



Species (Common Name)
Abalone
Alaska pollock
Asiatic hard cl
Chilean sea
Coral tr
Geod
Gr

## Monterey Bay Aquarium Seafood Watch

### BEST CHOICES

Arctic Char (farmed)  
Barramundi (US farmed)  
Clams (US farmed)  
Cobia (US farmed)  
Cod: Pacific (US farmed)  
Crab: Dungeness, Stone  
Halibut: Pacific (US)  
Lobster: Spiny (US)  
Mussels (farmed)  
Sablefish (farmed)  
Salmon (Black Cod (Alaska or BC)  
Scallops (Alaska wild)  
Shrimp, Pink (OR)  
Striped Bass (farmed)  
Tilapia (US farmed)

### GOOD ALTERNATIVES

Basa/Pangasius/Swai (farmed)  
Caviar, Sturgeon (US farmed)  
Clams (wild)  
Cod: Pacific (US farmed)  
Crab: Blue\*, King (US), Snow  
Flounders, Soles (Pacific)  
Herring: Atlantic  
Lobster: American/Maine  
Mahi Mahi/Dolphinfish (US)  
Oysters (wild)  
Paclic Alaska  
Salmon (wild, WA\* and north of  
Falcon, OR)  
Sea  
S, Canada)

THINK TWICE  
品种 Origin  
China  
Croatia

### AVOID

Caviar: Sturgeon\* (imported wild)  
Chilean Sea Bass/Toothfish\*  
Cobia (imported farmed)  
Cod: Atlantic and imported Pacific  
Flounders, Halibut, Soles (Atlantic)  
Grouper  
Lobster: Spiny (Brazil)  
Mahi Mahi/Dolphinfish (imported)  
Marlin: Blue\*, Striped\*  
Monkfish  
Orange Roughy\*  
Salmon (farmed, including Atlantic)\*  
Sharks\* and Skates  
Shrimp (imported)  
Snapper: Red  
Swordfish (imported)\*  
Tilapia (Asia farmed)  
Tuna: Albacore, Bigeye, Yellowfin  
(longline)\*  
Tuna: Blue\* and Tongol



Species (Common Name)	品种
Black pom	
Bluefin tuna	
Brown-marbled	
Super	

Switch the Fish  
find what's right for your dish

Based on information from the  
Good Fish Bad Fish Seafood Converter

COOKING TECHNIQUE  
PAN-FRY  
GRILL OR BQ  
BRAISE, POACH, OR STEAM  
BLOW DRY, SMOKED

AVOID

GoodFishBadFish  
goodfishbadfish.com.au

SUSTAINABLE  
sustainabletable.org.au

## SPECIES AND AVAILABILITY

Here is a guide to the availability and price of over 100 species

Species	Availability	Price
Arctic Char	Good	Low
Barramundi	Good	Low
Clams	Good	Low
Cobia	Good	Low
Cod	Good	Low
Crab	Good	Low
Dungeness	Good	Low
Halibut	Good	Low
Lobster	Good	Low
Mussels	Good	Low
Sablefish	Good	Low
Salmon	Good	Low
Scallops	Good	Low
Shrimp	Good	Low
Striped Bass	Good	Low
Tilapia	Good	Low
Tuna	Good	Low
Yellowfin	Good	Low

## THE BLUE OCEAN IN Guide to Ocean SEAFOOD

### AVOID DUE TO MERCURY

Women who are or may become  
PREGNANT, NURSING MOTHERS,  
and CHILDREN should NOT eat:

Tuna Steak  
Bluefin  
Bigeye  
(imported longline)

Monkfish  
Rockfish/Red snapper  
Sablefish/Black cod  
Tuna, Albacore  
Tuna, Yellowfin  
(imported longline)

What is a meal?  
A serving meal is about the  
size and thickness of your  
hand, or 1 oz. uncooked fish  
for every 20 lbs. of body weight.

140 lb. Adult = 8 oz. | 80 lb. Child = 4 oz.

From: NSW  
Also known as:  
Australia  
WILD CAL  
From: NSW

## Some Concerns

Catfish: Tail Bass (Jnt T) farmed  
Oysters: Atlantic soft shell (ATL), Geoduck (US Pac. Jnt T)  
Cod: Pacific (Canada, US) farmed  
Crab: King, Snow (Canada, US)  
Halibut: (US) bottom longline  
Haddock: (US) bottom longline  
Lingcod  
Lobster: American (US Atl.)  
Mahi mahi: Dolphinfish/Black cod  
Mussels: wild  
Octopus (US)  
Oysters: wild  
Sablefish: (CA, OR, WA)  
Salmon: Pacific wild  
Scallops: Sea (NE Atl. US)  
Shrimp: (MEX., Gulf of Mexico) farmed  
Sole: (Pac.) farmed  
Squid: Argentine, Humboldt, Shortfin, Surinam (Jnt T)  
Swordfish (US Atl.) pelagic longline  
Tuna: Rainbow (Canada) open-coast farmed  
Tuna (US) pelagic longline



## Alert Codes

Green = Best Choice. This species is currently  
fished/harvested sustainably and represents a best  
choice. Enjoy, while supporting responsible fishing  
and coastal livelihoods.

Yellow = Some Concerns. Seafood that should  
be consumed infrequently, or when a green choice  
is not available. There are conservation concerns  
with the current populations or practices in this  
fishery.

Red = Avoid. Do not purchase these fish for now.  
They come from sources that have a combination of  
problems—habitat damage, discard of unwanted  
species, poor management, low populations, can  
be easily harmed by fishing or may be listed by  
governments as Endangered.

Health advisory. Regular consumption of  
one or more species in this listing poses a health  
advisory. Avoidance of these species, or avoidance of  
specific parts, is advised. For further information visit:  
www.seafoodwatch.org

From: NSW  
Also known as:  
Australia  
WILD CAL  
From: NSW



# Benchmarking, Ecolabeling, & Seafood Watch: How, Why, and What Does it Mean?

John Volpe, PhD  
University of Victoria  
British Columbia, Canada  
jpv@uvic.ca





















Monterey Bay Aquarium -  
*Fishing for Solutions* exhibit runs 1997-1999



## The early days - 1999

### Summary of Criteria Ranks

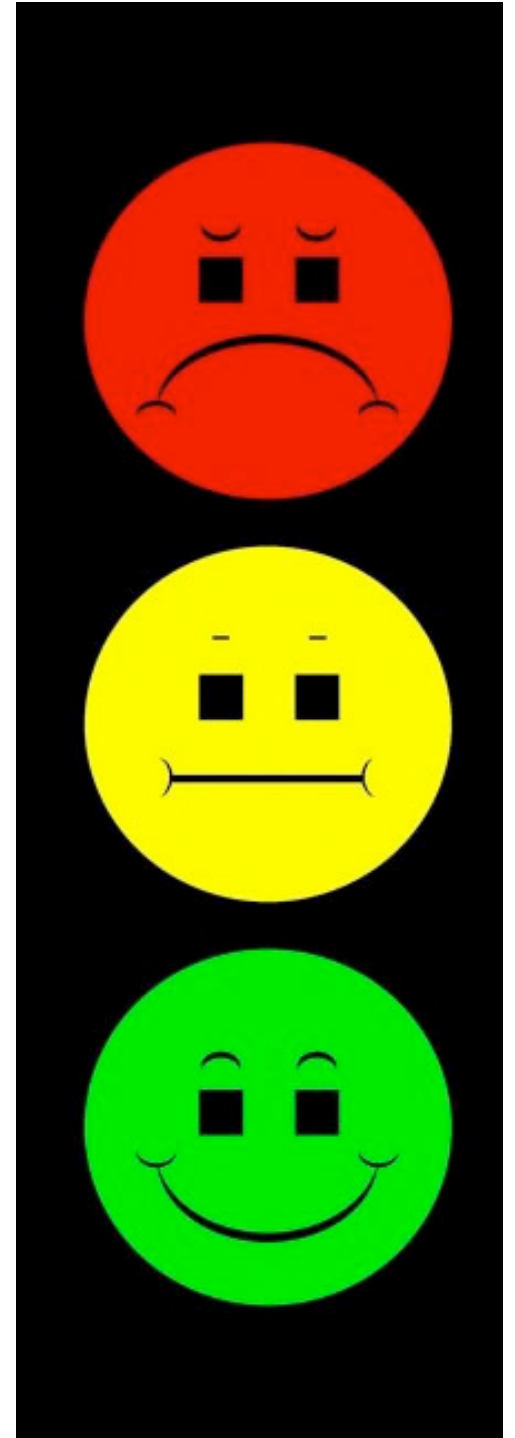
#### Conservation Concern

Sustainability Criteria	Low	Moderate	High	Critical
Use of Marine Resources				
Risk of Escapes to Wild Stocks				
Risk of Disease/Parasite Transfer to Wild Stocks				
Risk of Pollution and Habitat Effects				
Effectiveness of Management				

**Simple**

**Immediately  
recognizable**

**Unambiguous**





# Dr. George Leonard's KISS Principle

A species receives a recommendation of “**Best Choice**” if:

It has three or more green criteria and the remaining criteria are not red.

A species receives a recommendation of “**Proceed with Caution**” if:

Criteria “average” to yellow

There are four green criteria and one red criteria

Stock Status and Management criteria are both ranked yellow and remaining criteria are not red.

A species receives a recommendation of “**Avoid**” if:

It has a total of two or more red criteria

It has one or more Critical Conservation Concerns.



# 2003

BLUE OCEAN INSTITUTE

*Fresh Inspiration for Ocean Conservation*



Look for these colored labels to indicate the Blue Ocean Institute's rating.



Relatively abundant; fishing method causes little damage.



Some problems exist with abundance or fishing method.



Low abundance; fishing method seriously harms other wildlife or natural habitats.



Not yet rated.

# 2004 Aquaculture Dialogues



Eight “tables” established including farmed salmon  
6 – 8 key impact areas  
Define standards that capture best 20% of producers

> 2,000 farmers, retailers, NGOs, scientists and stakeholders within the aquaculture industry

- First significant pass-fail standard (*c/w recommendation*)
- Producer-centric, not species- or country-centric
- Consumer facing / on package



# Aquaculture Dialogues

Define standards



Manage standards and  
certification programs



2004

Quality assurance and food safety  
+ sustainability



2004

Extends certification to feed mills,  
hatcheries and processors



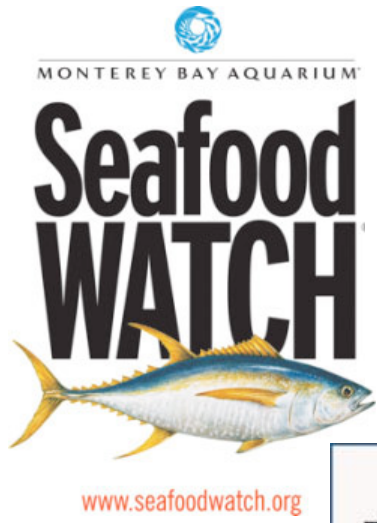
2004

Acts as auditor and certifier for  
food safety standards and new  
standards to “meet client needs”



2006

Certifies both farmed and wild caught  
product under the same label



BIOSUISSE



SEAFOOD FOR THE FUTURE



GREENPEACE



MARKS & SPENCER






[illegible][illegible][illegible]

**SAFE TO EAT  
2-3 MEALS  
PER WEEK**




OR

**SAFE TO EAT  
1 MEAL  
PER WEEK**



**AVOID  
DUE TO MERCURY**



**Follow this advice to reduce your exposure to mercury, PCBs, and other toxic chemicals:**

<ul style="list-style-type: none"> <li>♥ Anchovies</li> <li>♥ Black sea bass</li> <li>Butterfish</li> <li>Catfish</li> <li>Clams</li> <li>Cod (US Pacific) (US Atlantic)</li> <li>Crab (blue, King, Snow)</li> <li>Cod (US Pacific) (imported King)</li> <li>Crab - Imitation</li> <li>Crayfish (imported farmed)</li> <li>Flounder/Sole</li> <li>♥ Herring</li> <li>♥ Mackerel (canned)</li> <li>♥ Oysters</li> <li>Pollock/Fish sticks</li> </ul>	<ul style="list-style-type: none"> <li>♥ Salmon (fresh, canned)</li> <li>♥ Chinook (King) (Central, Alaska)</li> <li>♥ Chum (Dog, Red)</li> <li>♥ Coho (Silver)</li> <li>♥ Farmed *</li> <li>♥ Pink (Humpy)</li> <li>♥ Sockeye (Red)</li> <li>♥ Sardines</li> <li>Scallops (US Pacific) (US Atlantic)</li> <li>Scallops</li> <li>Shrimp/Prawns (US, Canada)</li> <li>Squid/Calamari (imported age)</li> <li>Tilapia</li> <li>♥ Trout</li> <li>Tuna (canned/light) (red/pink) (solid/pink, pure white)</li> </ul>	<p><b>Chilean sea bass</b> (Chile/Croat, Peru; Edward &amp; Martin Islands)</p> <p>♥ Chinook salmon (Puget Sound)</p> <p>♥ Croaker (white, Pacific)</p> <p>Halibut (Pacific) (Atlantic)</p> <p>Lobster (US, Canada) (imported Spiny Lobsters)</p> <p>Mahi mahi (imported longline)</p> <p><b>What is a meal?</b> A serving/meal is about the size and thickness of your hand, or 1 oz. uncooked fish for every 20 lbs. of body weight.</p> <p>160 lbs. Adult = 8 oz. / 80 lbs. Child = 4 oz.</p>
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**Women who are or may become PREGNANT, NURSING MOTHERS, and CHILDREN should NOT eat:**

<ul style="list-style-type: none"> <li>Mackerel (King)</li> <li>Marlin (imported)</li> <li>Shark</li> <li>Swordfish</li> <li>Tilefish ( Gulf of Mexico, South Atlantic)</li> </ul>	<ul style="list-style-type: none"> <li>Tuna Steak</li> <li>Bluefin</li> <li>Bigeye (imported longline)</li> </ul>
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♥ Highest in healthy omega-3 fatty acids

**ORANGE TIE:** Overfished, farmed, or caught using methods harmful to marine life and/or environment

★ **Farmed salmon information:**  
[www.doh.wa.gov/fish/farmedsalmon](http://www.doh.wa.gov/fish/farmedsalmon)  
**Seafood not listed! Call 1-877-485-7316**



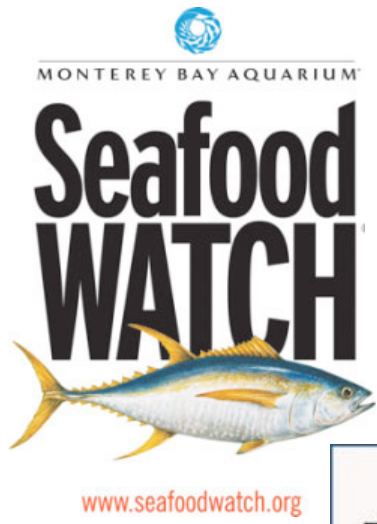
# Take Home 1

Recommendations are informative and give consumers context.

Green and Yellow convey meaning by not being Red

A standard depends entirely on its “brand” - is it recognized and trusted?





BIOSUISSE



SEAFOOD FOR THE FUTURE



GREENPEACE



MARKS & SPENCER







# GAPI

## Global Aquaculture Performance Index

An innovative tool for evaluating and improving the environmental performance of marine aquaculture



**SERG**  
SEAFOOD ECOLOGY RESEARCH GROUP



**University  
of Victoria**

Funded by:

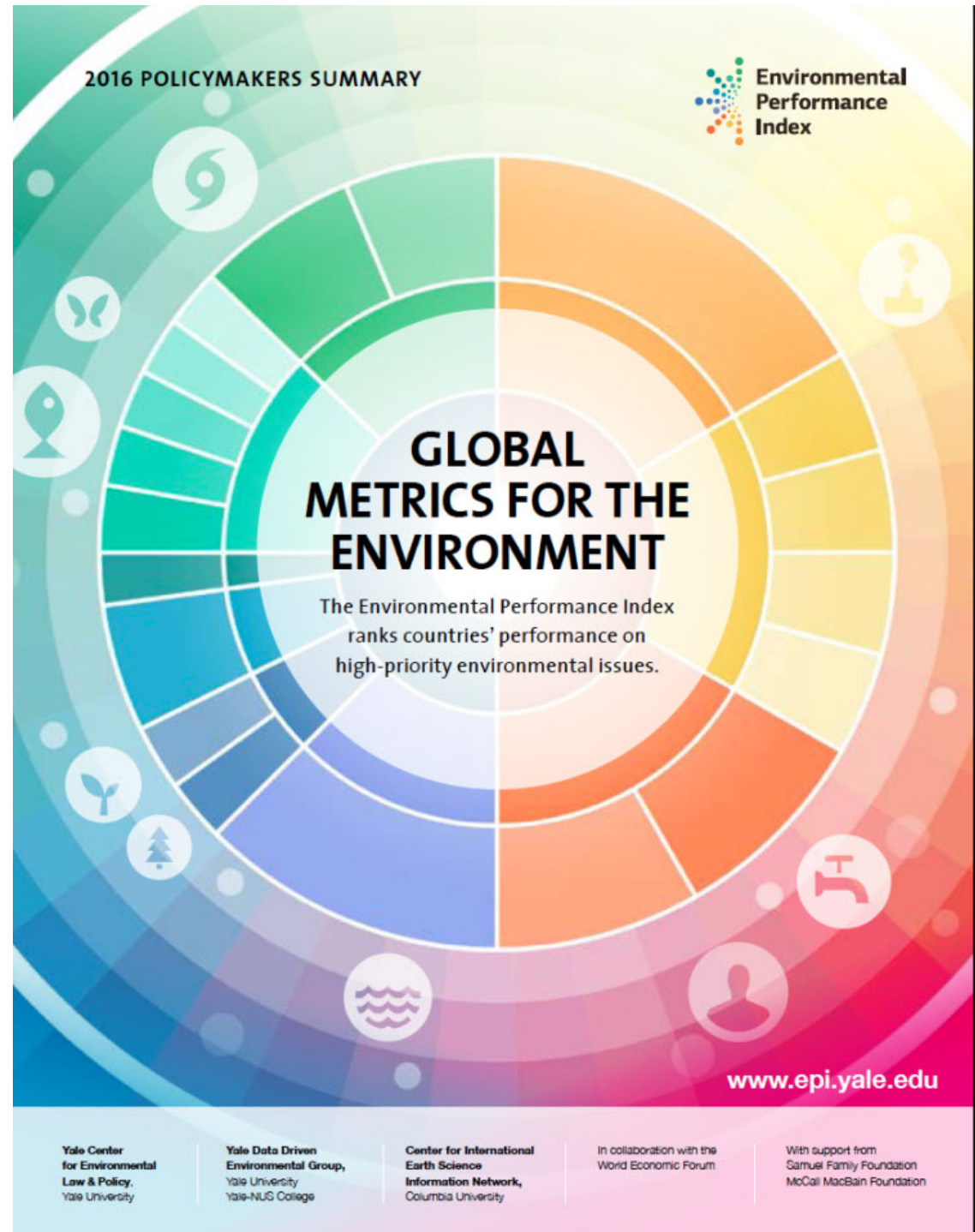


**LENFEST  
OCEAN  
PROGRAM**



THE  
**PEW**  
ENVIRONMENT GROUP

# GAPI is a mariculture- specific application of the *Environmental Performance Index*





93.7%

Coverage of Global  
Marine Finfish  
Aquaculture



## INPUTS

Capture-Based Aquaculture (CAP)

Ecological Energy (ECOE)

Industrial Energy (INDE)

Sustainability of Feed (FEED)

## DISCHARGES

Antibiotics (ANTI)

Antifoulants (Copper) (COP)

Biochemical Oxygen Demand (BOD)

Parasiticides (PARA)

## BIOLOGICAL

Escapes (ESC)

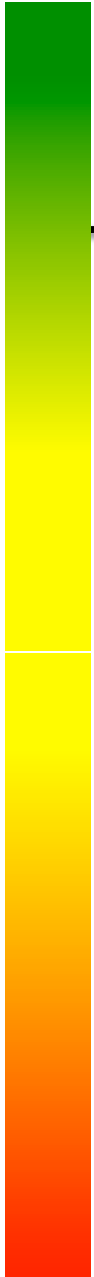
Pathogens (PATH)

# Consumer Reports®



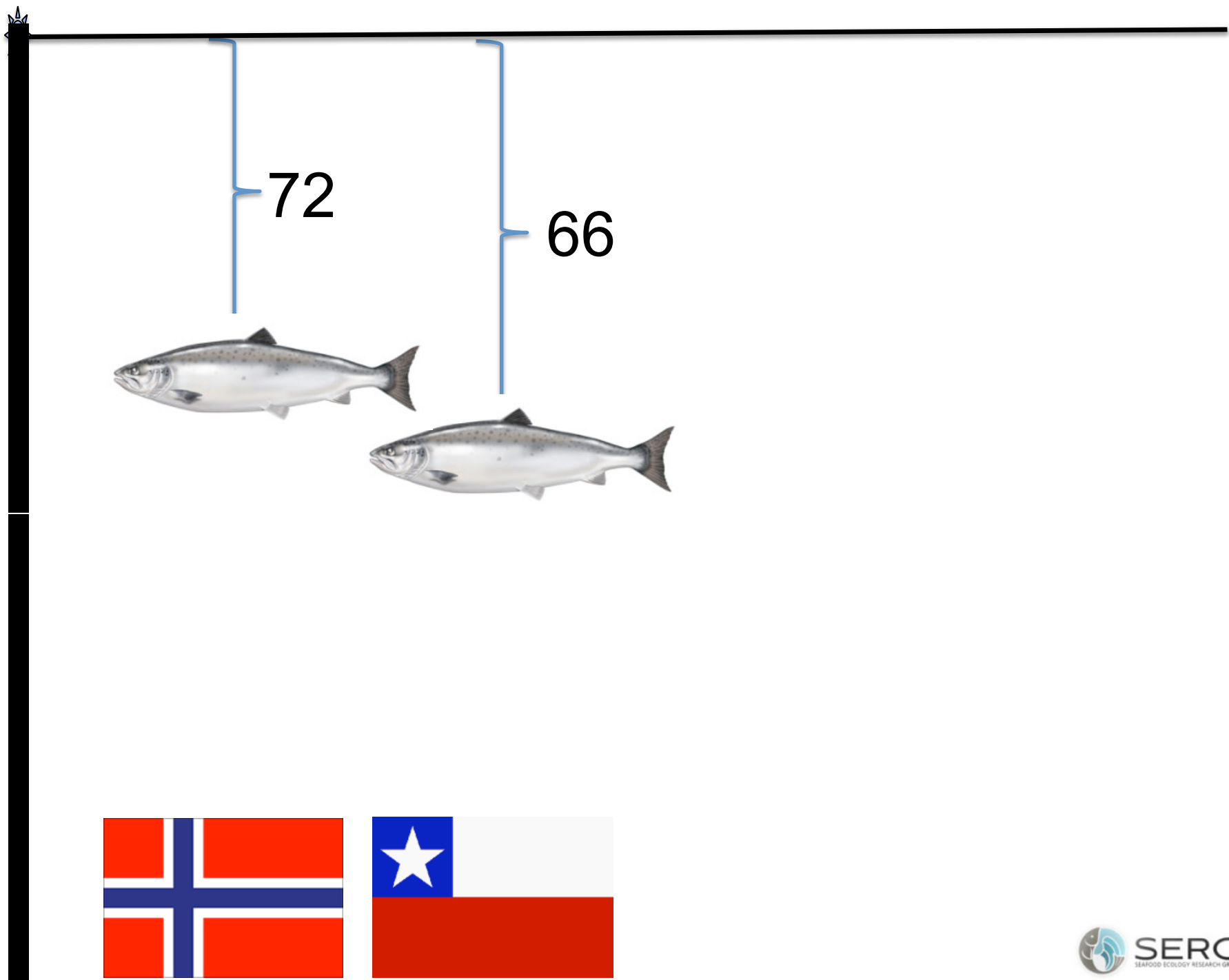
# ZAGAT SURVEY®

Environmental Performance

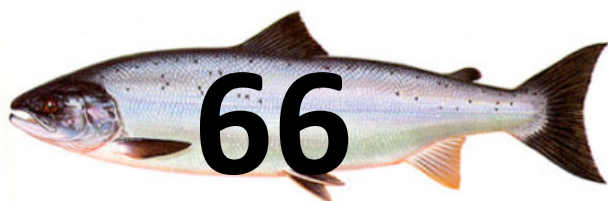


Environmental Standard: Zero Impact

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## INDICATOR SCORES

*for each  
species-country*

ANTI

BOD

CAP

COP

ECOE

ESC

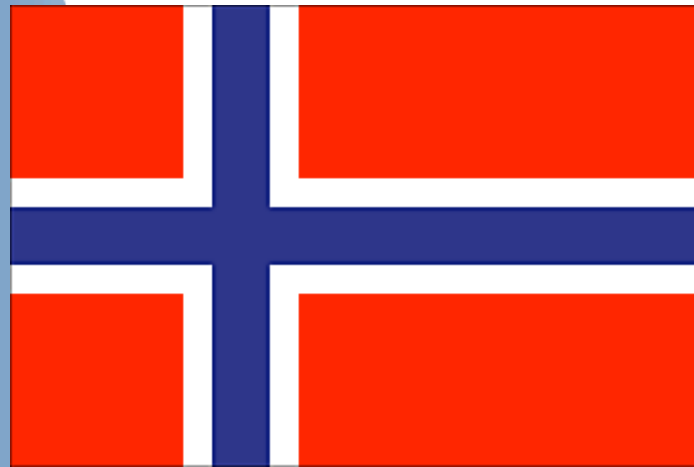
FEED

INDE

PARA

PATH

# 72 / MT





## INDICATOR SCORES

*for each  
species-country*

ANTI

BOD

CAP

COP

ECOE

ESC

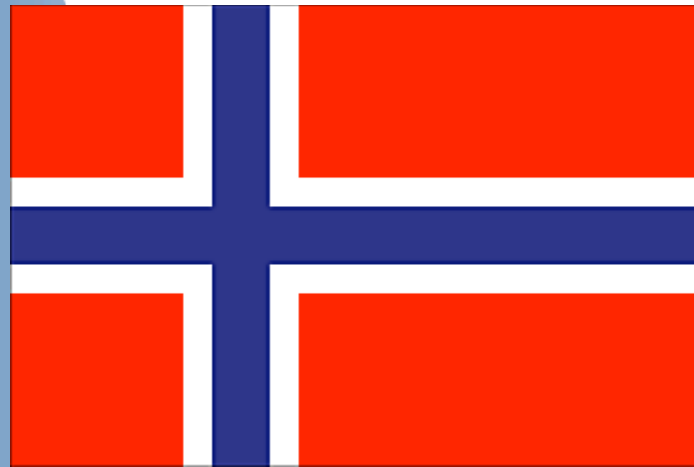
FEED

INDE

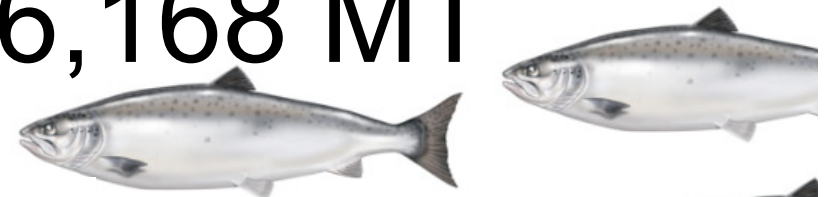
PARA

PATH

**72 / MT**



**33 / 736,168 MT**



**Score / MT  
("efficiency")**

**Salmon**



**Bream**



**Grouper**



# Environmental Score

**Grouper**



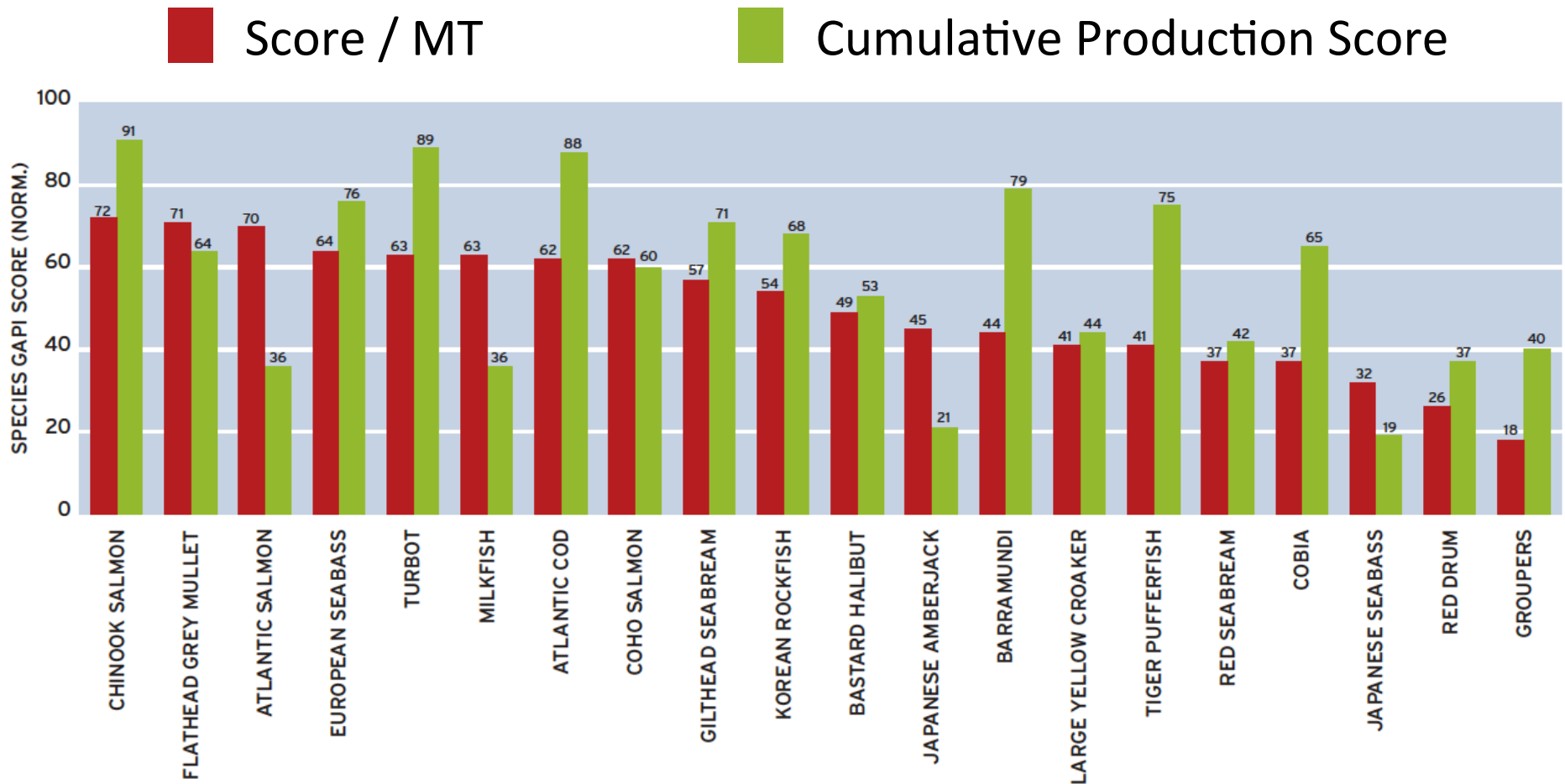
**Bream**



**Salmon**







Large variation between normalized and cumulative scores

All labels focus on normalized; Cumulative only is relevant

Figure 12: Normalised Versus Cumulative Species-Country Scores

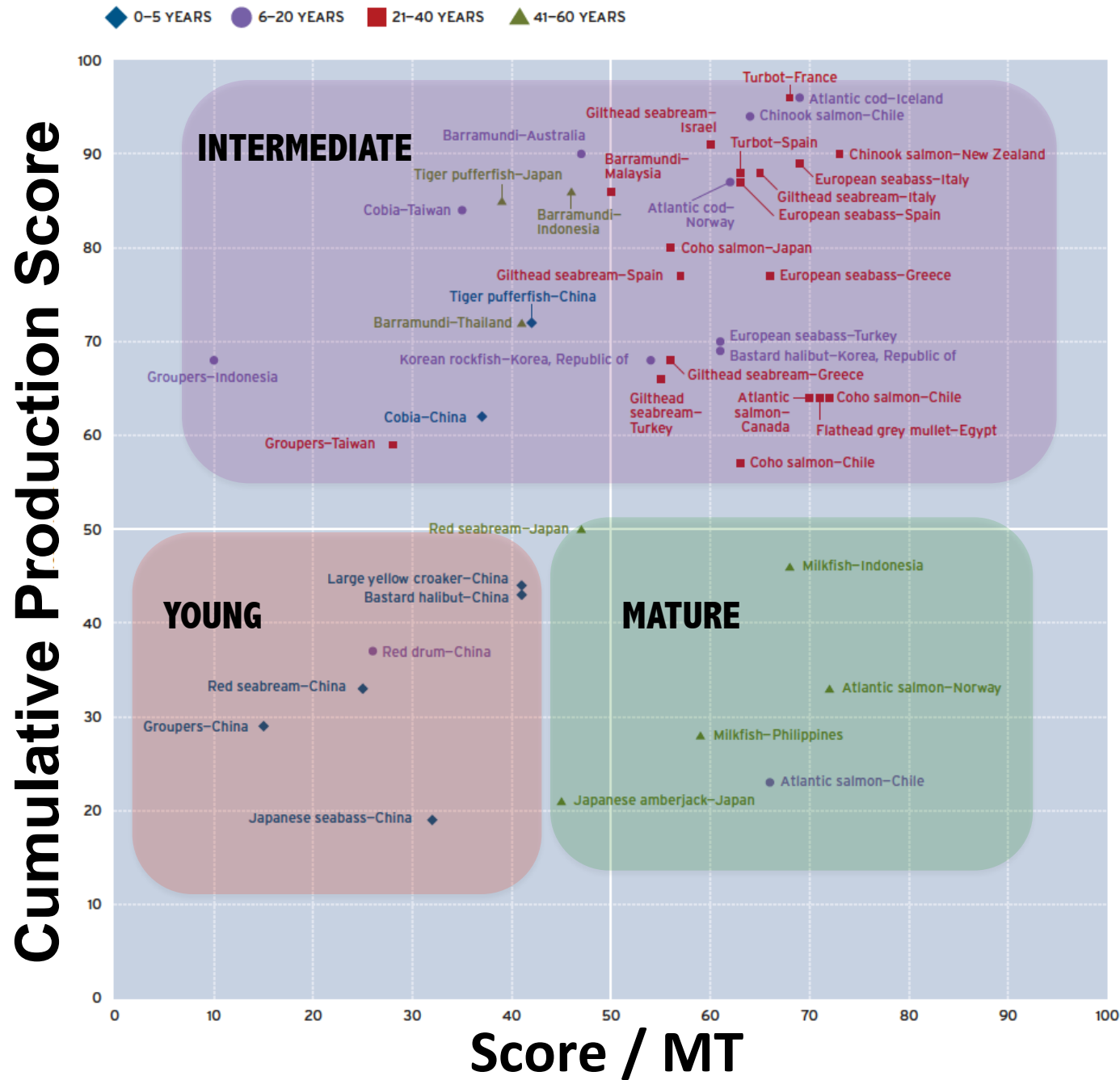
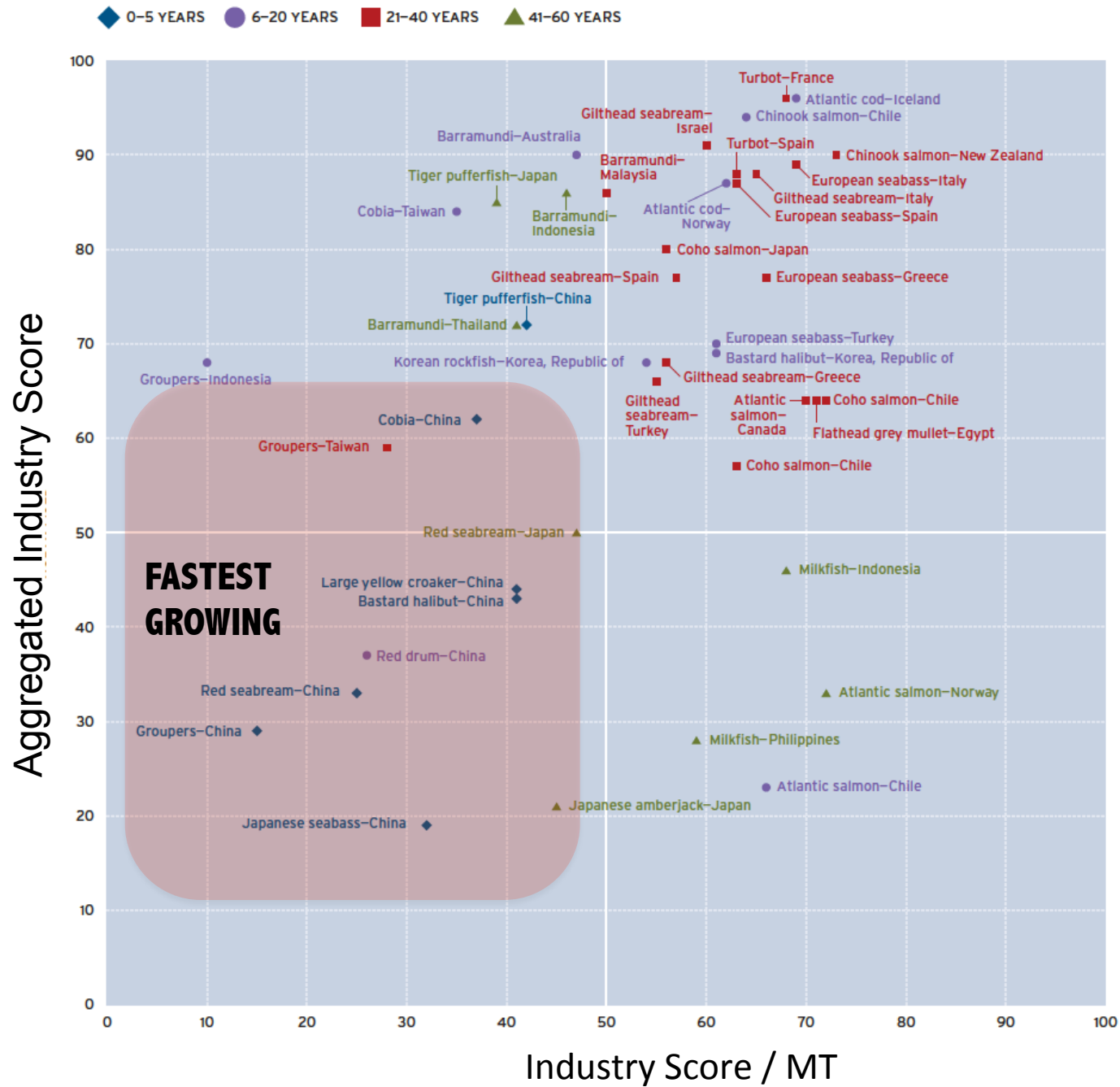


Figure 12: Normalised Versus Cumulative Species-Country Scores





**5,500,000 kg antibiotics  
(active ingredients)**

**16,400,000 kg  
parasiticides**

**1030 kcal industrial  
energy per 1 kcal product**





# Lessons Learned

Sustainability must be demonstrated, not assumed

Standardized, quantitative data required to demonstrate progress

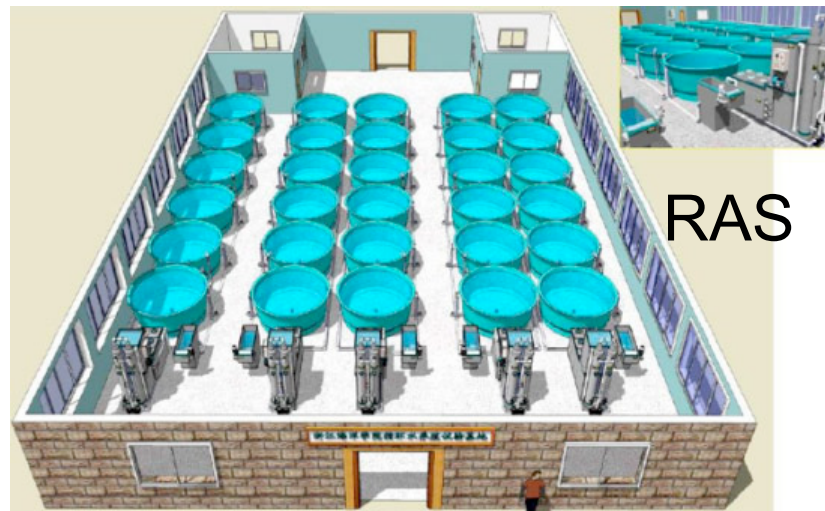
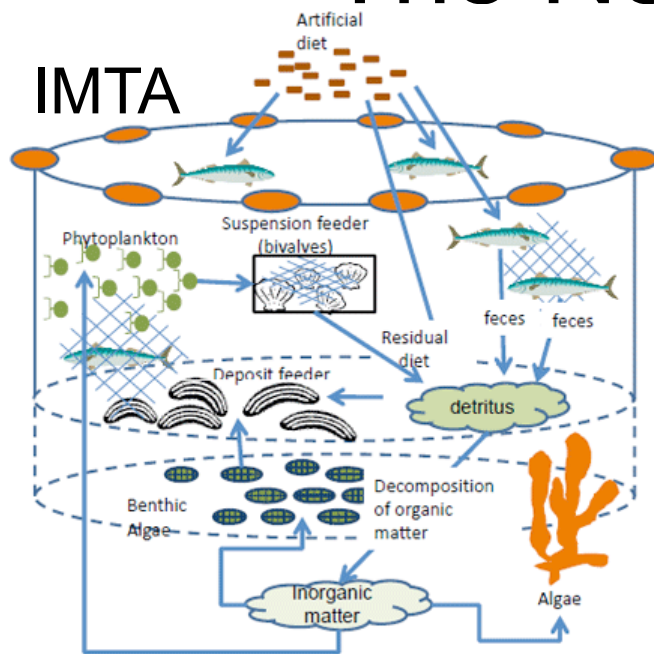
Greater attention must be paid to Asia

Next Step: Benchmark sustainability initiatives at farm level – FLAPI

# Take Home 2

Ecologically relevant criteria  
remain largely absent...  
challenging legitimacy

# The New Technologies



# Farm Level Aquaculture Performance Index

Methodology based on revised MBA methodology

Based on GAPI

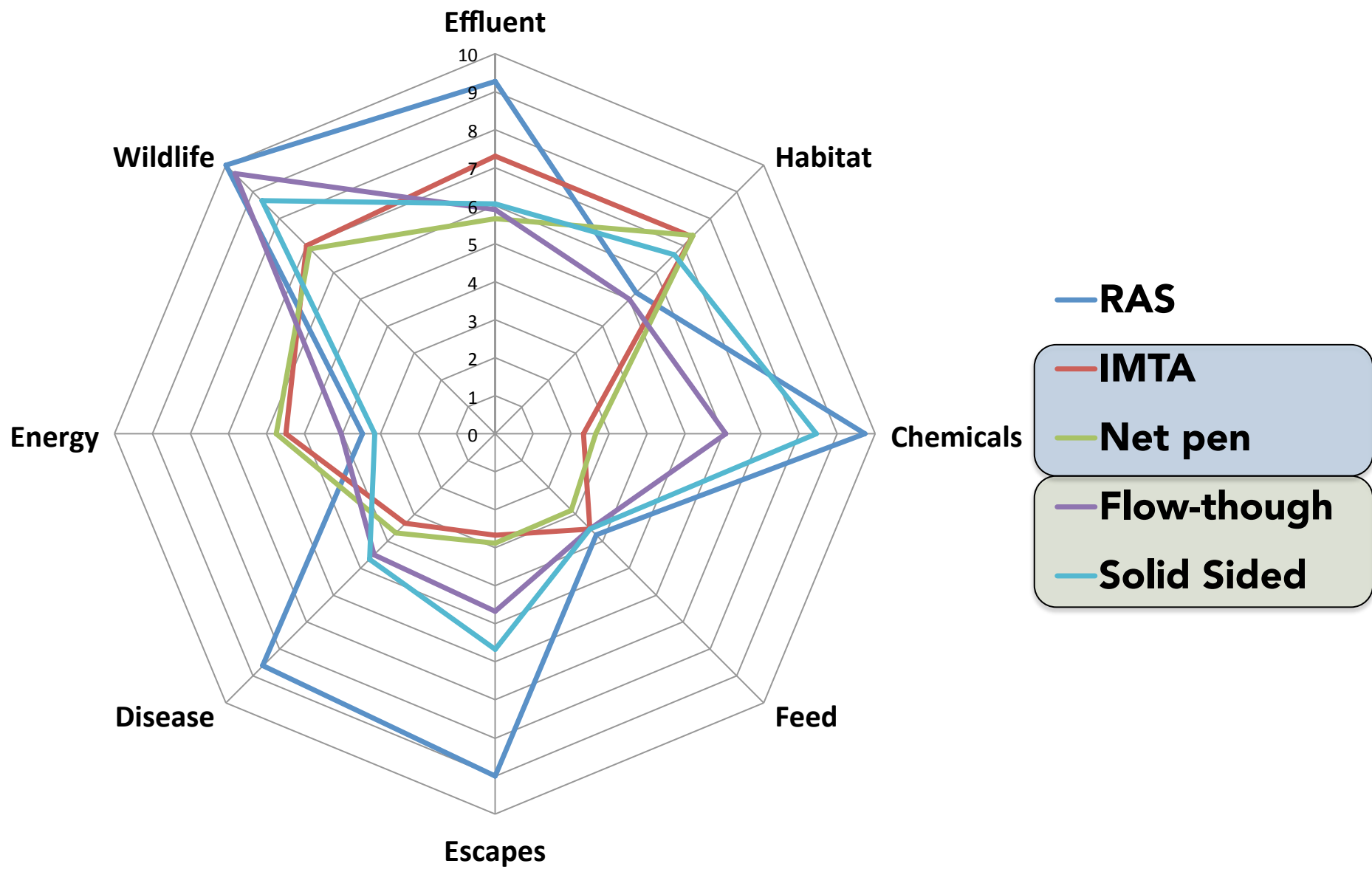
Based on EPI ...

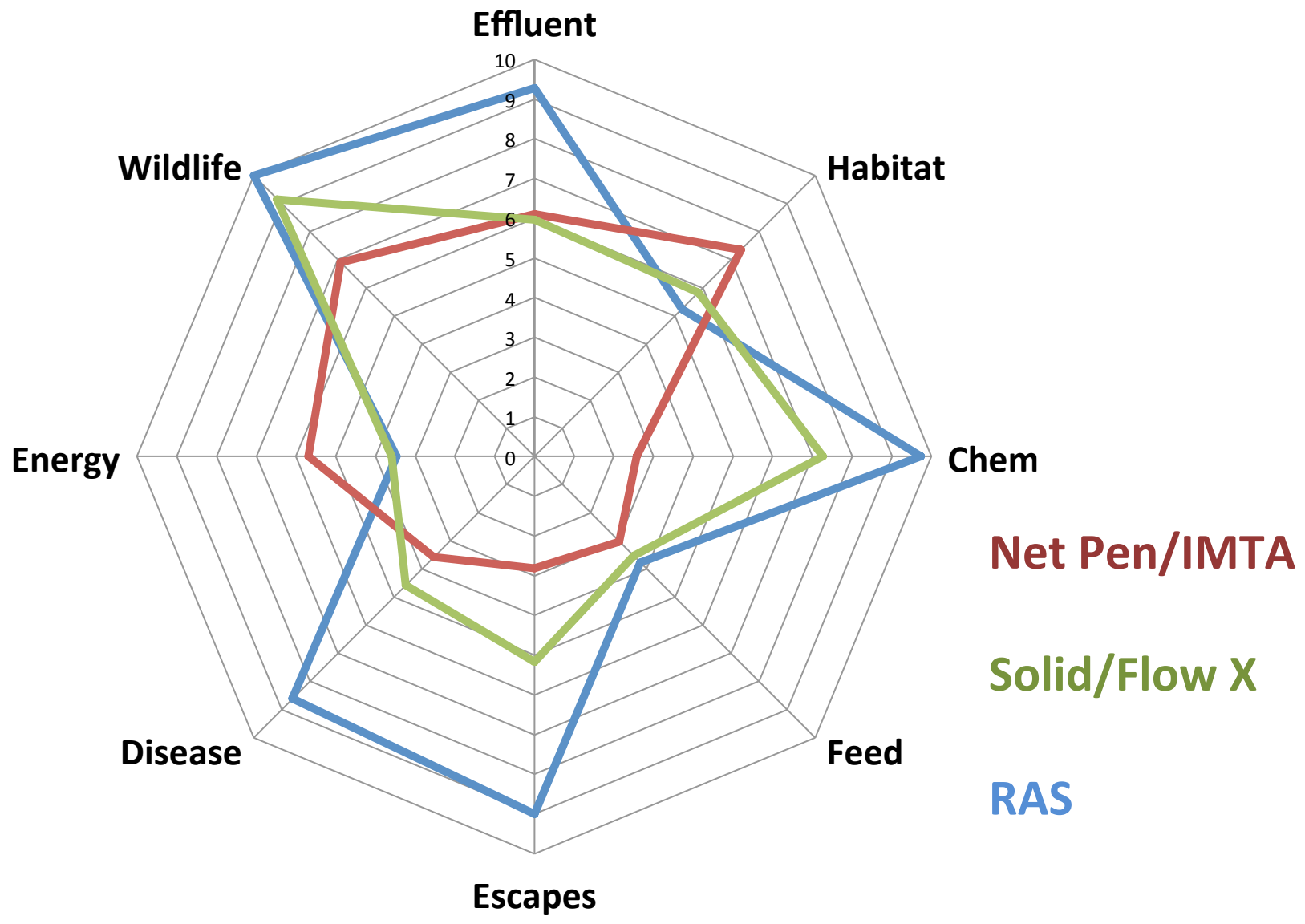
Farm level assessment of  
alternative aquaculture  
technologies



Valerie Ethier









**Moved all salmon production to RAS**

**Capped impacts at current levels**

**How much additional salmon could be produced for the current “cost” ?**

**1,000,000 MT more**

**~100 % increase**

# Take Home 3

RAS production internalizes efficiencies – is only the technology not susceptible to eco-performance depreciation with scale



GLOBAL AQUACULTURE PERFORMANCE INDEX

## HOW GREEN IS YOUR ECO-LABEL?

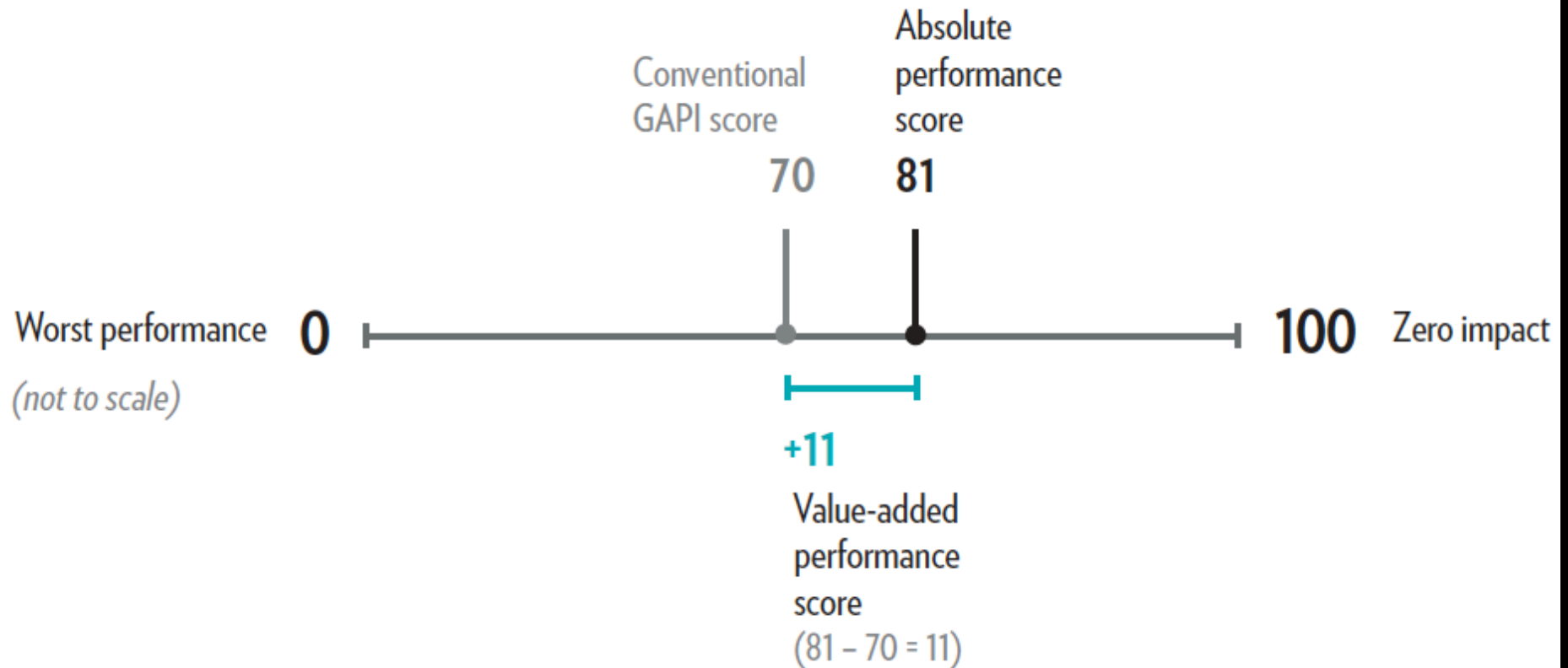
Comparing the Environmental Benefits  
of Marine Aquaculture Standards

University of Victoria, Seafood Ecology Research Group  
November 2011

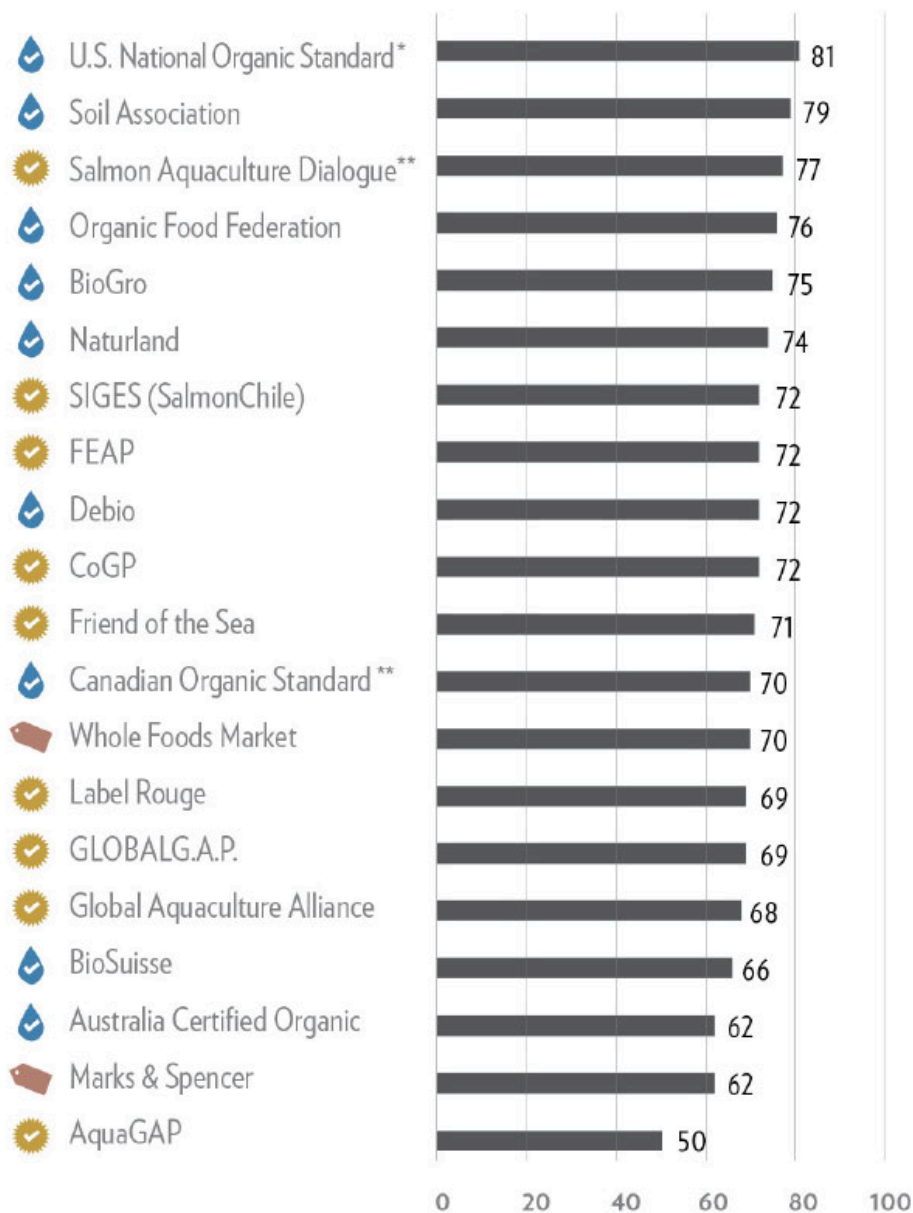


*Question:*

What is the minimum environmental performance required to meet a standard or certification?



What *minimum* environmental value-added performance does a standard / certification ensure?

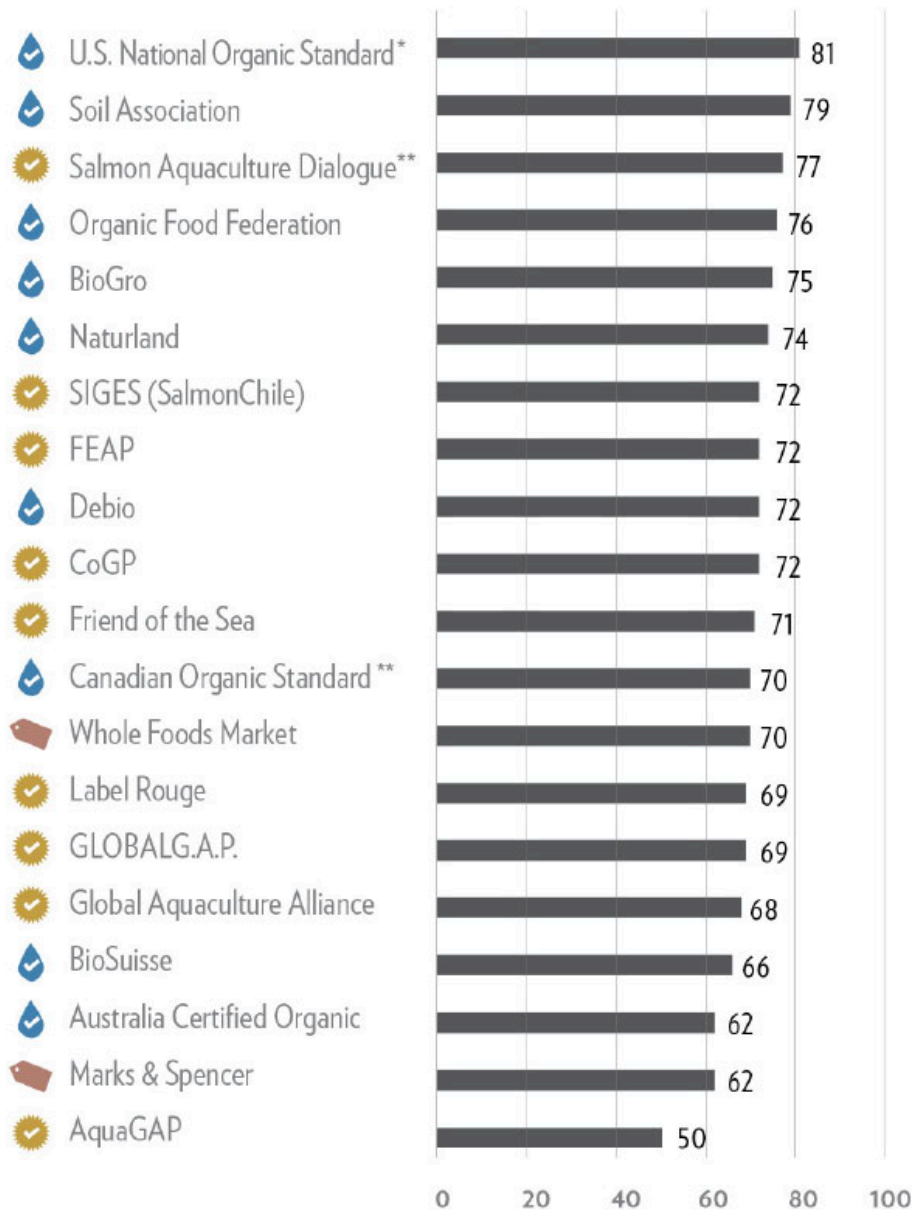


## Absolute Scores

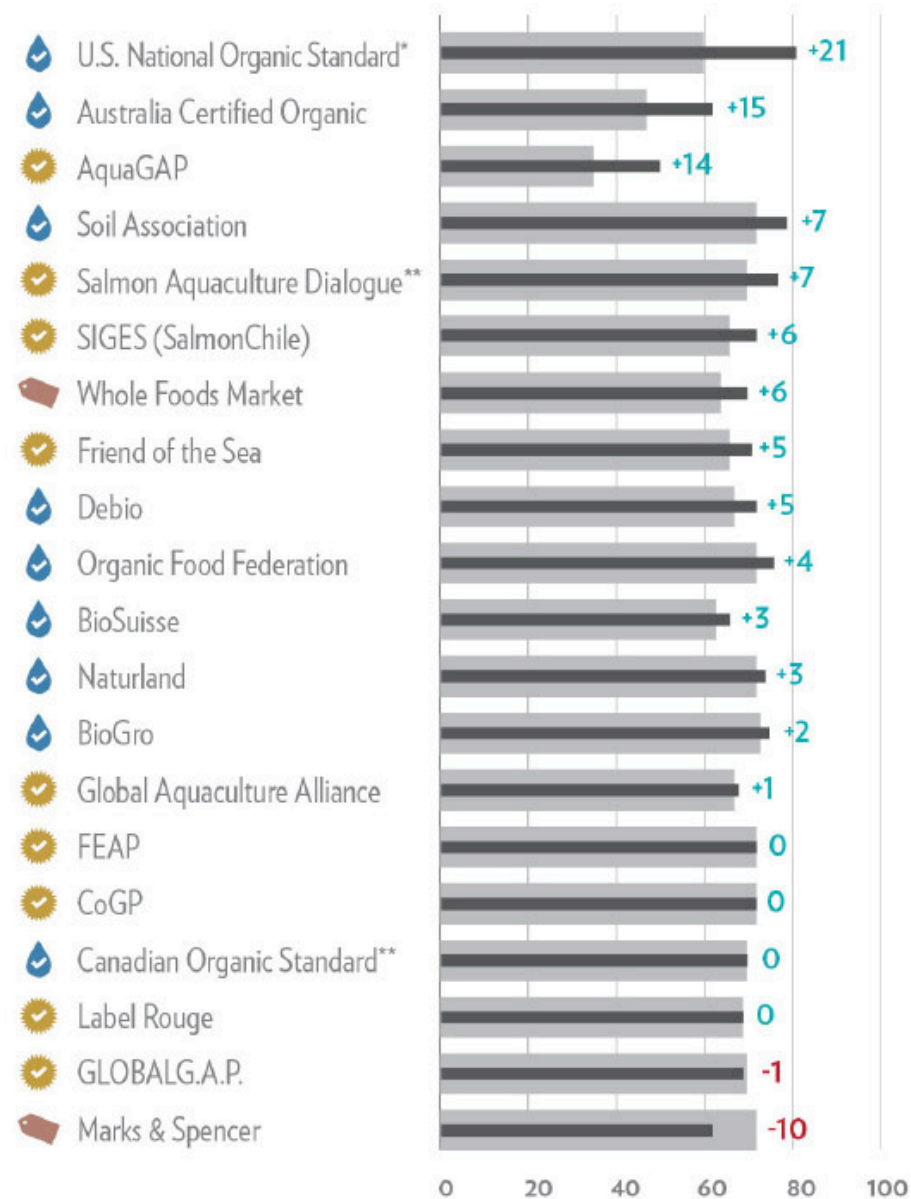
### Key:

- Third party/Industry
- Organic
- Retailer
- Absolute Performance score
- \* proposed standard*
- \*\* draft standard*
- Conventional GAPI score










Absolute Scores



Value-Added Scores

Key:

-  Third party/Industry
-  Organic
-  Retailer
-  Absolute Performance score
-  Conventional GAPI score
- \* *proposed standard*
- \*\* *draft standard*

SFW compared 29 standards from 10 certifiers – including 8 farmed salmon certifications and an additional 8 other finfish certifications

Standards Assessed		
Aquaculture Stewardship Council: Salmon	Friend of the Sea: Farmed Atlantic Salmon	Marine Stewardship Council
Aquaculture Stewardship Council: Pangasius	Friend of the Sea: Farmed Prawn	Naturland: Carp
Aquaculture Stewardship Council: Tilapia	Friend of the Sea: Farmed Mussel	Naturland: Fresh Water Fishes
Aquaculture Stewardship Council: Bivalves	Friend of the Sea: Farmed Arctic Char	Naturland: Gadidae (cod)
Aquaculture Stewardship Council: Shrimp	Friend of the Sea: Wild Fisheries	Naturland: Mussels
Canada Organic: Salmon	Global Aquaculture Alliance: Shrimp	Naturland: Salmonidae
Canada Organic: Shellfish	Global Aquaculture Alliance: Tilapia	Naturland: Shrimp
Certified Quality Salmon EcoStandard	Global Aquaculture Alliance: Salmon	Thai Code of Conduct
Certified Quality Salmon Saltwater Rearing	Global Aquaculture Alliance: Pangasius	Thai GAP (Good Aquaculture Practice)
Food Alliance: Shellfish	GlobalG.A.P.	

Table 1: Eco-certification programs' standards benchmarked (as of April 19, 2013)

Objective: Which met a SWP rating of “YELLOW”

Standards Assessed		
Aquaculture Stewardship Council: Salmon	Friend of the Sea: Farmed Atlantic Salmon	Marine Stewardship Council
Aquaculture Stewardship Council: Pangasius	Friend of the Sea: Farmed Prawn	Naturland: Carp
Aquaculture Stewardship Council: Tilapia	Friend of the Sea: Farmed Mussel	Naturland: Fresh Water Fishes
Aquaculture Stewardship Council: Bivalves	Friend of the Sea: Farmed Arctic Char	Naturland: Gadidae (cod)
Aquaculture Stewardship Council: Shrimp	Friend of the Sea: Wild Fisheries	Naturland: Mussels
Canada Organic: Salmon	Global Aquaculture Alliance: Shrimp	Naturland: Salmonidae
Canada Organic: Shellfish	Global Aquaculture Alliance: Tilapia	Naturland: Shrimp
Certified Quality Salmon EcoStandard	Global Aquaculture Alliance: Salmon	Thai Code of Conduct
Certified Quality Salmon Saltwater Rearing	Global Aquaculture Alliance: Pangasius	Thai GAP (Good Aquaculture Practice)
Food Alliance: Shellfish	GlobalG.A.P.	

All salmon and other finfish rated **RED**  
Nothing *at all* rated **GREEN**

# Take Home 4

Very significant variation in  
what is “sustainable”

Recent events suggest  
standards will harmonize with  
MBA ratings



# Complementary Roles

## Eco-certification



- Voluntary
- Continued improvement
- Field audits
- 14% global volume combined
- North Europe
- Traceability/CoC
- Annual audits

## Ratings Programs

### Monterey Bay Aquarium Seafood Watch

- Non-voluntary
- Current performance
- Desktop/some field visits
- 80-85% of US market
- North America
- Inform traceability policy
- Max 3 year updates



# Seafood Watch Seeks Public Comment On Proposed Criteria Update

Jul 02, 2015 | [Seafood Watch](#)

Monterey Bay Aquarium Seafood Watch invites public comments on proposed revisions to its fisheries and aquaculture assessment standards. Details about the changes and how to participate in the consultation process are available on the [Seafood Watch website](#). Feedback can be submitted through August 2.

Seafood Watch regularly revises its standards to account for new developments in the scientific understanding of the environmental effects caused by fisheries and aquaculture operations. Changes currently being reviewed include updates to the existing general fisheries and aquaculture standards, and a new standard for salmonid fisheries. The program is also developing an additional criterion to assess the greenhouse gas emissions of fisheries and aquaculture operations. Specifics for each are posted online:

- [Seafood Watch Fisheries Consultation](#)
- [Seafood Watch Aquaculture Consultation](#)
- [Seafood Watch Standard for Salmonid Fisheries Consultation](#)
- [Seafood Watch Greenhouse Gas Consultation](#)

For more information, visit the Seafood Watch website: [seafoodwatch.org/seafood-recommendations/standards-revision](http://seafoodwatch.org/seafood-recommendations/standards-revision). This is the second and final round for public comments.

The mission of the nonprofit Monterey Bay Aquarium is to inspire conservation of the oceans. The Seafood Watch program empowers individuals and businesses to make choices for healthy oceans.

[Download this release as a PDF](#)

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**Factor 5.1 – Wild fish Use Score = \_\_\_\_\_** (range 0–10)

Requiring 13 discrete data points and calculations

	Protein Gain or Loss (%)	Score
Net protein gain	> 0	10
Net protein loss	0.1–9.9	9
	10–19.9	8
	20–29.9	7
	30–39.9	6
	40–49.9	5
	50–59.9	4
	60–69.9	3
	70–79.9	2
	80–89.9	1
	> 90	0

**Factor 5.2 – Net Protein Gain/Loss**

= \_\_\_\_\_ (range 0–10)

Requiring up to 20 discrete data points and calculations

Total Area	ha ton <sup>-1</sup>	Score
Zero	0	10
Low	0.1–2.9	9
	3–5.9	8
Low-moderate	6–8.9	7
	9–11.9	6
Moderate	12–14.9	5
	15–17.9	4
Moderate-high	18–20.9	3
	21–23.9	2
High	24–26.9	1
Very high	> 27	0

**Factor 5.3 – Feed Footprint**

= \_\_\_\_\_ (range 0–10)

Requiring 14 discrete data points and calculations



Final Feed Criterion Score =

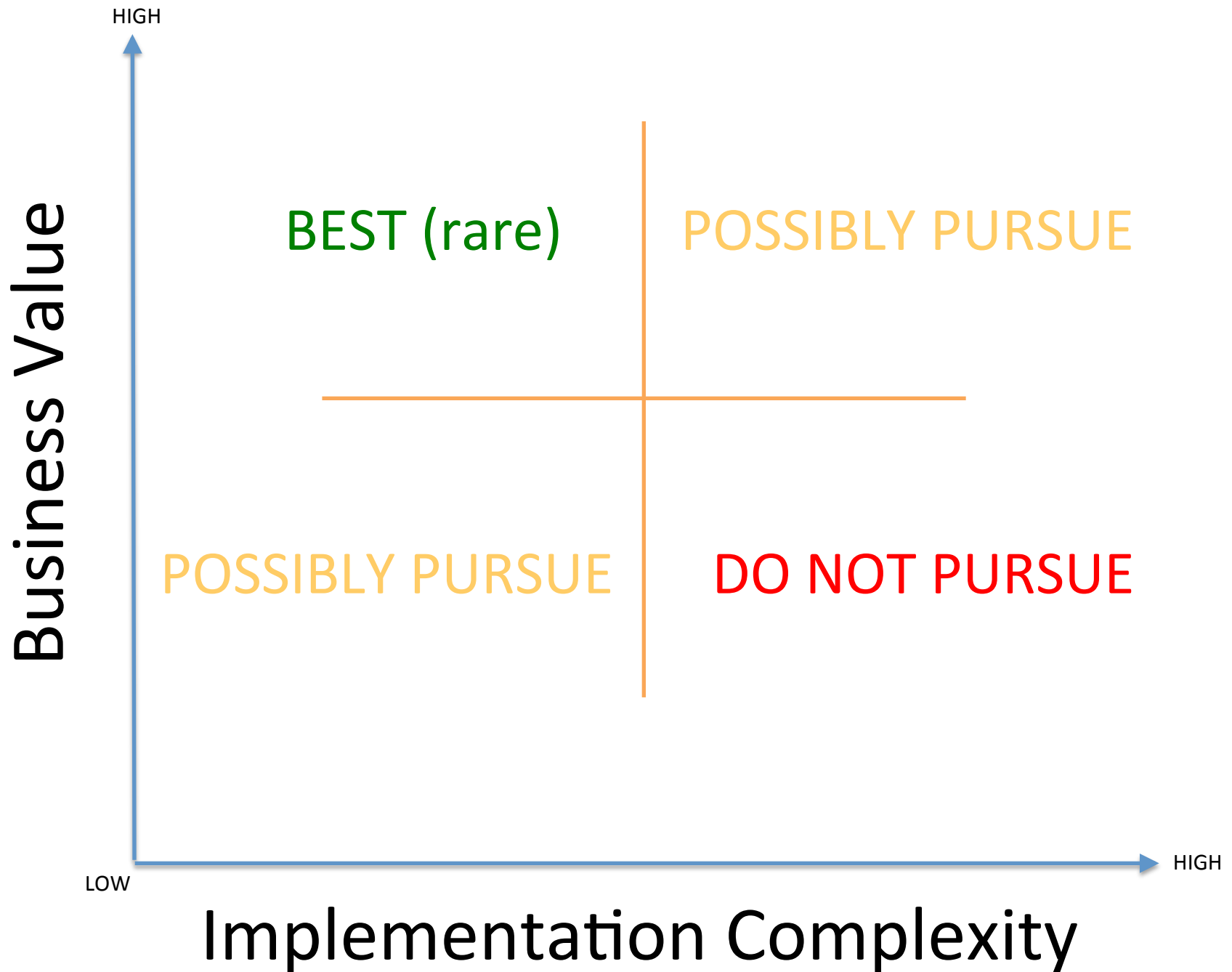
$$\frac{[(2 \times 5.1 \text{ Score}) + 5.2 \text{ Score} + 5.3 \text{ Score}]}{4}$$

= \_\_\_\_\_ (range 1-10)

This final score is comprised of 47 data points / inputs

“Feed” is just one to 10 criteria currently assessed







# Value proposition of standards / labels:

Informed consumers more likely to make “sustainable” choices (within their “willing to pay” window)





## Theory of Change





# But, what motivates consumer behavior?

reward / honor  
embarrassment  
guilt  
shame







reward / honor  
embarrassment  
**guilt**  
shame

In individualistic  
western cultures  
guilt is the dominant  
behaviour modifier  
... but guilt has its limits

CHILEAN SEA BASS  
(TOOTHFISH)

Consider the first major sustainable seafood label...







Mobilization of guilt created niche  
American market

Penetration << 100%

Dolphin unsafe tuna shifted to other  
markets

# WTO rules against U.S. dolphin-safe canned tuna labels

April 15, 2015 |





As RAS pivots to Asia...

Communal society structure

Most Asian languages lack a word for “guilt”

Shame, not guilt is the driver of change

If a product is socially accepted, there is no guilt  
and thus diminished traction for labels/standards



# Take Home 5

Guilt is a limited tool for driving  
consumer behaviour

Incomplete penetration and  
highly variable geographically



Looking into the future  
“...we will need more than  
5 million auditors...”



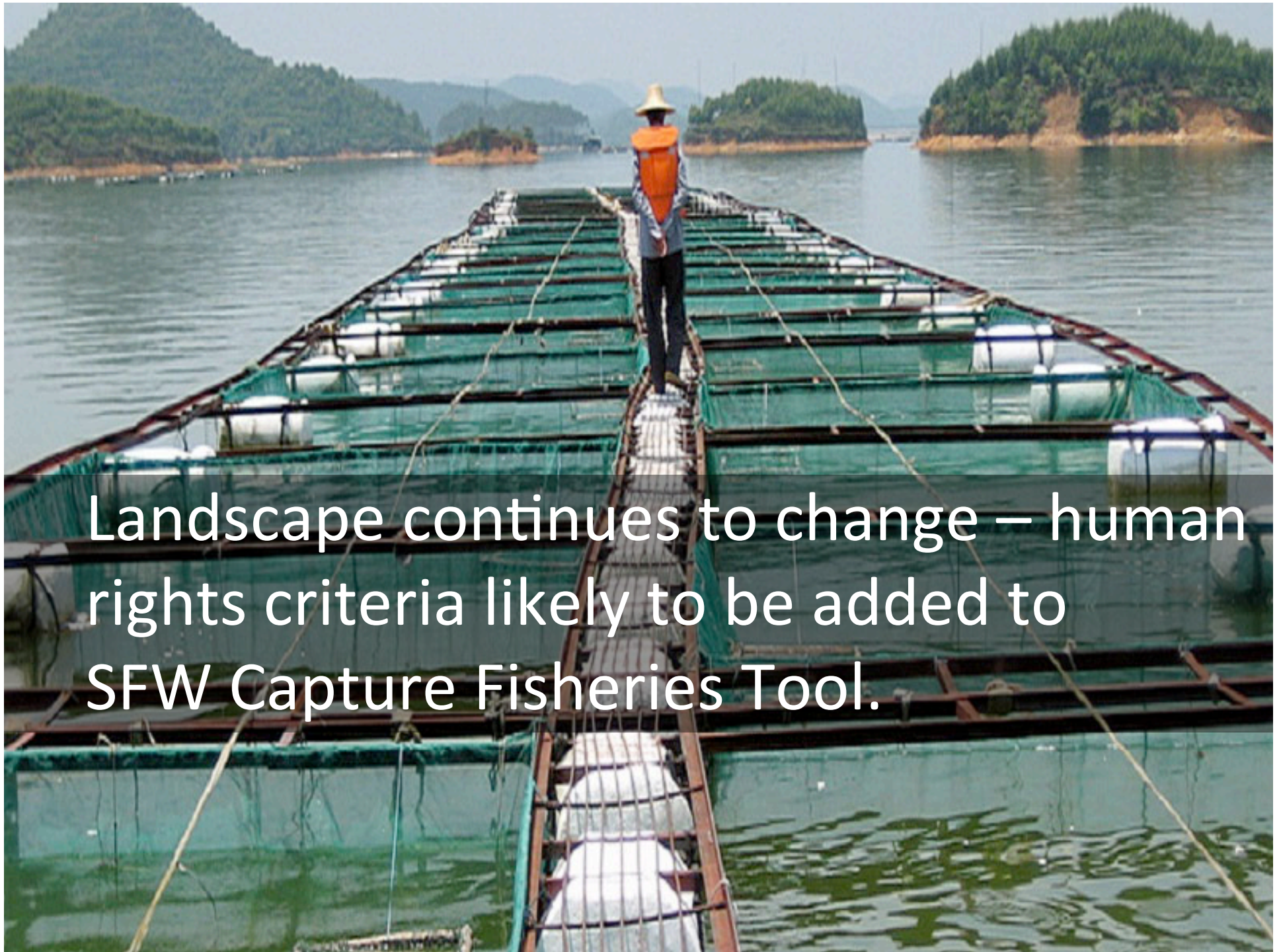
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GLOBALG.A.P. CEO Kristian Moeller - Aug 9 2016

<https://www.youtube.com/watch?v=T9fbp9nHvuA&feature=youtu.be>





Landscape continues to change – human rights criteria likely to be added to SFW Capture Fisheries Tool.



# Thank you

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