no (no discards in this fishery)
- discard ogive : not applicable
- discard survival : not applicable

Management unit : 28+29 - SW and S Portugal

B. - ASSESSMENT DATA (continued)

Length cohort analysis

MALES

- length range : 18-66 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried :
  value chosen : 0.5
- M : range tried : 0.1 and 0.2
  value chosen : 0.2

- max. F * delta T : 0.53 (over lower 75 % of length range)
- mean F * delta T : 0.17 (averaged across lower 75 % of length range)
- maximum F : 0.79 (over lower 75 % of length range)
- mean F : 0.44 (averaged across lower 75 % of length range)
- F_{max} : occurs at 50-60 % less than current F

- % increment in Y/R from F to F_{max} : 15 %
- % increment in B/R from F to F_{max} : 120-175 %

FEMALES

- length range : 10-62 mm
- length interval : 2 mm
- % distribution/raised distribution : raised

- terminal F : range tried : 0.1-0.8
  value chosen : 0.5
- M : range tried : 0.1-0.3
  value chosen : 0.2 (immatures) and 0.1 (matures)

- max. F * delta T : 0.50 (over lower 75 % of length range)
- mean F * delta T : 0.18 (averaged across lower 75 % of length range)
- maximum F : 0.44 (over lower 75 % of length range)
- mean F : 0.19 (averaged across lower 75 % of length range)
- F_{max} : occurs at 30 % less than current F

- % increment in Y/R from F to F_{max} : 2 %
- % increment in B/R from F to F_{max} : 52 %

Management unit : 30 - Gulf of Cadiz

A. - EXPLOITATION PATTERN and TRENDS

Biological stocks :

TAC area
- current TAC area : part of Sub-area IX TAC
- proposed TAC area : IX

Fleet units
- countries : Spain
- ports : Huelva, Isla Cristina, Puerto St. Maria
- gear : trawl

Effort
- reference period : no data available
- countries/gear :
- units :
- nominal trend :
- efficiency changes :
- other external influences :

Landings
- reference period : 1985-87
- countries/gear : Spain (trawl)
- whole/tail factor : landed whole
- nominal trend : data series too short to allow trend analysis
- discards : no discards

CPUE/LPUE
- reference period : no data available
- countries/gear :
- units :
- nominal trend :

Mean size data
- reference period : no data available
- countries/gear :
- source of data :
- sub area sampled :
- season sampled :
- trend :
- corr. with landings/effort :
- other external influences :

Research vessel surveys
- abundance data :