Freely-varying phi
Atlantic Cod Celtic Sea
Atlantic cod Faroe Plateau
Atlantic cod Iceland
Atlantic cod IIIa (west) and IV-VIId
Atlantic cod Irish Sea
Atlantic cod Northeast Arctic
Haddock Faroe Plateau
Haddock Iceland
Haddock ICES VIIb-k
Haddock Irish Sea
Haddock North Sea and IIIa-VIa
Haddock Northeast Arctic
Hake Northeast Atlantic North
Hake Northeast Atlantic South
Pollock Faroe Plateau
Pollock Iceland Grounds
Pollock Northeast Arctic
Ling Iceland Grounds
Blue Whiting Northeast Atlantic
European Plaice ICES VIId
European Plaice Irish Sea
European Plaice North Sea
European Plaice Subdivisions 21-23
Common sole 22-24-IIIa
Common sole Celtic Sea
Common sole ICES VIId
Common sole Irish Sea
Common sole North Sea
Common sole VIIIab
Common sole Western English Channel
Megrim ICES VIIIc-IXa
Megrim VII-VIIIabd
Fourspotted megrim ICES VIIIc-IXa
Golden Redfish V-VI-XII-XIV
Herring Iceland (Summer spawners)
Herring ICES 22-24-IIIa
Herring ICES 28
Herring ICES VIIa-g-h-j
Herring IIIa, VIId and North Sea
Herring Northern Irish Sea
Herring Subdivisions 25-29 and 32
Herring Subdivisions 30-31
Norwegian Spring Spawning Herring
Sprat ICES Baltic Areas 22-32
Atlantic menhaden Atlantic
Mackerel ICES Northeast Atlantic
Horse mackerel IIa-IVa-Vb-VIa-VII-VIII
White anglerfish VIIIc-IXa
Annual surplus production / estimated MSY
5
0
-5
0.0
0.5
1.0
1.5
Annual biomass / estimated K

Schaefer model (phi = 2)
Atlantic Cod Celtic Sea
Atlantic cod Faroe Plateau
Atlantic cod Iceland
Atlantic cod IIIa (west) and IV-VIId
Atlantic cod Irish Sea
Atlantic cod Northeast Arctic
Haddock Faroe Plateau
Haddock Iceland
Haddock ICES VIIb-k
Haddock Irish Sea
Haddock North Sea and IIIa-VIa
Haddock Northeast Arctic
Hake Northeast Atlantic North
Hake Northeast Atlantic South
Pollock Faroe Plateau
Pollock Iceland Grounds
Pollock Northeast Arctic
Ling Iceland Grounds
Blue Whiting Northeast Atlantic
European Plaice ICES VIId
European Plaice Irish Sea
European Plaice North Sea
European Plaice Subdivisions 21-23
Common sole 22-24-IIIa
Common sole Celtic Sea
Common sole ICES VIId
Common sole Irish Sea
Common sole North Sea
Common sole VIIIab
Common sole Western English Channel
Megrim ICES VIIIc-IXa
Megrim VII-VIIIabd
Fourspotted megrim ICES VIIIc-IXa
Golden Redfish V-VI-XII-XIV
Herring Iceland (Summer spawners)
Herring ICES 22-24-IIIa
Herring ICES 28
Herring ICES VIIa-g-h-j
Herring IIIa, VIId and North Sea
Herring Northern Irish Sea
Herring Subdivisions 25-29 and 32
Herring Subdivisions 30-31
Norwegian Spring Spawning Herring
Sprat ICES Baltic Areas 22-32
Atlantic menhaden Atlantic
Mackerel ICES Northeast Atlantic
Horse mackerel IIa-IVa-Vb-VIa-VII-VIII
White anglerfish VIIIc-IXa
Annual surplus production / estimated MSY
5
0
-5
0.0
0.5
1.0
1.5
Annual biomass / estimated K

Fox model (phi = 1)
Atlantic Cod Celtic Sea
Atlantic cod Faroe Plateau
Atlantic cod Iceland
Atlantic cod IIIa (west) and IV-VIId
Atlantic cod Irish Sea
Atlantic cod Northeast Arctic
Haddock Faroe Plateau
Haddock Iceland
Haddock ICES VIIb-k
Haddock Irish Sea
Haddock North Sea and IIIa-VIa
Haddock Northeast Arctic
Hake Northeast Atlantic North
Hake Northeast Atlantic South
Pollock Faroe Plateau
Pollock Iceland Grounds
Pollock Northeast Arctic
Ling Iceland Grounds
Blue Whiting Northeast Atlantic
European Plaice ICES VIId
European Plaice Irish Sea
European Plaice North Sea
European Plaice Subdivisions 21-23
Common sole 22-24-IIIa
Common sole Celtic Sea
Common sole ICES VIId
Common sole Irish Sea
Common sole North Sea
Common sole VIIIab
Common sole Western English Channel
Megrim ICES VIIIc-IXa
Megrim VII-VIIIabd
Fourspotted megrim ICES VIIIc-IXa
Golden Redfish V-VI-XII-XIV
Herring Iceland (Summer spawners)
Herring ICES 22-24-IIIa
Herring ICES 28
Herring ICES VIIa-g-h-j
Herring IIIa, VIId and North Sea
Herring Northern Irish Sea
Herring Subdivisions 25-29 and 32
Herring Subdivisions 30-31
Norwegian Spring Spawning Herring
Sprat ICES Baltic Areas 22-32
Atlantic menhaden Atlantic
Mackerel ICES Northeast Atlantic
Horse mackerel IIa-IVa-Vb-VIa-VII-VIII
White anglerfish VIIIc-IXa
Annual surplus production / estimated MSY
5
0
-5
0.0
0.5
1.0
1.5
Annual biomass / estimated K

Empirical taxon-specific phi
Atlantic Cod Celtic Sea
Atlantic cod Faroe Plateau
Atlantic cod Iceland
Atlantic cod IIIa (west) and IV-VIId
Atlantic cod Irish Sea
Atlantic cod Northeast Arctic
Haddock Faroe Plateau
Haddock Iceland
Haddock ICES VIIb-k
Haddock Irish Sea
Haddock North Sea and IIIa-VIa
Haddock Northeast Arctic
Hake Northeast Atlantic North
Hake Northeast Atlantic South
Pollock Faroe Plateau
Pollock Iceland Grounds
Pollock Northeast Arctic
Ling Iceland Grounds
Blue Whiting Northeast Atlantic
European Plaice ICES VIId
European Plaice Irish Sea
European Plaice North Sea
European Plaice Subdivisions 21-23
Common sole 22-24-IIIa
Common sole Celtic Sea
Common sole ICES VIId
Common sole Irish Sea
Common sole North Sea
Common sole VIIIab
Common sole Western English Channel
Megrim ICES VIIIc-IXa
Megrim VII-VIIIabd
Fourspotted megrim ICES VIIIc-IXa
Golden Redfish V-VI-XII-XIV
Herring Iceland (Summer spawners)
Herring ICES 22-24-IIIa
Herring ICES 28
Herring ICES VIIa-g-h-j
Herring IIIa, VIId and North Sea
Herring Northern Irish Sea
Herring Subdivisions 25-29 and 32
Herring Subdivisions 30-31
Norwegian Spring Spawning Herring
Sprat ICES Baltic Areas 22-32
Atlantic menhaden Atlantic
Mackerel ICES Northeast Atlantic
Horse mackerel IIa-IVa-Vb-VIa-VII-VIII
White anglerfish VIIIc-IXa
Annual surplus production / estimated MSY
5
0
-5
0.0
0.5
1.0
1.5
Annual biomass / estimated K

Thorson meta-analysis taxon-specific phi
Atlantic Cod Celtic Sea
Atlantic cod Faroe Plateau
Atlantic cod Iceland
Atlantic cod IIIa (west) and IV-VIId
Atlantic cod Irish Sea
Atlantic cod Northeast Arctic
Haddock Faroe Plateau
Haddock Iceland
Haddock ICES VIIb-k
Haddock Irish Sea
Haddock North Sea and IIIa-VIa
Haddock Northeast Arctic
Hake Northeast Atlantic North
Hake Northeast Atlantic South
Pollock Faroe Plateau
Pollock Iceland Grounds
Pollock Northeast Arctic
Ling Iceland Grounds
Blue Whiting Northeast Atlantic
European Plaice ICES VIId
European Plaice Irish Sea
European Plaice North Sea
European Plaice Subdivisions 21-23
Common sole 22-24-IIIa
Common sole Celtic Sea
Common sole ICES VIId
Common sole Irish Sea
Common sole North Sea
Common sole VIIIab
Common sole Western English Channel
Megrim ICES VIIIc-IXa
Megrim VII-VIIIabd
Fourspotted megrim ICES VIIIc-IXa
Golden Redfish V-VI-XII-XIV
Herring Iceland (Summer spawners)
Herring ICES 22-24-IIIa
Herring ICES 28
Herring ICES VIIa-g-h-j
Herring IIIa, VIId and North Sea
Herring Northern Irish Sea
Herring Subdivisions 25-29 and 32
Herring Subdivisions 30-31
Norwegian Spring Spawning Herring
Sprat ICES Baltic Areas 22-32
Atlantic menhaden Atlantic
Mackerel ICES Northeast Atlantic
Horse mackerel IIa-IVa-Vb-VIa-VII-VIII
White anglerfish VIIIc-IXa
Annual surplus production / estimated MSY
5
0
-5
0.0
0.5
1.0
1.5
Annual biomass / estimated K

Thorson meta-analysis pooled (phi = 1.736)
Atlantic Cod Celtic Sea
Atlantic cod Faroe Plateau
Atlantic cod Iceland
Atlantic cod IIIa (west) and IV-VIId
Atlantic cod Irish Sea
Atlantic cod Northeast Arctic
Haddock Faroe Plateau
Haddock Iceland
Haddock ICES VIIb-k
Haddock Irish Sea
Haddock North Sea and IIIa-VIa
Haddock Northeast Arctic
Hake Northeast Atlantic North
Hake Northeast Atlantic South
Pollock Faroe Plateau
Pollock Iceland Grounds
Pollock Northeast Arctic
Ling Iceland Grounds
Blue Whiting Northeast Atlantic
European Plaice ICES VIId
European Plaice Irish Sea
European Plaice North Sea
European Plaice Subdivisions 21-23
Common sole 22-24-IIIa
Common sole Celtic Sea
Common sole ICES VIId
Common sole Irish Sea
Common sole North Sea
Common sole VIIIab
Common sole Western English Channel
Megrim ICES VIIIc-IXa
Megrim VII-VIIIabd
Fourspotted megrim ICES VIIIc-IXa
Golden Redfish V-VI-XII-XIV
Herring Iceland (Summer spawners)
Herring ICES 22-24-IIIa
Herring ICES 28
Herring ICES VIIa-g-h-j
Herring IIIa, VIId and North Sea
Herring Northern Irish Sea
Herring Subdivisions 25-29 and 32
Herring Subdivisions 30-31
Norwegian Spring Spawning Herring
Sprat ICES Baltic Areas 22-32
Atlantic menhaden Atlantic
Mackerel ICES Northeast Atlantic
Horse mackerel IIa-IVa-Vb-VIa-VII-VIII
White anglerfish VIIIc-IXa
Annual surplus production / estimated MSY
5
0
-5
0.0
0.5
1.0
1.5
Annual biomass / estimated K