



# World Seafood Congress 2015

## Upskilling for a Sustainable Future

Grimsby, England  
5th to 9th September 2015



# Timothy Hansen

U.S. Federal Government Retired and President  
IAFI 2014-2015



## **Breakout Sessions:**

Trade – 2nd floor – Lecture Theatre 2H09

Upskilling – Plenary/Main Hall

Sustainability – 2nd floor – Lecture Theatre 2H16

There is a lift and stairs from the Atrium which leads to the 2nd floor.

## **WiFi:**

You have access to free WiFi and the code is WSC2015

## Logistics about Grimsby University:

## **Smoking:**

Grimsby Institute operates a strict NO SMOKING policy. Smoking is only permitted outside and in the designated smoking area which is accessed via the marquee. This policy also applies to Electronic Cigarettes (“e - Cigarettes”) and other similar devices

## **Prayer Room:**

If you would like to use the Prayer Room, please speak to a member of the team at the registration desk who can assist you

## **Access around the Campus:**

As there are students in and around the University Campus, it is important that you keep within the confines of the Congress area



**Photographs:**

No photographs can be taken outside due to student security

**First Aiders:**

If you or one of your fellow delegates requires any medical assistance, please contact the registration desk. The First Aid Room is located next to the registration desk

**Cloak Room:**

There is a Cloakroom in the Atrium

**Fire Alarm:**

In the unlikely event of the fire alarm sounding, please make your way to the nearest fire exit and your fire wardens will advise you where you to go

**Dinners:**

There will be two off-site dinners arranged by prior booking. Timings are listed below:

Seafood Fayre – Monday 7th September – Humber Royal Hotel from 7-11pm

Gala Dinner – Tuesday 8th September – Humber Royal Hotel from 7-11pm

If you have any questions, please feel free to speak to the team on registration







# Food safety challenges that seafood faces now and in the future

Shared problems – joint solutions

Geoff Ogle

Chief Executive Food Standards Scotland

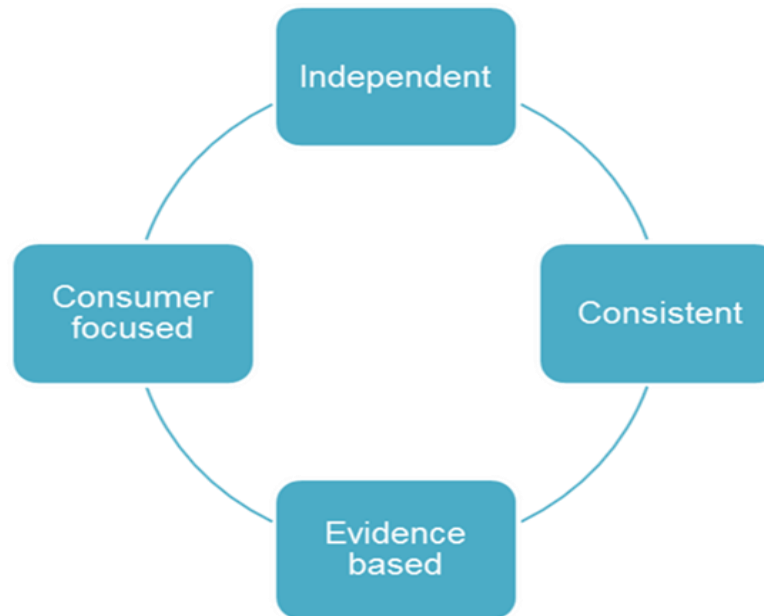
8<sup>th</sup> September 2015



# Introduction to Food Standards Scotland

- Took over the functions previously held by the Food Standards Agency in Scotland, with a broader remit in relation to diet and nutrition

**Here to ensure that information and advice on food safety and standards, nutrition and labelling is:**



# Introduction to Food Standards Scotland

**Works closely with the Food Standards Agency on many matters, including:**

- Policy development and European negotiations
- UK-wide incidents
- Science and evidence



**And in the context of Seafood, Food Standards Scotland will:**

- Represent the interests of Scotland in the development of UK and EU policy
- Ensure approaches to monitoring and enforcement are consistent and aligned with industry profile
- Support the sector in promoting compliance and consumer protection as key benefits to business and economic growth





## **Our Vision-**

To deliver a food and drink environment in Scotland that...

**benefits  
consumers**



**protects  
consumers**

**is trusted  
by  
consumers**

# Food Safety Challenges for UK Seafood

## Current (on-going) challenges:

- **Monitoring and risk assessment** – Contaminants, Shellfish safety, control of histamine and *Listeria monocytogenes* in fish and fishery products
- **Addressing regulatory burdens** – Anisakis in wild and farmed fish
- **Protecting the market** – addressing fraud and ensuring provenance and traceability in the fish and shellfish sectors



# Monitoring and Risk Assessment : Contaminants in fish

- Surveillance now underpinned by Marine Strategy Framework Directive Descriptor 9:  
*Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards*

DIRECTIVE 2008/56/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL  
of 17 June 2008  
establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)  
(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION

impact on marine waters regardless of where their effects occur.



## Currently regulated

- Heavy metals
- Dioxins, furans and PCBs



## New and emerging

- Arsenic
- Brominated flame retardants
- Brominated and mixed dioxins and biphenyls
- Polychlorinated naphthalenes (PCNs)

**BBC NEWS SCIENCE & ENVIRONMENT**

Home World UK England N. Ireland Scotland Wales Business Politics Health Education Sci

2 December 2013 Last updated at 17:58

Microplastics 'pose toxic threat to marine biodiversity'

By Mark Kinver  
Environment reporter, BBC News

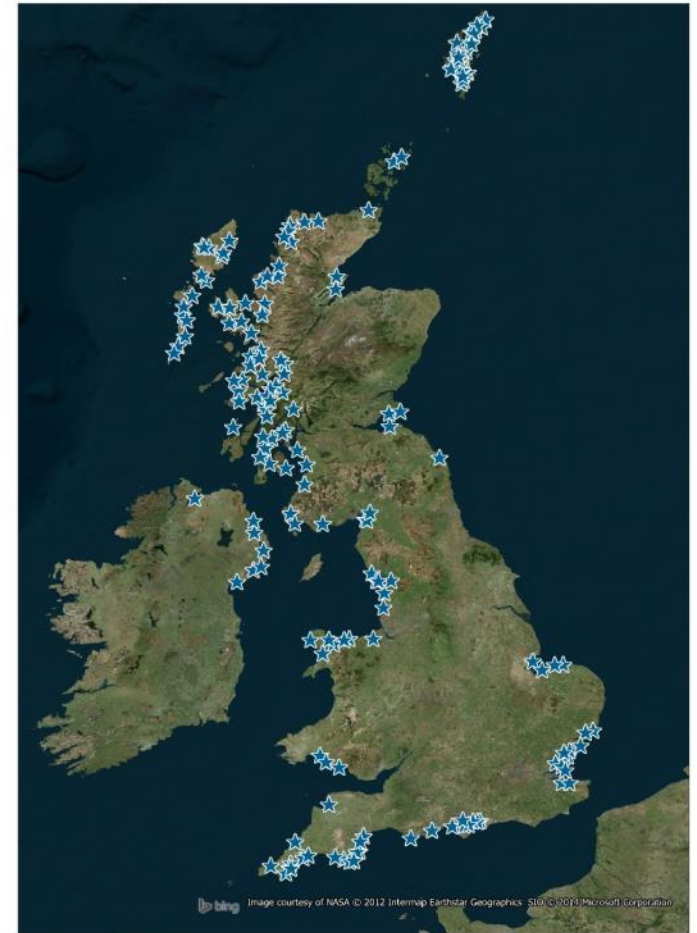
Tiny particles of waste plastic that are ingested by shoreline "eco-engineer" worms may be negatively affecting biodiversity, a study says.

So-called microplastics may be able to transfer toxic

- Preliminary data suggests decrease in levels of regulated contaminants between 2003 and 2013
- Need for on-going monitoring to assess trends and emerging risks

## Monitoring and Risk Assessment Live Bivalve Molluscs

- UK has one of the most developed LBM monitoring programmes in the world
- Compliance with EU Regulations to ensure shellfish harvesting areas are protected from contamination risks:
  - Sanitary surveys
  - Classification & management of harvesting areas
  - Biotoxin monitoring (risk based)
  - Phytoplankton monitoring
  - Chemical contaminants monitoring



# Monitoring and Risk Assessment Live Bivalve Molluscs – Viral contamination

- Lack of monitoring methods and incomplete evidence base – EU survey to inform food safety controls
- Preventing contamination at source: need for collaboration between industry and regulators (food safety and environment)

the guardian

Health warning after norovirus found in 76% of British oysters

Traces of virus, known as winter vomiting bug, found in more than three-quarters of the shellfish tested from UK growing beds

Consumer alert

Most popular

Infidelity site Ashley Madison hacked as attackers demand total shutdown

Food Safety magazine

CURRENT ISSUE DIGITAL EDITION SUBSCRIBE

Food Safety magazine

HOME | CURRENT ISSUE | EVENTS | MAGAZINE ARCHIVE | SIGNATURE SERIES | PRODUCTS | BLOG

CONTAMINATION CONTROL | FACILITIES | FOOD TYPE | MANAGEMENT | PROCESS CONTROL | REGULATORY | SANITATION

Home » Magazine Archive » February/March 2013

SEAFOOD | February/March 2013

**Noroviruses in Shellfish and Other Foods: Challenges of the 21st Century**

By Gary P. Richards, Ph.D., and David H. Kingsley, Ph.D.

If you were unfortunate enough to have a bout of norovirus illness during your lifetime, you probably still remember it

**Tenfold rise in cases of hepatitis E**

Shellfish linked to increase

AN explosion of cases of hepatitis E in Scotland has been linked to shellfish caught off the coast.

More than ten times the number of people are being diagnosed with the virus, also believed to be present in oysters, in the north-west.

Cases of hepatitis E, which causes liver problems such as jaundice and can be fatal in pregnant women, have risen from 13 in 2011 to 143 last year. More than a third of those affected were aged over 60.

The virus is thought to be found in 80 per cent of oysters, including sea lochs, pools and inland waterways.

It is also found in undercooked game meat, such as venison from shooting estates, and processed shellfish.

A study from 2012 found a large number of oysters collected off the West Coast contained the hepatitis E virus. Shellfish can become contaminated if the water has been polluted with sewage or animal waste.

However, it is not clear why there is a rise in cases, but some implications among oysters, only part of which is understood at the moment, according to experts.

The director of Food Standards Scotland (FSS), said: "Hepatitis E can be transmitted to a number of different ways, including poor sanitation and the consumption of contaminated food. FSS and Health Protection Scotland (HPS) are working with other partners to develop research which will improve our understanding of the main risk factors for hepatitis E in the north-west."

Experts say as many as 60,000 victims every year in Britain are regularly contracted the virus, which affects more men than women.

The 2012 study, published in the journal *Emerging Infectious Diseases*, examined oysters in oyster beds from five UK locations in the north-west, including one close to a slaughterhouse and one at a processing plant.

All but three of 26 oysters from the West Coast and five of those taken from the West Coast, but not oysters for hepatitis E, although it is not clear if the oysters have caused illness in humans.

Experts say contaminated oysters may be responsible for 10% of the virus, while the Shetland Islands Food Trust, oyster processor, industry partner, has to be aware.

The new investigation also found that FSS has not achieved a satisfactory level of monitoring responsibility from the Scottish Government and FSS is likely to work to reduce the number of cases.

"We recommend politicians should fund hygiene and following FSS advice about the prevention and handling of food."

... (text cut off) ...



# Monitoring and Risk Assessment Live Bivalve Molluscs – Marine biotoxins



© Shetland Mussels says all the mussels from the affected batch have either been eaten or destroyed.  
 Photograph: Jerry Lampen/EPA  
 The mussel industry in Shetland has suspended all commercial harvesting of mussels from the affected batch.



**MANAGING SHELLFISH TOXIN RISKS**  
 GUIDANCE FOR HARVESTERS AND PROCESSORS

Reviewed April 2014

For all queries about this guidance — including if, you require information in an alternative format such as audio, large print or Braille — please use the number below.

CONTACT TELEPHONE 01224 285157 Jenn

- Natural phenomenon – difficult for industry to manage
- Collaboration between FSS and shellfish industry led to ‘traffic light’ guidance to help in predicting biotoxin events and targeting testing regimes
- Marked reduction in product recalls and incidents

|             |   | Green  | Amber  | Red  |
|-------------|---|--|--|--|
| Information | Official Control results for flesh or FBO's own testing (EPT) | Low levels detected in shellfish   | OC/EPT at or above amber trigger level but below red trigger over previous 4 weeks | OC/EPT gives levels at red trigger level or above                                      |
|             | Phytoplankton Monitoring                                      | Levels below action limits or evidence to suggest non-toxic species                          | Phytoplankton samples at amber trigger level                                       | Phytoplankton samples at amber trigger level   |
|             | Wider Area consideration                                      | Neighbouring areas at green status also  | Neighbouring areas showing flesh or phyto at amber trigger level                   | Neighbouring areas showing flesh or phyto at red trigger level                         |
| Actions     | Harvesting Action   | All harvesting can continue subject to routine verification FBO sampling                     | Harvesting continues, with increased EPT or positive release.                      | Consider suspension of harvesting unless there is evidence for product safety          |
|             | Post Toxic Event Consideration                                | Area returns to green if criteria are met and 4 weeks have passed since red criteria applied | Area should remain at amber alert for minimum of 4 weeks before returning to green | Suspend harvesting on a precautionary basis until levels fall below red trigger level. |



## Monitoring and risk assessment: Managing microbiological risks

### Histamine in oily fish

- Human illness under-reported
- Resistant to cooking – need for control from catch through to processing and retail
- Effective HACCP key to prevent disruptions to the cold chain and growth of spoilage bacteria

### *Listeria monocytogenes* in smoked fish

- Regulations technically complex
- Difficult for small producers to manage – frequent failures
- Scientific and industry data allowed development of an online, easy to use tool

<http://safesmokedfish.foodstandards.gov.scot/>



# Addressing regulatory burdens

## Anisakis in raw and cold smoked fish

- Parasitic nematode – associated with serious illness in Asia
- A problem in wild fish – EU freezing requirements did not recognise low risk in pellet fed farmed fish
- UK evidence base supported EU negotiations to exempt three farmed species from freezing
- Collaborative approach key in addressing regulatory burden





# Protecting the market from fraud

## Traceability and Authenticity

- **Substitution** of fish species - extent of risk in the market and public sector food supply chains
- **Illegal fishing** - Strengthening enforcement
- **False claims** - protecting consumers from misleading labelling



# Protecting the market from fraud

## Traceability and Authenticity



### Which? investigation uncovers fish fraud

Fraudulent fish found in fish and chip shops

13 September 2014

**Seven out of 45 portions of fish bought from fish and chip shops across the UK were mislabelled, reveals a new Which? investigation.**

Earlier this year, Which? research discovered that 24 out of 60 lamb takeaways we tested were adulterated with other meats, so we wanted to see if food fraud was also happening in fish and chip shops.

We found that food fraud isn't limited to meat takeaways and horsemeat - fish in local chippies is being mislabelled too.

Which? members can read our full [investigation into lamb takeaways](#). If you're not already a member, you can gain access to this investigation and all of our online reviews with a [£1 trial subscription to Which?](#)



Seven out of the 45 portions of fish we bought were mislabelled

### Fraudulent fish at fish and chip shops

We bought 45 portions of fish labelled as haddock or cod from fish and chip shops in Birmingham, Manchester and Glasgow. We tested the fish DNA to find out what was really in it.

- Two portions in Manchester that were being sold as cod were, in fact, haddock
- In Glasgow, five sold as haddock were actually whiting.

Whiting easily passes for cod or haddock and is a cheaper fish, often used in fish meal and pet food.

### Stop Food Fraud campaign

In April this year we launched our Stop Food Fraud campaign - we want you to feel confident that the food you are buying is what it says it is. It's important that the Government, Food Standards Agency and local authorities



# Protecting the market from fraud

## Illegal razor clam harvesting in Scottish waters

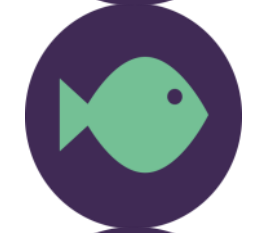


**We work with industry and across government to improve how we regulate difficult sectors such as the Scottish razor clam industry**



# Future challenges

- **Expanding the markets** – impact of growth targets on diet and food safety
- **Regulatory landscape** – potential for legislative change to create new opportunities for fraud and food safety risk
- **Climate change and ocean acidification** – risks and impacts on native fisheries
- **New technologies** – novel processing and rapid testing methods to allow regulators and industry to monitor authenticity and safety in real-time



# Expanding the market – impacts of growth on diet and food safety



Dietary health goals – promoting demand from sustainable supplies



Environmental impacts of aquaculture



Increasing import markets (contaminants, antimicrobial resistant bacteria)



New products – new risks?



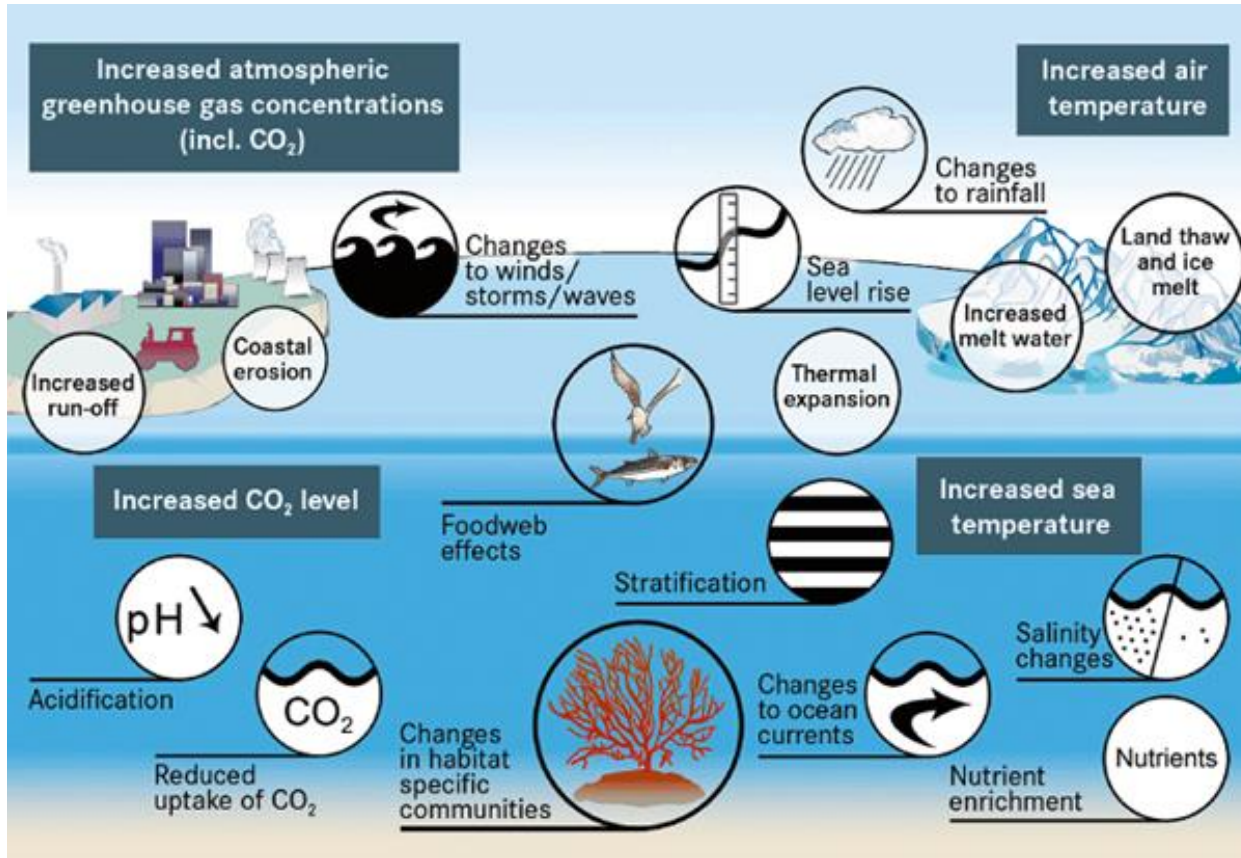
## Evolving regulatory landscape - Fish Discards Ban



- Fish landed under the discard ban are automatically classified as animal by-product category 3
- Enforcement challenge – increased scope for fraud and marketing of unfit product?



# Climate change



The changing climate has been linked to a wide range of impacts on fisheries and aquaculture



# Fish and Shellfish Authenticity Challenges

In general, label accuracy of finfish across Europe is increasing (Labelfish)



There are, however, a number of emerging issues in authenticity, relating to provenance, catch and process methods and sustainability claims





# Conclusion

- Food safety challenges may be biological, chemical or physical, or involve the authenticity of a product
- We need effective horizon scanning methods to ensure we are vigilant and able to detect new and emerging risks on a global scale
- To address these challenges, we need to work together to develop tools and interventions that are capable of tackling these shared problems
- **Collaboration and information sharing is key - working across government, with industry and scientific experts to achieve our joint goals**

**THANK –YOU!**



# Acknowledgements



UNIVERSITY OF STIRLING



Scottish Salmon  
PRODUCERS ORGANISATION



Food Standards Agency  
food.gov.uk



UNIVERSITY OF ABERDEEN

Hutchison Scientific Ltd



ScottishShellfish  
Marketing Group



Grimsby Institute



FRPERC  
Food Refrigeration and  
Process Engineering  
Research Centre



Hydrant



Cefas

marinescotland



The Scottish Government  
Riaghaltas na h-Alba



SEAFOOD



SAFETY ASSESSMENT LTD



APA The Association of  
Public Analysts



Seafood Shetland  
Incorporating Shetland Fish Processors and Shellfish Growers



Association of Scottish Shellfish Growers





# State of North-east Atlantic stocks: the alignment of CFP and MSFD

Tuesday 8<sup>th</sup> September 2015

WORLD SEAFOOD  
CONGRESS  
05 - 09 SEPTEMBER 2015  
GRIMSBY, UK



Dr Carl O'Brien

Defra Chief Fisheries Science Adviser

UK Delegate to ICES

UK Member of ACOM

Joint Buckland Professor for 2015



Centre for Environment  
Fisheries & Aquaculture  
Science



## Main aspects:

- Context - economic value (£ bn) of marine-related activities
- Assessed stocks
  - Good Environmental Status (GES)
    - Aligning CFP and MSFD objectives
- Looking to the future
  - ICES' advice in 2015 for 2016 fishing opportunities

- Marine-related activities contributed ~£38.5bn to UK GDP

| Marine sector  | Total GVA (£bn, 2012 prices) |
|--|------------------------------|
| Oil and gas (including support services)               | 22.8                         |
| Maritime transport (including construction and repair) | 7.0                          |
| Telecoms   | 3.2                          |
| Fishing, aquaculture and processing                    | 2.0                          |
| Leisure and recreation                                 | 1.4                          |
| Renewable energy (including servicing)                 | 0.8                          |
| Marine and maritime science                            | 0.8                          |
| Defence  | 0.4                          |
| Water abstraction                                      | 0.2                          |
| Mineral extraction                                     | 0.1                          |
| Total  | 38.5                         |



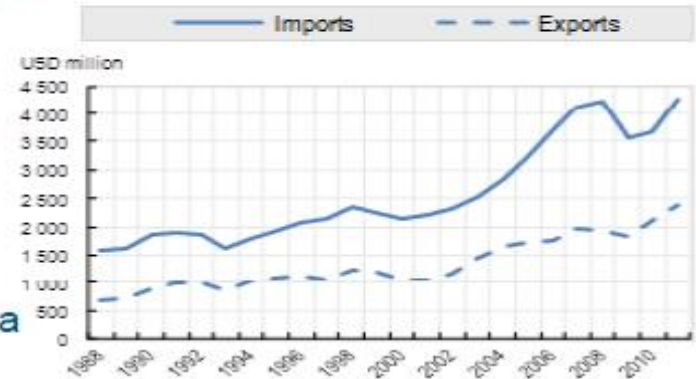
## UK remains a net importer of fish and fish products

2013 (imports, £2 737, 721 000 ton)

**Iceland (Cod)** | China | Faroe Islands | Germany | Denmark | Thailand

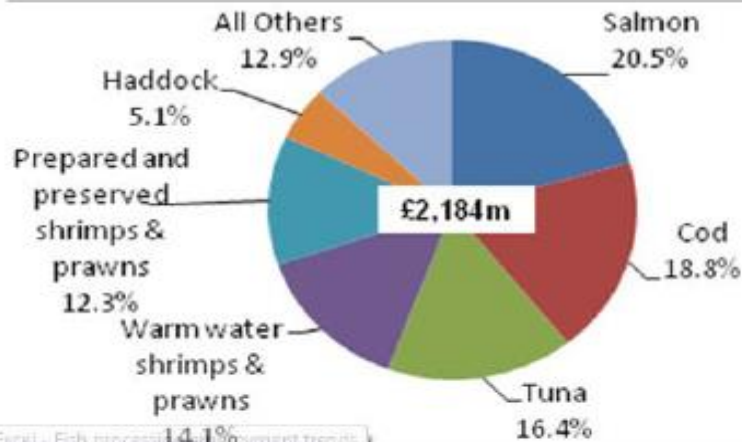
2014 (exports, £1 563, 501 000 ton)

**France (salmon)** | U.S.A. | Spain | Irish Republic | China | Italy

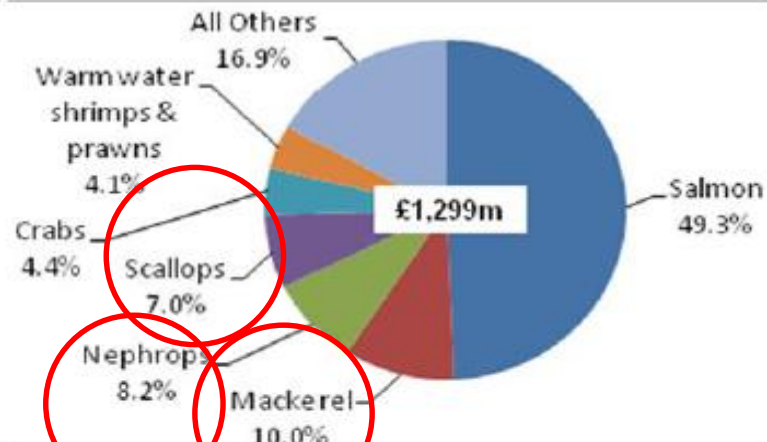


FAO FishStat Database

### UK Imports



### UK Exports



Excel - Fish processing - smart trends

Seafish statistics 2014

**Cefas**

# Context - trade



- Calendar year 2014:
  - Northeast Atlantic, North Sea and Baltic Sea
- Fishing generally progressing towards MSY in all areas since 2006
- Between 2006 and 2014:
  - # stocks fished at MSY increased from 2 to 26 
  - # stocks inside SBL has risen from 11 to 21 
  - # stocks with quantitative catch advice has risen from 59 to 72 





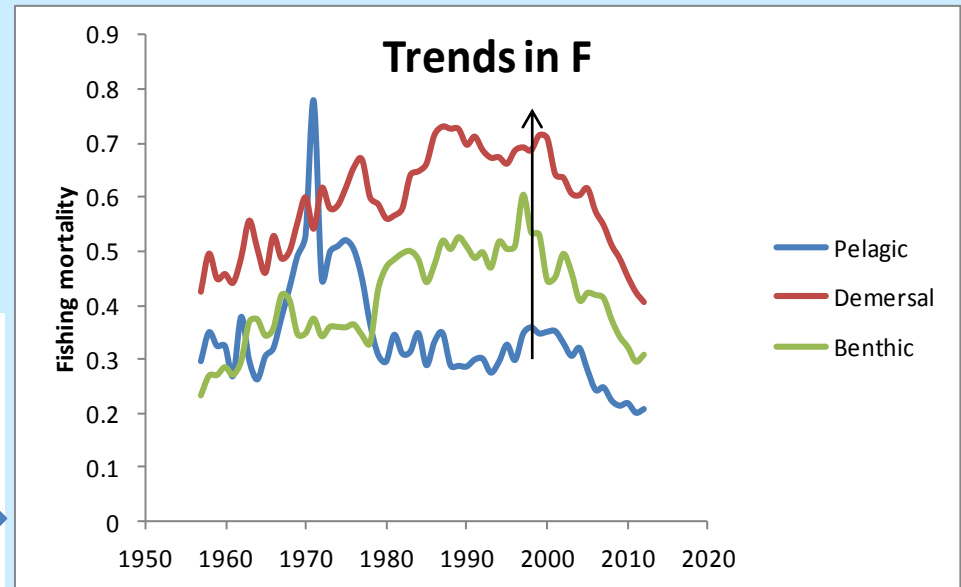
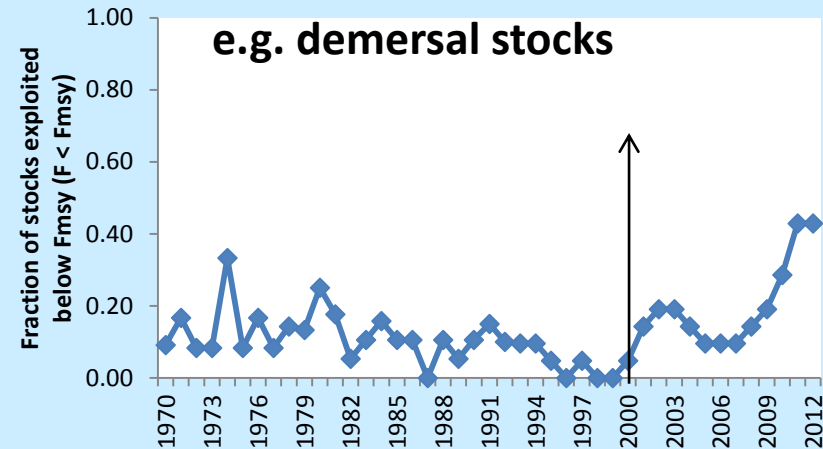
# State of stocks: Maximum sustainable yield (MSY)

2010: 33 of the assessed stocks

2011: 35 of the assessed stocks

2012: 46 of the assessed stocks

2013: 55 of the assessed stocks



Benthic – e.g. megrim, plaice, sole

Demersal – e.g. cod, haddock, whiting, saithe

Pelagic – e.g. blue whiting, herring, mackerel



Faroese region  $F$  above  $F_{MSY}$

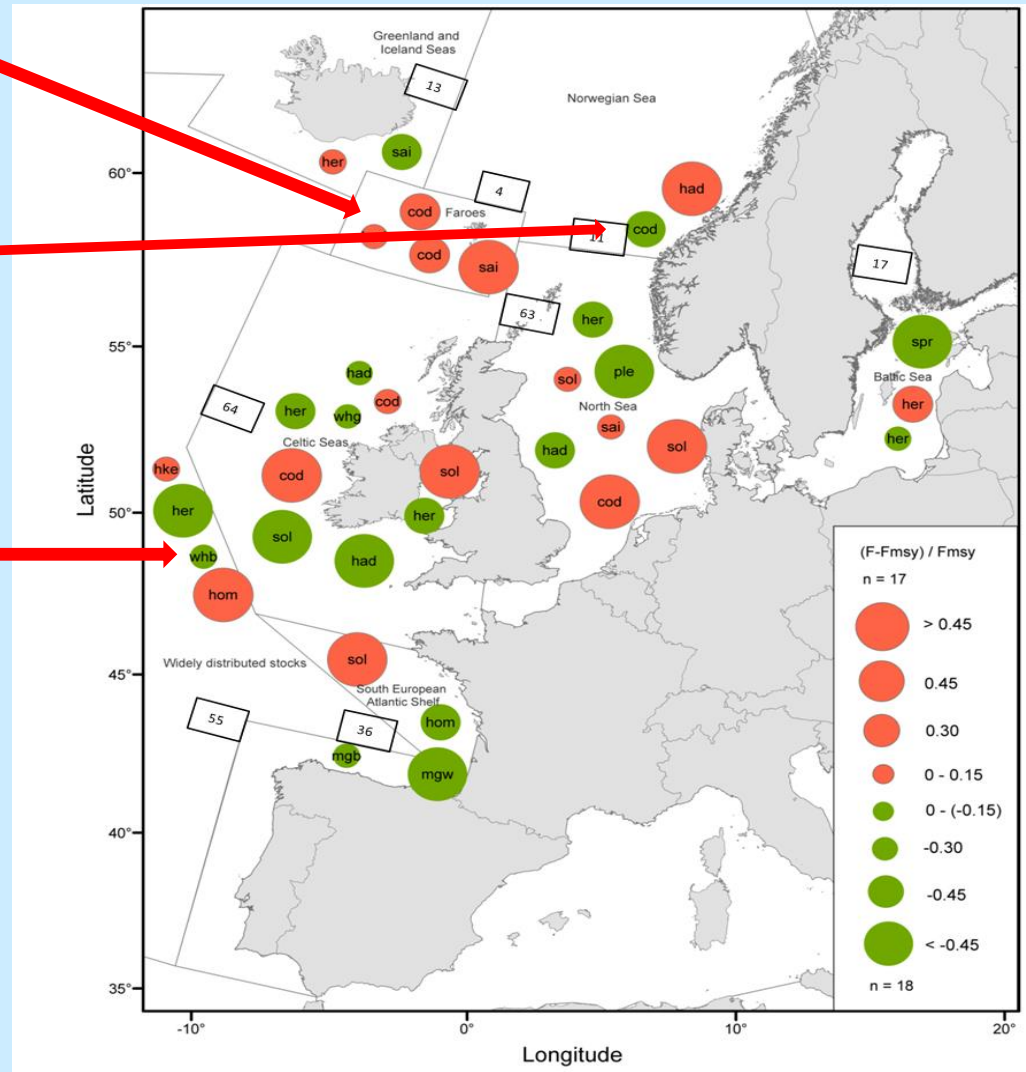
Northeast Arctic cod continues to increase in abundance

Widely distributed blue whiting continues to increase in abundance

Status of stocks in 2012 in terms of  $F$  in relation to  $F_{MSY}$

Well-managed stocks should have a green or a small red mark

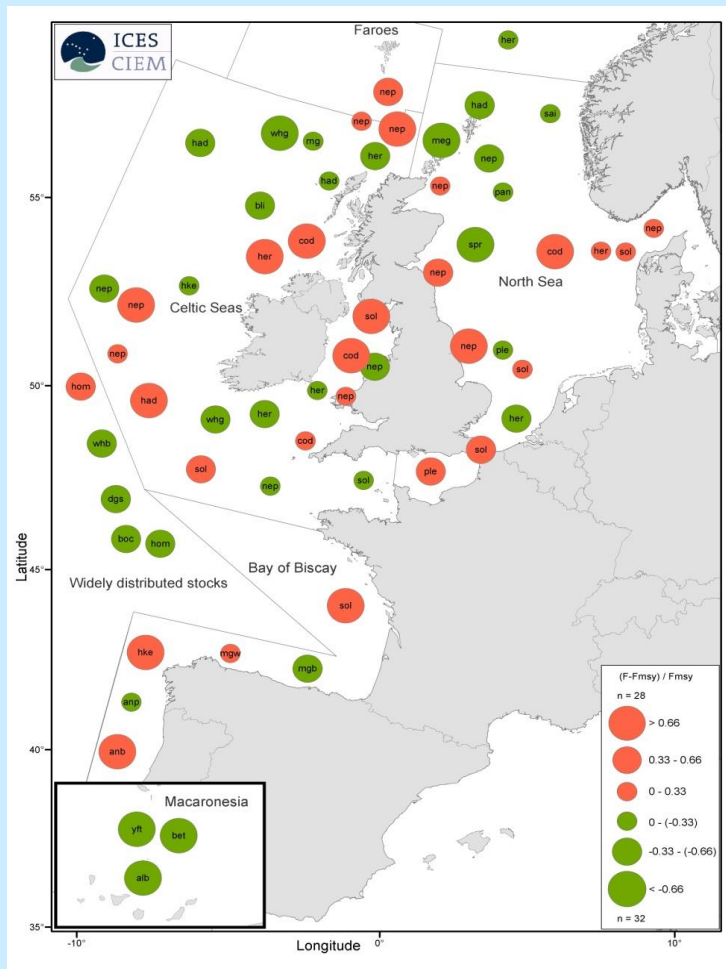
Numbers in rectangles are number of stocks assessed within each region



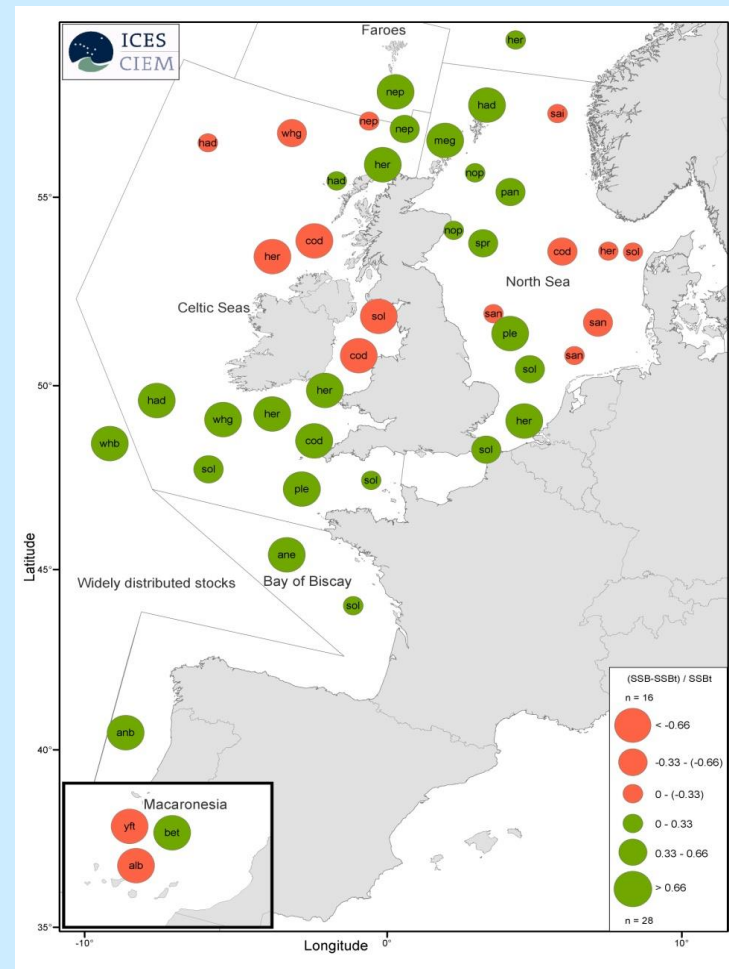
- ICES has refrained from using any  $B_{MSY}$  value as a reference point and focused on  $F_{MSY}$  and a biomass safeguard for scientific quota advice (*CFP*):
  - Lower bound of biomass variability as a safety measure rather than a constant rebuilding target (*MSFD*)
- This reflects that biomasses are variable, influenced by fishing mortality but not directly managed by fisheries measures, and that an equilibrium  $B_{MSY}$  may not make sense as a specific target or limit for policy
- In the MSFD Descriptor 3 development, this has created a dilemma as  $B_{MSY}$  is stated as an objective
  - $MSY B_{trigger}$  (*provisionally,  $B_{pa}$* )



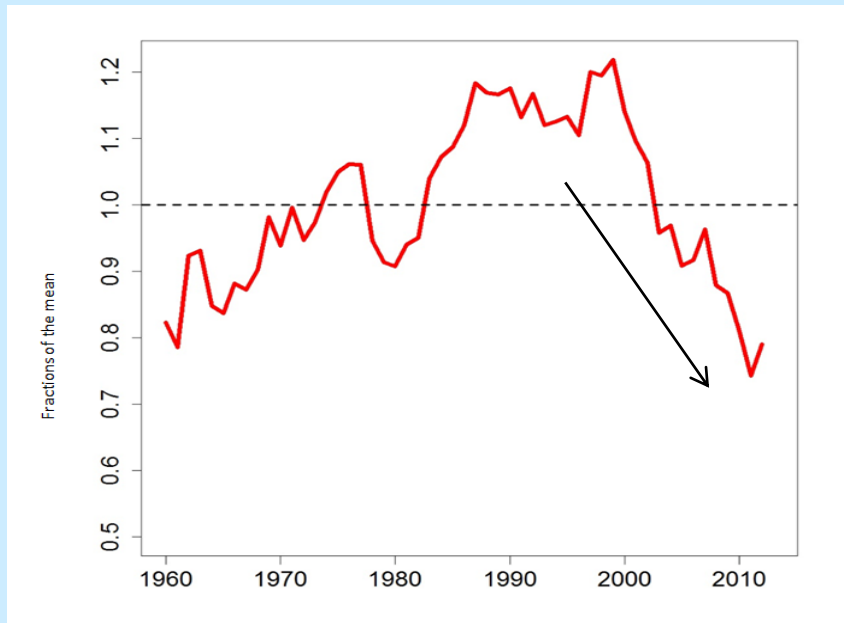
F



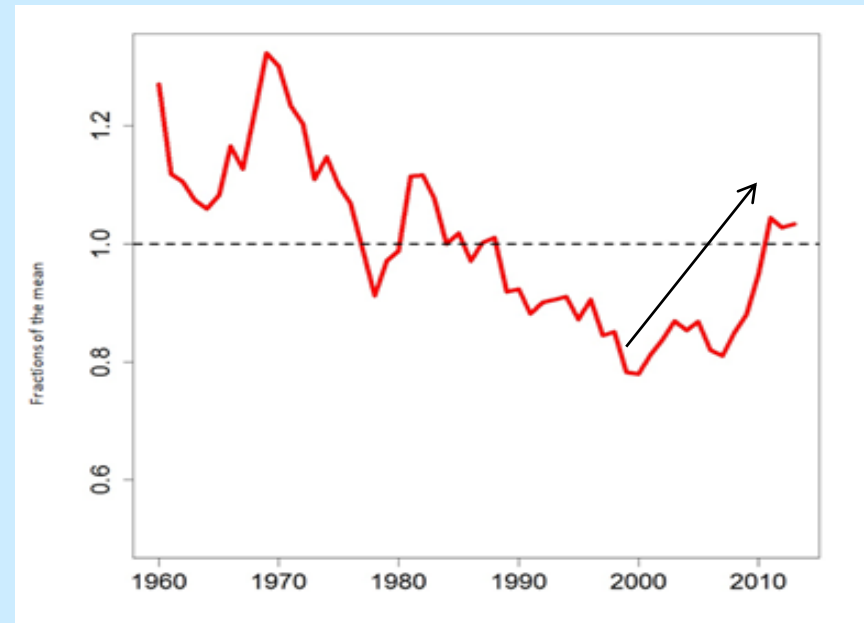
SSB



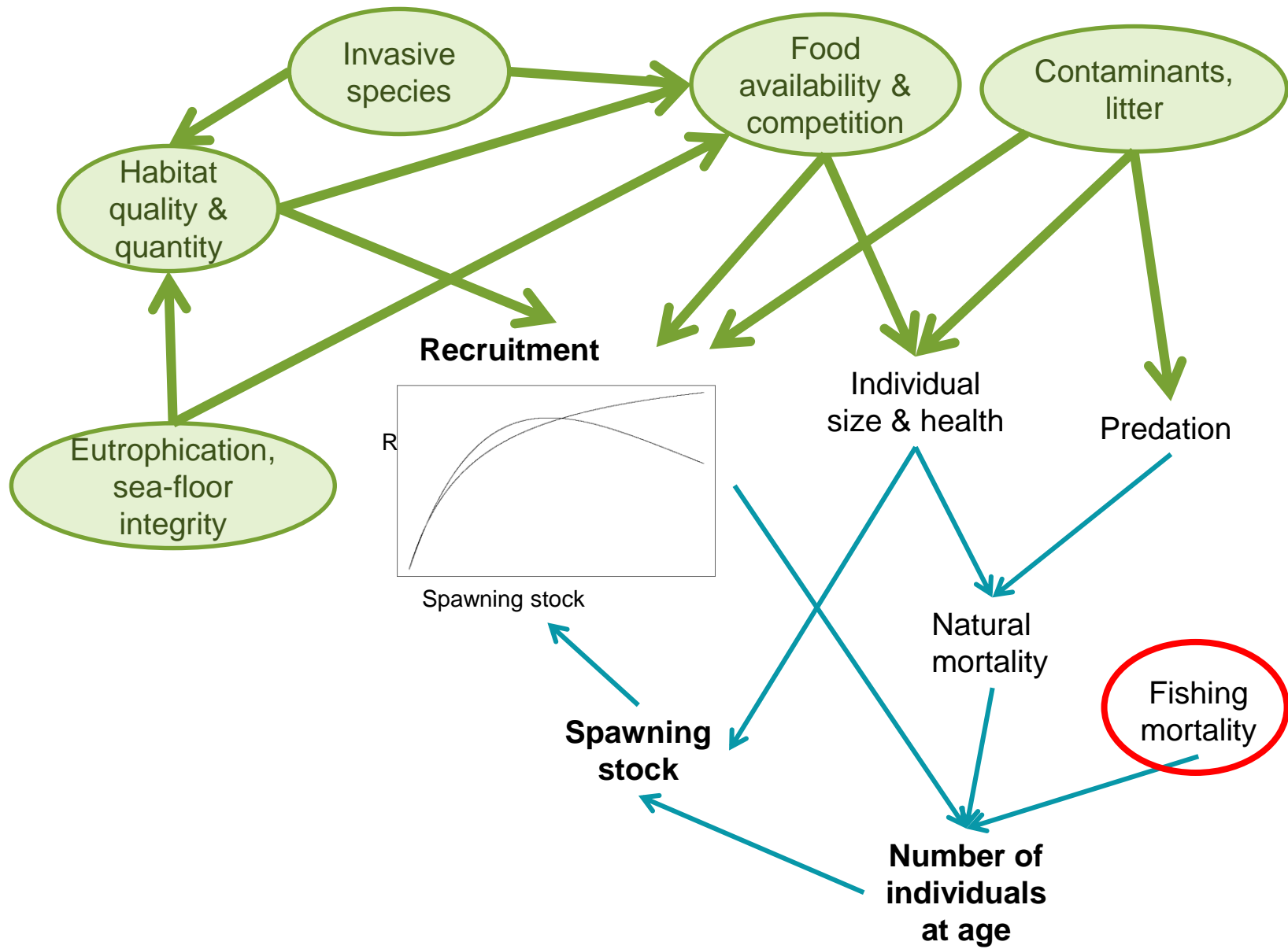
## Average fishing pressure

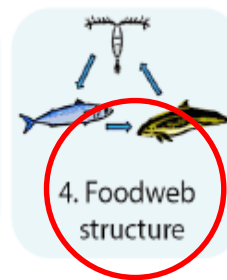


## Average stock biomass

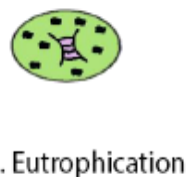


General trends: calendar year  
2014 major fish stocks





Common Fisheries Policy



Marine Strategy Framework Directive



Fisheries management measures critical

defra Department for Environment Food and Rural Affairs

Home About CFP Summary Maps Downloads CFP Index Contact

Charting Progress 2

The state of our seas

Charting Progress 2 is a comprehensive report on the state of the UK seas. It has been produced by Defra, the Marine Management Organisation (MMO), the Scottish Environment Protection Agency (SEPA), the Welsh Environment Protection Agency (WEPA), the Northern Ireland Environment Agency (NIEA) and the Crown Estate. It provides a detailed overview of the state of our seas, including information on the quality of our water, the health of our marine life, and the impact of human activities on the environment.

Download Full Report

Overview Report

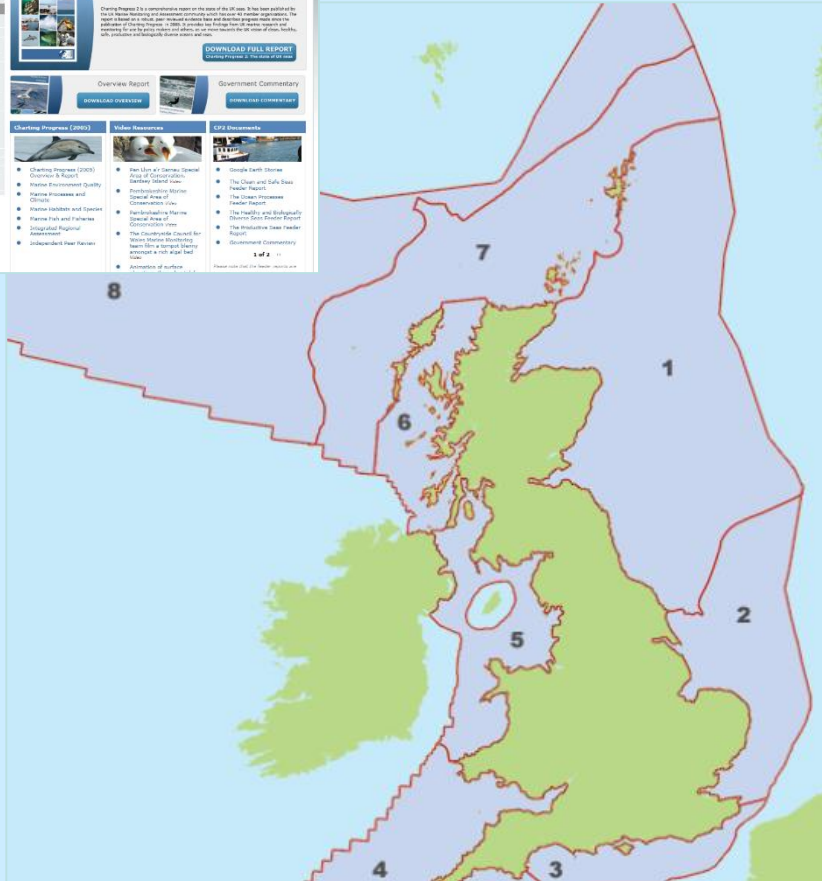
Government Commentary

Charting Progress (2005)

Other Resources

CFP Documents

- Charting Progress (2005) Overview & Report
- Annual Assessment Quality Review Processes and Outputs
- Marine Litter and Seaweed Management Plan
- Integrated Regional Assessment
- Independent Peer Review
- Annexes of our seas
- Annual Litter Survey Report
- Area of Critical Environmental Interest
- Environmental Quality Objectives
- Marine Litter and Seaweed Management Plan
- Integrated Regional Assessment
- Independent Peer Review
- Annexes of our seas
- Annual Litter Survey Report
- Area of Critical Environmental Interest
- Environmental Quality Objectives
- Marine Litter and Seaweed Management Plan
- Integrated Regional Assessment
- Independent Peer Review
- Annexes of our seas



Summary Table - Clean Seas

| Components currently assessed | Region  |   |   |   |   |   |   |   |
|-------------------------------|---|---|---|---|---|---|---|---|
|                               | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| <b>Hazardous substances</b>   | ↔   | ↔ | ↔ | ↔ | ↔ | ↔ | ↔ | ★ |
|                               | Main sources are inputs from rivers, the atmosphere, various industries and agriculture. These sources are subject to controls. In some limited areas marine biota are at risk, particularly near to the main sources in industrialised estuaries. Reservoirs in sediments due to historical contamination will take many years to dissipate to background concentrations due to persistency of the substances. |   |   |   |   |   |   |   |
| <b>Radioactivity</b>          | ↔   | ↔ | ↔ | ↑ | ↑ | ↔ | ↔ | ↔ |
|                               | Main sources are discharges from the nuclear sector and hospitals and the offshore oil and gas industry which discharges naturally occurring radionuclides. Received doses of radioactivity to both humans and wildlife continue to be well within regulatory limits.   |   |   |   |   |   |   |   |
| <b>Eutrophication</b>         | ↑   | ↔ | ↑ | ↑ | ↑ | ↑ | ↑ | ★ |
|                               | Main sources are inputs of nitrogen (N) and phosphorus (P) from sewage works and agriculture. Ecosystems are at risk if eutrophication occurs. A few very small coastal harbours and embayments with limited water circulation experience eutrophication problems. Nitrogen and phosphorus inputs to these are controlled.  |   |   |   |   |   |   |   |

Legend for assessment:

- Few or no problems
- Some problems
- Many problems
- Lack of evidence and/or robust assessment criteria
- ↔ No overall trend discernable
- ↑ State improving
- ↓ State deteriorating
- ★ No trend information available
- ≡ Low confidence in assessment



Centre for Environment Fisheries & Aquaculture Science

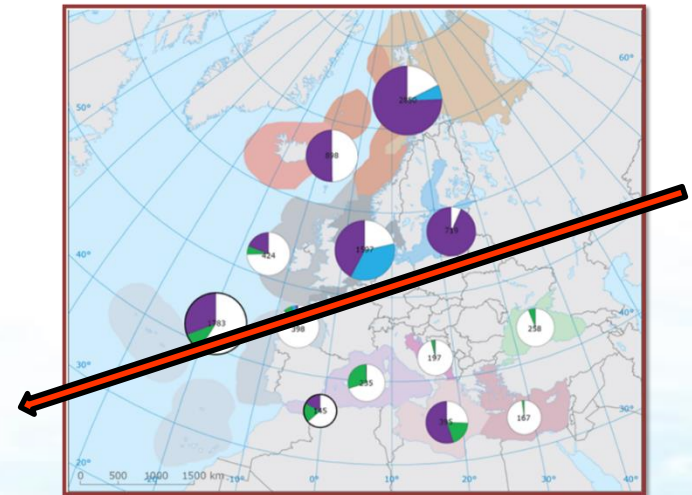
assessing the state of the Marine Environment





# Assessed stocks – movement towards assessment of GES

- stocks with both F & SSB estimates
- stocks with only SSB estimates
- stocks with only F estimates
- stocks with no *good environmental status* assessment



**E.g. North-east Atlantic**

**%**

Analytical

38

Trends based

10

Trends, survey only

39

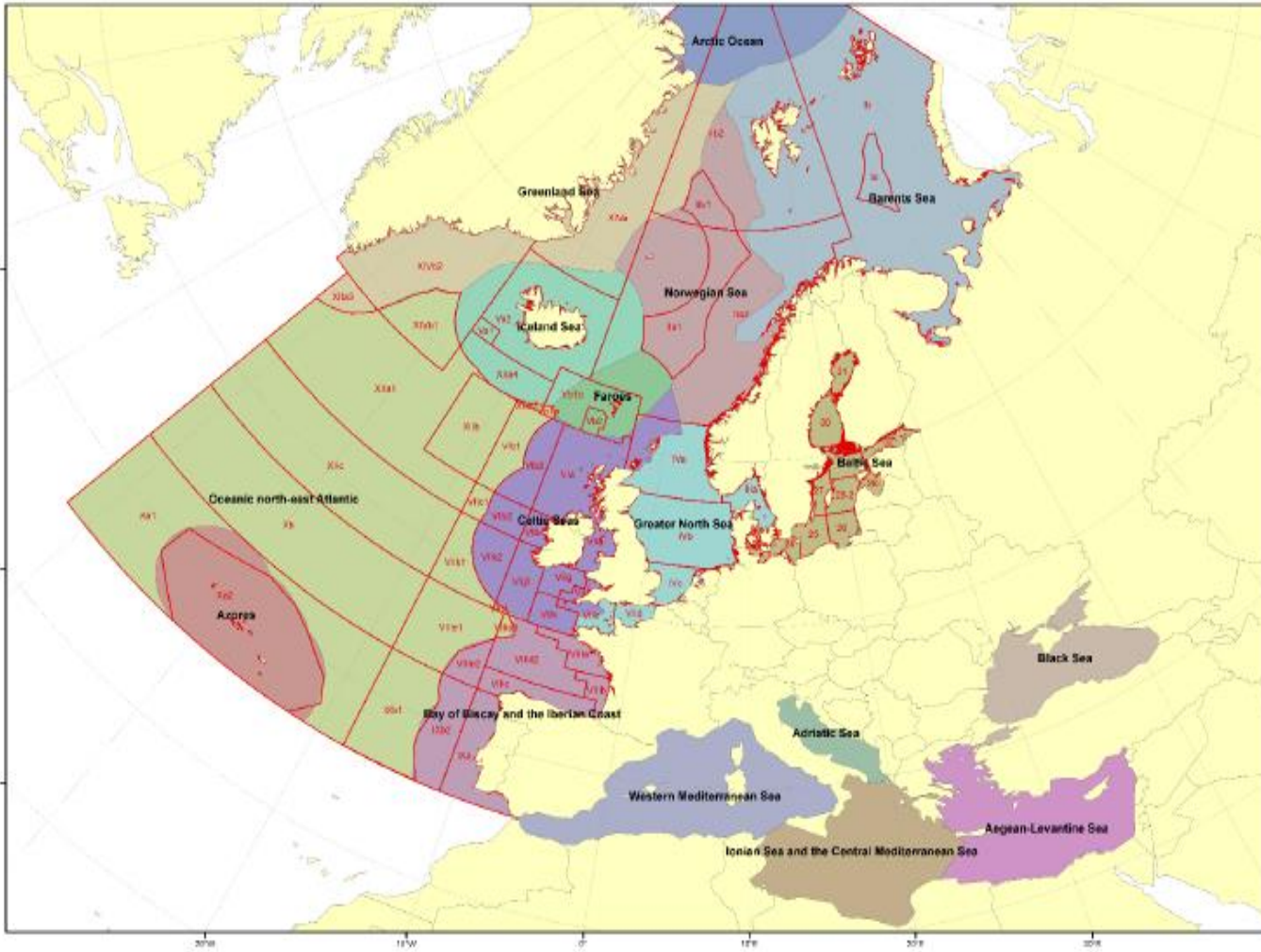
Catch only

13

➤ More uncertainty

➤ *Reduced quality and utility of advice for management*

# Marine Strategy Framework Directive



Region/sub-region

Baltic Sea

North-east Atlantic Ocean

(Greater North Sea including the Kattegat and the English Channel, Celtic Seas, Bay of Biscay and the Iberian Coast, and Macaronesian biogeographic region – waters surrounding the Azores, Madeira and the Canary Islands)

Mediterranean Sea (several sub-regions)

Black Sea



Centre for Environment  
Fisheries & Aquaculture  
Science

ICES' ecoregions  
~ MSFD areas

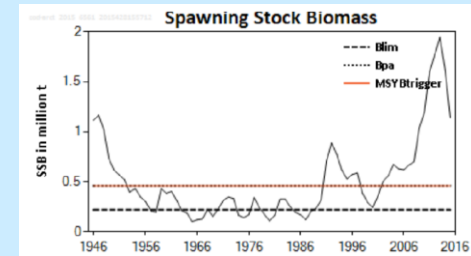


- Cod (2016 – management plan):

- 10% cut

- Haddock (2016 – management plan):

- 25% increase



**Table 3.3.8.1 Haddock in Subareas I and II. State of the stock and fishery, relative to reference points.**

|                           |                                    | Fishing pressure |      |      | Stock size             |                                    |      |      |   |                            |
|---------------------------|------------------------------------|------------------|------|------|------------------------|------------------------------------|------|------|---|----------------------------|
|                           |                                    | 2012             | 2013 | 2014 |                        | 2013                               | 2014 | 2015 |   |                            |
| Maximum Sustainable Yield | F <sub>MSY</sub>                   | ✓                | ✓    | ✓    | Below F <sub>MSY</sub> | MSY                                | ✓    | ✓    | ✓ | Above trigger              |
| Precautionary approach    | F <sub>pa</sub> , F <sub>lim</sub> | ✓                | ✓    | ✓    | Harvested sustainably  | B <sub>pa</sub> , B <sub>lim</sub> | ✓    | ✓    | ✓ | Full reproductive capacity |
| Management Plan           | F <sub>MGT</sub>                   | ✓                | ✓    | ✓    | Below target           | SSB <sub>MGT</sub>                 | ✓    | ✓    | ✓ | Above target               |

- Saithe (2016 – management plan):

- 15% increase

**Table 3.3.10.1 Saithe in Subareas I and II. State of the stock and fishery, relative to reference points.**

|                           |                                    | Fishing pressure |      |      | Stock size            |                                    |      |      |   |                            |
|---------------------------|------------------------------------|------------------|------|------|-----------------------|------------------------------------|------|------|---|----------------------------|
|                           |                                    | 2012             | 2013 | 2014 |                       | 2013                               | 2014 | 2015 |   |                            |
| Maximum Sustainable Yield | F <sub>MSY</sub>                   | ?                | ?    | ?    | Undefined             | MSY                                | ?    | ?    | ? | Undefined                  |
| Precautionary approach    | F <sub>pa</sub> , F <sub>lim</sub> | ⊙                | ✓    | ✓    | Harvested sustainably | B <sub>pa</sub> , B <sub>lim</sub> | ✓    | ✓    | ✓ | Full reproductive capacity |
| Management Plan           | F <sub>MGT</sub>                   | ✗                | ✓    | ✓    | Below target          | SSB <sub>MGT</sub>                 | ✓    | ✓    | ✓ | Above trigger              |

- Cod (2016 – management plan):

- 5% increase

Table 2.3.6.1 Cod in Division Va (Iceland grounds). State of the stock and fishery, relative to reference points.

|                           |                                      | Fishing pressure |      |      |                                  | Stock size                         |      |      |   |                                  |
|---------------------------|--------------------------------------|------------------|------|------|----------------------------------|------------------------------------|------|------|---|----------------------------------|
|                           |                                      | 2012             | 2013 | 2014 |                                  | 2013                               | 2014 | 2015 |   |                                  |
| Maximum Sustainable Yield | HR <sub>MSY</sub>                    | ✓                | ✓    | ✓    | Appropriate                      | MSY                                | ✓    | ✓    | ✓ | Above trigger                    |
| Precautionary approach    | HR <sub>pa</sub> , HR <sub>lim</sub> | ✓                | ✓    | ✓    | Below candidate reference points | B <sub>pa</sub> , B <sub>lim</sub> | ✓    | ✓    | ✓ | Above candidate reference points |
| Management Plan           | HR <sub>MGT</sub>                    | ✓                | ✓    | ✓    | Within expected range            | MGT                                | ✓    | ✓    | ✓ | Above trigger                    |

- Haddock (2016 – management plan):

- 18% increase

Table 2.3.12.1 Haddock in Division Va. State of the stock and fishery, relative to reference points.

|                           |                   | Fishing pressure |      |      |                       | Stock size           |      |      |   |                            |
|---------------------------|-------------------|------------------|------|------|-----------------------|----------------------|------|------|---|----------------------------|
|                           |                   | 2012             | 2013 | 2014 |                       | 2013                 | 2014 | 2015 |   |                            |
| Maximum Sustainable Yield | HR <sub>MSY</sub> | ✓                | ✓    | ✓    | Appropriate           | B <sub>trigger</sub> | ✓    | ✓    | ✓ | Above trigger              |
| Precautionary approach    | HR <sub>pa</sub>  | ✓                | ✓    | ✓    | Harvested sustainably | B <sub>lim</sub>     | ✓    | ✓    | ✓ | Full reproductive capacity |
| Management Plan           | HR <sub>MGT</sub> | ✓                | ✓    | ✓    | Within expected range | SSB <sub>MGT</sub>   | ✓    | ✓    | ✓ | Above trigger              |

- Saithe (2016 – management plan):

- 5% decrease

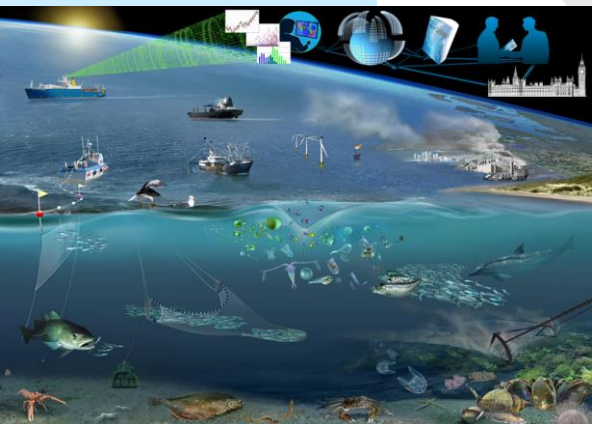
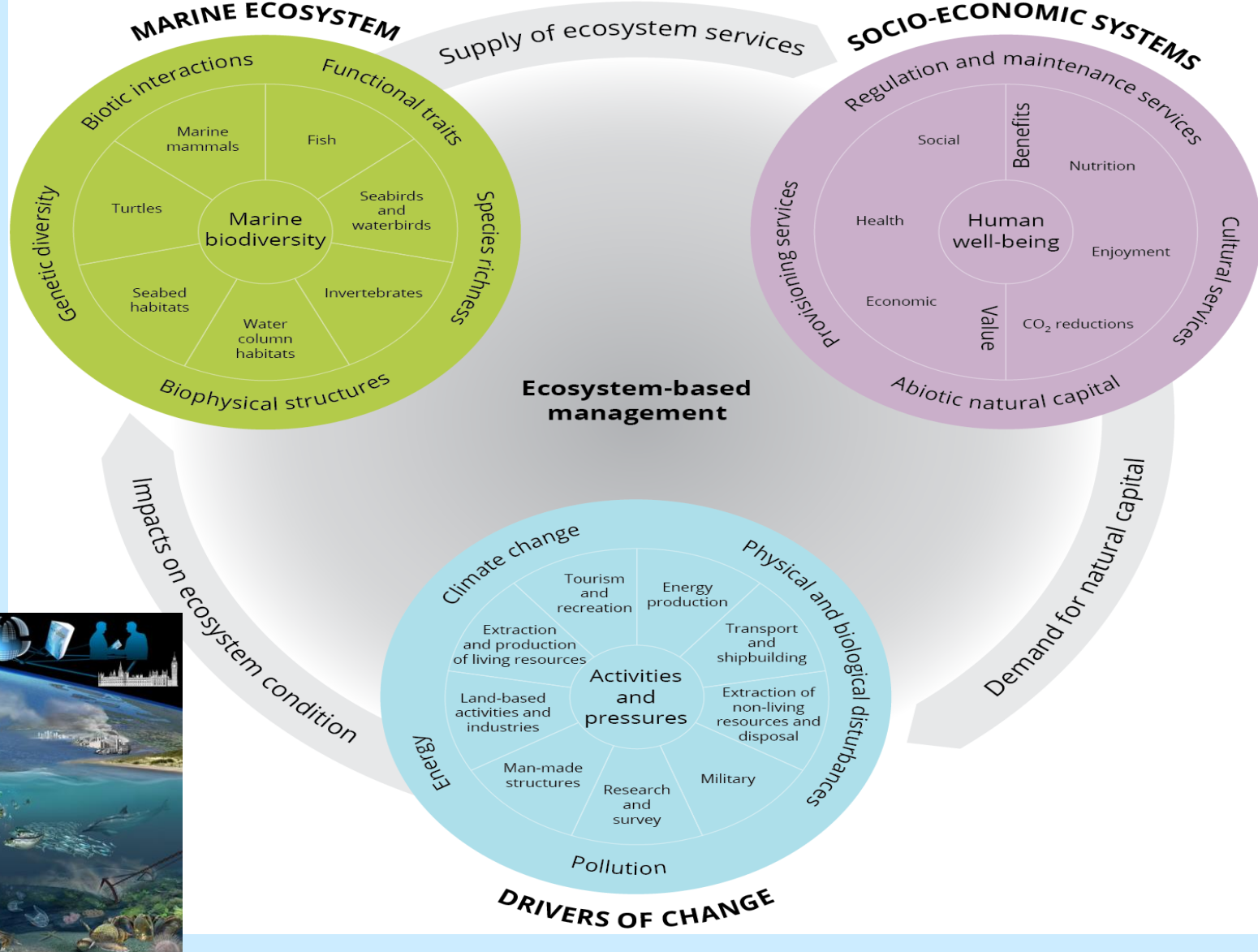
Table 2.3.14.1 Saithe in Division Va. State of the stock and fishery, relative to reference points.

|                           |                                      | Fishing pressure |      |      |                             | Stock size       |      |      |   |                                |
|---------------------------|--------------------------------------|------------------|------|------|-----------------------------|------------------|------|------|---|--------------------------------|
|                           |                                      | 2012             | 2013 | 2014 |                             | 2013             | 2014 | 2015 |   |                                |
| Maximum Sustainable Yield | HR <sub>MSY</sub>                    | ✓                | ✗    | ✓    | Appropriate                 | MSY              | ✓    | ✓    | ✓ | SSB above B <sub>trigger</sub> |
| Precautionary approach    | HR <sub>pa</sub> , HR <sub>lim</sub> | ✓                | ?    | ✓    | Below candidate ref. points | B <sub>lim</sub> | ✓    | ✓    | ✓ | SSB above B <sub>lim</sub>     |
| Management Plan           | HR <sub>MGT</sub>                    | ✓                | ✓    | ✓    | Within expected range       | MGT              | ✓    | ✓    | ✓ | SSB above B <sub>trigger</sub> |



- Prospects look good:
  - Continuing improvements in terms of sustainable fishing
    - North Sea, Skagerrak and Kattegat
      - E.g. North Sea advice is fairly positive with increases for key stocks: cod (+15%), haddock (+30%) and plaice (+15%). Reductions are advised for whiting (-15%), saithe (-6%) and *Nephrops* (-20%)
    - West of Scotland, Irish Sea and Celtic Sea
      - E.g. Celtic Sea continues to be a problem region with advised reductions in cod (-30%) and haddock (-27%), as well as some important sole and plaice stocks. However, an increase for hake (+6%) and rollover for anglerfish are advised, which are two economically important species for this region





# *Clean, healthy, safe, productive and biologically diverse oceans and seas*

Sustainable development/management, and use of  
marine and coastal resources

# Fisheries and state descriptors



1. Biodiversity

2. Non-indigenous species

3. Commercial fisheries, fish & shellfish

4. Foodweb structure

CFP



5. Eutrophication



6. Seafloor integrity



7. Alterations to hydrography

MSFD



8. Contaminants



9. Seafood contaminants



10. Marine litter



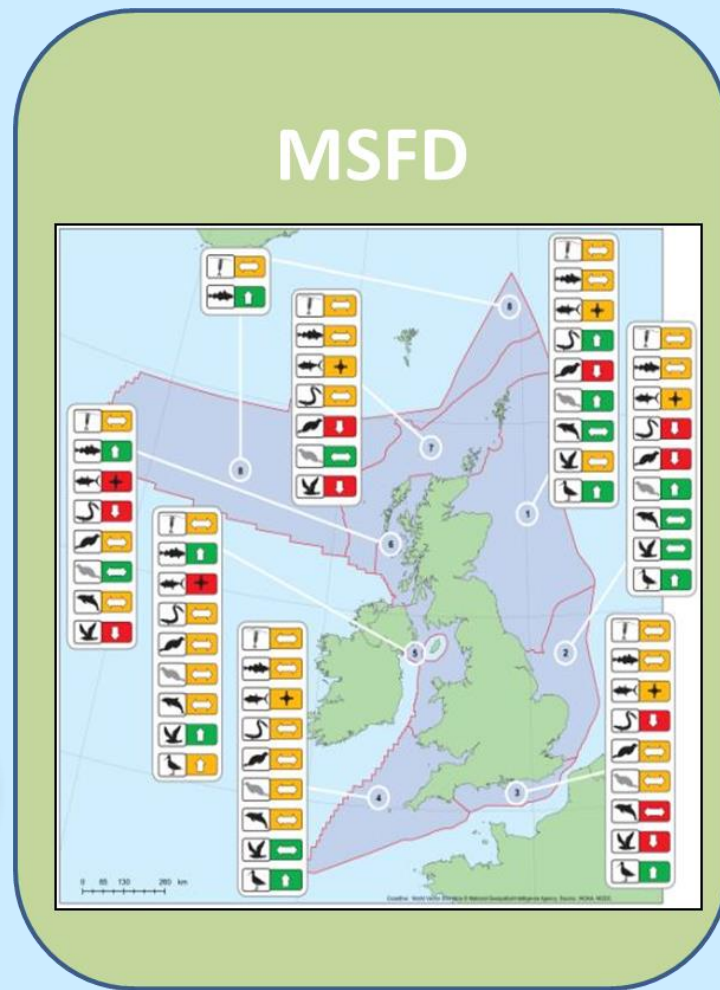
11. Energy & noise



WFD



MPAs



MSFD



Centre for Environment  
Fisheries & Aquaculture  
Science

CFP



MSFD

other policies



Cefas



- Marine environment and fisheries

- Applying the reformed CFP and environmental policy together



- Ecosystem-based management

- Establishing the goals
- Understanding the baseline
- Dealing with cross boundary issues
- Achievable objectives



- Stock status is cause for optimism
  - Movements in the right direction ( $F \downarrow$  ,  $SSB \uparrow$  )
  - Advances in data-limited approaches
- Need for pragmatism and flexibility
  - Transitional arrangements (mixed fisheries)
  - Regional approach(es)
- Dealing with uncertainty
  - Eliminate reliance on a single model
  - Management that is robust to uncertainties





Centre for Environment  
Fisheries & Aquaculture  
Science

Thanks for listening!







# Fisheries and aquaculture in the developing world: a research agenda for the next decade

Stephen J. Hall

World Seafood Congress, 2015, Grimsby, UK



# Objectives

---

- About WorldFish
- About the World's Fish Food System
  - How much fish do we produce today?
  - How much fish do we expect to produce in future?
  - How much fish do we need to produce in future?
- Implications from a developing country perspective
  - Three Challenges
  - A research agenda to meet those challenges
- Reflections on the skills we need

## **Mission**

To reduce poverty and hunger by improving fisheries and aquaculture



- Founded in 1975
- 272 Research staff
- 439 Staff globally
- 160 Research projects
- 7 Country offices
- \$US 41m income



### **Sustainable Aquaculture**

How do we increase productivity, resilience and development impact from small and medium scale aquaculture?



### **Nutrition & Health**

How can investments in fisheries and aquaculture best improve human nutrition and health?



### **Climate Change**

How will climate change affect fisheries and aquaculture in developing countries and how can adaptive capacity be built?



### **Policies & Practices for Resilience**

What policy and management investment will increase the resilience of small-scale fisheries and increase their contribution to reducing poverty and hunger?



### **Gender & Equity**

How can strengthening the rights of marginalized fish-dependent people reduce inequality and poverty?

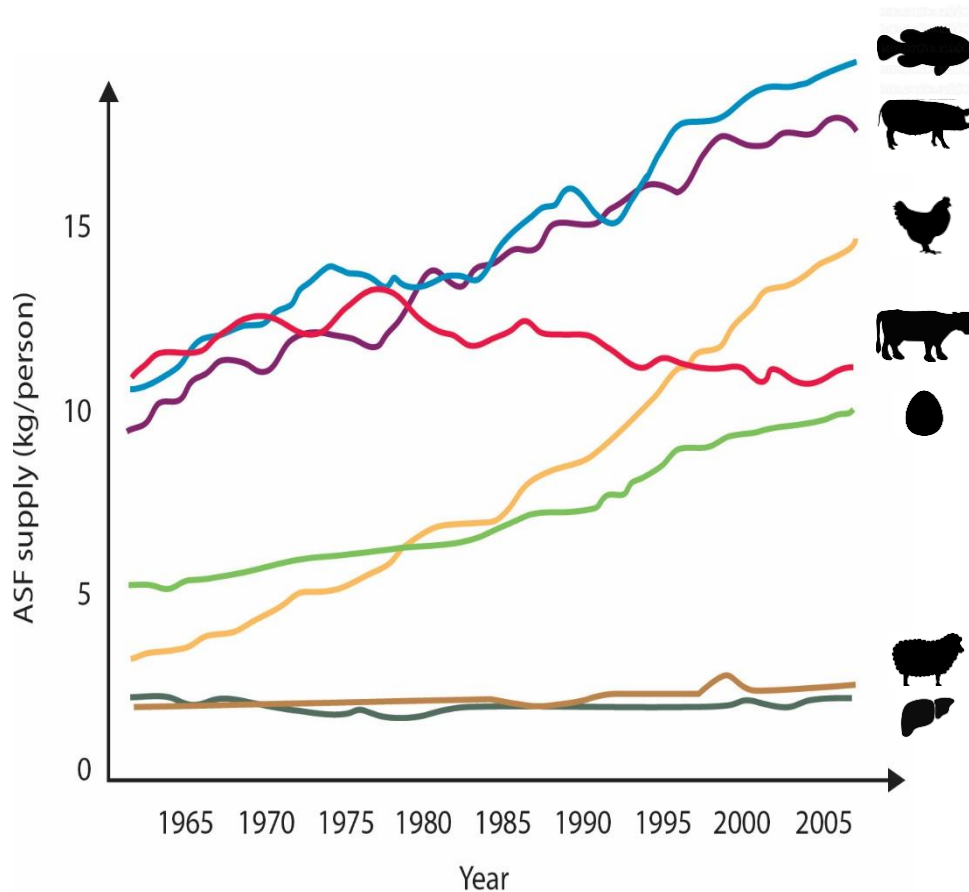


### **Value Chains**

How can we improve and diversify aquaculture and fisheries value chains to promote more equitable participation and higher productivity?



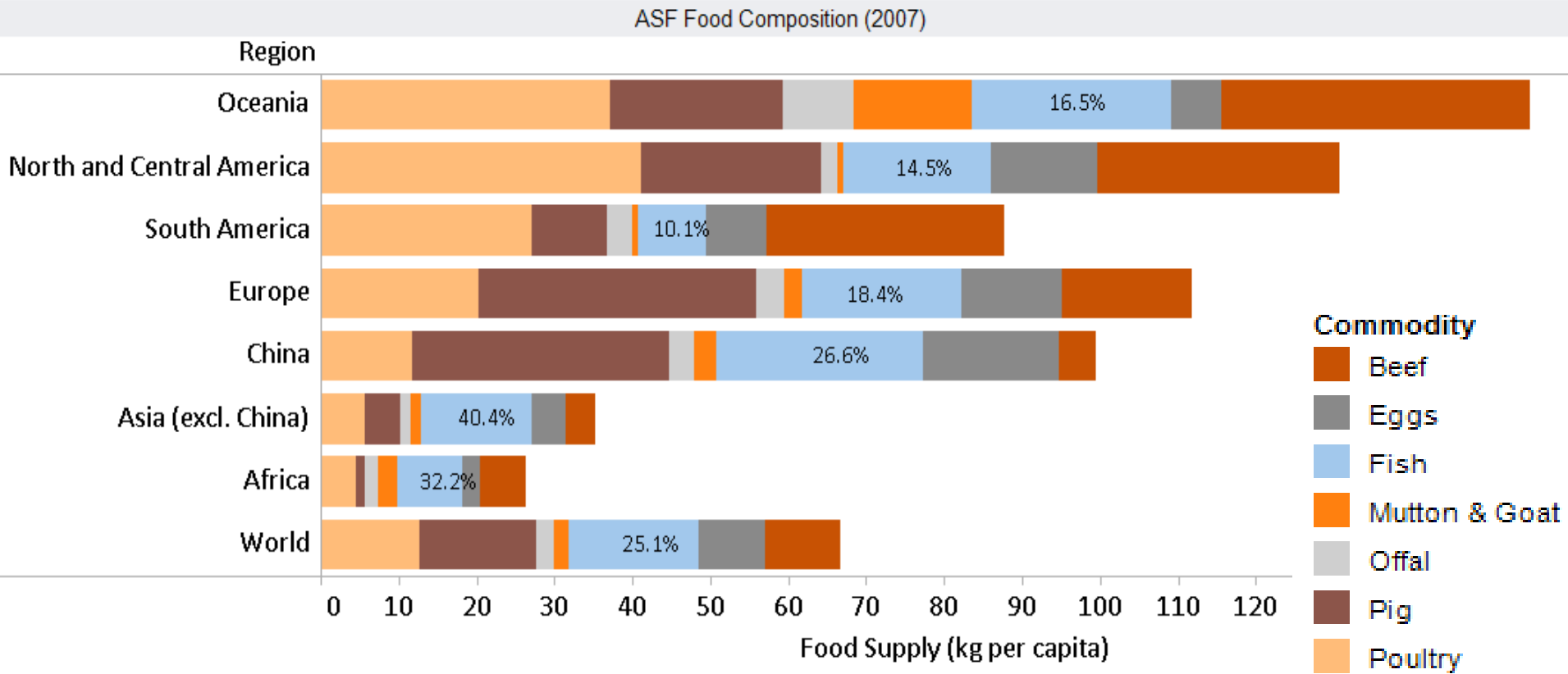
# Fish Matter



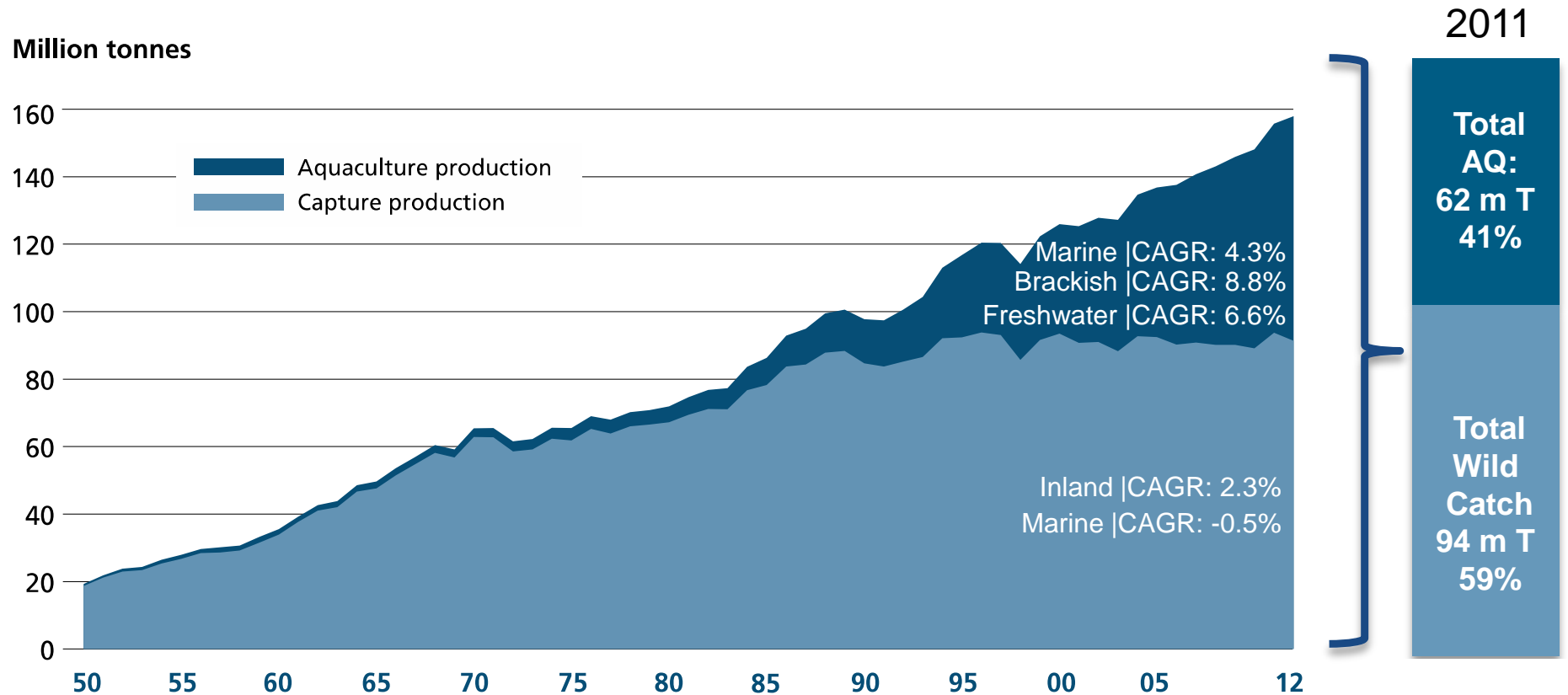
- 20% of animal protein intake for 3 billion people
- An important part of a healthy diet
- Nutrients essential to cognitive and physical development, especially in children

The most important of the major categories of animal-source foods

# Those most dependent on fish are among the most food and nutrition insecure.



# World Fish Production



Source: FAO 2014; note: volumes include fish for **human** consumption as well as fish for **other** uses such as fishmeal, etc.

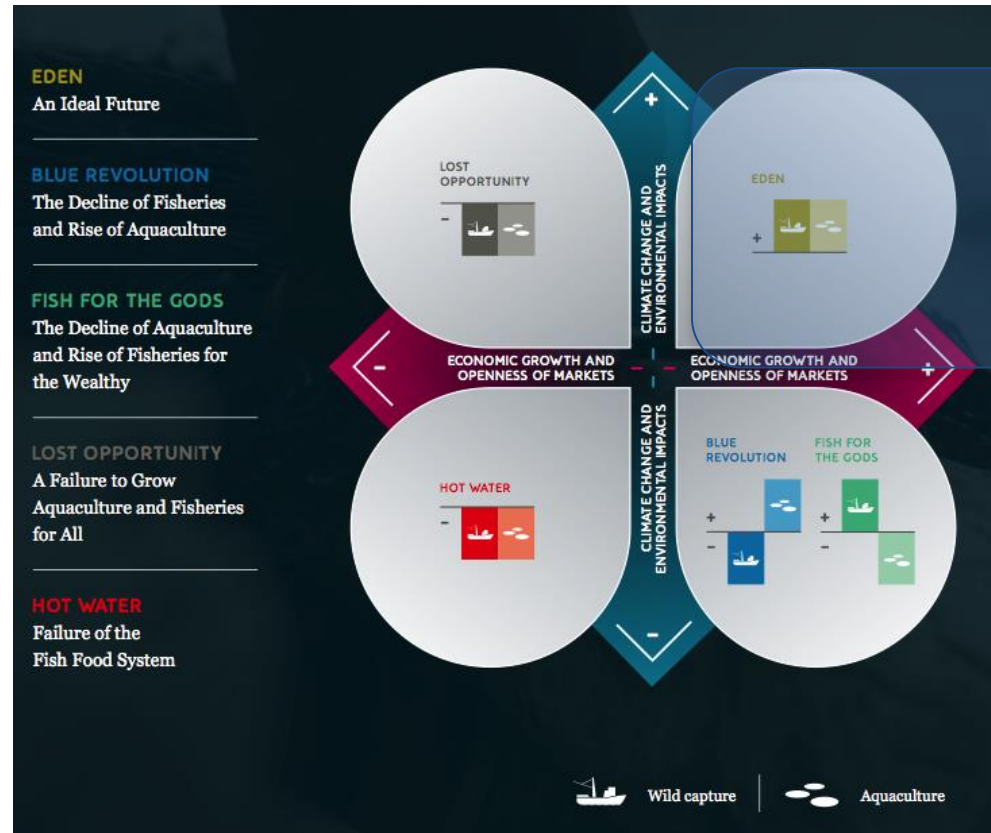
# FISHING FOR A FUTURE



FISHERIES AND  
AQUACULTURE  
IN THE 21ST CENTURY:  
AN INITIATIVE FOR  
GLOBAL ACTION

[www.fishingfuture.org](http://www.fishingfuture.org)

# 5 global scenarios for future of fish food system in 2030



Desirable 'Eden' Future

The outcome of a conversation with global business leaders, governments, philanthropic foundations and NGO stakeholders in Bellagio (2013)

# How much are we likely to produce by 2030?\*

2015 2030 CAGR



≈75 ≈109 2.5%



≈61 ≈61 0%

Total ≈136 ≈170

\*Average of FAO and World Bank Projections. Units: Million Metric Tons

How much fish should we produce in 2030?



# Estimating Future Fish Requirements

---

## Two Approaches

1. 2030 Projection based on nutritional need
  - How much fish for an adequate contribution to a nutritious balanced diet for everyone?
2. 2030 Projection based on trends in consumption (FAO Method)
  - How much fish to satisfy the world's appetite?



Not a substitute for detailed econometric analysis that models the interactions between supply and demand



# Method 1

## 'Ideal' fish consumption per kg body wgt

The World Health Organization (WHO) recommended daily protein intake, derived from a variety of sources, for good nutrition (per kg body weight per day).

Assume an idealised 20% of protein should come from fish

The amount of protein per kg body weight an individual should consume each year.

$$0.8g \times 0.2 \times \frac{1}{0.2} \times \frac{1}{0.6} \times 365 = 487 \text{ g/kg/yr}$$

Assume, on average, 60% of a fish is recoverable for consumption.

Assume, on average, protein comprises ~ 20% of the body weight of a fish.

# Method 1 (cont.d)

## The total biomass of humans in 2030

World Health Organization  
Body Mass Index Data (2005)

$$\overline{BMI}_{sex,age,country} \times \overline{Height}^2_{sex,age,country} = \overline{Body\ Weight}_{sex,age,country}$$

Country level demographic  
and health surveys

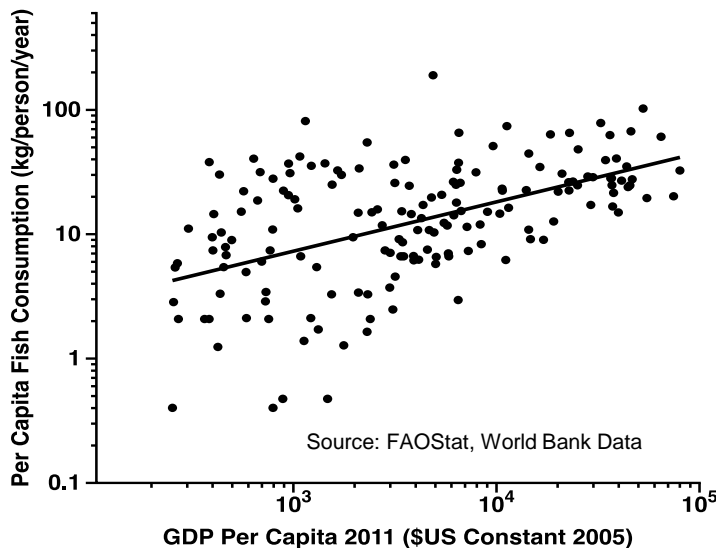
$$\sum_{\substack{sex, \\ age}} \overline{Body\ Weight}_{sex,age,country} \times \overline{Population}_{sex,age,country} = \overline{Total\ Biomass}_{country}$$

World Bank population  
projections (2030)

# Method 2

## Projecting from consumption trends

In general, countries with higher per capita GDP require more fish



1. Estimate relationship between per capita GDP and per capita fish consumption for each country from historical data
2. Project this relationship forward using estimated per capita GDP and population to predict fish requirement in 2030

$$Fish\ Consumption_{country, yr} = \beta \times GDP_{country, yr} + \alpha_{country} + \mu_{country, yr}$$

Where  $\alpha$  = Unknown intercept for each country  
 $\beta$  = Coefficient for GDP  
 $\mu$  = error term

# Estimated Fish Requirements in 2030\*



≈ 238

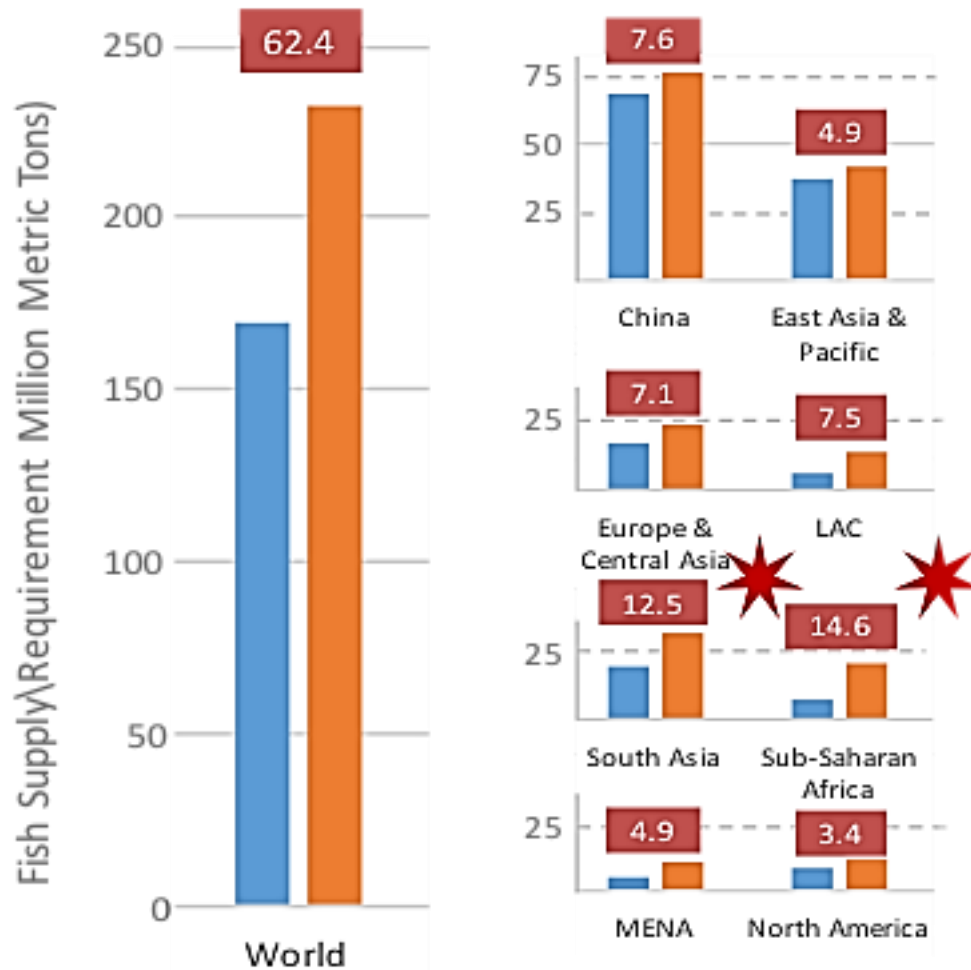
2030  
Requirement



≈ 228

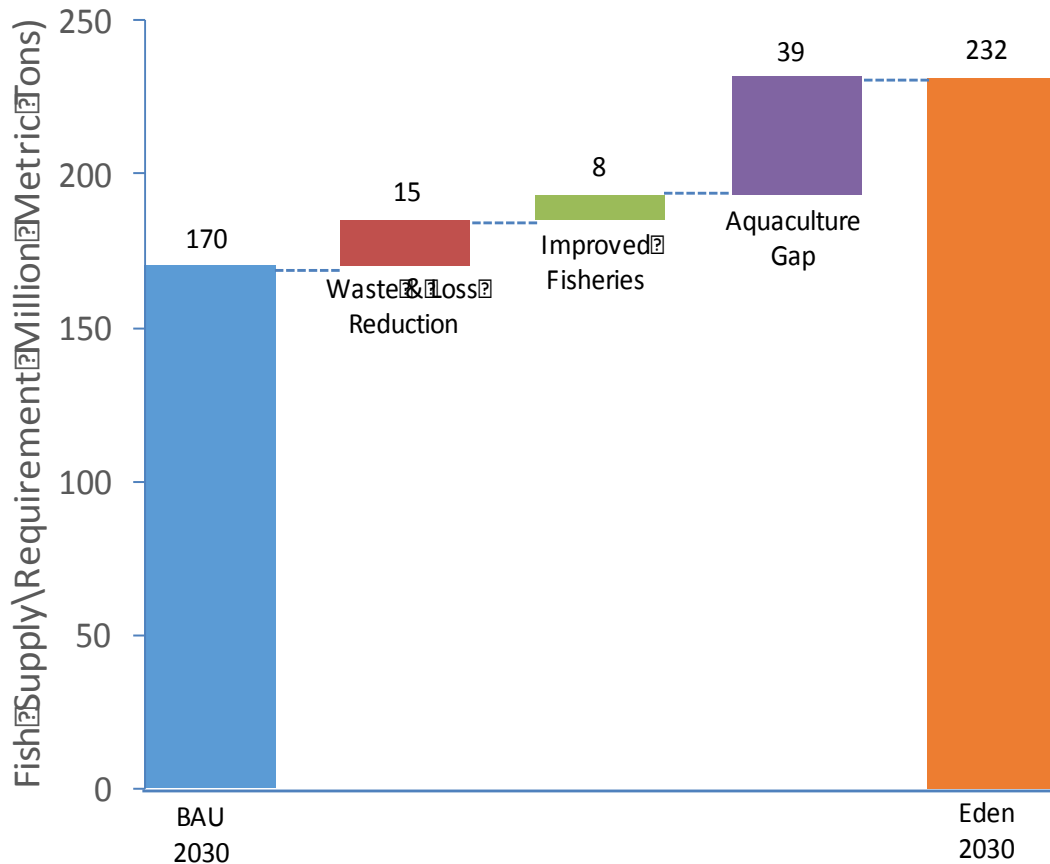
≈ 232

# 2030 Requirement versus Expectation



- We will be 62 million metric tons short unless we do something

# Aquaculture Growth is Vital



- Aquaculture will need to produce 39 million more tons than the 109 currently projected.
- This will require a shift from an expected 2.5% CAGR to 4.7%

But we cannot ignore fisheries and we need to reduce waste and loss!

# Implications from a developing country perspective?



Demand



Need

# The Production Challenge

How do we produce enough fish to meet future demand and need?





# The Sustainability Challenge

How do we ensure that the fish food system is both economically and ecologically sustainable?



# The Distribution Challenge

How do we ensure that the fish is affordable and available for all and that the economic and nutritional benefits from the sector are equitably shared?



# Interlinked Challenges



- 1 Technologies for sustainable intensification of aquaculture
- 2 Sustaining fish production systems
- 3 Developing nutrition sensitive fish value chains
- 4 Improving aquatic agricultural livelihoods

# Technologies for sustainable intensification of aquaculture

## Research Challenges

- Finding technology and financing combinations that accelerate pro-poor aquaculture development
- Sustaining rates of genetic improvement of fish suited to poor farmers
- Improving the nutritional value of farmed fish?
- Developing sustainable feed alternatives

## Polyculture with small indigenous species.



# Sustaining fish production systems

## Research Challenges

- Understanding the social and ecological implications for alternative trajectories for aquaculture growth?
- Identifying how modified river flows affect inland fisheries and aquaculture?
- Identifying fisheries governance approaches that distribute benefits more equitably?

## Linking ecological and economic scenario models



# Nutrition sensitive value chains

## Research Challenges

- Shape products and prices to increase the availability, affordability and accessibility
- Reducing losses and waste and improve food safety
- Reversing inequities in household distribution of fish to benefit children and pregnant women

## Intra-household consumption

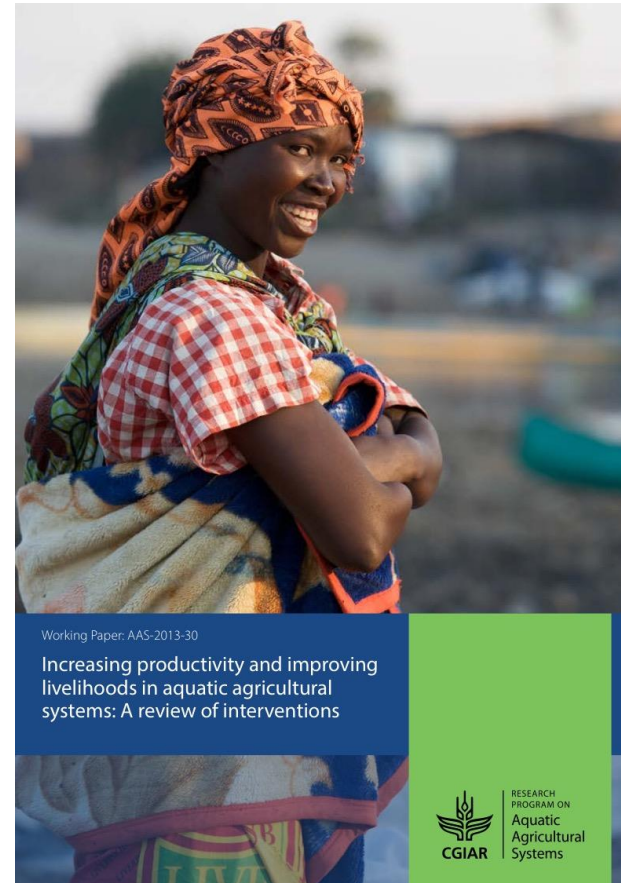


# Enhancing Aquatic Agricultural Systems?

## Research Challenges

- Identifying technology combinations work best
- Harnessing the agro-diversity to provide better livelihood options people in AAS
- Finding the best ways to engage with communities to achieve development outcomes?
- Scaling successes

## Technology Options



# The skills we need

Ecology

Biology



Economics

Anthropology



# System Leadership

Stanford **SOCIAL**  
**INNOVATION** REVIEW

---

**The Dawn of System Leadership**  
By Peter Senge, Hal Hamilton, & John Kania

Stanford Social Innovation Review  
Winter 2015

*“We face a host of systemic challenges beyond the reach of existing institutions and their hierarchical authority structures. ... at no time in history have we needed system leaders more.”*

Senge et al, 2014

**Thank You**







# **The European Union - contribution to the international fight against IUU fishing**

**Stelios Mitolidis  
Unit A1 - DG MARE - EUROPEAN COMMISSION**

**WORLD SEAFOOD CONGRESS 2015 – GRIMSBY UK – September 2015**

# Overview

- ***IUU: Global challenge***
  - International tools
  - EU international role
  - Reasons for an EU action
- ***EU IUU Policy***
  - Legal framework
  - Basic Principles
  - Scope
  - Practical experience - main objectives and operational tools
    - EU Catch Certification Scheme
    - EU Mutual Assistance System
    - Lists of Non-Cooperating Countries
- ***EU IUU Regulation in the broader EU Context***
- ***IUU Challenges – looking forward***



# IUU: Global challenge

## *International tools*

- International Law
- RFMO Measures

## *EU international role*

- International cooperation



# IUU: Global challenge

## ***REASONS FOR EU ACTION***

- *International consolidated tools are not enough*
- *Environmental and socio-economic impacts on fisheries resources, developing countries and on legitimate trade*
- *The EU is the largest importer of fishery products: It is essential to ensure traceability in the whole supply chain – from net to plate – of all fishery products traded with the EU*





# EU IUU Policy (I)

## **LEGAL FRAMEWORK**

- *IUU Regulation (No 1005/2008) - enforced on 1 Jan 2010*
- *Implementing regulation (No 1010/2009):*
  - Amended in January 2010 (No 86/2010), May 2010 (No 395/2010), March 2011 (No 202/2011) and November 2011 (No 1222/2011)
- *EU IUU vessels list: Regulations No 468/2010, No 724/2011, No 1234/2012, No 372/2013, No 137/2014 and No 1296/2015*
- *All information, including regulations, handbook and guidance notes can be found on: <http://ec.europa.eu/fisheries/iuu>*





# EU IUU Policy (II)

## **BASIC PRINCIPLES**

- **Non-discriminatory** instrument
- Seeks to **prevent, deter and eliminate** fishery products derived from IUU activities being traded to/from the EU
- Applies to **EU Member States and third countries** wanting to trade fish with the EU

## **SCOPE**

- **All fishing vessels** under any flag in all maritime waters
- **All processed and unprocessed marine fishery products**
- **Trade to and from the EU**

# EU IUU Policy (III)

## **PRACTICAL EXPERIENCE: MAIN OBJECTIVES AND OPERATIONAL TOOL**

- *Application of international law rules, laws and regulations of states, including international conservation and management measures*
- *Operational tool: **Catch Certification Scheme***

20.10.2008

EN

Official Journal of the European Union

L 286/27

ANNEX II  
European Community Catch Certificate and Re-export Certificate

| EUROPEAN COMMUNITY CATCH CERTIFICATE                                      |  |   |                            |   |   |                       |              |
|---|--|---|----------------------------|---|---|-----------------------|--------------|
| Document number   |  | Validating authority  |                            |   |   |                       |              |
| 1. Name   | Address                                  |   | Tel.                       |   | Fax   |                       |              |
| 2. Fishing vessel name  | Flag - Home port and registration number |   | Call sign                  | IMO/Lloyd's number (if issued)                                  |   |                       |              |
| Fishing licence No - Valid to   |  | Initials No, Fax No, Telephone No, E-mail address (if issued) |                            |   |   |                       |              |
| 3. Description of product   |  | Type of processing authorised on board                        |                            | 4. Reference to applicable conservation and management measures |   |                       |              |
| Species   | Product code                             | Catch area(s) and dates                                       | Estimated live weight (kg) | Estimated weight to be landed (kg)                              | Verified weight landed (kg) where appropriate |                       |              |
| 5. Name of master of fishing vessel - Signature - Seal:                   |  |   |                            |   |   |                       |              |
| 6. Declaration of transhipment at sea<br>Name of master of fishing vessel |  |   | Signature and date         | Transhipment date and composition                               |   | Estimated weight (kg) |              |
| Master of receiving vessel  |  | Signature   | Vessel name                | Call sign   | IMO/Lloyd's number (if issued)                |                       |              |
| 7. Transhipment authorisation within a port area                          |  |   |                            |   |   |                       |              |
| Name  | Authority                                | Signature   | Address                    | Tel.  | Port of landing                               | Date of landing       | Seal (stamp) |
| 8. Name and address of exporter   |  | Signature   |                            | Date  |   | Seal                  |              |
| 9. Flag State authority verification:                                     |  |   |                            |   |   |                       |              |
| Name/Title  |  | Signature   |                            | Date  |   | Seal (stamp)          |              |



# EU IUU Policy (IV)

## ***PRACTICAL EXPERIENCE: MUTUAL ASSISTANCE SYSTEM***

- ***Cooperative tool: systematic exchange of information***
- ***Cooperation between the **European Commission, EU Member States and stakeholders*****

## EU IUU Policy (V)

- **Results:**

- Investigations of **over 200 cases of suspected IUU vessels** from 27 countries leading to at least 10 third countries imposing sanctions against almost 50 vessels (9m € fines and fees recovered by coastal or flag States)
- More than **180 alert messages** to EU Member States on cases of risk
- More than **200 decisions to refuse imports into the EU**



# EU IUU Policy (VI)

## **PRACTICAL EXPERIENCE:**

### **LISTS OF NON-COOPERATING COUNTRIES**

- *Evaluation of almost 50 third countries*
- *Positive dialogue with many of these leading to cooperation between the Commission and third countries*
- *18 countries have not entered into dialogue process leading to pre-identification as non-cooperating third country (Article 32 - "yellow card"):*
  - 15.11.2012: Belize, Cambodia, Fiji, Guinea, Panama, Sri Lanka, Togo and Vanuatu
  - 26.11.2013: Curacao, Ghana and Korea
  - 10.06.2014: Papua New Guinea, the Philippines
  - 12.12.2014: St Vincent and Grenadines, Tuvalu, St Kitts and Nevis, Solomon Islands
  - 21.04.2015: Thailand
- *When shortcomings addressed, pre-identification status may be lifted:*
  - 15.11.2014 – Fiji, Panama, Togo and Vanuatu
  - 21.04.2015 – Korea, The Philippines
- *If shortcomings not addressed, move to next stage...*

# EU IUU Policy (VII)

## **PRACTICAL EXPERIENCE: LISTS OF NON-COOPERATING COUNTRIES**

- *Countries that do not cooperate in the fight against IUU identified as non-cooperating third countries by Commission (Article 31 – "red card")*
  - 26.11.2013 - Belize, Cambodia and Guinea
  - 14.10.2014 - Sri Lanka
- *Council can then list third countries as non-cooperating (Article 33 – "black list") with trade measures*
  - 24.03.2014 - Belize, Cambodia and Guinea
  - 26.01.2015 – Sri Lanka
- *Countries that make tangible progress can be delisted*
  - 15.12.2014 - Belize

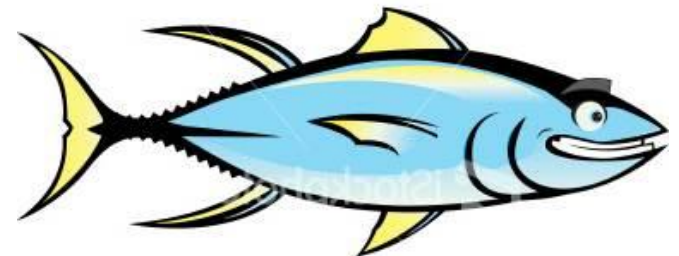


# EU IUU Policy (VIII)

## ***PRACTICAL EXPERIENCE: TANGIBLE RESULTS IN THIRD COUNTRIES***

- *Improved governance*
  - Revised legislation
  - Strengthened sanctions
  - Cooperation, coordination and mobilisation of different relevant authorities
  - Political commitment to the highest level
- *Strengthened MCS*
  - Improved vessel monitoring
  - Reinforcement of inspections and controls
- *Improved traceability throughout the supply chain*
  - Cross-checking and validation of CC data

**A new dynamic...**





# EU IUU Regulation in the broader EU Context

- *Coherence between all areas of **EU fisheries policy** – new CFP, SFPAs, control and FAR Regulations*
- *Coherence across European Commission – close **coordination with other DGs** (e.g.: DEVCO – alignment with Development priorities; EEAS – Maritime security strategies, etc...)*
- *Communication with other **EU Institutions** – European Parliament and Council*



# IUU Challenges – looking forward

- *Full implementation 2001 FAO IPOA*
- *FAO PSM Agreement*
- *Global Catch Certificate*
- *IMO number*
- *Increased exchange of information*
- *Chartering*
- *Increased use of new technologies*
- *Improved traceability*





***Thank you!***



***For more information: <http://ec.europa.eu/fisheries/iuu>***





# World Seafood Congress 2015

## Upskilling for a Sustainable Future

Grimsby, England  
5th to 9th September 2015

