# Stock: Northern Hake

**Assessment Quality Control Diagram 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Average F( 1-4 ,u) | | | | | | | | | | | | | | | | |
| Year | | | | | | | | | | | | | | | | |
| Date of assessment | | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
| 1989 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1990 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1991 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1992 | | 0.19 | 0.24 | 0.25 | 0.23 |  |  |  |  |  |  |  |  |  |  |  |
| 1993 | | 0.22 | 0.27 | 0.28 | 0.28 | 0.30 |  |  |  |  |  |  |  |  |  |  |
| 1994 | | 0.21 | 0.25 | 0.28 | 0.29 | 0.34 | 0.31 |  |  |  |  |  |  |  |  |  |
| 1995 | | 0.21 | 0.26 | 0.28 | 0.27 | 0.30 | 0.22 | 0.31 |  |  |  |  |  |  |  |  |
| 1996 | | 0.21 | 0.26 | 0.28 | 0.27 | 0.28 | 0.19 | 0.24 | 0.24 |  |  |  |  |  |  |  |
| 1997 | | 0.21 | 0.27 | 0.28 | 0.26 | 0.28 | 0.20 | 0.28 | 0.33 | 0.18 |  |  |  |  |  |  |
| 1998 | | 0.29 | 0.30 | 0.31 | 0.28 | 0.34 | 0.25 | 0.31 | 0.34 | 0.26 | 0.22 |  |  |  |  |  |
| 1999 | | 0.30 | 0.31 | 0.32 | 0.29 | 0.35 | 0.26 | 0.34 | 0.37 | 0.29 | 0.26 | 0.24 |  |  |  |  |
| 2000 | | 0.30 | 0.33 | 0.33 | 0.28 | 0.33 | 0.24 | 0.33 | 0.37 | 0.29 | 0.29 | 0.29 | 0.38 |  |  |  |
| 2001 | | 0.35 | 0.37 | 0.37 | 0.33 | 0.37 | 0.28 | 0.36 | 0.39 | 0.30 | 0.27 | 0.26 | 0.29 | 0.31 |  |  |
| 2002 | | 0.34 | 0.35 | 0.36 | 0.32 | 0.38 | 0.28 | 0.36 | 0.38 | 0.31 | 0.27 | 0.25 | 0.30 | 0.31 | 0.25 |  |
| 2003 | | 0.34 | 0.36 | 0.37 | 0.30 | 0.38 | 0.28 | 0.36 | 0.39 | 0.31 | 0.28 | 0.26 | 0.30 | 0.32 | 0.24 | 0.24 |

**Remarks:**  F range changes to average (2-6), as recommended by ACFM Only 1992 and 1993 have been included because previous assessments were made on different basis and were rejected by ACFM. In 1995, a revised assessment was presented to ACFM meeting.

**Stock: Northern Hake**

**Assessment Quality Control Diagram 2**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Recruitment (age 0 ) Unit: millions | | | | | | | | | | | | | | | | |
| Year class | | | | | | | | | | | | | | | | |
| Date of assessment | | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
| 1989 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1990 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1991 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1992 | | 374 | 240 | 420 | - |  |  |  |  |  |  |  |  |  |  |  |
| 1993 | | 365 | 228 | 308 | 241 | 271 |  |  |  |  |  |  |  |  |  |  |
| 1994 | | 337 | 216 | 309 | 222 | 230 | 311 |  |  |  |  |  |  |  |  |  |
| 1995 | | 333 | 236 | 340 | 300 | 343 | 282 | 252 |  |  |  |  |  |  |  |  |
| 1996 | | 338 | 235 | 356 | 315 | 425 | 393 | 269 | 483 |  |  |  |  |  |  |  |
| 1997 | | 340 | 237 | 371 | 309 | 345 | 316 | 188 | 221 | 319 |  |  |  |  |  |  |
| 1998 | | 331 | 238 | 360 | 311 | 333 | 300 | 228 | 263 | 280 | 118 |  |  |  |  |  |
| 1999 | | 328 | 234 | 356 | 281 | 319 | 305 | 225 | 244 | 250 | 97 | 76 |  |  |  |  |
| 2000 | | 332 | 233 | 360 | 286 | 311 | 300 | 206 | 220 | 223 | 96 | 95 | 96 |  |  |  |
| 2001 | | 326 | 227 | 348 | 282 | 309 | 291 | 218 | 247 | 254 | 170 | 150 | 131 | 164 |  |  |
| 2002 | | 279 | 221 | 301 | 254 | 292 | 242 | 214 | 236 | 239 | 170 | 162 | 118 | 138 | 256 |  |
| 2003 | | 263 | 225 | 299 | 251 | 288 | 242 | 211 | 237 | 239 | 165 | 150 | 186 | 148 | 115 | 234 |

**Remarks:** Average recruitment (1997-1998)

# Stock: Northern Hake

## Assessment Quality Control Diagram 3

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Spawning stock biomass ('000 t) | | | | | | | | | | | | | | | | | |
| Year | | | | | | | | | | | | | | | | | |
| Date of assessment | 1989 | | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| 1989 |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1990 |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1991 |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1992 | 306 | | 259 | 249 | 242 | 233 | 230 |  |  |  |  |  |  |  |  |  |  |  |
| 1993 | 163 | | 145 | 139 | 121 | 110 | 103 | 97 |  |  |  |  |  |  |  |  |  |  |
| 1994 | 188 | | 171 | 166 | 142 | 129 | 113 | 104 | 98 |  |  |  |  |  |  |  |  |  |
| 1995 | 179 | | 165 | 162 | 138 | 130 | 123 | 126 | 120 | 112 |  |  |  |  |  |  |  |  |
| 1996 | 192 | | 180 | 168 | 141 | 129 | 122 | 147 | 160 | 169 | 174 |  |  |  |  |  |  |  |
| 1997 | 164 | | 151 | 149 | 126 | 120 | 119 | 138 | 146 | 140 | 131 | 119 |  |  |  |  |  |  |
| 1998 | 177 | | 156 | 155 | 131 | 120 | 119 | 132 | 136 | 119 | 127 | 129 | 124 |  |  |  |  |  |
| 1999 | 167 | | 147 | 147 | 125 | 115 | 112 | 121 | 121 | 140 | 132 | 134 | 126 | 115 |  |  |  |  |
| 2000 | 169 | | 134 | 135 | 125 | 129 | 125 | 127 | 121 | 144 | 132 | 102 | 88 | 83 | 76 |  |  |  |
| 2001 | 138 | | 115 | 115 | 102 | 105 | 104 | 114 | 111 | 127 | 129 | 109 | 103 | 101 | 99 | 95 |  |  |
| 2002 | 144 | | 122 | 121 | 104 | 102 | 101 | 113 | 113 | 125 | 128 | 113 | 106 | 116 | 115 | 109 | 106 |  |
| 2003 | 142 | | 122 | 111 | 103 | 101 | 101 | 112 | 111 | 124 | 121 | 108 | 104 | 112 | 113 | 114 | 114 | 112 |

**Remarks:** Forecast , Value replaced, based on AM (1993-1996) stock numbers in age group 8+ for 1997.