

Comparison of NSSS and ICES Data

Introduction

Following the 2009 Fishers' North Sea Stock Survey, Henrik Sparholt of ICES carried out an analysis to compare fishers' perceptions of changes in the abundance of fish (from the survey) with ICES's assessments of the abundance of fish (spawning stock biomass) in the North Sea (see Appendix 2). His analysis indicated that there was agreement between the fishers' perceptions and ICES biomass estimates.

This analysis has been repeated, using Sparholt's method, to include the data from the 2010 Fishers' North Sea Stock Survey and more recent ICES stock biomass estimates.

Method

Fishers' North Sea Survey Data

Sparholt calculated an annual 'score' (or index) of abundance for each species from the Fishers' North Sea Stock Survey data as follows:

Firstly, the percentage of responses in each of the abundance categories ('much less', 'less', 'the same', 'more' and 'much more') each year are calculated for each species and area (Table 33). These percentages are then multiplied by a weighting factor (-2, -1, 0, 1, 2) and the results summed to give a single score for each area (Table 33).

Finally, the scores for all areas are averaged to give an overall score for each species each year.

ICES Data

Sparholt compared the abundance scores calculated from the fishers' survey with spawning stock biomasses (SSB) estimated by ICES. ICES estimates the SSB on the 1st of January each year but the fishers' survey covers the period from mid-year to mid-year (nominally from 1st July to 31st June the following year). The two data series are thus out of phase by about six months.

To compensate for this Sparholt's method estimates the SSB in the middle of each year by taking the average of the SSBs at the start of that year and at the start of the following year. Thus, for example, the mid-year estimate of the biomass of cod in

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2008 is the average of the biomass on 1st January 2008 (58,458 tonnes) and the biomass on 1st January 2009 (68,560 tonnes), which equals 63,509 tonnes.

Sparholt then calculated the percentage change from year to year in these mid-year biomass estimates.

Table 33 Illustration of method of calculating Sparholt's score, using data from the 2010 survey for Cod in Area 8.

Category	No. of Responses	% of Responses	Weighting Factor	% × Factor
'Much Less'	2	4%	-2	-0.08
'Less'	10	19%	-1	-0.19
'No Change'	22	42%	0	0.00
'More'	15	29%	1	0.29
'Much More'	3	6%	2	0.12
TOTAL	52			score = 0.13

Comparison of Results

The abundance scores calculated from the fishers' survey were compared with the percentage changes in mid-year biomass estimates, and the coefficients of determination (R^2) calculated.

ICES spawning stock biomass data were available for cod, haddock, whiting, common sole and plaice in the North Sea. In some cases these biomass estimates include adjacent areas such as the English Channel (ICES Sub-Area VIId) or the Skagerrak / Kattegat (ICES Sub-Area IIIa). Thus the area for which the biomass is estimated may not match exactly with the area covered by the fisher's survey. No attempt was made to adjust for that in this analysis.

Nephrops biomasses are estimated for individual functional units within the North Sea. For the purposes of this analysis the biomass for the Fladen unit (which accounts for more than 50% of nephrops catches in the North Sea) was used.

No biomass estimates are available for monkfish, and the saithe stock is assessed across the much larger Northern Shelf area (including the North Sea and West of Scotland areas) and so was not included in the analysis.

The available biomass estimates were compared with the fishers' survey abundance scores for the whole area covered by the survey. For a few species, comparisons were also made with smaller areas of the North Sea to evaluate how this affected the results.

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Results

The principle results are summarised in Figure 51. These show that there is at least some agreement between the abundance scores calculated from the Fishers' North Sea Stock Survey results and the ICES spawning stock biomass estimates.

For common sole no agreement was found for the whole North Sea, but a much better level of agreement was obtained when the comparison was limited to Fishers' North Sea Stock Survey results from the south-eastern North Sea only (areas 5-7).

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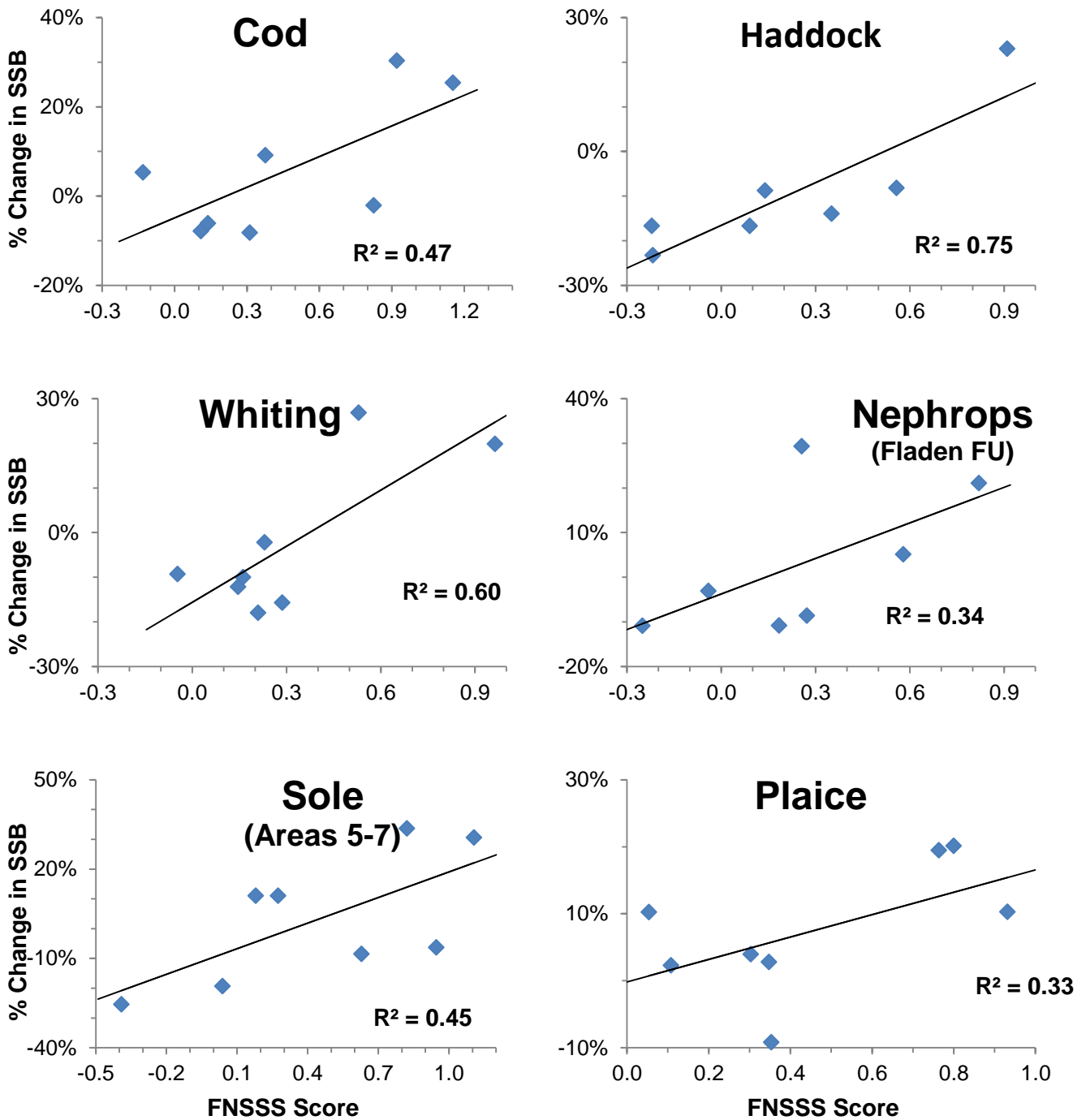


Figure 51 Plots of % changes in estimated mid-year spawning stock biomasses against annual Fishers' North Sea Stock Survey abundance scores with fitted linear trend lines and coefficients of determination (R^2). Abundance scores are calculated for the whole North Sea for all species except sole, where it is calculated for the south-eastern North Sea only. For nephrops the change in SSB is for the Fladen functional unit only.

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Discussion

Sparholt concluded from his previous analysis that there was agreement between the Fishers' North Sea Stock Survey abundance scores and the ICES estimates of spawning stock biomass, and that this left the way open for results from the Fishers' survey to be integrated into ICES's stock assessment models.

This re-analysis, using Sparholt's methods but including additional data from the most recent Fishers' survey and ICES estimates confirms his conclusions.

Substantial potential remains to refine this analysis, for instance (as the example of sole shows) by looking at different areas of the North Sea rather than simply the whole. The analysis could also be extended to include other parameters, especially recruitment.

Despite the apparent agreement between fishers' perceptions and scientific assessments, the issue of integrating the two - and in particular of making greater use of fishers' knowledge - raises some challenging questions. In particular as to how fishers' knowledge should be used or interpreted when it does not agree with the scientific assessment.

It may sometimes be assumed, explicitly or implicitly, that scientific assessments provide a standard of 'truth' against which fishers' knowledge must be tested - that fishers' knowledge is only useful or credible if it agrees with the scientific assessments. However, it should be borne in mind that scientific assessments also carry some degree of uncertainty, and can only be as good as the data on which they are based. Furthermore, there are inherent time-lags in the scientific process, between data being collected and assessments being completed. Fishers may detect changes in fish stocks before they can be detected by scientific assessments, but their perceptions may be influenced by factors such as their locality, fishing gear, and fishing behaviour.

Where fishers' and scientists' perceptions are in agreement then each reinforces the other. Where there is disagreement, the differences should be seen as something that needs to be explained, rather than as evidence that one side or the other is 'wrong'. The 'truth' may be more likely to lie somewhere between the two positions than at one extreme or the other. In general, there is a need for an open-minded approach to the use of fishers' knowledge in fisheries assessment and management, with fishers' and scientists' perceptions seen as complementary rather than contradictory.

Respondents' Comments

The following are comments made by respondents on their questionnaires. These have been roughly sorted into general categories, but there is some overlap.

Stock Status, Discards and Quota

- ◆ Fishing activity is decreased in all areas. Fish stocks are increased. Hopefully the scientists can agree!
- ◆ Lots of small cod
- ◆ Lots of fish in Norwegian Zone and Skagerrak.
- ◆ Lots of sprats - also small ones.
- ◆ Few cod within 15 miles from shore. Lots of cod - one and two year olds in 1B.
- ◆ Have 2 anchor seiners, we work only on the Dogger Bank from Easter to October. The plaice fishery here has never looked so good, possibly due to reduction of beam trawlers and industrial trawlers. There is a lot of food on the ground and the fish are growing quickly. This year we are using 150mm gear and have no discards at all. We are landing next to no size 4 plaice (or catching them) but feel this loss is worthwhile in returns and the likelihood of bigger fish next year. At sea the job has never looked so good but the job in whole looks very poor due to ever increasing strangulation by the reduction of quotas sea days and all the rest of the rubbish that is forever being spouted. It is virtually impossible to plan ahead in a fishing or business sense.
- ◆ Thornback Ray on increase by a huge number all sizes and very good recruitment. Very good numbers of 1 and 2 year old sole. Next year they will enter the fishery. Lack of quotas on most species in area to make a fair living. Herring also on increase. Caught high numbers of discarded cad makes you feel sick!
- ◆ The discards we are throwing away are mature fish because of this silly fishery policy
- ◆ The fisheries on the NE coast are very strong with very good recruitment for cod and haddock, plaice is really good with huge amounts of small on the grounds. Whiting are there in their usual abundance. Our main problem clear of fuel cost is the very poor quotas for all main demersal species, this and rental for the quota being a real financial burden to our business. For us to survive another year without going into liquidation we need more quota and days at sea. All we ask for is the chance to earn a living and to meet our commitments with our boat.
- ◆ Abundant cod. Saithe also abundant. Monks scarce this summer. Whiting more plentiful days closed areas quotas so unrealistic tis becoming a joke! the Scottish Share Fishermen is being squeezed out. Please do something.
- ◆ The usual story fed up having to throw back good quality fish which we can't avoid catching.
- ◆ No Ling quota, big discards. No Megrim quota, big discards. No Cod quota, discards. No Whiting quota, discards. No Saithe quota, big discards.
- ◆ There is an abundance of cod on all the inshore grounds with a small quantity of haddock, with the cod quota being so small we are having to change back over to the

Respondents' Comments

scallops for longer between quota allocations, therefore putting more pressure on the scallop stocks which we depend on in the winter time.

- ◆ Abundance of hake in all areas we work especially in area 50/E9. Some days we are dumping 100-150 boxes. This is the 4th summer this has been going on.
- ◆ Stocks too healthy. Quota & Days too unhealthy
- ◆ We have no days to fish and no quota to survive we have been at squid fishery last 5 weeks. It's a lifeline. Been complete shambles of a job our government should hold their heads in shame. I have been 40 years at sea.
- ◆ Stocks on most species appear very good East and West. But our 'Science' isn't seeing that. With more cuts predicted for 2011 it will be disastrous. The Science must be addressed!
- ◆ As I have a new boat my biggest problem is not having enough days to catch the quota I own.
- ◆ A very large abundance of megrims in our fishing grounds. Lack of days and size of mesh could finish us!!
- ◆ Any discarding of fish due to lack of quota, cod discard nil because of cameras. profit and crew wages drastically down due to increase of leasing quota and days don't know if we will survive another year with predicted quota and further days cuts. No hope for future. Help?!?!?!?1
- ◆ The changes in discards is mostly to do with quota at section 1 not a true picture of the Vessels in the Fishing now size, nothing to do, more - more Vessels going to prawns every year, so more will be landed.
- ◆ I am more optimistic about the fishing i.e. fish in the sea but with all the rules/regulations quotas it's a very bleak picture. but the way it is the now, with days shortage, quota shortage and costs to rent, fuel and crew it's all too much. All the scots are all packing up and going elsewhere. I can't blame them if it wasn't for me owning a boat I would be doing it myself. We are now very close to having Filipino crews but no Scottish Skippers left to Skipper.
- ◆ Never seen so much fish on the grounds as I'm sure your hearing from everybody. the Quota is so far out of whack with a lot of species out there.
- ◆ I don't agree with Vessels dumping cod in order to get 200 days North of 59 deg. they have to keep less than 2.5% cod in order to get these extra days. this is false science and taking 2 steps back and one forward. Maybe boats with these derogations should be made to have cameras onboard or take away an observer.
- ◆ At the moment in time fisheries i.e. Quota does not represent science or fisheries as example whiting is more abundant specie on grounds where haddock are usual but quota does not represent this. i have worked same grounds 15 years and yet I know little of fish habits so I am told leave nature to that who created it.
- ◆ There is a lot more plaice than we can ship in. In the first three months of the year we only caught 25% of the quota. Now after six months we almost need to avoid catching plaice. There is a lot of plaice.

Respondents' Comments

- ◆ The last 30-40 years a lot less fish has come into the Wadden Sea. I don't know what causes this, as there isn't any fisheries left on sardines, flounder, dab, cod, whiting. I only fish on the Wadden Sea for pleasure.
- ◆ In the 37 years that I have been fishing now, I have never experienced such high catches of plaice in such a short period of time. It is frustrating that because of wrong advice from biologists and government's regulation, especially the political agreements of the EC, the market for plaice (and the market for herring) is ruined. Apart from that, quota for plaice are systematically kept low.
- ◆ There is an explosive growth of dab as bycatch
- ◆ It looks like the SSB stocks are decreasing. Maybe because of the effect of pair trawling on the winter stock?
- ◆ In spring we catch a lot of cod (first three months), just like old times. It should be possible to land this fish. Now we are throwing +/- 3000 kg back and this is really not done. It is beautiful, marketable fish. The system should be changed!
- ◆ Quota for plaice has to increase
- ◆ Especially plaice and cod are doing great above 55° NB.
- ◆ We can catch whiting quite well. So why are the quota now even lower?
- ◆ Fisheries in the coastal region are very poor. In the mid '90s fish stocks declined due to heavy fisheries. However, the population is not recovering, even now the fisheries has decreased a lot. Could an increased level of antibiotics and contraception in the water be a cause of this? Fishery is better further out the coast. On the Wadden Sea there is little to no fish left as well.
- ◆ There is enough fish, but the quota are too low and the prices are too low.
- ◆ Fishery is good, plaice is fantastic! Prices are low, nobody can persist.
- ◆ Fishing is going well. We are pessimistic about regulations and licences. Costs are rising, prices are good.
- ◆ The plaice fishery has increased tremendously. This year we caught 24-30 tons of plaice in only three full days, consisting of 50-60% plaice 1 and 2.
- ◆ There is a lot of plaice. Many big hauls, sometimes up to 100 boxes per haul. I have never seen this in the 35 years I have spent at sea.
- ◆ In general, fisheries are good. The problem is however the impractical rules and the unrealistic interference of NGO's etc. The consequences of this are the planning of windmill parks, No Take Zone's, MPA's etc. etc. etc.

Fishing Method

- ◆ Some discards are decreased through technical adjustments
- ◆ Working 130 cod ends when targeting fish so see few small. working at least 100 when targeting prawns so see few small.
- ◆ All these new fishing methods that are available, are bad for the fisheries sector. They have a lot of discards. The beam trawl has much less discards.
- ◆ The North Sea Foundation wants the chains [of the beam trawl] off the North Sea. I will ensure you that if that happens, the North Sea is doomed. If the seabed is not touched, fishery will decline.

Respondents' Comments

- ◆ Beam trawling is however good for nature, because the seabed is touched a little. As with a ploughed farmland, no unwanted weeds will grow there. Because of the beam trawl, the sea will remain healthy and dynamic.
- ◆ We should return to smaller vessels that are multi-functional. We are dependent on the weather, that's how nature regulates itself. Less use of quota, more space for crew members, environmentally friendly (newest development), less energy. The quota of 1 large vessel is enough for three smaller vessels, yet on the three vessels there is enough space for 12 fishermen instead of the 6 that work on the large ship. Small ships need to be 25 meter and 500 hp.

Competition

- ◆ Maybe the size of the nephrops are influenced by the seismic investigations?
- ◆ Over the past 4 years the destruction by the nomadic twin-rig prawn trawlers destroying both the sea bed, and what was a healthy stock of prawns, is beyond belief. Twin-rig trawling should not be inside the 12 mile limit.
- ◆ And all the ships that are using twin rig or flyshoot kill everything. Sometimes discard rates are as high as 70%, yet many people do not know this. This is not the case with the beam trawl (with chains). We fish for only 4 days and can then leave everything to rest for the weekend. The other vessels however fish continuously in the North sea. In the South we leave it at rest (nothing happens) and the fishery is good. I hope you read this thoroughly and call me if you can.
- ◆ Reorganization / a decrease of the shrimp fleet is desirable, as is a weekend prohibition for the beam trawl.

Economic Situation

- ◆ Costs - Higher due to more days at sea. Profits - Lower due to fewer fish
- ◆ kW-days - Not willing to spend more money before I know how many days I get. In 2007 I bought 20 tonnes and I have got 53 days - this may end as a bankruptcy!!
- ◆ owing to the very poor quotas this year I have been working my boat single handed some months. It would be better if I had less days at sea but then whatever I catch I land no discards.
- ◆ had enough of rising quota and days at sea. Want to keep monies for myself - our business instead of paying a bastard quota trader to go to sea!!!
- ◆ We will be paying off 2 men as we don't have the days at sea to keep them. Also we have 98 tonne of monks which we don't have time to fish for.
- ◆ The oil prices are higher than in 2009
- ◆ More kg - lower price. Net result is still lower because of rising costs. Solution: consensus
- ◆ We make better profit catching shrimps
- ◆ Economic circumstances: the fuel is expensive and the prices for fish are too low. In general, fishing is good (especially on plaice and turbot). There should be a ban on the import of pangasius and tilapia. Our own market (fishermen) needs to be protected against all these imported fish. The fishery sector is damaged by the (non-efficient)

Respondents' Comments

laws and rules by the so called environmental organisations like Greenpeace and the North Sea Foundation.

- ◆ The big problem of our sector is the pricing of our product. The fishery has been really good in the first half year of 2010, yet the yield has been less than last year.

Management

- ◆ The vision of the E.C. has to change. All measures brings only dissatisfaction
- ◆ Crazy that the sand eel quota cannot be given before we've reached half the season.
- ◆ Why are we the only country in the EU to be working RTCs? and what are we saving the cod for if the other EU Vessels are ignoring UK RTC'? If we went on a catch system whereby you could land what you caught with the mesh size up a 130mm and 150-160 working days fish mortality would drop dramatically.
- ◆ We don't seem to be getting any credit for all the measures we take. Big meach RTC just seems to be cut all the time we soon won't have a white fish fleet left as boats can't survive on 110/120 days and quota cuts they speak about who else has to buy days to go to work.
- ◆ Effort only instead of quotas linked to FQA units of quota attached to the Vessel.
- ◆ Scottish Fishermen a fast disappearing breed of men. We will 'all' be soon out of a job.
- ◆ My opinion about fishery is that if we want to make it, then we should change the quota system. We should distribute quota amongst the active fishermen.

Survey

- ◆ an important fishery for our area is skate and rays which for some reason do not form part of your survey. we feel this matter should be given some consideration particularly as stocks have improved this year.
- ◆ We fish on seabass, and this is not mentioned in the survey

Other

- ◆ Prawn Marketing?
- ◆ We need to get marketing sorted out in the Nephrops industry.
- ◆ Yes, we have been sold down the Swanee!
- ◆ I have been a skipper no for 24 years and I have not seen as much fish on the grounds as there is now, we can take more fish in one haul now than it used to take in a week when I first went to sea after leaving school.
- ◆ I am getting really tired of the constant whining about porpoise and seals. I have already been fishing for 25 years with fixed gear and I have never caught an animal like that. Furthermore, I hope for more cod so I can fish in winter too.
- ◆ I believe that the Omegameter is a very good solution. Yet it should not result in other fishermen using forbidden mesh features. Everyone has the opportunity to know in advance whether or not his net meets the criteria.
- ◆ Due to the new measuring method we don't catch sole anymore, as our mesh sizes are too large now.

Respondents' Comments

- ◆ Because nowadays we measure the mesh size of the nets with the Omegameter we lose out on a lot of smaller sole. The difference between the 'schiel' [former measuring method] and omegameter is at least 5-6 mm in mesh size. I think (!) that we waste at least around 200 - 300 kg of sole category I and II every week.
- ◆ You keep talking about plaice-promotion for a long time, but we only receive just above one Euro on average. Why does it have to take so long and cost so much money? Why isn't it possible to put plaice as a ready-to-use product in the supermarket? To be heated in the microwave and then you can have a delicious meal. Do you ever talk with these large companies, because in January plaice is not of good quality but in May-July I don't see any change. You should talk to those companies and address that they don't give anything more for plaice now.
- ◆ Shrimp fishermen have to pay in other countries (Denmark) but you are doing nothing about it. It's also not included in this survey.
- ◆ Call us for some comments, aren't you able to do something? We are 100% shrimp fishermen. The shrimp fishery needs to get certified with MSC and limit its catches, then it will be alright. Only there are people already who will profit from someone else's limitations. Someone needs to pressure them into complying with the rules for MSC. It's not right if someone else profits from our limitations. Just help us!
- ◆ It's very good to listen to what fishermen say about these things, they spent 40 weeks a year on sea.

General Remarks

This report presents the results of an analysis of the data collected through the Fishers' North Sea Stock Survey in 2010. Given the non-quantitative and subjective nature of this survey these results need to be interpreted and used with caution. Furthermore, given the constraints of time and resources it has not been possible to fully analyse or explore all of the possible permutations of fish species, areas, fishing gear, vessel sizes and nationalities.

One disadvantage of this form of survey is that it only provides information on perceived changes; it does not tell us anything about absolute levels. For example, it can tell us whether fishermen think their costs were higher or lower than last year, but not how high those costs actually are. For this reason, further caution is necessary in interpreting the results; a decline in the proportion of fishermen reporting high costs might look like a positive result, but if their costs remain very high those fishermen may still face economic difficulties.

Overall, the number of questionnaires returned in 2010 was significantly higher than in 2009, and close to the average for the preceding few years. This is reassuring as it suggests that there is still significant interest in the survey amongst fishermen.

Overall, the results of the survey in 2010 appear to be fairly positive in terms of the state of fish stocks. For all fish species the majority reported higher abundances, although the proportions doing so were not as high as in 2009. Similarly, most fishermen reported catching all sizes of fish, and moderate or high levels of recruitment, for all species. The survey results also suggest a general decline in levels of discarding, with the majority of respondents reporting lower levels or no change. In contrast to 2009, the proportions reporting lower levels of discarding increased while the proportion reporting higher levels declined.

Fisher's perceptions of economic circumstances in 2010 were perhaps less positive. Although there were increases in the proportions reporting higher levels of profits and optimism, and lower costs, these tended to be from relatively low bases. The majority continued to report the same or higher costs and the same or lower levels of profit and optimism.

One noticeable trend throughout the survey is that the results from the Kattegat (area 9), and to a lesser extent the Skagerrak (area 8), often differ markedly from the rest of the North Sea. The reasons for this difference are not known, but it may reflect differences in the types of fishing gear or fishing vessels used in these areas. Alternatively, it may reflect the fact that these areas lie in a zone of transition between the North Sea and the Baltic, and in particular the influence of the latter.

General Remarks

Perhaps the most significant development related to the survey this year has been the analysis carried out by Henrik Sparholt (and updated in this report) comparing fishers' perceptions of changes in the abundance of fish with the scientific assessments of their abundance (see page 89). This analysis showed a good level of agreement between the two. Although further work will be needed to refine this analysis, this agreement should open the door to greater integration of fishers' knowledge and scientific assessments of fish stocks.

The issue of integrating fishers' knowledge - such as the results of this survey - and scientific assessments raises some challenging questions. In particular as to how fishers' knowledge should be interpreted when it does not agree with the scientific assessment (see page 93). Answering such questions is beyond the scope of this report, but they highlight the need for an open-minded approach to the issue.

Appendix 1

Sample Questionnaire Used in 2010

2010 Survey of North Sea Stocks

The purpose of this questionnaire is to ensure that fishermen's knowledge of the state of fish stocks is considered during the development of TACs.

The questionnaire should be completed by **comparing conditions in January - June this year with conditions in January - June last year.**

All information will remain strictly confidential. Data will be pooled before presentation to the Advisory Committee on Fisheries Management. To ensure complete confidentiality please *do not* write your name, or the name of your vessel, on this questionnaire.

Instructions

1. The questionnaire refers to the **North Sea only**.
2. The questionnaire is in four sections that will help us use the data
 1. Vessel size and gear type
 2. Information on the eight main species
 3. Your financial status compared to last year
 4. Any other information you may wish us to know
3. Questions should be answered by putting a tick in the appropriate box (see example below).

EXAMPLE				
Question 1	Answer 1	<input checked="" type="checkbox"/>	Answer 2	<input type="checkbox"/>
			Answer 3	<input type="checkbox"/>

4. **Please return your completed questionnaire to [national coordinator] by [date]**

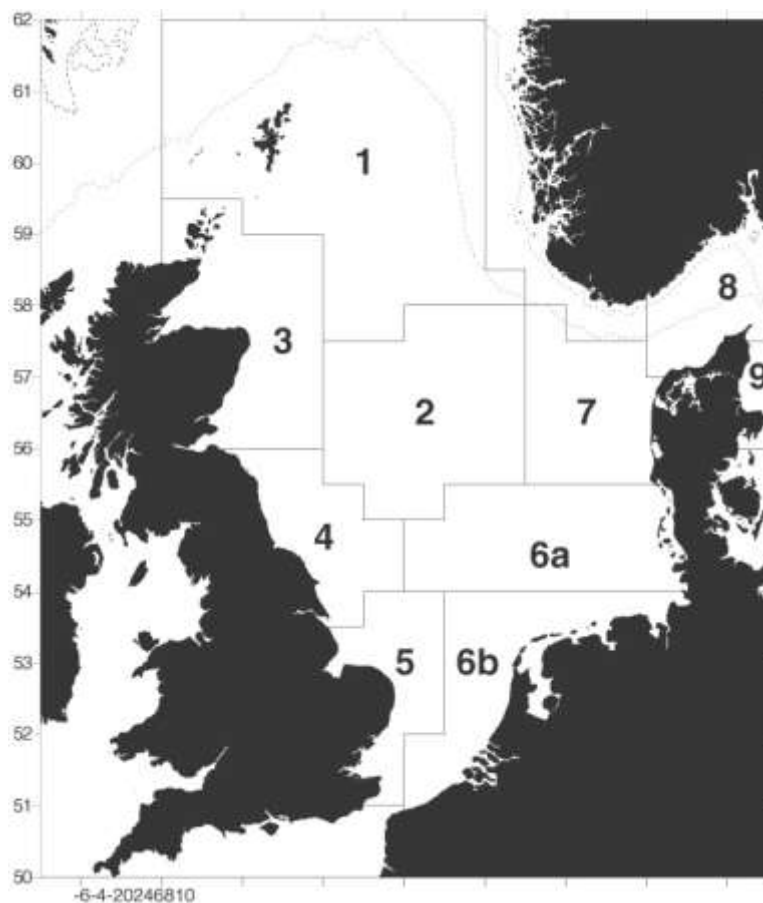
SECTION 1

VESSEL & GEAR									
Size	Under 15m			15-24m			Over 24m		
Main fishing method <i>last year</i>	Trawl		Nephrops Trawl		Beam Trawl		Gill Net		Seine
	Other (please specify)								
Main fishing method <i>this year</i>	Trawl		Nephrops Trawl		Beam Trawl		Gill Net		Seine
	Other (please specify)								

SECTION 2

When completing the question on fishing area in this section, reference should be made to the numbered boxes on the map below.

Information on abundance should be provided on the basis of **catch** not landings



Appendix 1

COD									
Area of fishing (refer to map)	1		2		3		4		5
	6a		6b		7		8		9

Has the abundance of cod changed since last year? No Yes

If yes:

Change in Abundance	Much less		Less		More		Much more	
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Has your level of cod discarding changed since last year? No Yes

If yes:

Change in Discards	Much less		Less		More		Much more	
--------------------	-----------	--	------	--	------	--	-----------	--

For this year:

Size range	Mostly small				All sizes				Mostly large	
Abundance of young fish about to enter fishery	Low		Moderate		High				Don't know	

HADDOCK									
Area of fishing (refer to map)	1		2		3		4		5
	6a		6b		7		8		9

Has the abundance of haddock changed since last year? No Yes

If yes:

Change in Abundance	Much less		Less		More		Much more	
---------------------	-----------	--	------	--	------	--	-----------	--

Has your level of haddock discarding changed since last year? No Yes

If yes:

Change in Discards	Much less		Less		More		Much more	
--------------------	-----------	--	------	--	------	--	-----------	--

For this year:

Size range	Mostly small				All sizes				Mostly large	
Abundance of young fish about to enter fishery	Low		Moderate		High				Don't know	

Appendix 1

WHITING									
<i>Area of fishing (refer to map)</i>	1		2		3		4		5
	6a		6b		7		8		9

Has the abundance of whiting changed since last year? No Yes

If yes:

<i>Change in Abundance</i>	Much less		Less		More		Much more	
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Has your level of whiting discarding changed since last year? No Yes

If yes:

<i>Change in Discards</i>	Much less		Less		More		Much more	
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For this year:

<i>Size range</i>	Mostly small				All sizes				Mostly large	
<i>Abundance of young fish about to enter fishery</i>	Low		Moderate		High		Don't know			

SAITHE									
<i>Area of fishing (refer to map)</i>	1		2		3		4		5
	6a		6b		7		8		9

Has the abundance of saithe changed since last year? No Yes

If yes:

<i>Change in Abundance</i>	Much less		Less		More		Much more	
----------------------------	-----------	--	------	--	------	--	-----------	--

Has your level of saithe discarding changed since last year? No Yes

If yes:

<i>Change in Discards</i>	Much less		Less		More		Much more	
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For this year:

<i>Size range</i>	Mostly small				All sizes				Mostly large	
<i>Abundance of young fish about to enter fishery</i>	Low		Moderate		High		Don't know			

Appendix 1

MONKFISH										
<i>Area of fishing (refer to map)</i>	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of monkfish changed since last year? No Yes

If yes:

<i>Change in Abundance</i>	Much less		Less		More		Much more	
----------------------------	-----------	--	------	--	------	--	-----------	--

Has your level of monkfish discarding changed since last year? No Yes

If yes:

<i>Change in Discards</i>	Much less		Less		More		Much more	
---------------------------	-----------	--	------	--	------	--	-----------	--

For this year:

<i>Size range</i>	Mostly small				All sizes				Mostly large	
<i>Abundance of young fish about to enter fishery</i>	Low			Moderate			High		Don't know	

NEPHROPS										
<i>Area of fishing (refer to map)</i>	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of Nephrops changed since last year? No Yes

If yes:

<i>Change in Abundance</i>	Much less		Less		More		Much more	
----------------------------	-----------	--	------	--	------	--	-----------	--

Has your level of Nephrops discarding changed since last year? No Yes

If yes:

<i>Change in Discards</i>	Much less		Less		More		Much more	
---------------------------	-----------	--	------	--	------	--	-----------	--

For this year:

<i>Size range</i>	Mostly small				All sizes				Mostly large	
<i>Abundance of young fish about to enter fishery</i>	Low			Moderate			High		Don't know	

Appendix 1

COMMON (DOVER) SOLE										
Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of sole changed since last year? No Yes

If yes:

Change in Abundance	Much less		Less		More		Much more	
---------------------	-----------	--	------	--	------	--	-----------	--

Has your level of sole discarding changed since last year? No Yes

If yes:

Change in Discards	Much less		Less		More		Much more	
--------------------	-----------	--	------	--	------	--	-----------	--

For this year:

Size range	Mostly small				All sizes				Mostly large	
Abundance of young fish about to enter fishery	Low		Moderate		High		Don't know			

PLAICE										
Area of fishing (refer to map)	1		2		3		4		5	
	6a		6b		7		8		9	

Has the abundance of plaice changed since last year? No Yes

If yes:

Change in Abundance	Much less		Less		More		Much more	
---------------------	-----------	--	------	--	------	--	-----------	--

Has your level of plaice discarding changed since last year? No Yes

If yes:

Change in Discards	Much less		Less		More		Much more	
--------------------	-----------	--	------	--	------	--	-----------	--

For this year:

Size range	Mostly small				All sizes				Mostly large	
Abundance of young fish about to enter fishery	Low		Moderate		High		Don't know			

SECTION 3

ECONOMIC CIRCUMSTANCES

Have your economic circumstances changed since last year?

<i>Difficulties in obtaining or retaining crew</i>	Much less		Less		Same		More		Much more
--	-----------	--	------	--	------	--	------	--	-----------

<i>Operating costs</i>	Much less		Less		Same		More		Much more
------------------------	-----------	--	------	--	------	--	------	--	-----------

<i>Profits</i>	Much less		Less		Same		More		Much more
----------------	-----------	--	------	--	------	--	------	--	-----------

<i>Are you more or less optimistic about the future?</i>	Much less		Less		Same		More		Much more
--	-----------	--	------	--	------	--	------	--	-----------

SECTION 4

Have you any additional information on the fisheries?

Thank you for your contribution.

Appendix 2

Comparison of NSSS and ICES Data

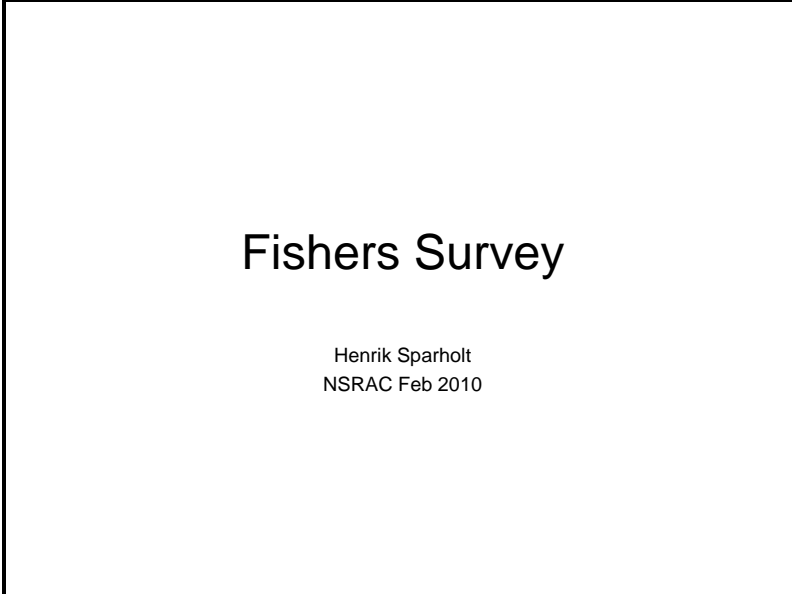
by Henrik Sparholt (ICES).

- A) *Presentation Delivered by Henrik Sparholt at the Meeting of the North Sea RAC Executive Committee on 18th February 2010*

- B) *Extract from the Minute of the Meeting of the North Sea RAC Executive Committee on 18th February 2010*

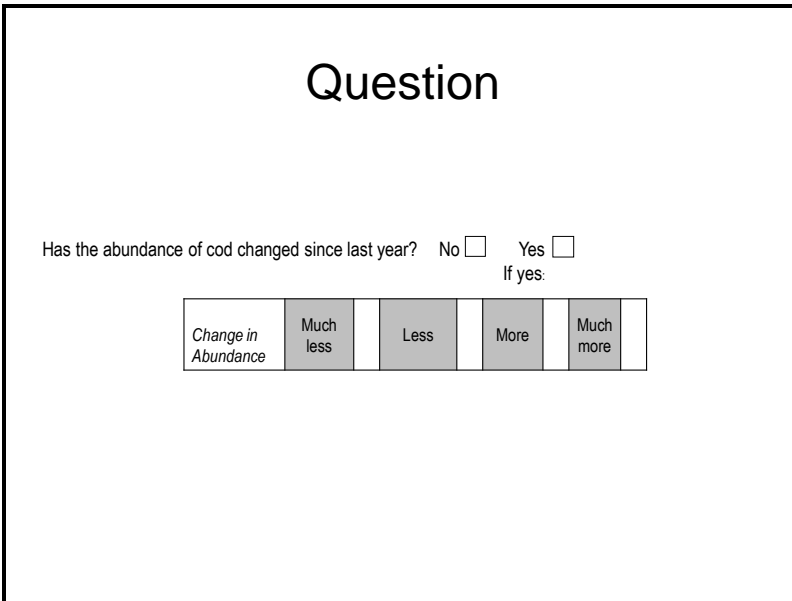
Appendix 2

A) *Presentation Delivered by Henrik Sparholt at the Meeting of the North Sea RAC Executive Committee on 18th February 2010*

1) A rectangular slide with a black border. The text is centered. The title 'Fishers Survey' is in a large, bold, black font. Below it, in a smaller font, is 'Henrik Sparholt' and 'NSRAC Feb 2010'.

Fishers Survey

Henrik Sparholt
NSRAC Feb 2010

2) A rectangular slide with a black border. The title 'Question' is centered at the top. Below it is a survey question with two checkboxes. Below the question is a horizontal scale with five categories: 'Change in Abundance', 'Much less', 'Less', 'More', and 'Much more'. The 'Much less' and 'More' categories are shaded grey.

Question

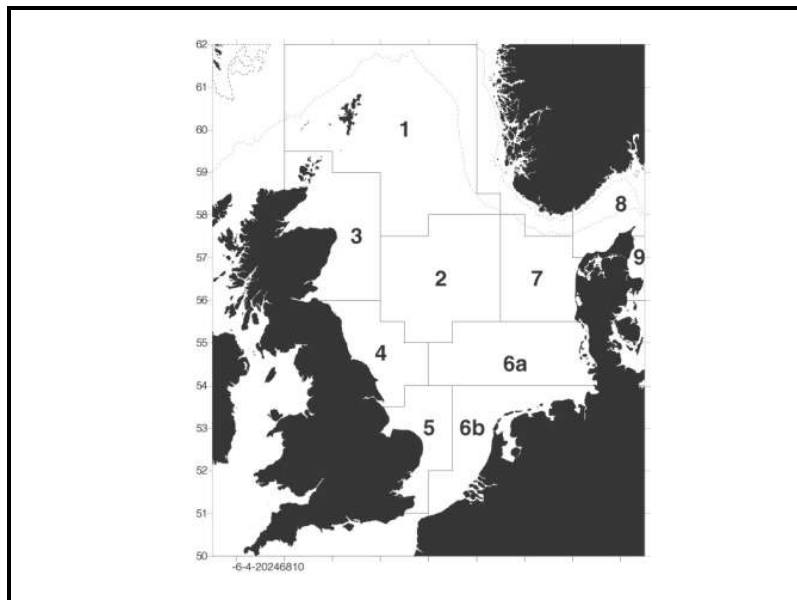
Has the abundance of cod changed since last year? No Yes
If yes:

<i>Change in Abundance</i>	Much less	Less	More	Much more
--------------------------------	--------------	------	------	--------------

Cod 2002 answers

Area	Abundance					n
	Much Less	Less	Same	More	Much More	
1	2	6	17	41	6	73
2	4	12	12	10	3	41
3	8	8	4	7	1	25
4	10	16	14	10	1	51
5	7	27	21	19	7	81
6a	21	52	42	36	11	162
6b	21	52	42	36	11	162
7	2	6	18	22	4	52
8	1	4	5	12	0	22
9	0	1	0	0	0	1

3)



4)

A score by year -weighting factors

Much Less	Less	Same	More	Much More
-2	-1	0	1	2

$$\text{Score} = (-2 \times 2 - 1 \times 6 + 1 \times 41 + 2 \times 6) / 72$$

5)

Cod 2002

Area	
1	0.59
2	-0.11
3	-0.56
4	-0.47
5	-0.10
6a	-0.22
6b	-0.22
7	0.38
Average score: -0.09	

6)

Cod ICES
Bottom
Trawl
Survey

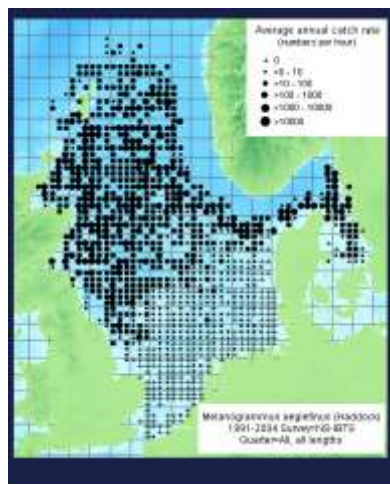
Areas 1-7



7)

Haddock
ICES
Bottom
Trawl
Survey

Areas 1-4
and 7

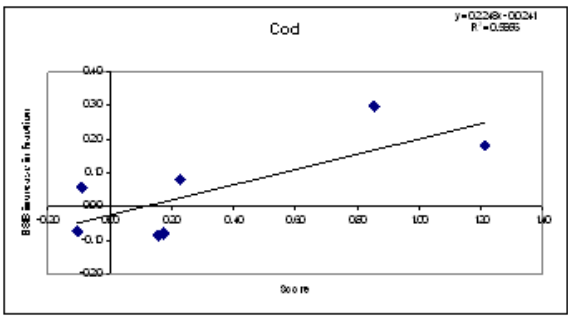


8)

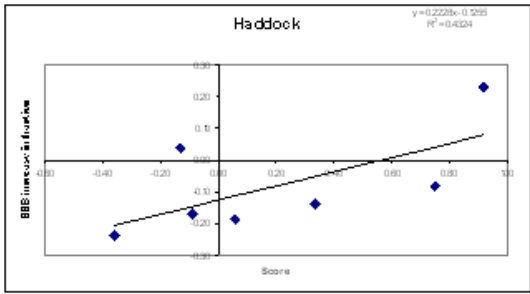
Do the score agree with ICES estimate of changes in SSB from one year to the next?

9)

Cod 2002-2008

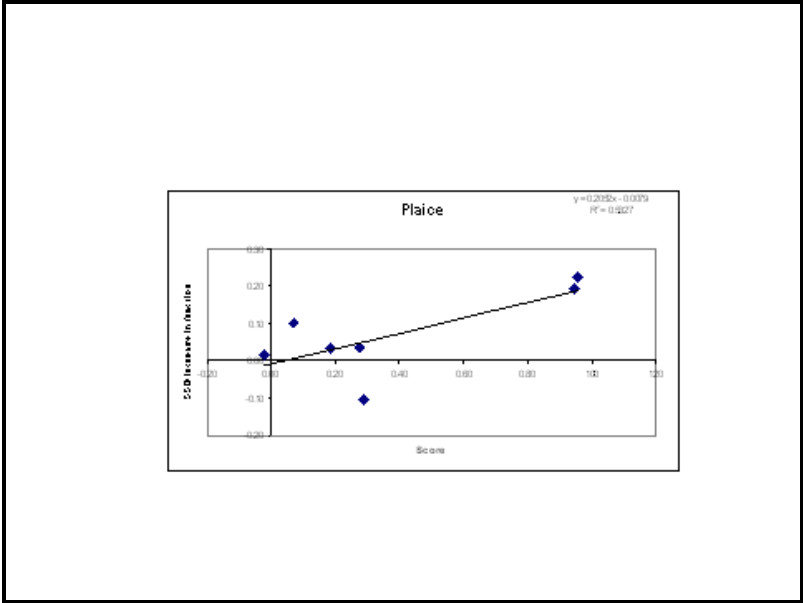


10)

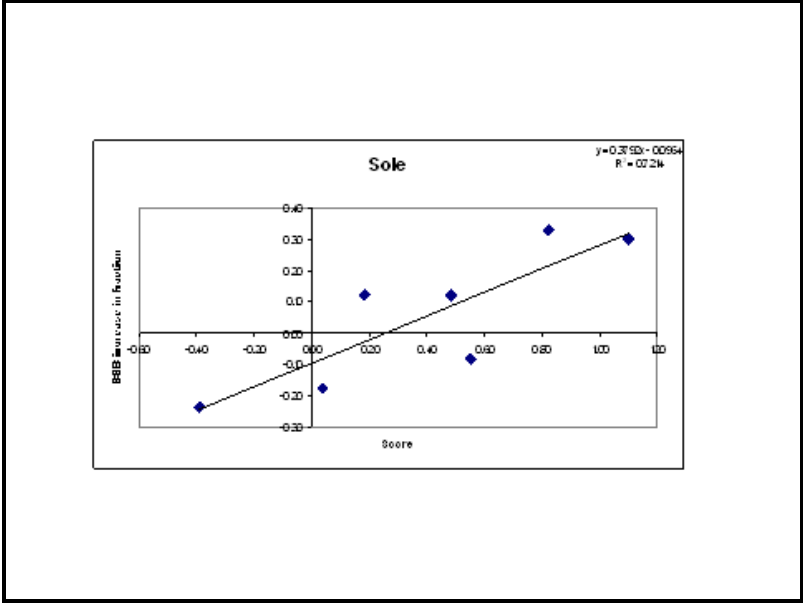


11)

12)



13)



14)

Yes, the scores agree with ICES estimates

How can it be used?

- Be part of the assessment model as one out of several timeseries – in that way the ICES estimate of SSB will be influenced by the score.

15)

What is needed for that to happen?

- Further analysis of the score calculation:
 - Should subarea size be included
 - Should subareas be weighted according to stock importance, e.g. based on IBTS data
 - Should additional information on average size, recruitment etc be included
 - Should other score algorithms be considered
- Revise ICES assess model to include the Fishers Survey Score timeseries of SSB changes from one year to the next

16)

Thank you for your attension

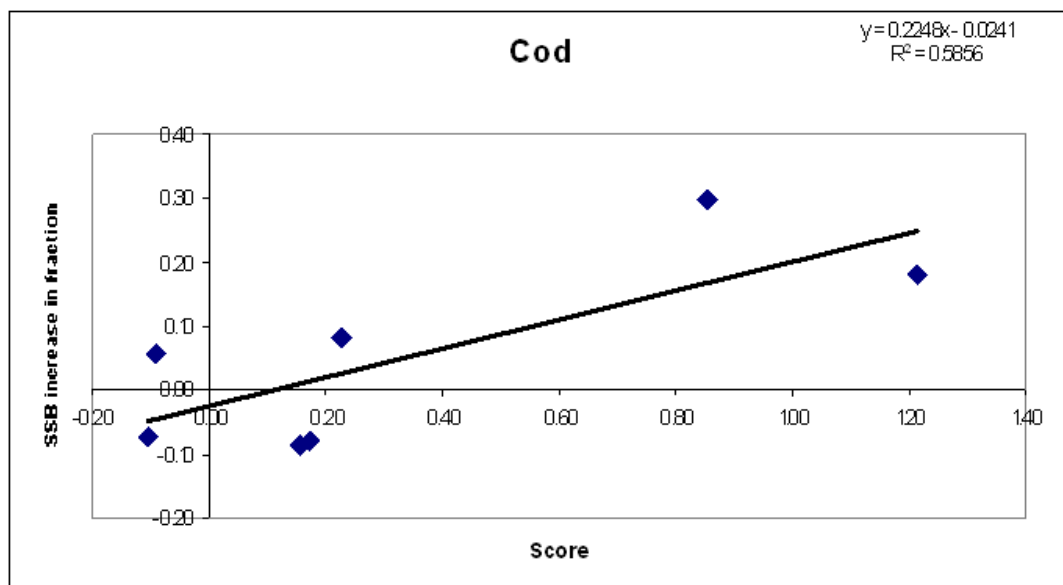
17)

Appendix 2

B) *Extract from the Minute of the Meeting of the North Sea RAC Executive Committee on 18th February 2010*

7. North Sea Fishers' Survey

7.1 Henrik Sparholt of ICES gave a presentation on the results of the Fishers' Survey based on a questionnaire issued annually through the NSRAC. The main source of information is a question based on fish abundance, eg. Has the abundance of cod changed since last year?. The answers are collated for different areas of the North Sea. Further analysis within ICES has applied a weighting factor to the different answers. The scores have then been worked out for the different areas. The scores have been compared with the results of the ICES Bottom Trawl Survey, in terms of changes in Spawning Stock Biomass from one year to the next. The results for cod over the years 2002 – 2008 are shown below:



7.2 A similar correspondence has been obtained for haddock, plaice, and sole. So, the scores from the Fishers' Survey agree with ICES estimates. That result leaves the way open for the Survey results to become part of the assessment model as one out of several timeseries – in that way the ICES estimate of SSB will be influenced by the score. For this to happen, further analysis of the score calculation must be carried out to ascertain:

- Whether subarea size should be included
- Whether subareas be weighted according to stock importance, e.g. based on IBTS data
- Whether additional information on average size, recruitment etc should be included
- Whether other score algorithms should be considered

Then, the ICES assessment models can be modified to include the Fishers' Survey Score time series of abundance changes from one year to the next.

Appendix 2

- 7.3 This approach looks really promising. We now have a time series which can be used in the assessments, but it needs a scientist to go through these calculations in order to present the results at an ICES benchmark meeting. The conclusion is that the Fishers' Survey should be continued as a good way of obtaining a time series of abundance.
- 7.4 Hugo Andersson thanked Henrik for his efforts on behalf of the Survey. Michael Park warned that enthusiasm for the survey had waned amongst fishers. Paula den Hartog agreed but thought that the knowledge that ICES is using the results would go some way towards restoring confidence in the survey. Barrie Deas said this was a very positive development. Our efforts were paying off. We should prepare a press release on this. The method offers a way of introducing fishers' information into the ICES assessments in a systematic way.
- 7.5 Henrik Sparholt thought that it was too late to introduce the figures into the 2010 benchmark meetings, which were about to be held. First we would need to prepare the material for the benchmark meeting. A scientific paper could also be prepared on this subject. Niels Wichmann said that a Danish journalist could perhaps interview Henrik, and the information could be released to the press by that means. Ann Bell pointed out that Ian Napier, of the North Atlantic Marine Centre, who had prepared the most recent data had also made a number of comments on the survey. She would discuss the preparation of a scientific paper with Henrik and Ian.

