A VIEW FROM FAROE

ICES AND EFFORT CONTROL MANAGEMENT

For some this is a funny story.
Others are reminded of Scientist who do not know their limits.

The story goes like this . . .
Somebody stole the stereo from the deaf people.
But do not worry. The blind people are searching.

DECEMBER 2016

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INTRODUCTION

This report has been written to provide insight should the United Kingdom replace the current Quota system with an Effort Control Management system.

A section of this report examines the advice from scientists and ICES. ICES are an example of an organisation that is living its own life. They are well educated people but it is hard to find any connection between their theory and realities of stock dynamics.

In no other industry would scientists choose to ignore the extensive expertise and practical knowledge of so many people!

There is reason to believe that fishermen know more than they are given credit for. The only other example that comes to mind is Ellinor Ostrom, Nobel Laureate, who noted that water systems in Asia, built by local uneducated people, were twice as effective as those built by well educated engineers.

This report includes some of the criticisms of fishery scientists, results and working methods.

The other part of this report is an explanation of the Effort Control/Days at Sea System used in the Faroe Islands.

This report is written with the purpose of explaining, in brief, some advantages of a Days at Sea system.

Information from this report can be used as an appraisal by politicians in the United Kingdom as they look to options for fisheries management as an independent nation.

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Strendur
Faroe Islands
30th December, 2016

ADVANTAGES OF REGULATION

If a fishery is unregulated then competition will be so fierce that nobody can make a profit and nobody will invest in future improvements. Nobody can finance an industry where the only certainty is that everybody will go bankrupt.

There is also reason to believe that an unregulated fishery will not yield the maximum quantity of fish. Therefore some regulation is needed.

Regulation provides a level playing field creating property rights and security in a regulated industry. This enables financing and paves the way for development and improvement in every aspect of the industry. The industry then has manpower, finance and equipment needed to sustain businesses.

Consequently, some form of regulation is needed - this is the easy part. The difficult part is finding a solution that is the best economic as well as the best ecologic solution.

The solution is even harder to find because Scientist with biological knowledge do not accept their limitations. Politicians listen to scientists - nobody listens to the Fishermen.

The problem in the Fishing industry is that the decision maker is the least informed, and the expert with the greatest knowledge has little or no influence on the regulation of the industry.

Politicians must open their eyes and understand that within the Fishing industry their are many experts, who although not academic, have a lot of knowledge due to lifelong experience in the field.

Fishermen are dependant on sustainable, successful fisheries as to whether their children go hungry to bed if they do a poor job and with the risk of losing their home if failure of management leads to failure of stocks.

In what other facet of life would other peoples opinion be of more value than the worker with this much at stake?

If the politician understood the work of the scientist and of the fishermen they would pay more heed of what fishermen are saying.

Then, with all parties working together, regulation would be more advanced and efficient as a result.

THE INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA (ICES)

ICES was established in 1902 in Copenhagen by 8 nations including Denmark and the United Kingdom. Today there are 20 member states. Total budget in 2014 was 42 million DKK. Income was 22 million DKK from membership countries, 10 million from the EU and 4.5 million from selling data etc. to other institutions and 4.8 million from projects. As with most government institutions expenses were higher than income by 2 million at just over 44.5 million.

ICES USES QUESTIONABLE DATA

As an example we will look at the Faroe Islands. Here they use a trawler built in 1978. They conduct 200 test tows of one hour duration in the spring and 100 test tows of one hour duration in the autumn. These test tows are conducted on the same day at the same time every year for comparison which takes no account of the cycles, conditions and fluctuations of the natural environment. This data, which they use to estimate the stocks of cod, haddock and saithe, is therefore unrepresentative of the true dynamics of the marine environment.

Scientists claim this to be the scientifically correct method which should guarantee a correct result, however fishermen dispute this. They have 3 arguments . . .

1. A design drawing of the trawl does not exist and the trawl looks like a part of it is missing. This has been stated and documented with particular questioning of the unsuitability of going directly from 135 millimetres to 40 millimetre mesh size. This is very unusual, and no gear technologists believes this to be the correct hydro-dynamics. There are no drawings of the trawl doors and one has been replaced. This replacement was not original because the company with the original does not exist anymore, this further compromises the suitability of the gear.
2. It is not possible to compare trawling over the years by using the same date and the same hour. Fishermen use the tide and the phase of the moon and neither follow the dates of a calendar. Thus using same hour and date is not reliable and should not count as scientific.
3. Since 1961 scientists have produced advice on the levels to be fished of cod, haddock and saithe. Comparing advice and actual fishing shows us two interesting things.

   Firstly, their advice of reductions of cod at 71%, haddock at 81% and saithe at 86% in comparison to what we have caught over this period should not be possible. According to ICES models the last cod should have been caught before 1970.

   Secondly, the next thing to note is that both graphs are practically identical, this should not be possible. This shows that catch data is a large part of their mathematical formula and as their catch data is inaccurate for the reasons cited above this is therefore most likely the underlying problem with calculations from ICES. The model is too simple and indications are that it is not reliable, as also mentioned by Fiskidaganevndin *(*Faroese Marine Institute).*

ARE ICES CALCULATIONS RELIABLE?

Today all regulations are done on basis of advice from ICES, however not everybody follows, or believes that advice is accurate. However, as MSC and other groups are emerging, and Supermarkets and customers are willing to pay more for a stamp from MSC, there is an increasing dependancy and conformity to listen to ICES.

It is all based on an assumption that what ICES says is correct. There is absolutely no evidence of any improvement in how their data is collected and there is no proof that ICES advice is reliable.

The stamp from MSC is purely a money machine and sales tactic where large supermarket chains pay to avoid responsibility and unwanted attention.

Below you see ICES advice in comparison to that of Havstovan for 2011, 2012 and 2015 and 2016. The table is shown so that the years are on the same line. It is very clear that ICES are calculating back in time. This means they change the numbers. Probably they say it is scientific, however, what assurance is there regarding accuracy of their figures when their own documentation shows that they do not know the size of the stock in the current year?

The table below shows that in 2011 SSB was estimated to be 29.801 ton, in 2012, 23.813ton , 2015 19.290 ton and in 2016 18.135 ton. This proves that calculations are not even close to reliable.

The same situation arises when the data for Saithe is scrutinised. This shows that ICES are not infallible.

ESTIMATE OF COD BY ICES AND HAVSTOVAN

TOSKUR

NB! Gýtingarstovnurin (SSB) er í tonsum, meðan Tilgongdin er í 1000-tal

	Sambært ICES / Havstovuni Juni 2011		Sambært ICES / Havstovuni Juni 2012		Sambært ICES / Havstovuni Juni 2015		Sambært ICES / Havstovuni Juni 2016	
Árstal	Gýtingarstovnurin (SSB)	Tilgongd	Gýtingarstovnurin (SSB)	Tilgongd	Gýtingarstovnurin (SSB)	Tilgongd	Gýtingarstovnurin (SSB)	Tilgongd
2000	46.314	19.731	46.031	19.723	45.736	19.710	46.396	19.972
2001	59.179	29.699	58.926	29.695	58.652	29.687	59.118	29.888
2002	56.132	13.265	55.918	13.262	55.679	13.258	56.006	13.160
2003	40.548	6.272	40.488	6.254	40.399	6.240	40.542	6.112
2004	27.204	3.661	27.144	3.652	27.059	3.631	26.435	3.527
2005	23.738	6.371	23.616	6.102	23.470	6.095	22.942	5.880
2006	21.345	8.230	21.054	7.706	20.897	7.619	19.879	7.393
2007	18.169	5.957	17.549	5.207	17.387	5.120	16.786	5.030
2008	22.787	8.718	20.792	7.117	20.433	6.506	20.129	6.465
2009	23.900	12.685	20.412	9.801	19.563	8.425	19.359	8.237
2010	31.404	19.456	24.065	15.453	21.525	12.297	21.047	11.303
2011	29.801	11.403	23.813	4.400	19.114	4.145	18.135	4.294
2012			25.829	3651*	19.290	1.773	17.848	1.884
2013					20.785	2.453	19.083	2.890
2014					21.142	6.772	20.087	7.654
2015					18.781	874	19.729	2.389
2016							22.408	3.374

Source: Fiskidaganevndin Faroe Islands 2016
http://www.fo24.net/2016/08/11/3313

ESTIMATE OF SAITHE BY ICES AND HAVSTOVAN

UPSI

NB! Gýtingarstovnurin (SSB) er í tonsum, meðan Tilgongdin er í 1000-tal.

	Sambært ICES / Havstovuni Juni 2011		Sambært ICES / Havstovuni Juni 2012		Sambært ICES / Havstovuni Juni 2015		Sambært ICES / Havstovuni Juni 2016	
Árstal	Gýtingarstovnurin (SSB)	Tilgongd	Gýtingarstovnurin (SSB)	Tilgongd	Gýtingarstovnurin (SSB)	Tilgongd	Gýtingarstovnurin (SSB)	Tilgongd
2000	90.288	35.712	80.603	35.754	80.387	35.840	80.608	35.923
2001	87.357	88.036	82.618	87.894	83.993	88.038	84.237	88.189
2002	83.901	105.756	80.090	105.884	81.692	105.902	81.993	106.023
2003	113.459	61.960	94.680	64.731	97.221	64.250	97.592	64.513
2004	75.641	52.540	109.720	53.416	112.980	53.921	113.454	54.075
2005	133.778	70.116	125.154	69.410	127.858	69.984	128.179	70.045
2006	131.705	21.608	125.234	21.483	127.123	22.222	127.839	22.264
2007	112.859	20.723	120.163	18.628	120.818	18.880	121.636	19.344
2008	116.186	62.346	104.921	36.003	104.362	31.307	105.278	31.700
2009	88.920	36.340	93.514	20.054	93.278	13.723	94.514	14.067
2010	110.606	66.251	71.601	40.771	69.401	24.290	70.921	22.829
2011	110.529	42.680	65.919	42.887	56.238	34.720	57.701	33.044
2012			74.151	25.956*	49.174	34.439	49.796	27.787
2013					48.637	35.951	46.255	26.799
2014					70.026	61.619	58.803	40.621
2015					82.089	26.993	77.216	62.836
2016							96.770	29.626*

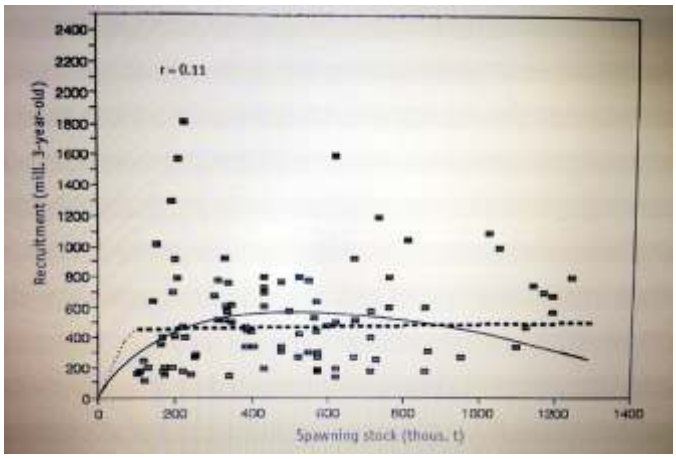
It was estimated in 2004 that spawning stock biomass of Saithe in 2011 should be 75.641 ton, in 2012 109.720ton, in 2015 112.980 ton and in 2016 113.454 ton.

This shows that they are calculating backwards to get their numbers right. This is proof that they have no idea of the current situation.

THERE IS NO CONNECTION BETWEEN SPAWNING STOCK AND RECRUITMENT

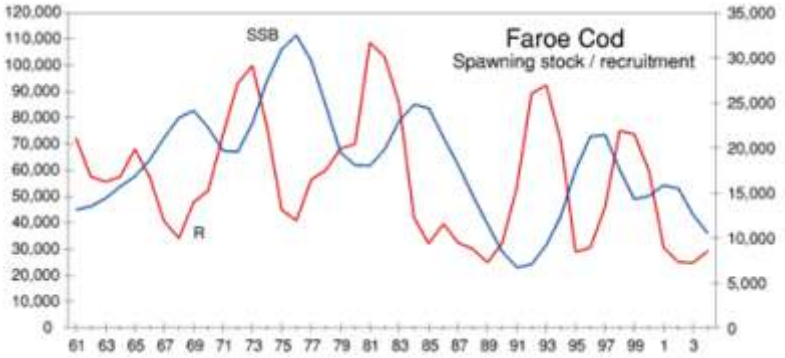
ICES advice is to have a relatively large biomass so that we can fish the same quantity every year and be sure we have a good reproduction of each species.

This argument sounds good, but documentation shows that there is no connection between size of stock and how many new fish enter the stock. In fact the only proof is that it is the opposite. Norwegian statistics of cod show us that the relation between size of spawning stock and recruitment is R=0.11 which is very close to zero connection.



Relationship between recruitment of North-East Artic cod stock and spawning stock biomass.

Jón Kristianson, who is an Icelandic fisheries biologist, made a very interesting curve from data from the Faroe Islands. This data shows very clearly that recruitment and size of stock are in counter phase.



Gytebestand SSB, og rekruttering R, svinger i motfase. Stor gytebestand gir liten rekruttering.

COD CAN INCREASE LENGTH 15% AND DOUBLE IN WEIGHT IN JUST 90 DAYS

A test was made in Canada to find out about growth of cod and also their ability to swim. The test was done on 30 cod caught in St. Lawrence Bay. The test was done over 84 days and the cod were put in two closed chambers with 15 cod in each. One half did not get any food at all and the other got as much food as they wanted.

Results were pretty clear. Starved cod lost 200 grams of weight and several millimetres in size. Fed cod gained 600 grams (85%) in weight and 6.5 centimetres (15%) in length.

The test also showed that starving cod have a significantly reduced ability to swim fast or in bursts. This severely reduces their ability to catch food.

Table 1. General characteristics of Atlantic cod before and after 12·weeks of feeding or starvation at 9.9±0.4°C and a salinity of 28.7±1.1‰

Parameter	Starved cod	Fed cod
Initial mass (g)	754 ±136	799 ±166
Initial length (cm)	46.1 ±2.8	45.6 ±3.0
Initial condition factor (initial mass 3 length3)3100	0.76 ±0.03	0.84 ±0.10
Final mass (g)	509 ±112	1457 ±356
Final length (cm)	45.8 ±2.8	52.3 ±3.2
Final length range (cm)	40.3 to 50.3	46.2 to 58.3
Final condition factor	0.53 ±0.04	1.0 ±0.1
White muscle mass (g)	143 ±46	732 ±178
Red muscle mass (g)	10.4 ±3.4	23.4 ±6.0
Growth rate in mass (%·day–1)	–0.49 ±0.11	0.78 ±0.20
Growth rate in length (%·day–1)	–0.01 ±0.01	0.18 ±0.06
Gonadosomatic index	1.0 ±0.8	0.8 ±0.5
Hepatosomatic index	0.6 ±0.1	7.9 ±2.1
Hematocrit (%)	32.55 ±10.27	34.24 ±5.29
Male/female	15/15	15/14

Data are shown as means ± S.D.

COD LARVA KNOWS HOW TO STAY AWAY FROM PREDATORS

A Norwegian study, based on other studies, shows that there are many reasons why fish larva survive or not. The study shows that cod larva know how to avoid predators. It shows that if larva are well fed, or even moderately fed, the ability to identify and stay away from predators is substantial. However, moderately fed cod larva move to find food, increasing their susceptibility to predation.

This study showed that there are three factors which are important for the survival of cod larva. They are, access to food; staying away from predators and the ability to survive an attack from a predator.

Citat from the Norwegian study

The proportion of larvae found in the safe side provides information on the larvae's ability to sense a predator and to behave in an adaptive way to its presence. In the three youngest age groups almost all the surviving larvae were in the safe side. Except for in the youngest age group, starved larvae seemed more vulnerable to predation than fed larvae. The number of starved larvae found in the safe side was lower than in the control groups, indicating that more larvae moved over to the risky side than in the opposite direction. The starved larvae thus seemed either unable to sense the predator at the required distance or unable to keep distance. For the fed larvae the safe-side distribution was not different from the control groups. Two causal mechanisms might explain this. The fed larvae could either sense the predator presence and/or avoid the area of danger, or the escape success could be relatively higher, giving them time to move from the risky to the safe side by random movement or active avoidance at the same rate as they moved in the opposite direction. We favour the latter explanation because otherwise one could argue that fed larvae in the 13 d age

group are more developed in regard to perceiving predator presence than the starved larvae in the 21 d age group. This is unlikely, since when the larvae in the 21 d age group were transferred to the starvation tanks they were older that the fed larvae in the 13 d age group.

For the two oldest age groups a gradually higher proportion of larvae were found in the safe side. Here we would argue that the safe side distribution is relatively more affected by the larvae being able to perceive the predator's presence. This is supported by the observation that feeding activity was influenced by predator presence in these older age groups. The safe side distribution would be the result of one or several of the following behavioural mechanisms: 1) The larvae showing a higher reaction rate with age (Folkvord and Hunter 1986; Margulies 1989) giving them more time to seek refuge by random movement, 2) the larvae sensing the predator and avoiding entering the risky area, and 3) the larvae actively seeking refuge in the safe compartment.With increasing age and nutritional status the relative importance of these mechanisms differ as a result of the ongoing development of the sense organs with larval size or age (Batty 1989; Fuiman and Magurran 1994) and of differences in motivation for predator avoidance. For instance in the oldest age group significantly more fed and moderately starved larvae were found in the safe side compared to in the controls, while for the most starved larvae there was no difference. The fed and moderately starved showed (1) a high reaction rate, (2) sensed the predator and avoided entering the risky area and, (3) could likely actively seek refuge. The most starved larvae sensed the predator and avoided entering the risky area (2), but the escape success was too low to give the larvae time to seek refuge, or if they were able to actively seek shelter, the motivation to do so was too low.

This study shows that very small cod larva have the ability to evade predators. It is also clear that if the number of predators in one year is much higher in comparison to another year, then the number of cod larva that survive is lower.

Cod are cannibalistic. Resultantly, a large stock of cod reduces survival of larva. A great influx of mackerel and herring, such as that encountered recently in the Faroe Islands, shall also be expected to have some effect.

Jón Kristjánsson, who is a scientist from Iceland, has completed studies which document that when the spawning stock of cod is large the survival rate of larvae and small cod is very low.

In 1961 Ponomarenko showed that in the Barents Sea 55% of food (by weight) in cod between 15-35 cm long was other cod smaller than 10 centimetres.

ICES FLAWS, by Jon Kristjansson

What is here called "ICES" and "They", is a synonym for the national institutions that are responsible for the fishery research and management in the different countries united in ICES.

Ices, originally founded to gather multinational information has become a cartel consisting of many nation's Fisheries Research Institutes that act like a block. They have common views and policies, and reject and fight hard against opinions and oppositions from fishermen and independent scientists.

They use survey data to fulfil their models, without considering biometric data, general ecology and fish biology.

They ignore intra- and inter- species competition for food and space

They have determined, guessed, that natural mortality, N, is a constant factor 0.2, for most species and most year classes, and is invariable. One only has to ask a salmon farmer to know that the mortality (natural) in his tanks and cages it not a constant factor. It depends solely on available food and space and general well being of the fish. If the manager does not thin out in the tanks (by fishing) and distribute the fish between tanks, mortality will rise.

ICES calculate the total mortality, Z, from survey- and landings data, with uncertainty that is never reported. The fishing mortality, F, is then calculated from the equation F=Z-N

They ignore health and body condition of individual fish and how it affects mortality. The well behaving of the fish affects its survival rate. A poorly fed fish has less resistance against diseases and predators, lower resistance and is more likely to die.

In their management, they control only one factor, that is fishermen. Throughout the management history, from around 1950, the only explanation for diminishing fish stocks, according to their measurements, is over fishing and their only advice has been: Fish less

They disregard information on selective fishing, how targeting only the larger part of fish populations affects the younger year classes, leads to increased competition and increases mortality in young fish leading to less recruitment (Kolding, J. and Paul A.M. van Zwieten 2011).

They ignore how density affects the growth of fish. Higher numbers of fish in an area means that there is less food for the individual fish. That means slower growth and poorer body conditions. In such a situation, fishing intensity has to be increased. But they do not even record fish condition or pay intention to it

The net result of management last 30 years is that the harvest from most demersal stocks has decreased. They tell us that over fishing is the cause, however most fleets have been vastly reduced during the period (Kristjansson, Jon 2016)

In the Faroe Islands ICES changed SSB from 110 ton to 66 ton, or 40% reduction, in a two year old data-set. This is not scientific. Ray Hilborn also came to this conclusion at the 2011 World Conference on Stock Assessment Methods for Sustainable Fisheries (July 2013, Boston, USA).

He concluded: "Results from the simulation workshop indicated that none of the conventional age-based or age-aggregated models performed well for recovering simulated truths at the end of the time series—the period that has the most influence on fishery management. The recognition that stock assessment models are gross simplifications of complicated realities should help us to accept the general shortcomings of typical stock assessments and to avoid elevating stock assessments beyond their capability".

References:

Kolding, J. and Paul A.M. van Zwieten (2011): The Tragedy of Our Legacy: How do Global Management Discourses Affect Small Scale Fisheries in the South? http://jonkr.mmedia.is/english/tragedy.pdf

Kristjansson, Jon (2016): Conference in Runavik Faroe islands September 2016. http://jonkr.mmedia.is/english/Runavik2016.pdf

DAYS AT SEA SYSTEM IN FAROE ISLAND

In the Faroe Islands fishing was unregulated for everyone outside of 3 miles until 1964, when the limit was set at 12 nautical miles. Thereafter is was increased to 200 nautical miles on the 1st January,1977.

Since the Faroe Islands started fishing with larger vessels in 1872, fishermen from Faroe Islands have been fishing in other countries. First in Iceland and then Greenland, Barents Sea, Canada and North Sea.

When fishing grounds were nationalised in 1960-1980 Faroese fishermen lost a large and profitable part of their fishing grounds.

Every vessel had to come and fish in Faroese waters. This over capacity was not a good situation as Faroese fishing grounds do not yield as much as the fishing grounds of Iceland, Norway and also Canada .

To address this situation the Faroe Islands initiated the provision of government subsidies to compensate. Fish factories were established as a job creator, and not as a profitable business. As fish factories need fish, the fleet was increased. This all through the government subsidies.

Due to these government subsidies and guarantees to banks, this artificial bubble continued for 10-15 years, until 1992 when the banks went bankrupt. The trigger was that the artificial bubble had created over-fishing of cod and haddock, stocks of which went down to almost zero.

Denmark bailed us out with very hard conditions. One condition was a quota system. Another was that all fish factories got one owner and some of the existing factories were closed. It was a creditor solution.

In 1994 the quota system was initiated and due to the low stocks, started from a point of very low quotas.

In 1996 this was changed because it was impossible to fish legally due to the quota system. Faroes is a small country where everyone knows what is going on.

Parliament, together with industry, and with very little or no help from scientists, replaced the quota system with a Days-at-Sea system.

The following is a short introduction to the Faroe Islands Days-at-Sea fishing system and the history which led to it.

WHY DID FAROE ISLANDS REPLACE QUOTA WITH FISHING DAYS?

The Faroe Islands has used a Days-at-Sea system since 1996 after the Faroe Islands were forced by creditors to introduce a quota system in 1994.

After two years the quota system was discarded because quotas and catches were very different as black fish (illegal landings) became a very big problem.

As the system failed, parliament raised the quota twice in one year against all advice, as politicians and committees (not experts) tried to find a solution.

The quota system was put in place in 1994 because of demand from the Danish Government who provided money because Faroe Islands government and the Banks went bankrupt. It was against the will of parliament but parliament had to agree.

The Quota system was initiated after the two worst fisheries for cod ever recorded. As ICES has used these historical catches as a part of their estimate, quotas were very low. However, as stocks rebounded the inaccuracy of data generated by quotas meant there was a lot more cod and haddock than scientists were willing to admit. The fisheries in the Faroe Islands consists of many different species in the same place, with cod catches found everywhere.

The solution for fishermen in response to quotas that were lower than the predominance of fish encountered on the grounds was not to discard, but to cheat.

Fish was mis-reported as species which were not subject to any quota.

Statistics from this period show that exports of ling and tusk increased by a surprising amount due to this mis-documentation. Statistics also show that recordings of landing of small cod virtually disappeared.

It has now been admitted publicly that a lot of fish was exported to EU countries where they were more than happy to change the name of the fish.

The Faroe Islands is a very small country where everybody knows everybody, and it is not possible to have a system where everybody is cheating.

It must be borne in mind that the size of quota decides what and where it is possible to fish. Insufficient quota either drives vessels away from more profitable fishing grounds to fishing grounds with little profitability as they try to comply, results in misreporting and bad data, or as observed in the United Kingdom and the EU, results in excess effort as vessels must discard fish that they have no quota for in order to find fish that they can keep. To understand this you probably need to be a fisherman.

History shows that ICES has made a lot of mistakes and the short term reliability of ICES is very poor. Due to this the quota allocated was wrong and out of line with stocks.

Because members of parliament in the Faroe Islands in 1995 understood the fishing industry and listened to the people involved in the industry they could comprehend the problem.

By moving to a Days-at-Sea system they solved two problems. One was cheating and the other was the inaccurate data and science caused by this. Due to the failings of the quota system, and the mistakes by the scientists, the total GDP of the Country had been reduced by 5-10%.

HOW WAS QUOTA TRANSFERRED TO DAYS-AT-SEA

In 1995 and 1996 a group of persons representing different types of fishing vessels and government offices sat down to find a solution to the problems with the quota system. This group came up with a Days-at-Sea system.

When Days at Sea were introduced the fleet was divided in to seven groups.

Categories of fishing vessels in 1996 and allocated days

Category	Type	# of Vessels	Days per vessel	Total days
1	Large single trawlers had a separate system, moving to Fishing-Days later			
2	Pair Trawlers	33	243	8,225
3	Long liners >110 GRT	19	160	3,040
4	Long liners 60-110 GRT	16	110	1,650
5	Long liners 40-60 GRT	31	110	3,410
6	Long liners 15-40 GRT	56	100	5,600
7	Boats < 15 GRT	211	96	27.000

Each vessel then received a number of fishing days. In order to calculate how many days each vessel should have they counted how many days each group had been at sea between 1984 and 1994.

From this they reach an average, and this average number of days was allocated to every vessel/boat in each group. Every vessel in each group obtained the same number of days.

In the table above you can see how many days each type of vessel got and how many vessels there are and total number of days.
The table below shows how many fishing permits there were.

Number of fishing permits, by vessel category, 1987 - 1995

	1987	1988	1989	1990	1991	1992	1993	1994	1995
Single Trawler	21	21	20	20	17	16	16	15	15
Pair Trawler	53	53	58	55	47	46	39	37	35
Long Liner	17	17	19	21	21	21	21	19	19
Small boats > 20 GT	84	84	75	84	74	68	68	68	68
Small boats < 20 GT				305	335	297	274	950	1092
Others	17	17	14	15	13	13	15	15	

Categories 3-7 are free to use long line or jiggers.

Category 7 is a special group. Many people own a small boat. No fishing permit was needed before 1990 for boats below 20 GRT. It was decided that everybody had a right to a fishing permit. Thus all small boats were registered as fishing boats. Thus number of licences was 1092 as shown in table.

Category 7 was also changed to below 15 GRT. Thus the number varies in these categories.

As the table above shows, total number of small boats is 1092 but only 211 are full time fishing vessels.

As we know, when there is plenty of fish everybody remembers they have a boat. Thus the number of fishing days was significantly raised. It was close to doubled. In total it was 27,000.

The 211 full time fishing vessels own their days and the rest is shared between the other boats in category 7.

It is to be expected that the smallest vessels/boats should get the best deal when a system is changed. This is because of social considerations where the areas in the periphery always get an advantage.

TAKING CARE OF THE MIXED FISHERIES PROBLEM

Number of days was also based on historical catch data of cod, haddock, saithe and red-fish.

Table: Average share of catch for each species and category 1984-1994

Category	Type	Cod	Haddock	Saithe	Red-fish
1	Single Trawler	4%	1.75%	13%	90.5%
2	Pair Trawler	21%	10.25%	69%	8.5%
3	Long Liner	23%	28%		
4	Small boats > 15 GT	31%	34.5%	11.5%	0.5%
5	Small boats < 15 GT	20%	23.5%	6%	
6	Others	1%	2%	0.5%	0.5%

The system was set up based on historical catches. The risk with fishing days is that everybody tries to catch only one type and large quantities of the most valuable species. The solution to this is a system of regulation with areas closed for fishing to some types of vessel.

At the same time areas were closed for different types of fishing gear. This was done so that it was not possible to fish in spawning areas and where you only catch small fish.

Regulations have also been made so that the minister can stop fishing in an area of his choice when too many small fish are observed in catches. It is obligatory to report if a vessel is catching too large a proportion of small fish.

This system of Closures helps to protect one type of fish from being over exploited.

It is a simple job to make a system like this, and it has been working for 20 years. Scientists say that you can control fishing with a Days-at-Sea system.

When you make a system for fishing you have to think long term and find a system that is accepted and is possible to administrate and gives the best long time result.

In 20 years we have learnt:

1 Scientific advice reduced Days-at-Sea by approximately 40% over 20 years, however despite less time, total catch levels have been maintained.
2 Any benefits of a Quota System can also be provided by a Days-at-Sea system.
3 There is a clear correlation between used Days-at-Sea and total catch.
4 Annual Catch has reached record highs on two different periods. Iceland, UK and others with a quota system never reach 50% of previous records.
5 Smaller boats were allocated more Days than historical calculation recommended.
6 Stocks on closed fishing grounds do not increase.
7 There is absolutely no black fish. Discarding does not exist. Statistics in the Faroe Islands are 100% correct.
8 Automatic reduction of Days-at-Sea of 1% per annum to compensate for productivity gain should have been implemented in 1996.
9 Political power of scientists make every fishing system unstable.

Segregation of different types of fishing gear is a challenge. Deciding how to limit catches of particular fish is a challenge. To facilitate transferability of days between vessels a conversion table for the value of one Day-at-Sea to another type of vessel has to be made. That is a challenge but it was accomplished in the Faroe Islands.

PROPERTY RIGHTS OF FISHING PERMITS AND DAYS-AT-SEA

In order to fish a vessel needs a fishing permit and an allocation of Days-at-Sea. Days-at-Sea are allocated to each fishing permit based on the original distribution in 1996. Parliament allocates Days-at-Sea every year in August for the period 1st September until 31st August.

Fishing permits originated in 1993, based on data from around 1980 when fishery limits were set to 200 nautical miles.

Between 1977 and 1993 you needed permission from government and a fishing licence, and new licences were given. No new permits have been allocated since 1993. Fishing permits are the property of the owner.

It is possible to consolidate two permits into one when buying other vessels or when replacing two vessels with one larger vessel.

It is possible to buy fishing days from another vessel. You can sell all your days or just a part of your Days-at-Sea.

It is not possible of permitted to own Days-at-Sea and no vessel so as all rights to fish stay with active fishermen.

It is not permitted to own a vessel with a fishing permit but with no Days-at-Sea.

DAYS AT SEA ARE EQUALLY GOOD TO QUOTA TO PROTECT FISH STOCKS

Head scientist at Havstovan, Eilif Gaard, said that in principal there is no difference between the efficiency of regulation with Days-at-Sea or Quotas.

In a meeting with politicians in November, the chief scientist from Havstovan on cod, Petur Steingrund, also said that regulating fisheries with Days-at-Sea or with Quotas is equally efficient.

HOW DAYS AT SEA ARE SET BY PARLIAMENT

Parliament received two differing sets of advice. One from Havstovan, which is government institution, based on advice from ICES. The other from the "Days at Sea Committee" which inputs the advice, expertise and observation from the fishing industry.

In general, Parliament listens more to the expertise within the industry, but as Havstovan/ICES annually advise a reduction there has been a small reduction almost every year despite catch levels remaining consistent showing stocks are stable.

Resultantly, due to ICES advice, Days-at-Sea have been reduced by approximately 50% since 1996.

HOW TO MAKE A NEAR PERFECT DAYS AT SEA SYSTEM

1. Divide all vessels into different sizes and different types of fishing gear.
2. Calculate how many days current fishing vessels have used the past 10-20 years
3. Every Vessel is allocated Days-at-Sea corresponding to average of his groups historical use of Days-at-Sea (some adjustment has to be made to regulate unfair and unintended allocation).
4. Locate areas that might be closed for fishing by some or all Vessels
5. Name species that are more valuable and might be over exploited
6. Name the most important species for each type of Vessels
7. Calculate how many percent of each important specie each group of Vessels is Catching
8. Make a system to calculate the value of one Day-at-Sea of one type of Vessel to another type of Vessel. This in order to make it possible to transfer days between types of Vessels and keeping the fishing pressure unchanged. This is also useful when somebody is making a new vessel which is not exactly the same size.
9. Have limit on how consolidation between groups is done
10. Make a fixed reduction of Days-at-Sea of 1% pr. Year as productivity is increasing.
11. Every vessel reports on a computer system daily and satellite positioning systems are used. Faroe Islands has a system that is easy to implement. We get public daily statistics online.
12. Make everybody understand that Days-at-Sea in regulating overall effort are managing the eco-system for a sustainable fishery.
13. Try to make everybody understand that it is normal that catches of various species will fluctuate naturally from one year to another year.
14. Make sure everybody trust that the system is fair and Days-at-Sea are distributed in a fair way. If this is not so future agreement will never happen and improvements will be blocked because of lack of trust.
15. Scientists should only give advice and not be left to make decisions.
16. Politicians should make general rules and aims, and leave detailed regulation to fishermen.

DAYS-AT-SEA OUTPERFORM QUOTAS IN EVERY DISCIPLINE

Days-at-Sea eliminates black fish and gives reliable and realistic statistics. Discards will be eliminated. Fishing will be more efficient as you save fuel and become more environmentally friendly. Days-at-Sea will be accepted by the industry. Spawning Stock Biomass will be larger according to reliable data. Scientists say Days-at-Sea are equal to quotas.

Every person with knowledge of the fishing industry will prefer Days-at-Sea. Every environmentalist will say Days-at-Sea outperforms quotas.

Statistics show that SSB is larger with Days-at-Sea than with quotas.

British Politicians must now decide. Hopefully they do the right thing and do not choose the status quo.

No system is perfect.
But this is close to perfect.
Very close.

DAYS AT SEA IN FAROE ISLANDS

Written by Eivind Jacobsen

Eivind was born in 1968. He gained a degree from Business School and a degree as skipper/captain.

A sailor from 1985-1992, Eivind was also mayor for 8 years, running his own business for 14 years.

All his relatives are vessel owners and skippers. He lives in a community where fishing has been important for more than 100 years and hosts a weekly radio programme mainly focussing on the fishing industry.

Eivind has an understanding of fishermen, and also scientific calculations.

A VIEW FROM FAROE

ICES AND EFFORT CONTROL MANAGEMENT

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