8.4.2 EU request on recreational cod data needs for monitoring the recreational fisheries

Advice summary

ICES advises on the data needs for the monitoring of recreational cod fisheries. The most important recommendations are:

• recreational catches should be included in the stock assessment if there are indications that they are substantial;

• the sampling design should provide for separate methods to collect effort data using a list frame or a random telephone/mail survey, and catch per unit effort data using an access point survey;

• catch data should be collected for all segments of the recreational fishery (e.g. shore, private boat, and charter boat fishing), at a temporal and spatial resolution matching the variability of the data and the stock assessment needs;

• the sampling programme should be able to collect landings and discard/release data, including catch composition (size, weight).

ICES offers more detail on statistically sound sampling of recreational fisheries, but considers that such surveys would have to be carefully adapted to the specifics of the sampled recreational fishery.

Request

ICES is requested *to identify data gaps on recreational fisheries of cod in the Baltic sea region and provide advice on how best to fill these gaps in order to arrive at sound estimates of recreational fishing mortality. This advice should be delivered by 1 June 2016 at the latest and address the following questions in detail:*

1. Which data on recreational cod fishing in the Baltic Sea is currently available to ICES?
2. What are the ICES criteria for including data from the recreational cod fishery into the annual stock assessment, and what is the ICES definition of recreational fishery in this respect?
3. Which recreational fisheries data, based on ICES criteria, should be collected by BALTFISH Member States in order to arrive at reliable Baltic-wide estimates of the cod recreational fisheries, bearing in mind:

a. The need to act in a cost-effective manner.
b. The need to account for differences in nature of cod recreational fishery across BALTFISH Member States.
c. The possibility for the data to be extrapolated by ICES for previous years.

ICES has addressed the request through the following structure:

i) What is the ICES definition of the recreational fishery on cod in the Baltic Sea region?
ii) What are the ICES criteria for including data from the Baltic Sea recreational cod fishery into the annual stock assessment?
iii) Which data on recreational cod fishing in the Baltic Sea are currently available to ICES?
iv) What are the data gaps and approaches to fill these gaps to arrive at sound estimates of recreational fishing mortality?
v) Which recreational fisheries data, based on ICES criteria, should be collected by BALTFISH Member States in order to arrive at reliable Baltic-wide estimates of the cod recreational fisheries, considering:

a The need to act in a cost-effective manner.
b The need to account for differences in the nature of the cod recreational fisheries across BALTFISH Member States.
c The possibility for the data to be extrapolated by ICES for previous years.

Elaboration on the advice

1. What is the ICES definition of the recreational fishery on cod in the Baltic Sea region?

Recreational fishing are all non-commercial fishing activities exploiting living aquatic resources for recreation, tourism, or sport (EU, 2009). In the Baltic Sea this covers active fishing methods including line and spear and passive fishing methods including nets, traps, pots, and set-lines (ICES, 2013).

2. What are the ICES criteria for including data from the Baltic Sea recreational cod fishery into the annual stock assessment?

The requirements for the inclusion of recreational fishery data in the cod stock assessments in the Baltic Sea are reliable annual estimates of total removals (catches minus surviving released fish) in numbers-by-length class. For the western Baltic cod assessment, which is based on an age-structured model, the numbers-by-length class would need to be converted to numbers-at-age before inclusion in the assessment. This could be done by using available age–length keys from commercial fisheries and current surveys. For the eastern Baltic cod assessment there is currently no analytical assessment model, but it is likely that recreational data would also be required in numbers-by-length class if these data are to be included in future assessment models. Stratification of data collection should be by ICES subdivision. Data provision should be on an annual basis together with commercial data and would be launched in the ICES data call in support of the ICES fisheries advice.

A minimum requirement is five years of data. Beyond the minimum requirement, historical knowledge is helpful to make assumptions for the reconstruction of historical time-series data over a longer period.

3. Which data on recreational cod fishing in the Baltic Sea are currently available to ICES?

The data currently available to ICES is presented in Tables 8.4.2.1 and 8.4.2.2. For assessment purposes the only available numbers-at-age data are from Germany.

4. What are the data gaps and approaches to fill these gaps to arrive at sound estimates of recreational fishing mortality?

Current data gaps relate to the following:

1. No data: Individual BALTFISH Member States (MS) do not conduct recreational fisheries surveys and/or provide no data.
2. Temporal coverage: Available data stem from a pilot survey and/or surveys are conducted on an irregular basis.
3. Spatial coverage: Available data stem from a certain region only and do not cover the entire coastal waters of the MS.
4. Fishing methods/platforms not covered: Relevant fishing methods/platforms (e.g. charter boats, private boats, shore fishing) are not covered by recreational fisheries surveys.
5. Lack of type of data: Available data are in weight or numbers only (no catch composition data), making conversion to numbers-at-age problematic.
6. Data quality: Available data is of insufficient quality, e.g. not representative.

To fill these gaps and arrive at sound estimates of recreational fishing mortality the following approaches are required:

1. The MS need to conduct recreational fishing surveys to estimate volume (numbers, weight, and length or age composition) of catches and releases.
2. An annual frequency of data collection over a number of years is required to develop a time-series of recreational fishing mortality that includes both the retained and the released components of the catch.
3. Recreational fisheries surveys need to cover the spatial use patterns of the recreational fisheries.

4. Recreational fisheries surveys need to cover the relevant fishing methods/platforms to quantify all significant recreational mortality.
5. As a minimum the various surveys being conducted need to collect annual catch volume in numbers and biological data (size or age composition) for both caught and released components.
6. Sampling design needs to be probability based.

5. Which recreational fisheries data, based on ICES criteria, should be collected by BALTFISH Member States in order to arrive at reliable Baltic-wide estimates of the cod recreational fisheries, considering:
   a. The need to act in a cost-effective manner.
   b. The need to account for differences in nature of cod recreational fishery across BALTFISH Member States.
   c. The possibility for the data to be extrapolated by ICES for previous years.

To arrive at reliable Baltic-wide estimates of the cod recreational fisheries the MS need to conduct recreational fishing surveys collecting annual numbers, weight, and length or age composition of catches and releases. The surveys need to cover the stock area and need to be agreed on at a regional level.

To estimate total catches and releases, the following information is usually needed (ICES, 2015a):

- The total number of recreational fishers, boats, and number of fishing trips or other measures of participation or fishing effort, generally estimated from a national survey.
- Demographic and avidity (frequency of fishing) data are needed to re-weight samples to be more representative of the population and improve accuracy.
- Catch per unit effort (or catch per person or per boat, depending on the type of survey) recorded for a representative number of fishers, boats, or trips, etc., for example from on-site surveys of individual anglers or completion of catch diaries or vessel logbooks. Data are needed for the retained (harvested) catch as well as for released fish if total fishery removals are to be estimated using data on post-release mortality.
- Biological data on catch size or age composition is required both for retained and released components if removals at size or age are needed for an assessment model. Direct on-site measurements of fish length are known to be more accurate than self-reported data.

Exemptions from annual data collection may be evaluated on a case-by-case basis in consultation with end users where existing data (based on previous surveys or pilot surveys) show the magnitude of the recreational cod catches (harvest and releases) to be low. However, recreational fisheries may become more or less important over time, e.g. because of stock dynamics, fish availability, or changing fishing effort. Therefore, continuous data collection even at very low levels is advantageous unless recreational catches are so small that imputation for missing survey years have only a small effect on the quality of assessment results and advice. This would need to be evaluated on a case-by-case basis in consultation with end users.

Annual variability of recreational catches in a MS is an important issue for frequency of surveys (as an example, German CPUE data for western Baltic cod fluctuated by a factor of 2–8 over a period of five years), as carrying out a survey in a year with abnormal weather or fish availability will introduce more uncertainty in an assessment if the survey is only done every three years instead of annually.

The most cost-effective way to conduct recreational fishing surveys and avoid costly population screening surveys is having a licence system in place where licence holders can be contacted. To further achieve cost-effectiveness, regional sampling plans for collection of catch composition data (i.e. which length, weight, and age data are to be combined with those of other countries) should be agreed in the regional coordination groups (RCGs) with advice from ICES, STECF, etc. Strata without catch composition data can be raised by strata with available data, similar to the raising routines used for commercial data.

Suggestions

Data collection should be coordinated on a regional scale to ensure the necessary harmonization of survey coverage, compatibility of methods, and improvement of cost-effectiveness. Collection of multispecies data is preferable and generally easy to conduct within the same national survey programme (ICES, 2015b).

Basis of the advice

Background

Many millions of people throughout Europe participate in recreational sea fishing. Recent surveys show that for some stocks recreational fishery harvests can be as large as commercial landings, but these have generally not been accounted for in stock assessments until recently.

The current EU data collection regulation has required MS to collect recreational fisheries data for certain species since 2002 (EU, 2001). In the Baltic Sea, annual weight of catches of cod has been required since 2008 (EU, 2008).

There are three main notable challenges associated with recreational fisheries data collection: (1) there is no central registration of recreational fishers, (2) recreational catches are not documented, and (3) recreational fishers fish in areas that are remote and difficult to access. As a result, recreational fishing surveys are complex and difficult to conduct, often requiring a number of different surveys to collect data on effort, catch per unit effort, and biological composition of the catch. This expertise is difficult to maintain unless surveys are conducted regularly, but generally it is easy to collect multiple species within the same survey programme (ICES, 2015a).

At present, total recreational mortalities of Baltic cod are not included in stock assessments. This increases the uncertainty in the assessment results and may impact on the ability to effectively manage the stocks. It is also very difficult to make effective allocation decisions between recreational and commercial fisheries without this information (ICES, 2015a).

Additional information

Recreational boat fisheries may operate in similar ways to small-scale commercial fisheries, fishing in similar areas and targeting similar species assemblages, and often using similar fishing methods such as rod and line, handlines, longlines, nets, pots, and spearfishing. In some areas, recreational fishery catches of charter and private boats may be comparable to those of small-scale commercial fishing vessels, and the same data collection methods may apply to commercial vessels and angling charter boats where complete or almost complete lists of vessels are available that can be used to select the vessels to sample.

National recreational fishery surveys, and similar types of surveys needed for some small-scale inshore commercial fisheries, can be of comparable cost to other forms of fishery data collection, such as research vessel surveys, port sampling, and at-sea estimation of discards and catch composition. There is a need for analytical methods to evaluate the relationships between the cost of data collection, the precision of estimates, and the contribution of each data set to the precision of assessments and advice, so that funds can be allocated to data collection schemes in the most cost-effective way. Regional cooperation on recreational surveys between nations is needed as any estimates need to be comparable and of appropriate quality. This could also lead to improvements in cost-effectiveness.

Robust methods are needed to include recreational fishery catch estimates in analytical or non-analytical assessments and associated advice when relatively few years have estimates, and when the estimates are only available at intervals of two or more years. These should be developed by an appropriate scientific working group or through a commissioned project (ICES, 2015b).

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Annex

Table 8.4.2.1 Most recent marine recreational harvest estimates in tonnes (t) or numbers (#). Figures in brackets indicate differing years in the sampling period 2013–2015. Source: ICES (2015a).

Country	Cod		Survey
	Harvest	Release	
Denmark	1 250 t (2015)	1 895 021 # (2014)	A combined telephone and Internet survey was designed together with Statistic Denmark. Two recall surveys, with their own questionnaires and group of respondents, were carried out. The first survey, the "licence list survey", specifically targeted that part of the Danish population with a valid annual fishing licence. When a licence is issued, the Danish social security number of the purchaser is registered, providing an efficient way to contact these persons. However, the list does not cover: (i) tourists (since they do not have a Danish social security number), (ii) those fishing without a valid licence, and (iii) people with a valid reason not to have a licence. The second survey, the "omnibus survey", targeted a subsample of the entire Danish population. This survey was intended to estimate the number and effort of fishers who fished without a valid licence. In this survey, no questions concerning their harvest were asked. Data on average size of eel, cod, and sea trout are obtained by a reference panel of 75 fishers. No biological data are available. Recreational cod catch data from 2009 to 2015 are available.
Estonia			Catch reporting has been mandatory since 2005 for licensed recreational fishery with passive gears. Catch data are reported and stored in the Estonian Fisheries Information System (EFIS) for passive gears.
Finland	3 t (2012)	0 t (2012)	A nationwide biennial recreational fishing survey is conducted for all species and gears. A stratified sampling of about 6000 household-dwellings is done with response rates of around 40–45% after a maximum of three contacts. A telephone interview is done for a number of the non-respondents. Harvested catch-and-released catch is measured separately by species. Recreational data have been collected biennially from 1998 to 2014.
Germany	2 430 020 # 3 032 t (2015)	1 138 514 # (all) 359 183 # (dead) 128.6 t (2015)	CPUE data from an annual stratified random access point survey covering all access points along the Baltic coast (2005–2015). Effort estimates by postal survey from 2006–2007 will be replaced by effort data from a nationwide CATI-Bus telephone screening, followed by a 1-year telephone diary recall survey conducted in 2014–2015. Recreational length distributions from on-board sampling of charter vessels by survey agents (2009–2015). Length-weight age data from commercial/BITS sampling for conversion to numbers-at-age and mean-weight-at-age (1991–2015). Reconstruction of historical time-series data from 1991 to 2004.
Latvia	0.1 t (2012)	0 t (2012–2014)	In 2012 a survey of the recreational cod fishery from fishing vessel was conducted. Catches were very low, more leisure than fishing trips. The catches taken in the recreational fishery with commercial gears (self consumption fishery) are reported and added to commercial catches.

Country	Cod		Survey
	Harvest	Release	
Lithuania	10 t (2014)		Small commercial angling boats are licensed, with the number of trips and data being obtained from census, direct interviews, and questionnaires. In 2013 Lithuania implemented a new data collection system. The total number of recreational fishery charter vessels and boats can be obtained from the daily reports of the border police. Twice a week joint surveys with fishery inspectors are conducted at sea to inspect the recreational fishery, where data on number of fishers, catch volumes by species as well as length and weight distribution of catches are collected.
Poland	1 273 t (2014)		Sea angling in Polish waters started in 2011. Since then the number of charter boats has increased to approximately 30. In 2014, 11 on-board observer trips were conducted to collect biological data, and ten Harbour Masters Offices were visited to collect data on number of angling trips and number of anglers on-board charter vessels.
Sweden	214.6 t (2015)		Cod estimates are from tour boat fishing in the Sound. In 2014, 11 on-board observer trips were performed to collect biological data and ten Harbour Masters Offices were visited to collect data on the number of angling trips and the number of anglers on-board charter vessels. The tour boat survey has been carried out annually in the Sound between Sweden and Denmark (2011–2015). Length–weight data is available for 2012 and 2013.

Table 8.4.2.2 Recreational fisheries data availability by year, fishing modes, weight, numbers, harvest, release, and length.

MS	Sampling years	Recreational data collection	Platforms/modes covered	Annual weight of harvest? Y/N	Annual numbers of harvest? Y/N	Annual weight of releases? Y/N	Annual numbers of releases? Y/N	Composition (age or size) Y/N	Comments
Germany	2005–2015	Y	All (charter boats, private boat, shore)	Y	Y	Y	Y	Y	Longest available annual time-series in the Baltic Sea. Biological data collection (length distribution) in subdivisions 22 and 24 since 2009.
Denmark	2009–2015	Y	All	Y	N	Y	Y	N	Third longest available time-series in the Baltic Sea. Cod harvest is recorded in numbers and weight, therefore back-calculation of annual harvest in numbers should be possible.
Estonia	2016	N	passive	N	N	N	N	N	There is mandatory catch reporting for recreational fishers using passive gears. No data provided.

MS	Sampling years	Recreational data collection	Platforms/modes covered	Annual weight of harvest? Y/N	Annual numbers of harvest? Y/N	Annual weight of releases? Y/N	Annual numbers of releases? Y/N	Composition (age or size) Y/N	Comments
Finland	2002-	Y	All	Y	N	Y	N	N	Longest available biennial time-series in the Baltic Sea. No catch in numbers data available.
Lithuania	2014–2015	Y	Charter boats, private boats	Y	N	N	N	Y	No catch in numbers data provided, but possibly available. Biological data is collected.
Latvia	2012–2014	Y	Private boats	Y	N	Y	N	N	Recreational passive gear catches are counted against national quota. Recreational rod and line catches are considered to be low.
Poland	2014–2015	Y	Charter boats	Y	N	N	N	Y	Only charter boats are sampled. Private boat sector and land-based activities are not included in estimates.
Sweden	2011–2014	Y	Charter boats (Subdivision 23)	Y	N	Y	N	Y	Only charter boats in Subdivision 23 sampled. No private boats and no shore fishing. No coverage of the rest of the Swedish coastal waters. The available national mail survey monitors inland and marine waters. Some fishing modes may be under-sampled, leading to low precision of estimates.