

ECOREGION **Barents Sea and Norwegian Sea**
STOCK **Cod in Subareas I and II (Norwegian coastal waters cod)**

Advice for 2012

ICES advises on the basis of the Norwegian rebuilding plan: If the spawning stock index in the 2011 autumn survey (results available in early December) is lower than the index in 2010, the fisheries regulations should aim at a reduction of F in 2012 of at least 30% relative to 2009. If the survey index is higher than in 2010, the measures taken in 2011 should continue in 2012.

Stock status

F (Fishing Mortality)	
	2008-2010
MSY (F_{MSY})	Unknown
Precautionary approach (F_{pa}, F_{lim})	Unknown
Qualitative evaluation	Variable without trend
SSB (Spawning Stock Biomass)	
	2009-2011
MSY ($B_{trigger}$)	Unknown
Precautionary approach (B_{pa}, B_{lim})	Unknown
Qualitative evaluation	At its lowest

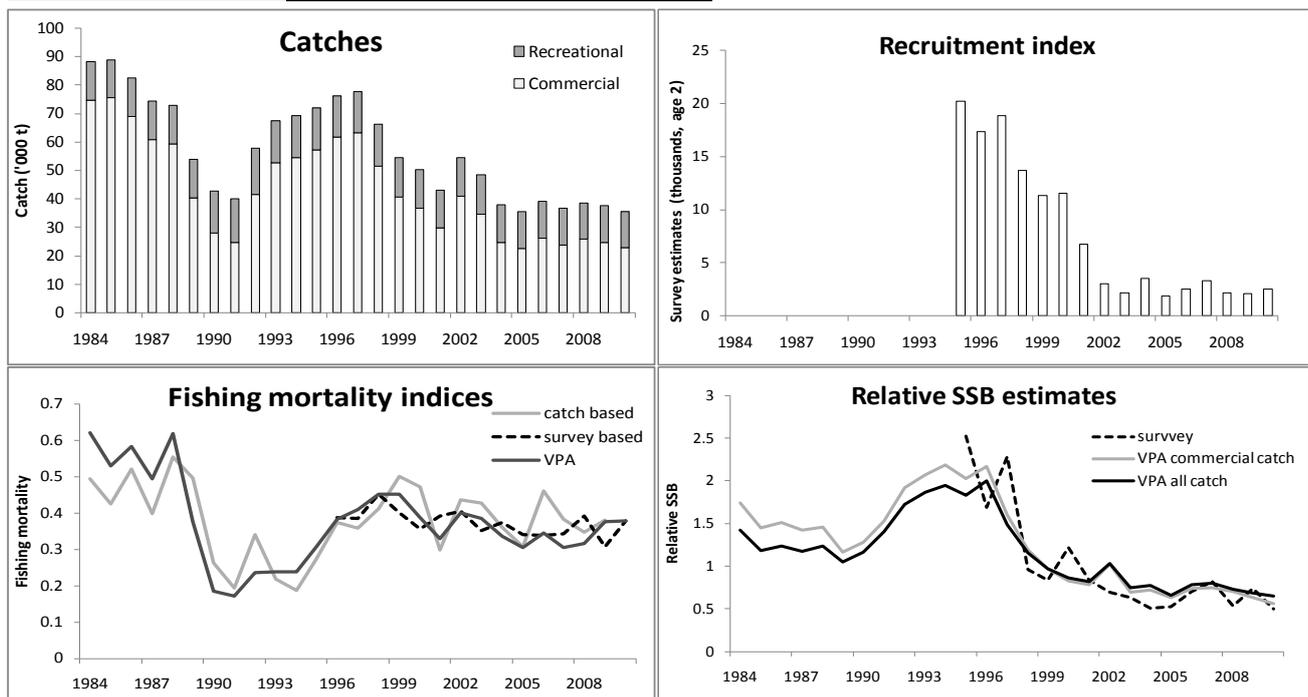


Figure 3.4.2.1 Cod in Subareas I and II (Norwegian coastal waters cod). Landings, recruitment, fishing mortality estimates (from various sources), and relative SSB estimates (1 = average 1995–2005).

This is a trends-based assessment. The survey indicates that the SSB is at its lowest. Recruitment has remained low since 2002. F appears variable without a clear trend since 2000.

Management plans

A rebuilding plan as agreed by the Norwegian authorities (Annex 3.4.2) was evaluated by ICES in 2010 (ICES, 2010). ICES considers the proposed plan to be provisionally consistent with the precautionary approach.

Biology

Genetic studies indicate that the cod in some fjords could be separate stocks. An assessment of the combined stocks is not likely to detect fluctuations of the smaller components, and thereby the current assessment approach involves some risk to local stocks. The stock complex is still not fully mapped, but the existence of local stocks also calls for special attention to protect genetic diversity and smaller components.

The geographical distribution of coastal cod and Northeast Arctic cod overlap, particularly in the first half of the year, when the Northeast Arctic cod migrates to the Norwegian coast to spawn. Also, immature Northeast Arctic cod migrate to the Norwegian coast to feed on spawning capelin.

The fisheries

Catch by fleet	Commercial landings (2010) = 22.9 kt (51% gillnets, 22% Danish seine, 25%, longline/handline, 3% bottom trawl). Unreported catches in recreational fishing are estimated at 12.7 kt.
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Quality considerations

Estimated catches in the recreational fishery represents about 35% of the total catch in recent years. However, these are not monitored on an annual basis and these estimates are considered to be uncertain. Sampling of commercial catches was reduced in 2010, leading to additional uncertainty.

Scientific basis

Assessment type	Based on survey trends.
Input data	Catch-at-age and an acoustic survey (coastal survey) (NOcoast-Aco-4Q).
Discards and bycatch	Estimate of recreational catches available.
Indicators	F from VPA initiated with terminal F from regression with survey Z.
Other information	None.
Working group report	AFWG

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Reference points

No reference points have been defined for this stock.

Outlook for 2012

A trends-based assessment is provided for this stock. No fishing possibilities can be projected on this basis.

Rebuilding plan

The rebuilding plan (Annex 3.4.2) was put into operation in 2011. The spawning biomass index in the 2010 survey was below the index in the 2009 survey. This means that the regulation in 2011 aims for a 15% reduction of F relative to 2009.

The rebuilding plan specifies that if the spawning stock index in the 2011 autumn survey is lower than the index in 2010, the fisheries regulations should aim at a reduction of F in 2012 of at least 30% relative to 2009. If the survey index is above the 2010 index, the regulations should ensure that F in 2012 is at least 15% below the 2009 value. The assessed trend for the stock is slowly declining. Therefore a 30% reduction in F will imply a reduction of catches in 2012 of at least 30% compared to the 2009 catch.

ICES has evaluated the plan and considers it to be provisionally consistent with the precautionary approach (ICES, 2010) but it has not been evaluated against the MSY framework. The basis of this evaluation is the precautionary approach, and not the new ICES MSY framework. However, it is anticipated that ongoing work will provide a basis for revisiting the consistency of the proposed plan with the ICES MSY framework in the next year or two. ICES notes that there is no basis at present for deriving absolute estimates of F_{MSY} . However, it is likely that the current F is above any candidate values of F_{MSY} and the plan therefore represents a step towards MSY.

MSY approach

The survey indicates that the SSB is at its lowest while F appears variable without clear trend since 2000. Therefore, catches should be reduced at a rate greater than the rate of stock decrease.

PA approach

Given the SSB and recruitment are at their historical minima for this stock, no catches should be taken in 2012.

Additional considerations

Management considerations

The SSB and recruitment are at historical minima. Continued exploitation at current fishing mortality could lead to a further decrease in the SSB.

In order to minimize catches of the Norwegian coastal cod, strong restrictions should apply to all fisheries catching cod where coastal cod mixes with Northeast Arctic cod. The Norwegian–Russian TAC system for cod (Northeast Arctic and coastal) does not in practice restrict the overall catches of coastal cod. From the mid-1970s to 2003 an expected catch of 40 000 t from the coastal cod was added annually to the quota for Northeast Arctic cod. Since 2004, the additional catches expected from this stock has been set around 20 000 t.

The implementation of the rebuilding plan will require measures to further reduce the effective fishing effort in all fisheries where coastal cod are caught, including recreational fisheries. The regulations introduced over the period 2004–2009 seem not to have affected the F compared to the preceding years. Stronger measures are required to obtain the F-reductions specified in the rebuilding plan.

Regulations and their effects

Landings of cod are counted against the overall cod TAC for Norway, where the expected catch of coastal cod is in the order of 10%. Catches of coastal cod are thereby not effectively restricted by quotas. The fishery is regulated by the same minimum size, the same minimum mesh size on fishing gears as for Northeast Arctic cod, maximum bycatch of undersized fish, closure of areas having high densities of juveniles, and by seasonal and area restrictions. In addition to the mixed fishery with Northeast Arctic cod, coastal cod is also caught as bycatch in the saithe fishery.

A number of regulations are aimed at the protection of coastal cod: Trawl fishing for cod is not allowed inside the 6-nautical mile line except for about 10 fresh fish trawlers which in a few areas had a dispensation until autumn 2010 to fish between the 4- and 6-mile line in the period 15 April–15 September. Since the mid-1990s the fjords in Finnmark and northern Troms (areas 03 and 04) have been closed for fishing with Danish seine. Since 2000, the large longliners have been restricted to fishing outside the 4-nautical mile line. To achieve a reduction in landings of coastal cod additional technical regulations in coastal areas were introduced in May 2004 (after the main fishing season) and continued with small modifications in 2005 and 2006. In the new regulations “fjord lines” are drawn to close the fjords for direct cod fishing with vessels larger than 15 meters. A box closed to all fishing gears except handline and fishing rod is defined in the Henningsvær–Svolvær area. This is an area where spawning concentrations of coastal cod is usually observed and where the catches of coastal cod has been high. Since the coastal cod is fished under a merged coastal cod/Northeast Arctic cod quota, the main objective of these regulations is to move the traditional coastal fishery from areas with high fractions of coastal cod to areas where the proportion of Northeast Arctic cod is higher.

Further restrictions were introduced in 2007 by not allowing pelagic gillnet fishing for cod and by reducing the allowed bycatch of cod when fishing for other species inside fjord lines from 25% to 5%, and outside fjord lines from 25% to 20%. The regulations were maintained in 2008. In addition, since 2009 the most important spawning area in the southern part of the stock distribution area (Borgundfjorden near Ålesund) has been closed to fishing (except for handline and fishing rod) during the spawning season.

The 2010 landings were estimated to be 23 000 t, i.e. above the expected catch (21 000 t) set at the quota agreement. The regulations have not reduced catches, and current catches are considered to be too high.

In 2011 no dispensations were given for fresh fish trawlers to fish inside 6 nautical miles. In the recreational fishery the allowance for selling cod is reduced from 2000 kg to 1000 kg per person per year. The maximum gill net length per person in the recreational fishery is reduced from 210 m to 165 m. Minimum size now also applies to recreational and tourist fishing. For cod this is set to 44 cm in the area north of 62°N. In 2010 and 2011 10 000 t of the Norwegian cod quota was set aside to cover the catches taken in the recreational and tourist fisheries and to cover catches taken by young fishers (to motivate young people to become fishers).

Information from the fishing industry

Since 2005, a reference fleet of coastal vessels, mainly gillnetters, provide regular sampling data for length, age, and stock separation. These data are used to estimate catch-at-age for the corresponding fleets. In addition, when fishing between the 4- and 6-mile lines the freshfish trawlers provide otoliths for stock separation.

Uncertainties in assessment and forecast

Estimated catches in the recreational fishery have been added to the commercial catch. These represent about 35% of the total catch in recent years. These estimates of additional catches are considered to be uncertain. Changes in the landings sampling programme has lead to increased uncertainty in the estimated quantity and age composition of commercial catches of coastal cod in 2010.

The catches and survey indices are estimated by distinguishing between coastal cod and Northeast Arctic cod through the inspection of the otoliths. The precision and accuracy of the method has been investigated by comparison of different otolith readers and results from genetic investigation. The results indicate high accuracy when using the otolith method, but the adequacy of sampling has not been investigated.

Comparison with previous assessment and advice

The stock situation is similar to last year. Recent advice has been zero catch on the basis of precautionary considerations. This year the advice is based on the rebuilding plan, which provisionally is considered to be in accordance with the precautionary approach.

Sources

ICES. 2010. Report of the ICES Advisory Committee, 2010. ICES Advice, 2010. Book 3, section 3.3.3.1, pp. 3–5.
ICES. 2011. Report of the Arctic Fisheries Working Group, 28 April–4 May 2011. ICES CM 2011/ACOM:05.

Table 3.4.2.1 Cod in Subareas I and II (Norwegian coastal waters cod). ICES advice, management, and landings.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC ¹	Official landings ³	ICES landings ²
1987	Not assessed		40		61
1988	Not assessed		40		59
1989	No advice		40		40
1990	No advice		40		28
1991	Included in TAC for Subareas I and II		40		25
1992	Shot forecast included in TAC for I and II		40		42
1993	Shot forecast included in TAC for I and II		40		53
1994	No advice		40		55
1995	No advice		40		57
1996	No advice		40		62
1997	No advice		40		63
1998	No advice		40		52
1999	No advice		40		41
2000	No advice		40		37
2001	Reduce F considerably	22	40		30
2002	catches should be reduced by the same proportion as for Northeast Arctic cod	13	40		41
2003	Reduce F considerably	8	40		35
2004	A recovery plan	0	20		24
2005	A recovery plan	0	21		22
2006	A recovery plan	0	21		26
2007	A recovery plan	0	21		23
2008	A recovery plan	0	21		26
2009	Zero catch and a recovery plan	0	21		25
2010	Zero catch and a recovery plan	0	21		23
2011	Same advice as last year	0	21 ⁴		
2012	Rebuilding plan, action dependent on autumn survey	-			

Weights in '000 t.

¹40 000 tonnes has until 2003 been added annually to the agreed TAC of Northeast Arctic cod; 20 000 t were added in 2004 and 21 000 t in 2005–2011.

²Estimated according to otolith type, does not include estimated recreational catches.

³No official landings.

⁴Additional regulations were introduced to meet the objectives of the recovery plan, while the 21 000 t were still included in the combined TAC for coastal cod and NEA cod.

Annex 3.4.2 Rebuilding Plan

The rebuilding plan (as communicated to ICES by the Norwegian Ministry of Fisheries and Coastal Affairs) is as follows:

“The overarching aim is to rebuild the stock complex to full reproductive capacity, as well as to give sufficient protection to local stock components. Until a biologically founded rebuilding target is defined, the stock complex will only be regarded as restored when the survey index of spawning stock in two successive years is observed to be above 60 000 tons¹. Importantly, this rebuilding target will be redefined on the basis of relevant scientific information. Such information could, for instance, include a reliable stock assessment, as well as an estimate of the spawning stock corresponding to full reproductive capacity.

Given that the survey index for SSB does not increase, the regulations will aim to reduce F^2 by at least 15 per cent annually compared to the F estimated for 2009. If, however, the latest survey index of SSB is higher than the preceding one – or if the estimated F for the latest catch year is less than 0.1 – the regulations will be unchanged.

Special regulatory measures for local stock components will be viewed in the context of scientific advice. A system with stricter regulations inside fjords than outside fjords is currently in operation, and this particular system is likely to be continued in the future.

The management regime employed is aiming for improved ecosystem monitoring in order to understand and possibly enhance the survival of coastal cod. Potential predators are – among others – cormorants, seals and saithe.

When the rebuilding target is reached, a thorough management plan is essential. In this regard, the aim will be to keep full reproductive capacity and high long-term yield.”

¹The average survey index in the years 1995–1998.

² Ages 4–7.