

The sustainability of forage fisheries: the bond with the ShAD, status, problems, options

Pedro Sousa (FishSource Director), **Jim Cannon** (SFP CEO)



Sustainable Fisheries Partnership

Presented remotely to the Guayaquil Shrimp Aquaculture Dialogue
October 9, 2008



Shrimp Aquaculture Dialogue
Guayaquil, 8-9 October 2008



Sustainable Fisheries Partnership

Overview:

1. The Sustainable Fisheries Partnership
2. What is fisheries' sustainability?
3. The sustainability of forage fisheries
 4. Fisheries' sustainability vs. the Shrimp Aquaculture Dialogue
 5. FishSource
 6. Status of forage fisheries: global overview
7. Current status of some of the major forage fisheries



1. The Sustainable Fisheries Partnership



Sustainable Fisheries Partnership – Who we are:

- SFP is a Non-Government Organisation (NGO) founded in late 2006; currently 30 staff and consultants; growing rapidly
- Mission: “maintain healthy ocean and aquatic ecosystems, enhance fishing and fish-farming livelihoods and secure food supplies”
- The Partnership improves access to information to guide responsible seafood sourcing, and enhances the ability of seafood companies and partners to improve fish-farming and capture fisheries



SFP – what we do:

- SFP provides strategic and technical guidance to seafood suppliers and producers; helps convene them together with other like-minded companies in Fishery Improvement Partnerships
- Builds consensus around specific improvements in policies, marine conservation measures, and fishing and fish-farming practices
- Driven initially by providing advice / working close to the seafood supply chain on the status of global whitefish stocks but rapidly expanding to other work fields, including the sustainability of farmed organisms - SFP engaged on WWF dialogues: tilapia (TAD) and pangasius (PAD) – Jack Morales (SFP Aquaculture Director)

5



Goal of this presentation:

SFP to provide input to the Shrimp Aquaculture Dialogue / technical working groups as external stakeholders; introduce / consolidate FishSource as a useful tool to assess the sustainability of wild fisheries and thus contribute actively to the development of standards for responsible fish farming.

6



2. What is fisheries' sustainability?



What fisheries' sustainability is – Management

The integrated process of information gathering, analysis, planning, consultation, decision making, allocation of resources and formulation and implementation, with enforcement as necessary, of regulations or rules which govern fisheries activities in order to ensure the continued productivity of the resources and the accomplishment of other fisheries objectives.

(UN FAO, 2002)



Fisheries' sustainability – “3” Essentials:

Management / decision-making

Management plans; adequacy of set measures in light of scientific advice; Enforcement / Compliance; Illegal, Unregulated, and Unreported fishing (IUU); etc.

Stock Status

Stocks levels against biological reference points; harvest levels / fishing mortality rates; natural mortality rates; etc.

Ecological Impacts

PETS = protected, endangered, threatened species; requirement marine habitat mapping and impact assessment; requirement of comprehensive ecological risk assessments; effects of gears on the environment, etc.



3. The sustainability of forage fisheries



Forage fisheries' sustainability: **background**, current problems and uncertainty

- Production of forage fisheries heavily increased over the past 50 years in response to demands of fish and oil for animal feeds
- In the past 20 years more than ¼ of overall fish catch has been used for reduction purposes
- Emerging fisheries (e.g., krill) as the result of growing demand for farmed fish

11



Forage fisheries' sustainability: background, **current problems** and uncertainty

- Species typically used for reduction purposes depart from food-chain top predators for which “stock healthy” standards historically developed
- In the food web, forage species act instead as a link / energy pathway between producers (zooplankton, on which they feed upon) and secondary consumers to which they are prey;
- Impact (harvesting) upon forage fisheries, i.e., the “middle” of the food chain, is repercussive on both below and above energetic levels

12



Forage fisheries' sustainability: background, current problems and uncertainty

- *The “single species” assessment / management model might not be sufficiently precautionary for forage fisheries – this is a reckoning by ultimate scientific developments;*
- ENGO's currently strongly engaged on advocating a rather ecosystem-based approach to define *more adequate* (lower) harvest levels (pressure over MSC, ICES...);
- The traditional biological reference points used to define the “healthiness” of fish stocks might not be adequate for forage fisheries

13



Forage fisheries' sustainability background, current problems and uncertainty; however:

- Scientists not yet advised formally on how much the healthiness barrier should be raised; key assessment institutes (e.g., ICES, NMFS) and sustainability certifiers (MSC) have not dealt explicitly with this issue yet
- Pressure over all stakeholders to foment an overall, broad discussion still on-going; several organizations currently engaged on different aspects of forage fisheries: IFFO, FIN, ICES, Monterey Bay Aquarium, New England Aquarium, WWF, EDF, Seafood Choices Alliance, SFP, Seafish, among others...

14



Forage fisheries' sustainability

background, current problems and uncertainty; **however:**

- The MSC has certified Bering Sea / Aleutian Islands pollock; mid-water living species / mid-water fishing gears and acting like a keystone prey species in the ecosystem – quite close to lower food-chain pelagics commonly used for reduction purposes
- MSC set the threshold higher for pollock though: B_{MSY} was used as the limit lower level rather as target level, as traditionally used

15



Forage fisheries' sustainability

background, current problems and uncertainty; **therefore:**

- Currently, the sustainability status of forage fisheries is measured against the formal biological reference points and despite there is overall notion that those might not be precautionary enough for forage species, they shall be used as reference until overall agreement (ENGO's, managers, scientists) is reached;
- The above applies to FishSource (as we shall soon see), as FishSource follows the MSC / ICES assessment standards; thus all statements provided hereafter should be framed accordingly.

16



4. Fisheries' sustainability and the Shrimp Aquaculture Dialogue



How does the wild fisheries' sustainability issue fit in the on-going ShAD?



Principles for responsible shrimp farming
(FAO, WWF, et al.)
/ **ShAD working version:**



1. Farm siting
2. Farm design / construction
3. Water use
4. Broodstock and postlarvae

5. Feed management

Criteria: Feed ingredients and sources;

Fishmeal, fish oil, and fisheries by-products must be sourced from sustainable, well managed fisheries

or as

defined by.

6. Health management
7. Food safety



Principle 5: Feed management

Criteria: Feed ingredients and sources;

Fishmeal, fish oil, and fisheries by-products must be sourced from sustainable, well managed fisheries or as defined by.

yet, “How to define a responsible source if no MSC certification exists?”



FishSource™

Status and environmental performance of fisheries worldwide

www.fishsource.org

Why? Because FishSource provides our view on how MSC would rate any fishery, in light of MSC standards and of past assessments of certified fisheries.



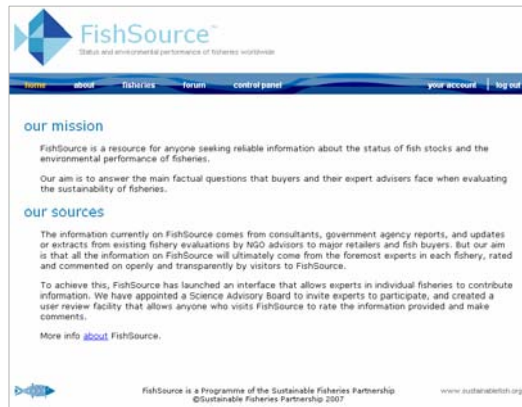
5. FishSource



FishSource

www.fishsource.org

FishSource is an online information resource about the status of fish stocks and the environmental performance of fisheries world wide



21



FishSource purpose

- Collate and summarize source materials needed as inputs for sustainability analyses
- Focus to date on information on the sustainability of individual fisheries, and general improvement needs
- Now developing structure and content for information on the specific improvements needed, milestones, and the progress being made in improving fisheries



22



FishSource assessment criteria

- Based on the Marine Stewardship Council (MSC) standards and / or international organisms' criteria (e.g. International Council for the Exploration of the Sea – ICES)
- FishSource does not have its “own” sustainability rating system, rather providing the user with a straight forward, clear, information on how international, accredited systems *would* rate / have rated the fisheries



FishSource search page

home about fisheries forum register login

Our sustainability analyses

FishSource currently has over 110 fishery profiles analysed, and this number is still increasing.

Use the map to select a particular fishery profile or search for using the search tool below.

You can also filter the fisheries shown by selecting specific criteria on the right.

Search

Enter your search terms and hit 'go'. Your results will be shown below.

[Want to know more about how to search?](#)

Search

All fisheries (110)

Jurisdiction Authority

Species

Gear type

Group

Filter

atlantic coast - pollock
argentine hake - north of 41°s
argentine hake - south of 41°s
argentine hake
arrowsmith rounder - gulf of alaska (us)
atlantic cod - fresh sea
atlantic cod - georges bank
atlantic cod - gulf of maine
atlantic cod - irish sea
atlantic cod - labrador
atlantic cod - in gulf of all bays
atlantic cod - in scottish shelf
atlantic cod - newfoundland
atlantic cod - rockall
atlantic cod - st. georges bank
atlantic cod - a gulf of all bays
atlantic cod - a scottish shelf and bay of bally
atlantic cod - st. pierre bank
atlantic cod - st. georges bank
atlantic coast - mark mark (us)
baltic sea
barents sea capelin
barents sea cod
barents sea haddock
barents sea herring
barents sea snow crab - baltic
blue swimming crab (thailand)
brazilian sea bass



FishSource ID page

Example:

Aleutian islands pollock

- MSC Certified;
- Most seen as whitefish, yet, somewhat lower in the food web, pelagic behaviour (swims in open-water)



Current speculation on whether or not it could be used for reduction purposes

FishSource™
Status and environmental performance of fisheries worldwide

home about fisheries forum control panel your account log out

Aleutian Islands Pollock last updated on 31st August 2008 [+ contribute](#)

SHARE

Identification Scores Summary Sustainability Info Basics Sources Reviews

Common name of fishery
US Alaskan Pollock

Other common names
Alaska Pollock, Walleye Pollock, Pollock

Jurisdiction
United States

Fisheries Management areas
Alaska, Aleutian Islands

Gear types
Midwater trawl

Species
Theragra chalcogramma

Common species names
Alaska Pollock

FishSource is a Programme of the Sustainable Fisheries Partnership
©Sustainable Fisheries Partnership 2007

www.sustainablefish.org



FishSource details page

(Sustainability Info)

Example:

Aleutian islands pollock

Aleutian Islands Pollock last updated on 31st August 2008 [+ contribute](#)

SHARE

Identification Scores Summary Sustainability Info Basics Sources Reviews

2. Stock Status

2a. Reference Points (top)

The BSAI Fishery Management Plan defines the Overfishing Level (OFL) and the maximum sustainable yield (MSY). The plan also defines the Acceptable Biological Catch (ABC). The plan also defines the Limiting Reference Point (LRP). Both of these limits; both are given in terms of spawning biomass (FSPR%) on fully recruited average female spawner biomass, and the LRP is intended as a precautionary tactic by

1. Management Quality

1a. Stock Assessment (top)

An age-structured stock assessment for the Aleutian Islands pollock resource has been developed, refined, and applied since 2003. Using the recently developed framework of the Assessment Model for Alaska (AMAK), stock assessment authors evaluated three stock assessment models (Models 1, 2A and 2B) for the assessment underpinning 2007 catch limits. The underlying AMAK model is implemented using ADMB software, and allows for estimation of many parameters in non-linear models. It models catch-at-age with the standard Baranov catch equation. For population dynamics, it follows "numbers-at-age over the period of catch history with natural and age-specific fishing mortality occurring throughout the 14 age groups that are modeled (ages 2-15+)," the assessment authors note.

Section contents:

1. Management Quality
 - a. Stock Assessment
 - b. Scientific Advice
 - c. Managers Decisions
 - d. Compliance
2. Stock Status
 - a. Reference Points
 - b. Current Status
 - c. Trends
 - d. Recovery Plans
3. Environment and Biodiversity
 - a. PET Species
 - b. Other Target and Bycatch Species
 - c. Habitat
 - d. Marine Reserves

3. Environment and Biodiversity

3a. PET Species (top)

The western stock of Steller sea urchin is listed under the U.S. Endangered Species Act, and its feeding areas and around rock ledges are closed to groundfish fishing. These closures encourage the likelihood that groundfish fishery animals. These closures encourage Alaska Peninsula, the Aleutian Islands, and Alaska. After declining for decades, shown slight increases during

Whether this uptick is an early question of whether the fishin their food supply. A major cha



FishSource summary page

Example:
Aleutian islands pollock

www.fishsource.org

Aleutian Islands Pollock last updated on 31st August 2008 [+contribute](#)

SHARE

Identification **Scores** Summary Sustainability Info Basics Sources Reviews

1. Summary

Strengths: Since 1999 pollock harvests in the Aleutian Islands area have been far below catch limits, mainly due to regulations that restrict trawling to prevent potential depletion of prey for endangered Steller sea lions. The harvest strategy uses multiple precautionary measures, and stock assessments use many best practices. A pilot Fishery Ecosystem Plan for the Aleutian region aims to preserve its unique ecological features.

Weaknesses: Pollock stock structure in the Aleutians is not well understood, and seasonal fluctuation in pollock concentrations elevates the risk of error in setting catch limits.

Options: Continue research on stock structure. Continue the new experimental winter survey, which produces biomass estimates closer to the time of potential winter harvests.

1a. Management Quality ([see detailed section](#)) (top)

Stock Assessment

Assessment models and methods used in this fishery include many best practices.

There is uncertainty about stock structure of Aleutians Island pollock, which

Section contents:

1. Summary
 - a. Management Quality
 - b. Stock Status
 - c. Environment and Biodiversity

Ratings for this profile

Compiled from 1 votes

5 - Agree completely
4 - Agree mostly
3 - Neutral
2 - Disagree mostly
1 - Disagree completely

Overall profile



FishSource scores

- 0-10 (10 = best performance)
- **Rough thresholds* based on MSC standards:**

Below 6: needs improvement on that standard AND is currently unsustainable

Between 6 and 8: needs improvement, but not unsustainable

Between 8 and 10 = currently sustainable.

Aleutian Islands Pollock last updated on 31st August 2008 [+contribute](#)

SHARE

Identification **Scores** Summary Sustainability Info Basics Sources Reviews

FishSource Scores

The indices range from 0 to 10, with 10 being the highest score. To learn how the FishSource indices are calculated, you can download a PDF document [here](#).

Management Quality	
Is the management strategy precautionary?	10.0
Do managers follow scientific advice?	10.0
Do fishers comply?	10.0

Fish stock

Is the fish check healthy?	10.0
Will the fish stock be healthy in future?	10.0

*Check FishSource for further info on how scores are devised:
http://www.fishsource.org/indices_overview.pdf

Scores are thus our view of how MSC would rate the respective fishery:

Aleutian Islands Pollock last updated on 31st August 2008

Identification Scores Summary Sustainability Info Basics Sources Reviews

FishSource Scores

The indices range from 0 to 10, with 10 being the highest score. To learn how the FishSource indices are calculated, you can download a PDF document [here](#).

management quality

Is the management strategy precautionary? **10.0**

Do managers follow scientific advice? **10.0**

Do fishers comply? **10.0**

fish stock

Is the fish stock healthy? **10.0**

Will the fish stock be healthy in future? **10.0**

www.fishsource.org

$F_{\text{at low biomass}} = 0$ (no fishing)

Advised $TAC_{08} = 28,000t$
Set $TAC_{08} = 19,000t$

Catch₀₇ = 2,500t
Set $TAC_{07} = 19,000t$

$SSB_{08} = 82,210t$
 $B_{40\%} = 40,378t$

$F_{07} = 0.196$
 $F_{\text{trp}} = 0.56$



Current content of FishSource

- September 2008: 113 live fisheries (~200 more fisheries pending for internal review and / or awaiting formal contribution from authors)
- Profiles mostly focused on whitefish fisheries but forage fisheries and crustacean fisheries' profiles now growing rapidly in number





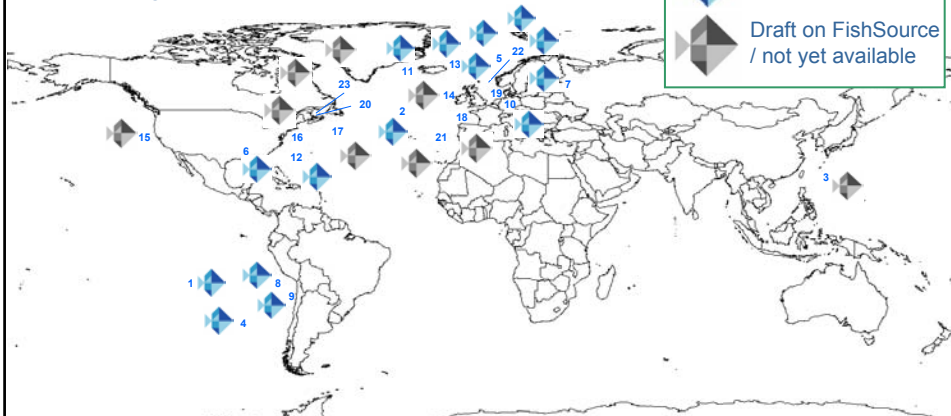


6. Status of forage fisheries: global overview



24 forage fisheries make currently
the bulk of global production:

 Live on FishSource
 Draft on FishSource / not yet available

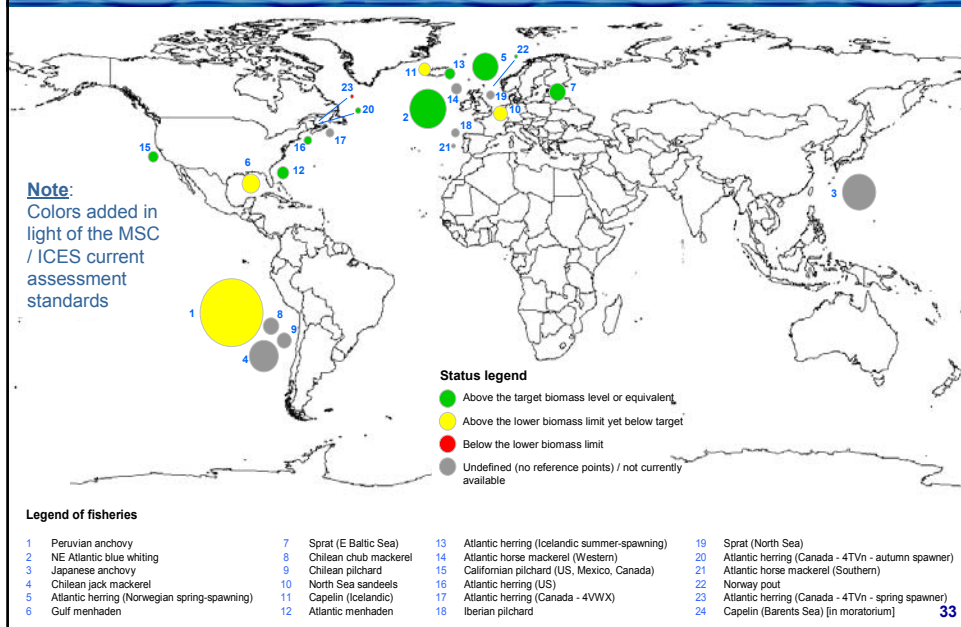


Legend of fisheries

- | | | | |
|--|-------------------------|---|--|
| 1 Peruvian anchovy | 7 Sprat (E Baltic Sea) | 13 Atlantic herring (Icelandic summer-spawning) | 19 Sprat (North Sea) |
| 2 NE Atlantic blue whiting | 8 Chilean chub mackerel | 14 Atlantic horse mackerel (Western) | 20 Atlantic herring (Canada - 4TVn - autumn spawner) |
| 3 Japanese anchovy | 9 Chilean pilchard | 15 Californian pilchard (US, Mexico, Canada) | 21 Atlantic horse mackerel (Southern) |
| 4 Chilean jack mackerel | 10 North Sea sandeels | 16 Atlantic herring (US) | 22 Norway pout |
| 5 Atlantic herring (Norwegian spring-spawning) | 11 Capelin (Icelandic) | 17 Atlantic herring (Canada - 4VWX) | 23 Atlantic herring (Canada - 4TVn - spring spawner) |
| 6 Gulf menhaden | 12 Atlantic menhaden | 18 Iberian pilchard | 24 Capelin (Barents Sea) [in moratorium] |

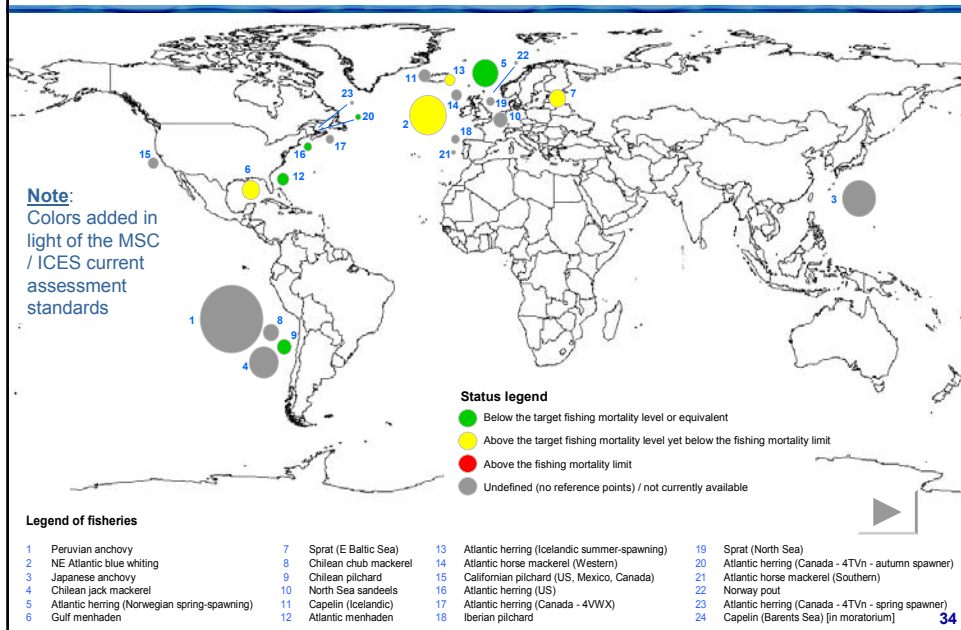
Current snapshot on forage fisheries' sustainability: stock status

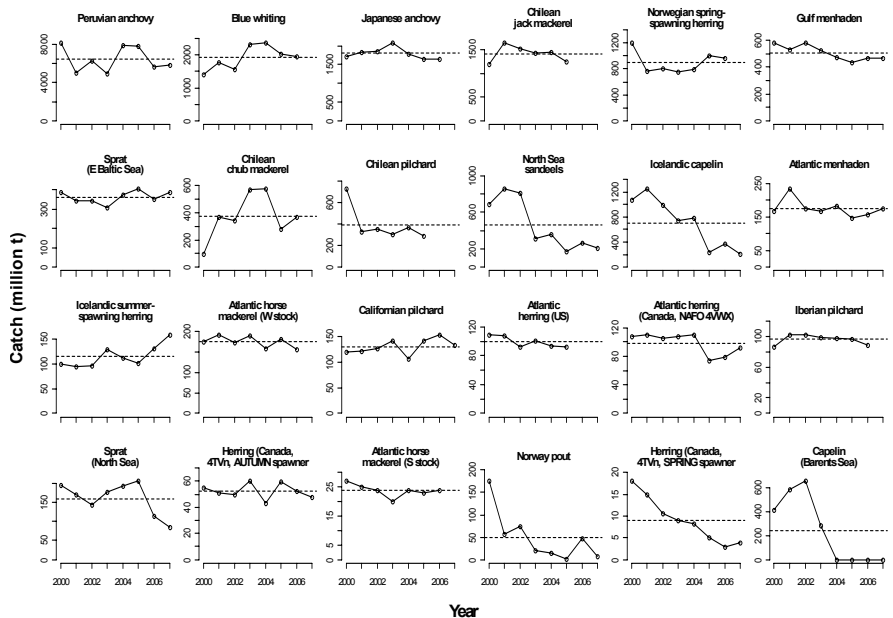
(circles are proportional to latest annual official catch)



Current snapshot on forage fisheries' sustainability: harvest levels

(circles are proportional to latest annual official catch)





7. Current status of some of the major forage fisheries

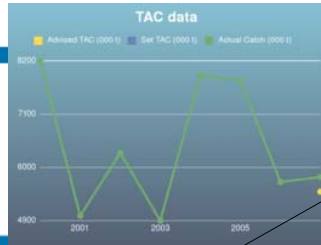




Peruvian anchovy

management quality

- Is the management strategy precautionary? 6.0
- Do managers follow scientific advice? 10.0
- Do fishers comply? 9.1

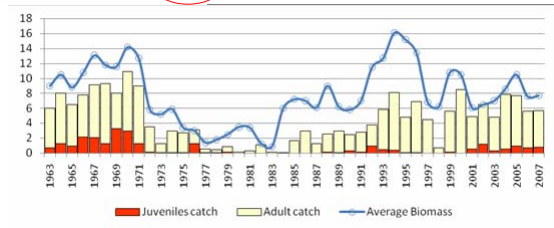


F_{trp} = 0.8; yet, no data on current F is available

fish stock

Is the fish stock healthy? na Will the fish stock be healthy in future? na

No "healthiness" threshold has been defined for the stock; yet, above Blimit (5 million t).



Blue whiting

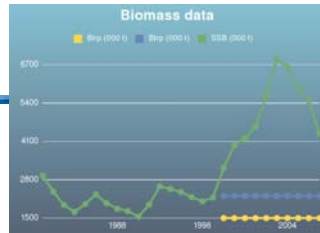
Scores:

management quality

- Is the management strategy precautionary? 6.0
- Do managers follow scientific advice? 1.7
- Do fishers comply? 10.0

fish stock

- Is the fish stock healthy? 10.0
- Will the fish stock be healthy in future? 6.4





Norwegian spring-spawning herring

Scores:

management quality

- Is the management strategy precautionary? 8.4
- Do managers follow scientific advice? 9.5
- Do fishers comply? 10.0

fish stock

- Is the fish stock healthy? 10.0
- Will the fish stock be healthy in future? 8.7



Example: scores for 3 fisheries in FishSource

Note: other MSC standards cannot be translated into a quantifiable score (rather "quality"-related)

	Peruvian anchovy	Blue whiting	Norwegian herring
Score 1 (Precautionary management?)	6.0	6.0	8.4
Score 2 (Managers in line with advice?)	10.0	1.7	9.5
Score 3 (Fishers in line with management?)	9.1	10.0	10.0
Score 4 (Current stock health)	NA	10.0	10.0
Score 5 (Future stock health)	NA	6.4	8.7

*Status as by Oct 2008



Acknowledgements

- Jim Cannon (CEO, SFP)
- Brad Warren (SFP Seattle, POP Director)
- Dessy Anggraeni (SFP Research Director)
- Merul Patel (Site Technical Design and Coding; CIO, SFP)
- Jack Morales (SFP Aquaculture Director)
- And many contributors!

Thank you!



Sustainable Fisheries Partnership

www.sustainablefish.org

www.fishsource.org