4 English summary of the State of Marine Stocks in Icelandic Waters 2014/2015 and Prospects for the Quota Year 2015/2016

2.1 Cod

Total landings of Atlantic cod (*Gadus morhua*) in 2014 were 221 thousand t, compared to 223 thousand t in 2013. The total allowable catch (TAC) for cod in the quota year 2014/2015 was set according to the harvest control rule (HCR) at 218 thousand t.

Biomass indices in the spring survey have more than doubled in the last seven years, mostly due to increased abundance of older cod. Mean weights at age in the landings and spring survey have increased in recent years and are presently around the long-term average.

The reference biomass (age 4 and older) in 2015 is estimated 1302 thousand t and the spawning stock is estimated at 547 thousand t, compared to $B_{lim} = 125$ and $B_{trigger} = 220$ thousand t. The reference biomass has increased in recent years and is now larger than observed in the last three decades. The spawning stock has not been larger since the early 1960s. During the last decade, the harvest rate has declined from 34–40% to around 20% and the fishing mortality from above 0.7 in 2000 to 0.3 in 2014. Recruitment during this period has been around two thirds of the long-term average. The decrease in harvest rate, imposed by management action, has hence been the main reason for the increase in stock size.

Based on the present assessment, the TAC in 2015/2016 should be set at 239 thousand t according to the management plan. It is expected that catches in the next few years will remain around that level. The Marine Research Institute (MRI) iterates the importance that catches are constrained within that specified in the HCR.

2.2 Haddock

In 2014, 34 000 t of haddock (*Melanogrammus aeglefinus*) were landed, compared to 44 000 t in 2013. The national TAC in the quota year 2014/2015 was set according to the harvest control rule (HCR) at 30 400 t. According to the HCR, the TAC for the next quota year is 40% of the predicted reference biomass (45 cm and larger) in the beginning of the next calendar year.

The spawning stock biomass 2015 is estimated at 78 000 t and the biomass of age 3 and older haddock at 112 000 t. The harvest rate in 2014 was 35%. Year classes 2008–2013 are estimated to be small, or 28 million age 2 individuals on average (about 24 000 t), but the 2014 year class is estimated to be large. Growth was poor in 2004–2009 but has increased since then. Growth in 2014 is estimated above average and faster than predicted last year. Mean weight at age in March 2015 is close to or above the average since 1985 for all age groups.

Based on the present assessment, the TAC for the quota year 2015/2016 according to HCR is 36 400 t.

2.3 Saithe

In 2014, landings of saithe (*Pollachius virens*) were 46 000 t, compared to 58 000 t in 2013. The TAC for the quota year 2014/2015 was set according to the harvest control rule (HCR) at 58 000 t.

The catch weights have have decreased for ages 4–6 in recent years but are close to average for other ages. Biomass indices from the spring trawl survey were high in 2012–2013 but lower in 2014–2015. The reference biomass of age 4 and older is estimated as 255 000 t at the beginning of 2014, with a harvest rate of 18% in 2014. The 2008 and 2009 year classes are large but recruitment has been lower since then. Short-term projections based on the HCR indicate that the reference biomass at the beginning of 2016 will be around 238 000 t.

According to the HCR, the saithe TAC for the quota year 2015/2016 will be 55 000 t.

2.4 Golden redfish

In 2014, approximately 51 000 t of golden redfish (*Sebastes norvegicus*) were landed from the East-Greenland, Iceland and Faroese waters, about 2 500 t less than in 2013, and of which about 48 000 t were caught in Icelandic waters.

According to an age-length based model (Gadget) the spawning stock has increased since 2005 after a considerable reduction in 1985–1995. Fishing mortality has decreased in recent years and is now close to $F_{MSY,9–19} = 0.097$. There are indications from surveys conducted in Icelandic and East-Greenland waters that recruitment in recent years has been poor.

In 2014, the Icelandic government adopted a formal management plan for the golden redfish fishery in East-Greenland/Iceland/Faroes area. ICES has evaluated this management plan but Greenland and the Faroes have not yet adopted it. The management plan is based on a HCR of $F_{MSY,9–19} = 0.097$, reducing linearly if the spawning stock is estimated below 220 000 t ($B_{trigger}$). According to the HCR, the golden redfish TAC for the quota year 2015/2016 will be 51 000 t for the East-Greenland/Iceland/Faroes area.

2.5 Beaked redfish

Beaked redfish (*Sebastes mentella*) are managed as three separate stocks: Icelandic demersal deep sea redfish, shallow pelagic redfish, and deep pelagic redfish.

In 2014, about 9 500 t of Icelandic **demersal deep sea redfish** were landed, about 700 t more than in 2013. The lack of long-term indices of abundance prevent analytical assessment, but survey indices from the autumn survey since 2000 are used as basis for the advice. The index of fishable biomass decreased in 2000–2014. ICES and MRI recommend that effort should be kept low and the TAC in Icelandic waters should not exceed 10 000 t for the quota year 2015/2016.

In 2014, about 6 400 t of **shallow pelagic redfish** were caught, mainly by Russia on the main fishing grounds south and southeast of Greenland. Annual landings peaked at about 100 000 t in 1993–1995. Given the poor state of the stock, ICES has advised since 2010 that no directed fishery should take place.

In 2014, the estimated landings of **deep pelagic redfish** were about 24 000 t, compared to 43 000 t in 2011 and 75 000–140 000 t in 1995–2004. The Icelandic fleet caught about 2 000 t in 2014, compared to 8 500 t in 2014 which is the lowest catch since the beginning of the fishery in 1992.

ICES will give advice on the pelagic redfish stocks for 2016 in autumn 2015, and will base the advice on the results from the international acoustic/trawl survey conducted in the Irminger Sea and adjacent waters in June–July 2015.

2.6 Norway redfish

A directed fishery for Norway redfish (*Sebastes viviparus*) started in 1997 with a catch of 1 200 t. The catches declined rapidly until 2000, and between 2001 and 2009 only a few tonnes were landed. In 2010, a directed fishery started again with total landings of 2 600 t, followed by 1 400 t in 2011 and annual landings of about 500 t in 2012–2014. Little is known about the stock size and sustainable yield. Therefore, MRI recommends that the precautionary approach is adopted in the management of Norway redfish fishery and recommends a TAC of no more than 1 500 t for the quota year 2015/2016.

2.7 Greenland halibut

In 2014, approximately 21 000 t of Greenland halibut (*Reinhardtius hippoglossoides*) were landed from the East Greenland, Iceland, and Faroese waters, of which the Icelandic fleet caught 10 000 t. CPUE of the Icelandic trawler fleet has been slowly increasing from a historical low in 2005. Biomass indices from combined surveys in Icelandic and Greenlandic waters have been increasing in recent years and are close to the high levels observed in 1998–2001. ICES and MRI recommend that effort should be reduced to a level corresponding to the long-term maximum sustainable yield. Such effort corresponds to a total catch of no more than 22 000 t for the East Greenland, Icelandic and Faroese waters in the 2015/2016 quota year.

2.8 Halibut

In 2012, a regulation was issued to ban all directed fishery for halibut (*Hippoglossus hippoglossus*) and that all viable halibut must be released in other fisheries. The landings of halibut dropped to 36–45 t in 2012–2014, compared to 555 t in 2011. Historically, halibut has mainly been taken as bycatch in the bottom trawl and longline fisheries. In the last years before the regulations, a longline fishery directed at halibut was developing, coinciding with a sharp decline in the survey biomass index. In recent years, the biomass indices from the groundfish survey have declined to a very low level. Currently, the halibut stock seems to be severely depleted, with very little recruitment into the spawning stock in recent years.

MRI recommends that these regulations should be maintained until clear indications of improvement in the stock are evident.

2.9 Plaice

In 2014, about 6 000 t of plaice (*Pleuronectes platessa*) were landed. Survey biomass indices have been stable and increased somewhat in recent years. Stock assessment indicates a decrease in fishing mortality since 1996 and an increase in biomass since 2000. MRI recommends that the catch should not exceed 6 500 t in the quota year 2015/2016, and that regulations regarding area closures on spawning grounds remain in effect.

2.10 Dab

In 2014, 505 t of dab (*Limanda limanda*) were landed. Between 1987 and 1997, landings of dab increased from 1 200 to 8 000 t, but have since decreased substantially. Survey indices of fishable biomass and juvenile abundance declined considerably in 2015. MRI recommends a TAC no higher than 500 t in the defined management area for the quota year 2015/2016.

2.11 Long rough dab

In 2014, only 70 t of long rough dab (*Hippoglossoides platessoides*) were landed, compared to the record high of 6 400 t in 1996. Survey indices and CPUE have been near a historical low in recent years. MRI does not recommend a TAC for the quota year 2015/2016. However, MRI recommends closure of main spawning areas during the spawning season.

2.12 Witch

Since 1988, landings of witch (*Glyptocephalus cynoglossus*) have ranged between 900 and 3 000 t, with landings in 2014 amounting to about 1 200 t. The abundance index for the fishable stock reached a maximum in 2005, declined in 2005–2008 but has since been stable. CPUE shows a similar trend, although it has increased since 2012 concurrent to a decrease in fishing effort. Survey data indicate a considerable decline in recruitment in recent years. MRI recommends a TAC of no more than 1 100 t for the quota year 2015/2016.

2.13 Lemon sole

In 2014, about 1 200 t of lemon sole (*Microstomus kitt*) were landed. Survey indices of the fishable stock were high in 2003–2010, but have decreased in 2011 to 2015. Recruitment indices have been high since the early 2000s. CPUE in the demersal seine fishery off Southwest Iceland has doubled from the period 1993–1998 to the present. Preliminary stock assessment indicates a high fishing mortality rate. MRI recommends a TAC of no more than 1 300 t for the quota year 2015/2016.

2.14 Megrim

Megrim (*Lepidorhombus whiffiagonis*) is caught as bycatch in the demersal seine and *Nephrops* fisheries off South Iceland. In 2014, 340 t of megrim were landed. MRI does not recommend a TAC for the quota year 2015/2016.

2.15 Atlantic wolffish

Landings of Atlantic wolffish (*Anarhichas lupus*) in 2014 were about 7 300 t, the lowest landings since before 1950. The index of fishable biomass is above average but recruitment indices are at historically low levels. The fishable part of the stock has been decreasing since 2006 and is not expected to increase much in the coming years, since recruitment to the fishable stock will be low. MRI recommends a TAC of no more than 8 200 t for the quota year 2015/2016, based on $F_{max} = 0.29$. In addition, MRI recommends a continued closure of the major spawning area off West Iceland during the spawning and incubation season in autumn and winter.

2.16 Spotted wolffish

Landings of spotted wolffish (*Anarhichas minor*) in 2014 were about 1 900 t. The average annual landings were about 900 t in 1982–1997, but have increased to 2 300 t since 1997. Survey indices of recruitment, total biomass and fishable biomass are all at a historical low, while the harvest rate is about three times higher than in 1985–1997. The basis of the MRI advice is to reduce the harvest rate to half of what it was in 2000–2013. MRI recommends that the TAC for the quota year 2015/2016 should not exceed 900 t.

2.17 Blue ling

In 2014, about 1 700 t of blue ling (*Molva dypterygia*) were landed. Indices from the autumn survey indicated an increase in biomass and recruitment between 2005 and 2010, but indices from 2012 indicate a decrease in stock size which is projected to continue due to very low levels of the juvenile index since 2010. MRI recommends that landings be constrained to no more than 2 550 t in the quota year 2015/2016. The basis of the advice is to bring the exploitation level down to similar levels as observed in 2002–2009 when the stock size was increasing. Furthermore, a continued closure of known spawning grounds from 15 February to 30 April should be maintained.

2.18 Ling

Landings of ling (*Molva molva*) in 2014 were 14 000 t, having increased steadily since 2001. Survey indices of harvestable biomass have remained high since 2007, however the juvenile index has been at low levels for the last three years. Estimates from an analytical stock assessment indicate that SSB has increased in recent years and at the same time fishing mortality has decreased and was at F_{MSY} in 2014. SSB and catches are projected to decline in coming years due to the low estimates of recent recruitment. MRI and ICES recommend

a TAC of no more than 16 200 t on the basis of F_{MSY} in the quota year 2015/2016, including catches of foreign fleets which have been about 1 500 t in recent years.

2.19 Tusk

Landings of tusk (*Brosme brosme*) from Icelandic waters were 6 000 t in 2014. Indices of the fishable biomass in the spring survey increased considerably in 2001–2012, but have varied at high level in the last three years. Recruitment indices peaked in 2006, decreased until 2013, but there are signs that recruitment is again increasing. The tusk stock assessment is based on the Gadget model as recommended by ICES.

MRI recommends that the catches be no more than 3 440 t in the quota year 2015/2016, including catches of foreign fleets. This advice is based on $F_{MSY} = 0.20$. It is furthermore recommended that the closure of nursery areas off the southeast and south coast is continued.

2.20 Whiting

In 2014, about 900 t of whiting (*Merlangius merlangus*) were landed. The landings have declined over the last three years. Whiting was mostly a bycatch in the Icelandic bottom trawl fishery, but a directed fishery has developed on the spawning grounds off the south coast in spring. Survey indices of the fishable stock were high in 2004–2005, due to good recruitment, but have declined since then. Recruitment indices were above average in 2008 and 2015, but very low in the years between. MRI does not recommend a TAC for whiting for the quota year 2015/2016. However, low indices of the fishable stock indicate that the stock has declined in recent years.

2.21 Anglerfish

In 2014, about 1 200 t of anglerfish (*Lophius piscatorius*) were landed from Icelandic waters. The catches have been declining since 2009 when they reached a maximum of 4 100 t. Recent surveys and CPUE indicate a relatively large fishable stock, due to very good recruitment in 1998–2007. However, survey indices since 2012 have shown poor recruitment for year classes 2008–2014. Due to the decreasing recruitment, the fishable stock is expected to decline in the coming years. MRI recommends that that the catches be no more than 1 000 t in the quota year 2015/2016.

2.22 Lumpfish

In 2014, about 4 000 t of female lumpfish (*Cyclopterus lumpus*) were landed in Iceland, which is 1 500 t below the average landings of the period 1971–2014. Effort and number of licenses have decreased in recent years. After several years of decline, the biomass index has increased over the past two years.

The basis of the MRI advice is to keep F_{proxy} at or below the average from the reference period (1985–2011). The advice is given in two stages: In this report an initial advice is based on the 2015 survey biomass index, but the final advice will be given after the survey in 2016, based on the 2015 and 2016 survey biomass indices.

MRI recommends an initial TAC of 2 040 t for the 2015/2016 quota year. MRI also recommends improved monitoring of bycatch and discards of other species from the female lumpfish fishery.

2.23 Herring

Landings of **Icelandic summer-spawning herring** (*Clupea harengus*) during the fishing season 2014/2015 amounted to 95 000 t but the TAC was set at 83 000 t. The difference is because of transfer of quota between years. The main part of the stock overwintered in offshore areas west of Iceland instead of inshore areas in Breiðafjörður as it did for the seven preceding years. The spawning stock biomass is estimated 342 000 t in the year 2015, significantly lower than in the 2014 assessment. A very small 2011 year class entering the spawning stock is the main reason for the decline in SSB. MRI recommends a TAC of 71 000 t for 2015/2016 based on $F_{0.1} = 0.22$.

In 2014, around 59 000 t of **Norwegian spring-spawning herring** were landed by Icelandic vessels, with estimated total international landings of 437 000 t. This corresponds to 18 000 t more than the recommended TAC set by ICES. As the spawning stock biomass in 2015 is estimated to be below B_{pa}, the fishing mortality rate shall be reduced. Therefore, ICES has recommended a TAC of 283 000 t for 2015, corresponding to $F = 0.08$. Iceland has issued a quota of 41 000 t in 2015, based on an international agreement reached in 2007. It is expected that the catches will exceed the advised TAC, as in the two last years, due to lack of agreement among the coastal states on the allocation of the quota. ICES will recommend a TAC for 2016 in autumn 2015.

2.24 Capelin

The TAC of capelin (*Mallotus villosus*) for the fishing season 2014/2015 was 580 000 t. The total landings were 517 000 t, of which Icelandic vessels landed 354 000 t. The fishing season 2015/2016 will be based on the year classes from 2012 and 2013. The indices of immature capelin in the 2014 autumn survey were close to the long-term average of 60 billion fish. Based on these results, ICES and MRI advice according to a recently adopted HCR that an initial quota of 54 000 t be set for the season 2015/2016. This advice will be revised after autumn/winter surveys in 2015/2016. Further, MRI advises that summer/autumn fishery should not open until October.

2.25 Blue whiting

International landings of blue whiting (*Micromesistius poutassou*) in the Northeast Atlantic in 2014 are estimated at around 1.2 million t, of which Icelandic landings were around 183 thousand t. Due to poor recruitment of the year classes 2005–2008, the spawning stock declined to about 2.9 million t in 2010. Since then, recruitment has been close to the long-term average, which in combination with low fishing mortalities has led to an increase in the spawning stock biomass, to about 5.7 million t in 2015. ICES recommended a catch quota not exceeding 840 thousand t in 2015 but the coastal states agreed on a TAC of 1 260 thousand t. ICES will release its advice for 2016 in October 2015.

2.26 Mackerel

International landings of mackerel (*Scomber scombrus*) in the Northeast Atlantic in 2014 are estimated at 1.4 million t. Since the mid 2000s mackerel has been observed in the Icelandic EEZ in increasing numbers and a directed fishery started in 2007. In 2014 the Icelandic landings were 173 000 t. According to the stock assessment from September 2014, the spawning stock was around 2 million t during 1994–2003 but increased thereafter and was around 4.3 million t in 2014. ICES recommends a catch quota of 906 000 t in 2015 and will assess the stock in autumn 2015 and release its advice for 2016 in October.

2.27 Pearlside

Experimental pelagic trawl fishery for pearlside (*Maurolicus muelleri*) started in 2008 and the landings peaked in 2009 at around 46 000 t. Since then, landings have decreased and no landings were reported in 2013 or 2014. Little is known about the biology and stock size of pearlside. MRI recommends that the catch should not exceed 30 000 t in the quota year 2015/2016.

2.28 Greater silver smelt

In 2014, about 6 300 t of greater silver smelt (*Argentina silus*) were landed, compared to the historical maximum of 16 400 t in 2010. The fishable biomass index increased in 2014, however this change is unlikely to be driven by changes in biomass. The stock is assessed with limited data and must therefore be harvested with caution. MRI recommends a TAC of 8 000 t for the quota year 2015/2016.

2.29 Nephrops

In 2014, a total of 1 965 t of *Nephrops norvegicus* were landed, compared to 1 724 t in 2013. The survey biomass index has decreased since 2008 and reached its lowest value in 2015. According to the current assessment, the fishable stock biomass (age 6 and older) in 2015 is 10 700 t. The stock biomass increased in 1997–2007, as a result of large year classes and a sustainable F_{opt} management strategy. Recent year classes have been measured historically small and the fishable stock has decreased sharply. However, the stock of large *Nephrops* (age 10 and older) is still above the long-term average. MRI recommends a TAC of no more than 1 500 t in the quota year 2015/2016.

2.30 Northern shrimp

In the quota year 2014/2015, the fishery for **inshore** northern shrimp (*Pandalus borealis*) was open in Arnarfjörður and Ísafjarðardjúp, and in the Snæfellsnes and Eldey areas. MRI recommends a TAC of 700 t for the Snæfellsnes area in the period 1 May 2015 to 15 March 2016, and 200 t for the Eldey area in 2015. MRI will recommend TACs for other inshore areas on the basis of stock assessment surveys in autumn 2015.

In 2014, the **offshore** catch of northern shrimp was 4 000 t, compared to the highest level of 65 000 t in 1997. MRI recommends a TAC of 4 000 t for offshore northern shrimp (excluding the Dohrn Bank area) for the quota year 2015/2016.

2.31 Iceland scallop

The Iceland scallop (*Chlamys islandica*) fishery remained closed during the 2014/2015 fishing season. Survey indices declined drastically in 2001–2006 to a historical minimum. The downward trend in stock abundance was mainly due to increased natural mortality, probably caused by protozoan infestation in

adult scallops. Recruitment has been poor but year classes from 2010 and especially 2012 are emerging. MRI therefore recommends a continued closure of the conventional scallop fishery in the quota year 2015/2016.

2.32 Ocean quahog

In 2014, only 18 t of ocean quahog (*Arctica islandica*) were landed, compared to the maximum of 14 400 t in 2003. Since 1987 a fishery for human consumption has been developing, but annual landings have been variable due to variable effort related to the market. MRI recommends a harvest rate of 2.5% of the estimated stock size corresponding to no more than 32 500 t in the quota year 2015/2016.

2.33 Common whelk

Pot fishing for common whelk (*Buccinum undatum*) started in Breiðafjörður in 1996. In 2014, the total catch amounted to 93 t compared to 89 t in 2013. According to a survey conducted in 2012, 15 years of fishing has had a negligible effect on the abundance index. MRI recommends a TAC not exceeding 750 t in Breiðafjörður in the quota year 2015/2016.

2.34 Sea cucumber

In 2014, about 850 t of sea cucumber (*Cucumaria frondosa*) were landed. Since 2003, the fishery has been developing, but annual landings were minimal until 2008. A maximum of nine fishing licenses are issued in this fishery, three within each of the three defined areas off Iceland. MRI recommends a harvest rate of 10% of the estimated stock size in each surveyed subarea.

2.35 Sea urchin

In 2014, 231 t of sea urchin (*Strongylocentrotus droebachiensis*) were landed. Harvesting of sea urchin started in 1993 and total landings reached a maximum of 1 500 t in 1994, but declined rapidly and were negligible in 1997–2006. Since 2007 the catches have been between 125 and 231 t. Areas with good quality sea urchins are limited in size, which requires a precautionary management approach.

2.36 Whales

In 2006, Iceland resumed commercial whaling on fin whales (*Balaenoptera physalus*) and common minke whales (*Balaenoptera acutorostrata*). In 2014, 24 common minke whales and 137 fin whales were caught in Icelandic waters.

According to stock assessments conducted by the Scientific Committees of IWC and NAMMCO, the size of the **common minke whale** stock around Iceland (the Central North Atlantic stock) is estimated to be close to what it was when commercial whaling commenced. Based on IWC and NAMMCO assessments, MRI has in recent years recommended that annual catches of common minke whales from the Central North Atlantic stock do not exceed 229 animals in the Icelandic continental shelf area (CIC). A formal assessment of the minke stocks is in progress within IWC and NAMMCO. MRI will advise on 2016 hunting after a NAMMCO assessment in autumn 2015.

Results from a **fin whale** sightings survey in 2007 indicate a total population size of 20 600 animals in the East Greenland/Iceland/Jan Mayen area (EGI), which is similar to the 1995 and 2001 surveys. On the basis of recent assessments conducted by the Scientific Committees of the IWC and NAMMCO, the MRI has in recent years evaluated annual catches of up to 154 fin whales on the traditional grounds west of Iceland as sustainable and precautionary. MRI will advice on 2016 hunting after a NAMMCO assessment of the status of fin whale population in the North Atlantic.

2.37 Seals

According to a survey conducted in 2011, the **harbour seal** (*Phoca vitulina*) stock was around 11 000 animals. The stock was estimated as 34 000 seals in 1980 and has remained stable since 2003. However, a partial survey in 2014 indicates a considerable reduction in numbers. The adopted management plan is to maintain the harbour seal population at around 12 000 animals.

A **grey seal** (*Halichoerus grypus*) survey was conducted in 2012, where 4 200 animals were estimated along the Icelandic coast. The stock was estimated as 12 000 animals in 1990. The adopted management plan is to maintain the grey seal population at around 4 100 animals.

Seal catch data for the last few years are incomplete and it is important to improve the monitoring and collection of catch data, as a basis to evaluate the current mortality rate and population status.