

# Back to the Future of Fisheries: Using Historical Reconstructions of Fishery Performance Indicators (FPIs) to Assess the Performance of Quota Managed Fisheries

Michael De Alessi & Chris Anderson

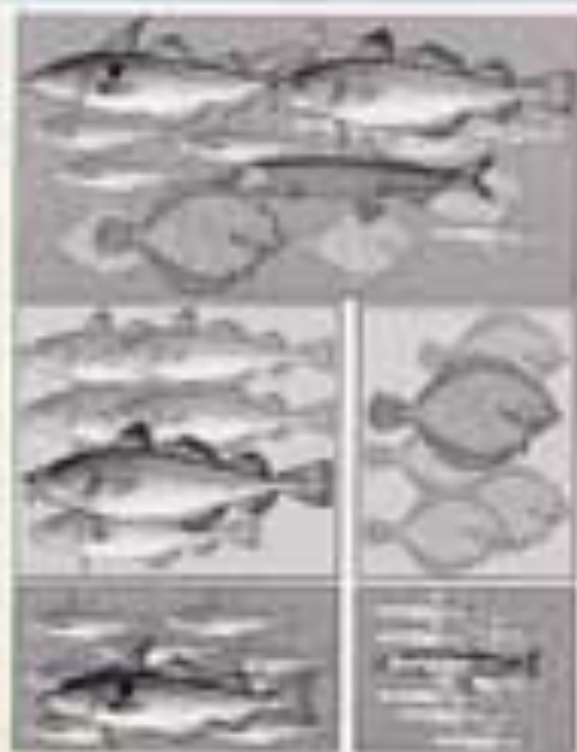
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Case studies on the  
allocation of transferable  
quota rights in fisheries

FAO  
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411



Case studies on the  
effects of transferable  
fishing rights on fleet  
capacity and concentration  
of quota ownership

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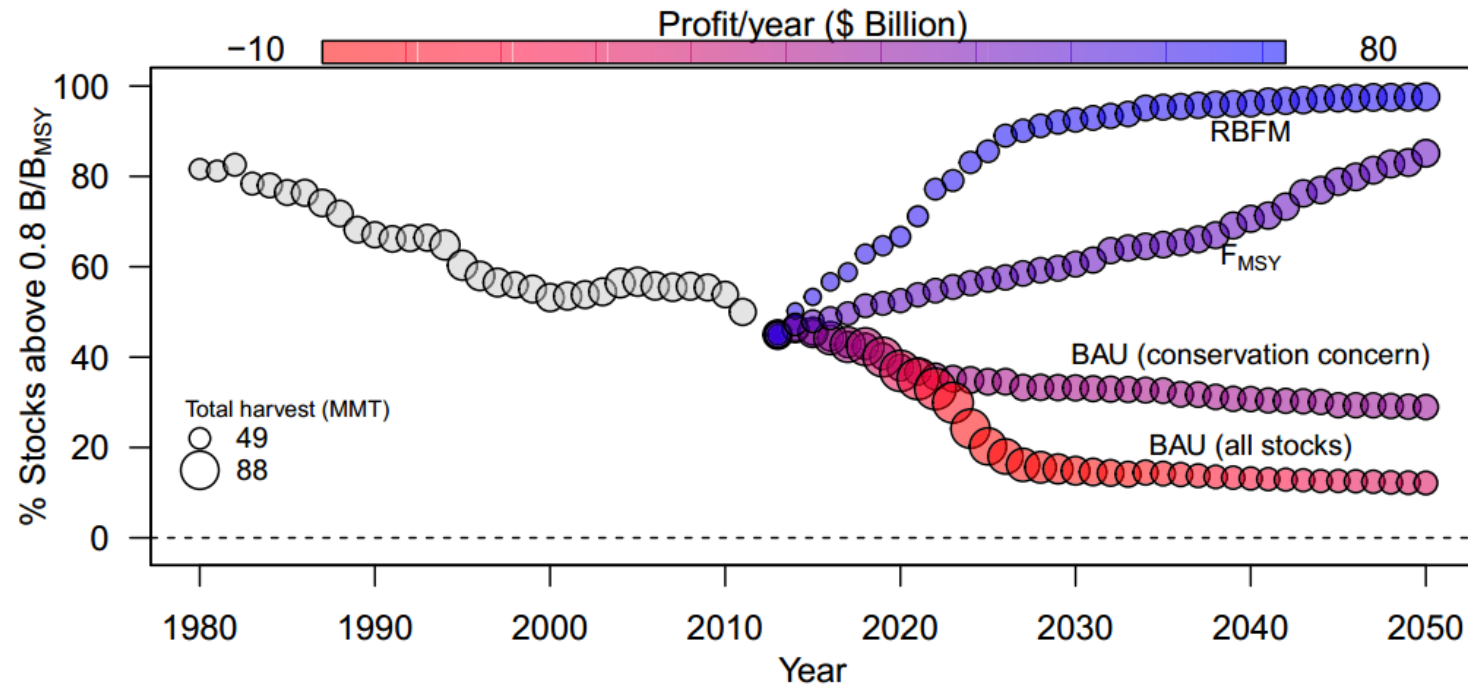


# Global fishery prospects under contrasting management regimes

Christopher Costello<sup>a,1</sup>, Daniel Ovando<sup>a</sup>, Tyler Clavelle<sup>a</sup>, C. Kent Strauss<sup>b</sup>, Ray Hilborn<sup>c</sup>, Michael C. Melnychuk<sup>c</sup>, Trevor A. Branch<sup>c</sup>, Steven D. Gaines<sup>a</sup>, Cody S. Szuwalski<sup>a</sup>, Reniel B. Cabral<sup>a</sup>, Douglas N. Rader<sup>b</sup>, and Amanda Leland<sup>b</sup>

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Edited by James A. Estes, University of California, Santa Cruz, CA, and approved February 26, 2016 (received for review October 14, 2015)



# Individual transferable quotas in achieving multiple objectives of fisheries management

Eriko Hoshino<sup>a</sup>  , Ingrid van Putten<sup>a b</sup>,  
Sean Pascoe<sup>a</sup>, Simon Vieira<sup>c</sup>

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Final Report

## Retrospective assessment of ITQs to inform research needs and to improve their future design and performance

Sean Pascoe, Eriko Hoshino and Ingrid van Putten (CSIRO Oceans and Atmosphere)

Simon Vieira (doMar Research)

FRDC Project No 2017-159

RESEARCH ARTICLE

# The Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes

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# What are FPIs?

- Rapid assessment instrument for measuring the triple bottom line of
  - **Ecological**
  - **Community &**
  - **Economic performance** (wealth generation from fishery resources)
- Two sets of indicators
  - **Outcomes (outputs):**  
Identify where wealth accumulates within a fishery supply chain
  - **Enabling Factors (inputs):**  
Assess levels of factors that are conjectured to support wealth creation

# Scoring FPIs

## 122 individual metrics

- scored from 1 to 5
- designed to be easy to score across a wide range of fisheries
- chosen to reflect industry standards or simple quintiles of performance
- rely on basic data and expert assessment of qualitative indicator levels
- requires little or no primary data collection

Inputs and outputs indicators are broken into key dimensions

- individual metrics may be imprecise, but multiple metrics for each performance dimension leads to a more accurate impression of what is and is not working.

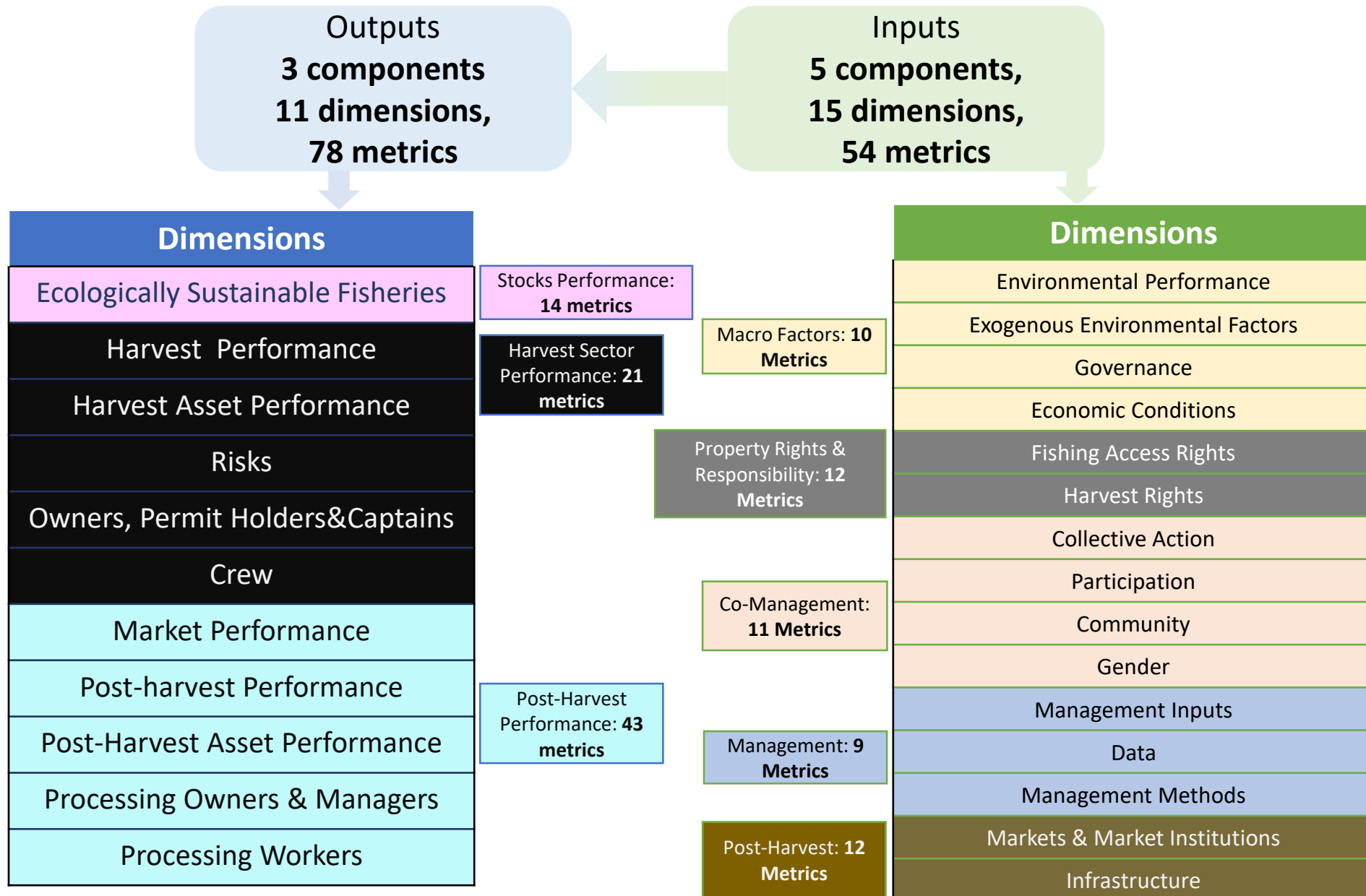
Each metric is also given a quality score to indicate how confident the scorer is regarding the accuracy of the chosen bin

# Measuring Performance

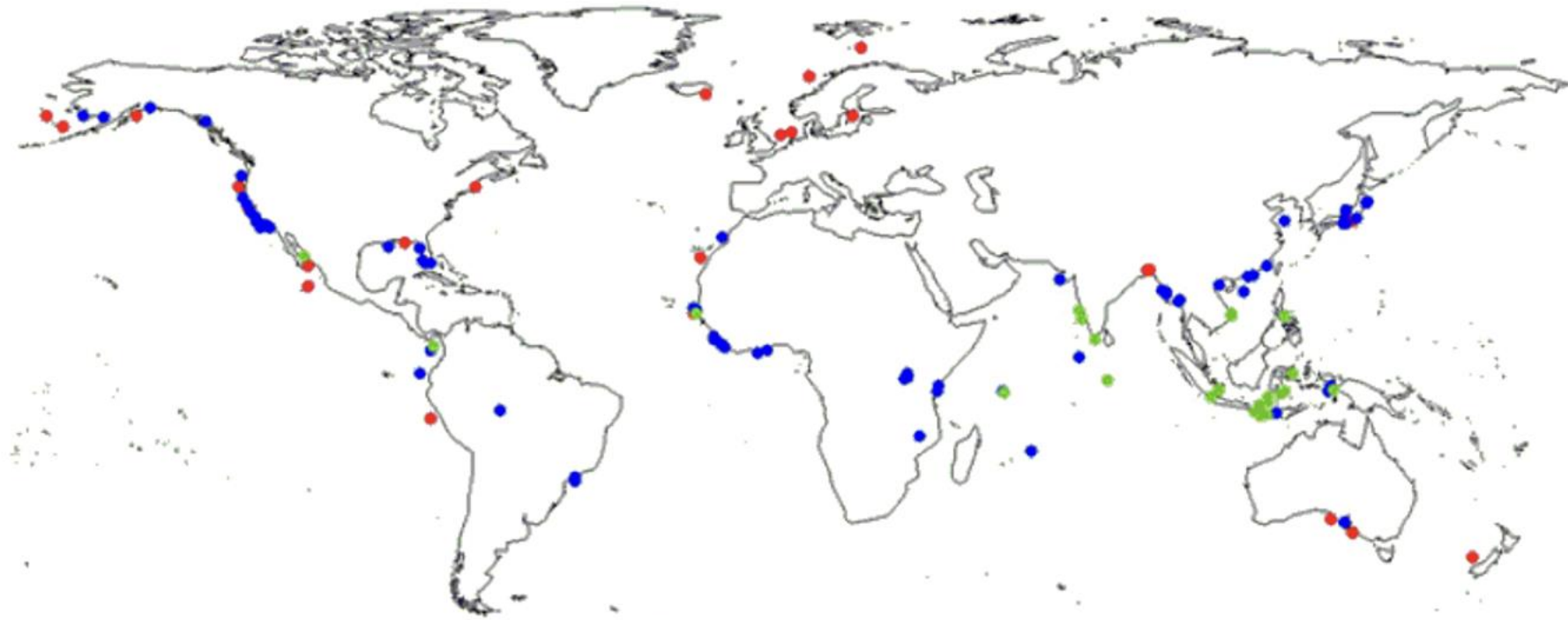
- Triple Bottom Line
  - Ecology
  - Economics
  - Community
- Sector Performance
  - Ecosystem
  - Harvest sector
  - Post-Harvest sector



# FPI Structure



# FPI dataset



open access = green, access rights = blue (limited entry only),  
harvest rights = red

## Historical Reconstructions of 19 Quota Managed Fisheries

Iceland: Pelagic fisheries (capelin & herring)  
Demersal larger scale (cod)  
Demersal smaller-scale (cod)

NZ: Deepwater Fisheries (orange roughy, hoki, ...)  
Inshore finfish (snapper)  
Paua (abalone)  
Rock Lobster

Peru: Anchovetta

Australia: South Australia Rock Lobster  
South Australia Piri (cockle)

United States: New England groundfish  
Surf Clam & Ocean Quahog  
Gulf of Mex. Red snapper  
Gulf of Mex. Grouper  
Pacific Whiting (hake)  
Alaska Pollock  
Alaska crab  
Alaska Halibut  
Alaska Sablefish

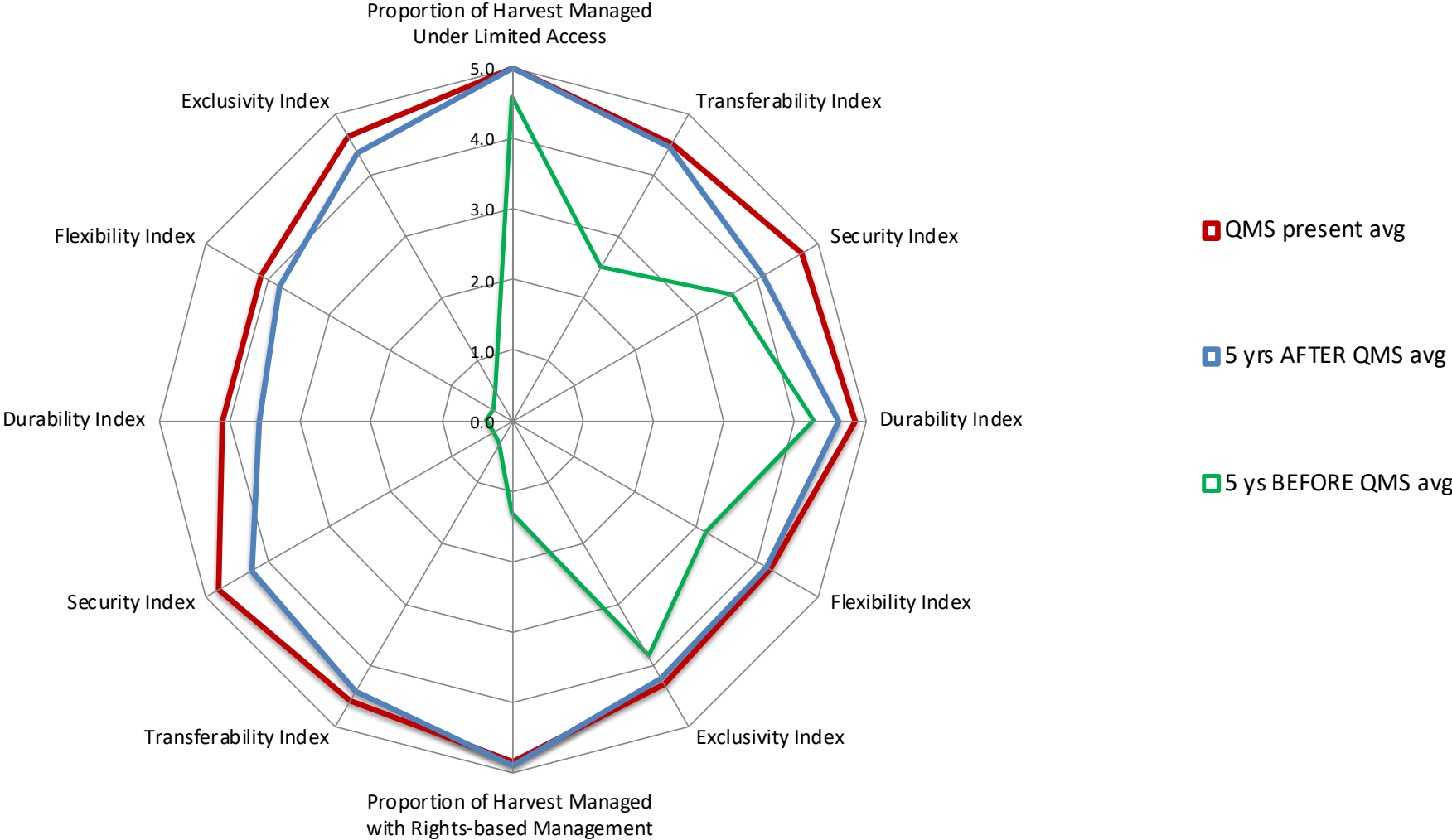
<b>Transferability Index</b>	<ul style="list-style-type: none"> <li>• 5: Very Strong: Fully transferable through well-established, efficient market institutions;</li> <li>• 4: Strong: Fully transferable, but institutions are poor or illiquid;</li> <li>• 3: Moderate: Transferable, but with severe restrictions on who can hold, or how much;</li> <li>• 2: Weak: Transferable only under highly restricted and limited condition;</li> <li>• 1: Harvest rights not transferable</li> </ul>	NA if there is no harvest right
<b>Security Index</b>	<ul style="list-style-type: none"> <li>• 5: Very Strong: Harvest rights are completely respected by the government;</li> <li>• 4: Strong: Rights are mostly respected by the government and generally survive changes in government administration;</li> <li>• 3: Moderate: Rights are at risk of retraction with changes in administration;</li> <li>• 2: Weak: Rights are highly threatened or there is high political uncertainty;</li> <li>• 1: None: Harvest rights are not protected</li> </ul>	Extent to which the government threatens to reduce or eliminate the harvest rights. NA if there is no harvest right.
<b>Durability Index</b>	<ul style="list-style-type: none"> <li>• 5: Very Strong: &gt; 10 years to perpetuity;</li> <li>• 4: Strong: 6 to 10 years;</li> <li>• 3: Moderate: 1 to 5 years;</li> <li>• 2: Weak: Seasonal;</li> <li>• 1: None: None/daily</li> </ul>	Duration of the harvest right. NA if there is no harvest right. If the harvest rights are renewable with reapplication and the harvesters expect to be able to continue to harvest the same percentage then score based
<b>Flexibility Index</b>	<ul style="list-style-type: none"> <li>• 5: Very Strong: All decisions on time of harvest, gear used and handling practices are in the owner's control;</li> <li>• 4: Strong: Minimal restrictions on time of harvest and technology;</li> <li>• 3: Moderate: Modest restrictions on time of harvest and technology;</li> <li>• 2: Weak: Significant restrictions on time of harvest and technology;</li> <li>• 1: Time of harvest, gear used and handling practices are not in the owner's control</li> </ul>	Ability of right holders to be flexible in the timing and production technology employed. NA if there is no harvest right.
<b>Exclusivity Index</b>	<ul style="list-style-type: none"> <li>• 5: Very Strong: Management prevents harvest in excess of rights allocation; no intrusion by outsiders</li> <li>• 4: Strong: Management allows little harvest in excess of allocation; little intrusion by those without rights</li> <li>• 3: Moderate: Modest harvest in excess of rights allocation; modest intrusion on resource by those without rights</li> <li>• 2: Weak: Harvest in excess of rights allocation significantly affects resource or markets; significant intrusion on resource by those without rights</li> <li>• 1: None: Completely unrestricted open access, despite</li> </ul>	Ability of right holders to exclude those who do not have the right from affecting the resource or market. This includes intrusion by competing resource users such as recreational or bycatch fisheries and dilution or lack of enforcement leading to excess harvest by licensed harvesters. See manual for exactly when recreational/subsistence users affect this score. If a management authority chooses to dilute existing harvest

Transferability Index	<ul style="list-style-type: none"> <li>• 5: Very Strong: Fully transferable through well-established, efficient market institutions;</li> <li>• 4: Strong: Fully transferable, but institutions are poor or illiquid;</li> <li>• 3: Moderate: Transferable, but with severe restrictions on who can hold, or how much;</li> <li>• 2: Weak: Transferable only under highly restricted and limited condition;</li> <li>• 1: Harvest rights not transferable</li> </ul>	NA if there is no harvest right
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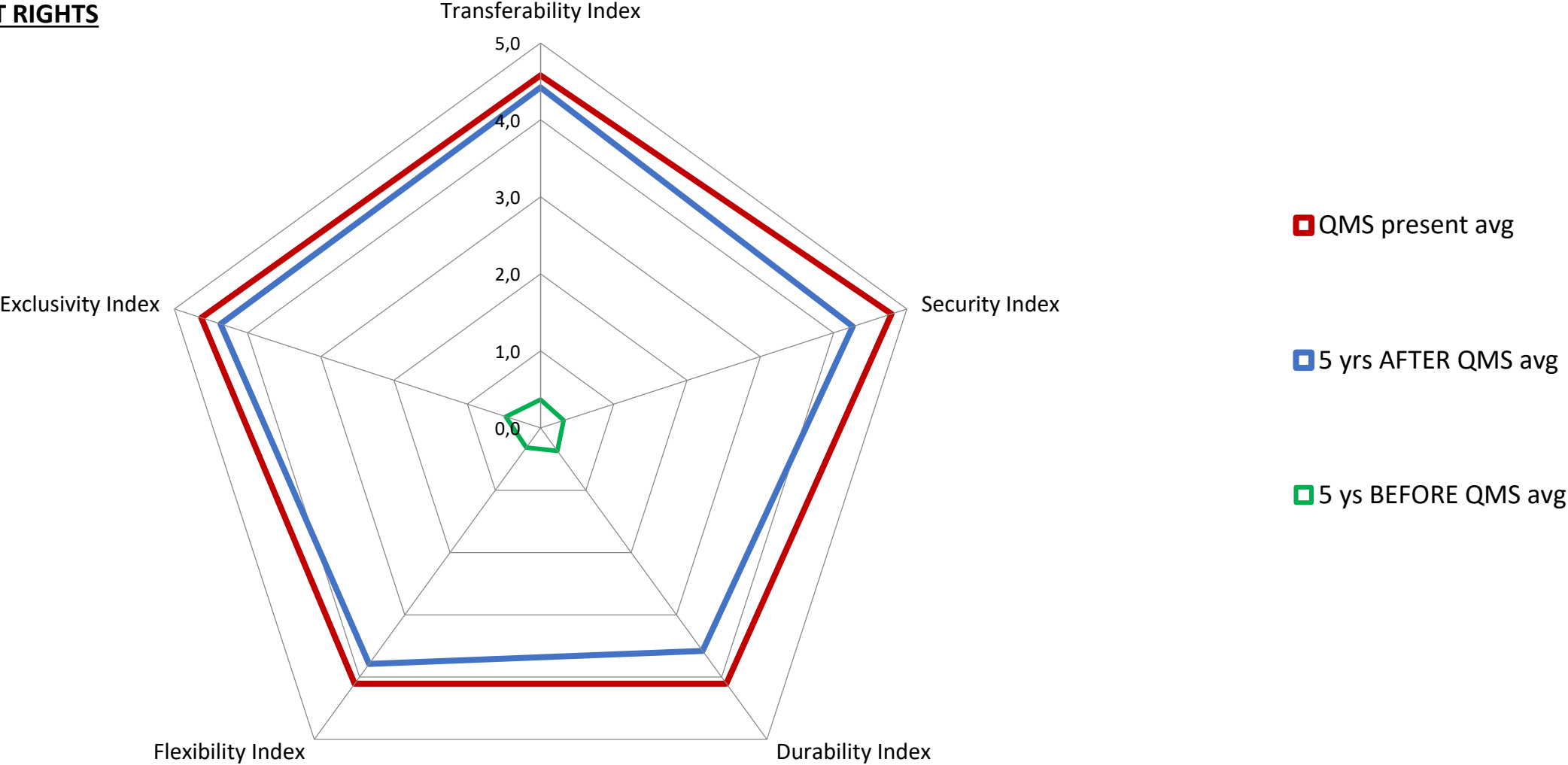
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Exclusivity Index	<ul style="list-style-type: none"> <li>• <b>5:</b> Very Strong: Management prevents harvest in excess of rights allocation; no intrusion by outsiders</li> <li>• <b>4:</b> Strong: Management allows little harvest in excess of allocation; little intrusion by those without rights</li> <li>• <b>3:</b> Moderate: Modest harvest in excess of rights allocation; modest intrusion on resource by those without rights</li> <li>• <b>2:</b> Weak: Harvest in excess of rights allocation significantly affects resource or markets; significant intrusion on resource by those without rights</li> <li>• <b>1:</b> None: Completely unrestricted open access, despite putative right</li> </ul>	Ability of right holders to exclude those who do not have the right from affecting the resource or market. This includes intrusion by competing resource users such as recreational or bycatch fisheries and dilution or lack of enforcement leading to excess harvest by licensed harvesters. See manual for exactly when recreational/subsistence users affect this score. If a management authority chooses to dilute existing harvest rights by frequently increasing allocations then the exclusivity score should be very low. NA if there is no harvest right.

**HARVEST RIGHTS**

**LIMITED ACCESS**

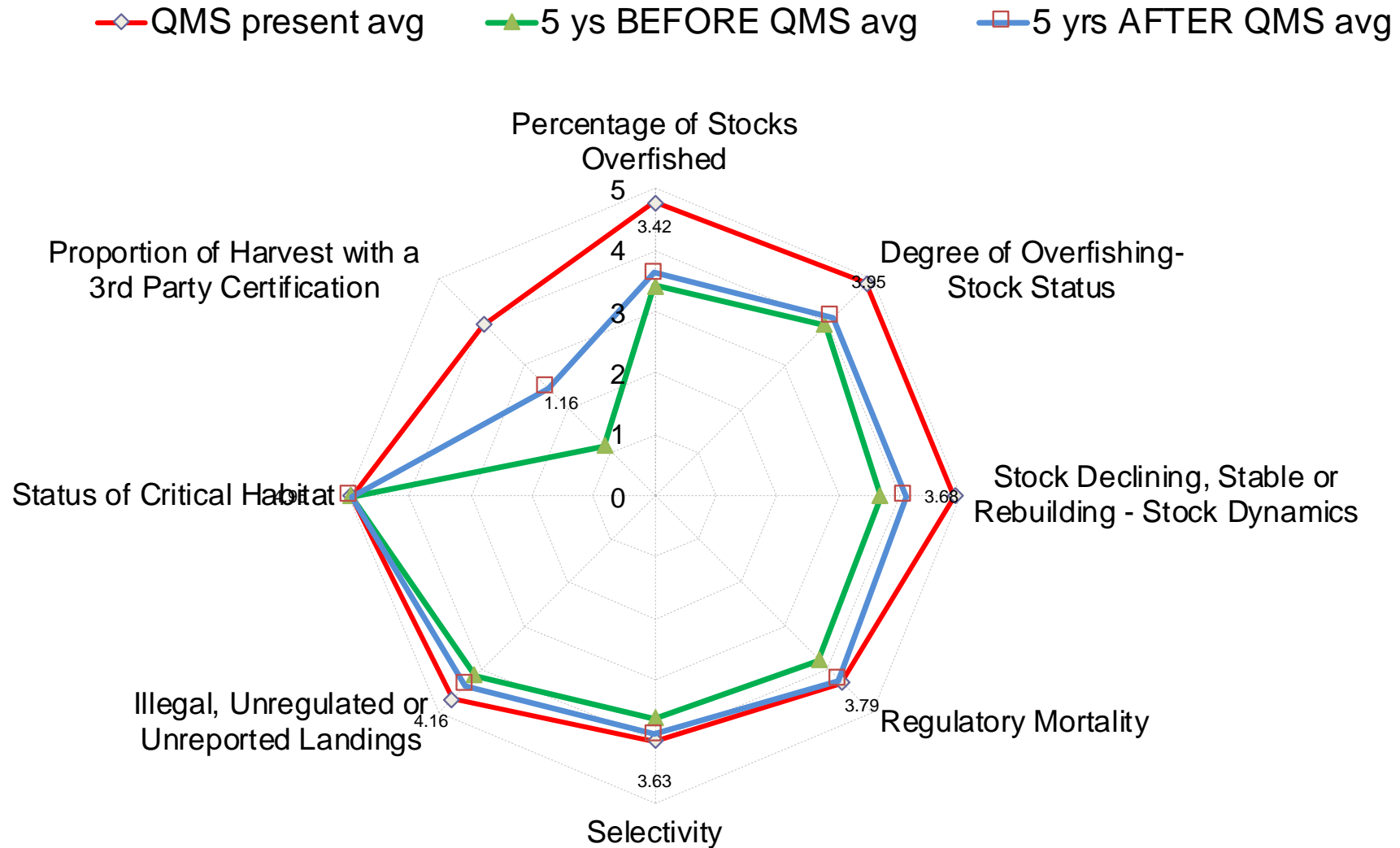


HARVEST RIGHTS



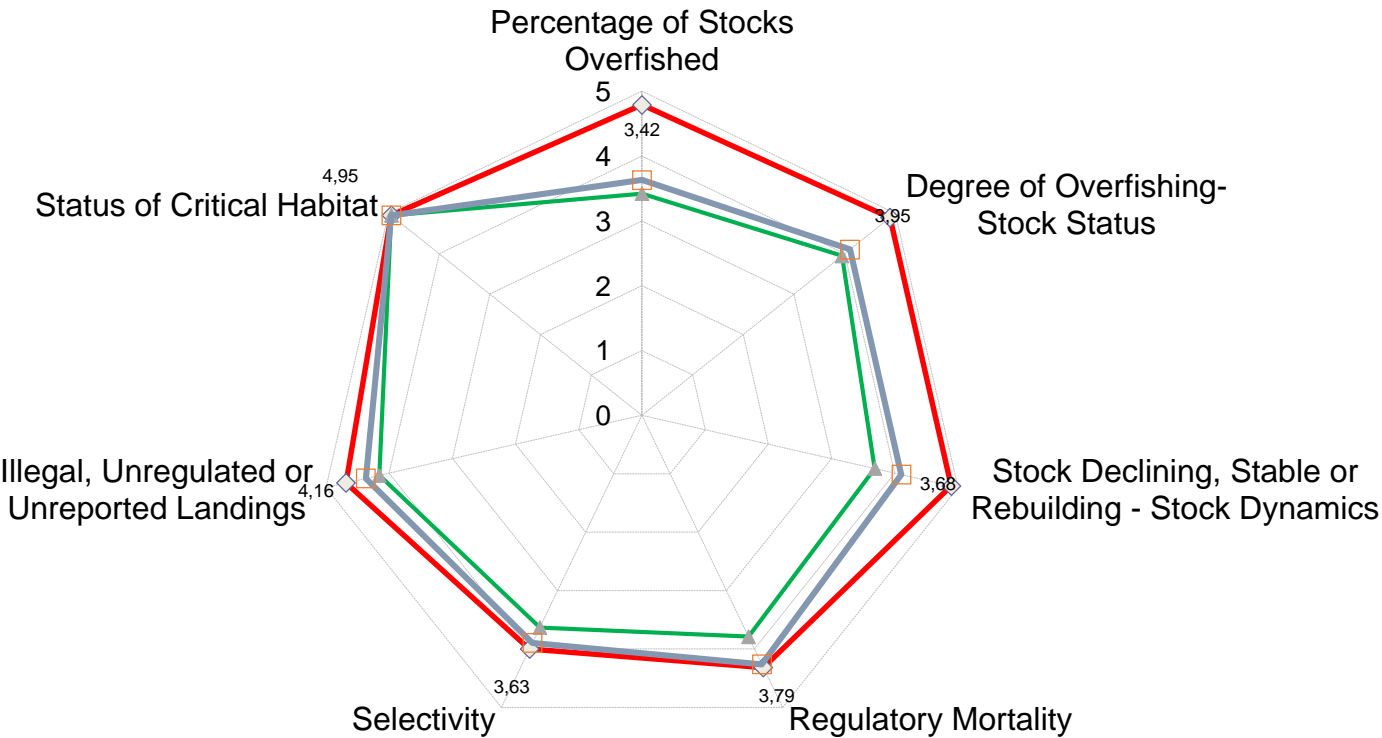


## Fish Stock Health & Environmental Performance

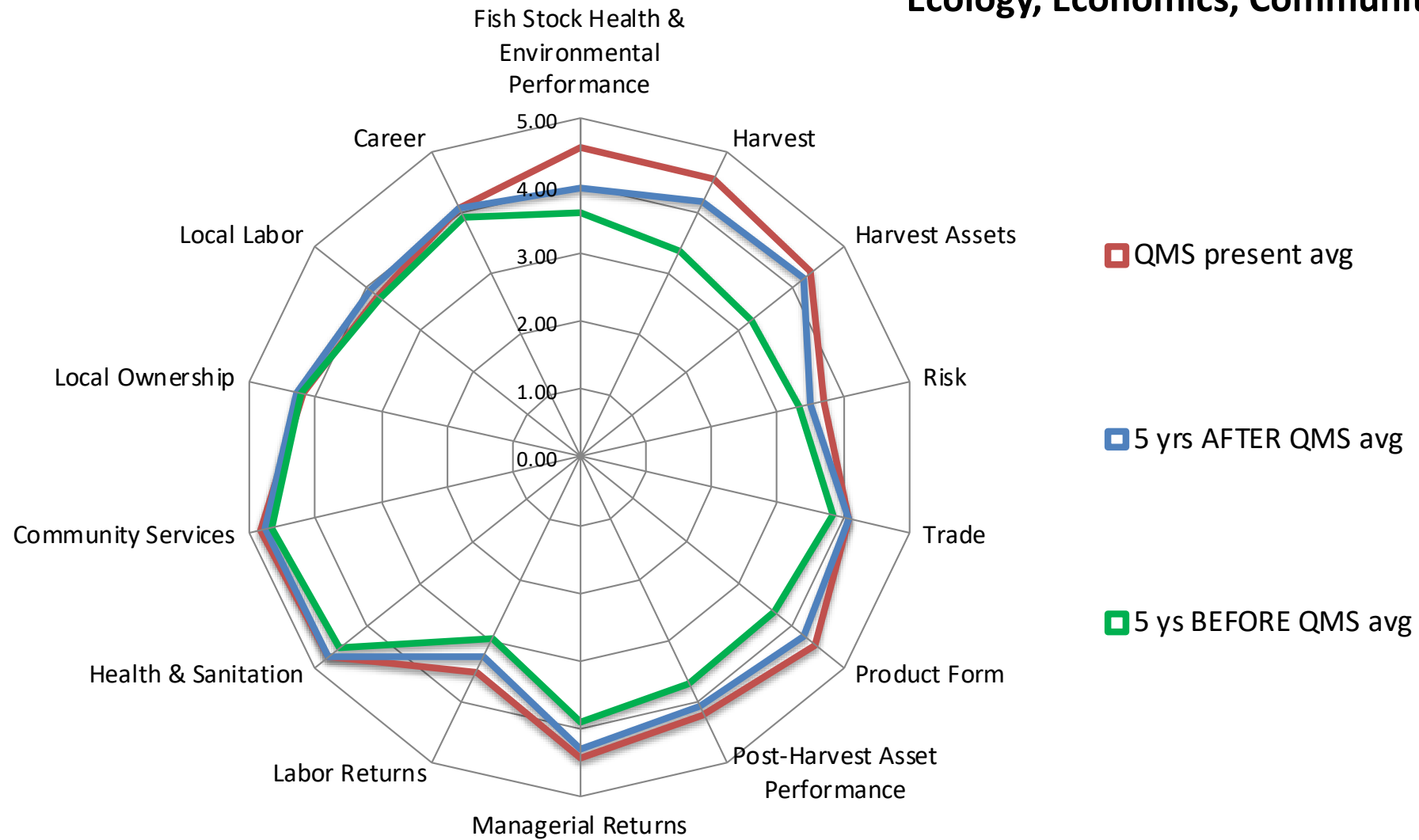


# Fish Stock Health & Environmental Performance

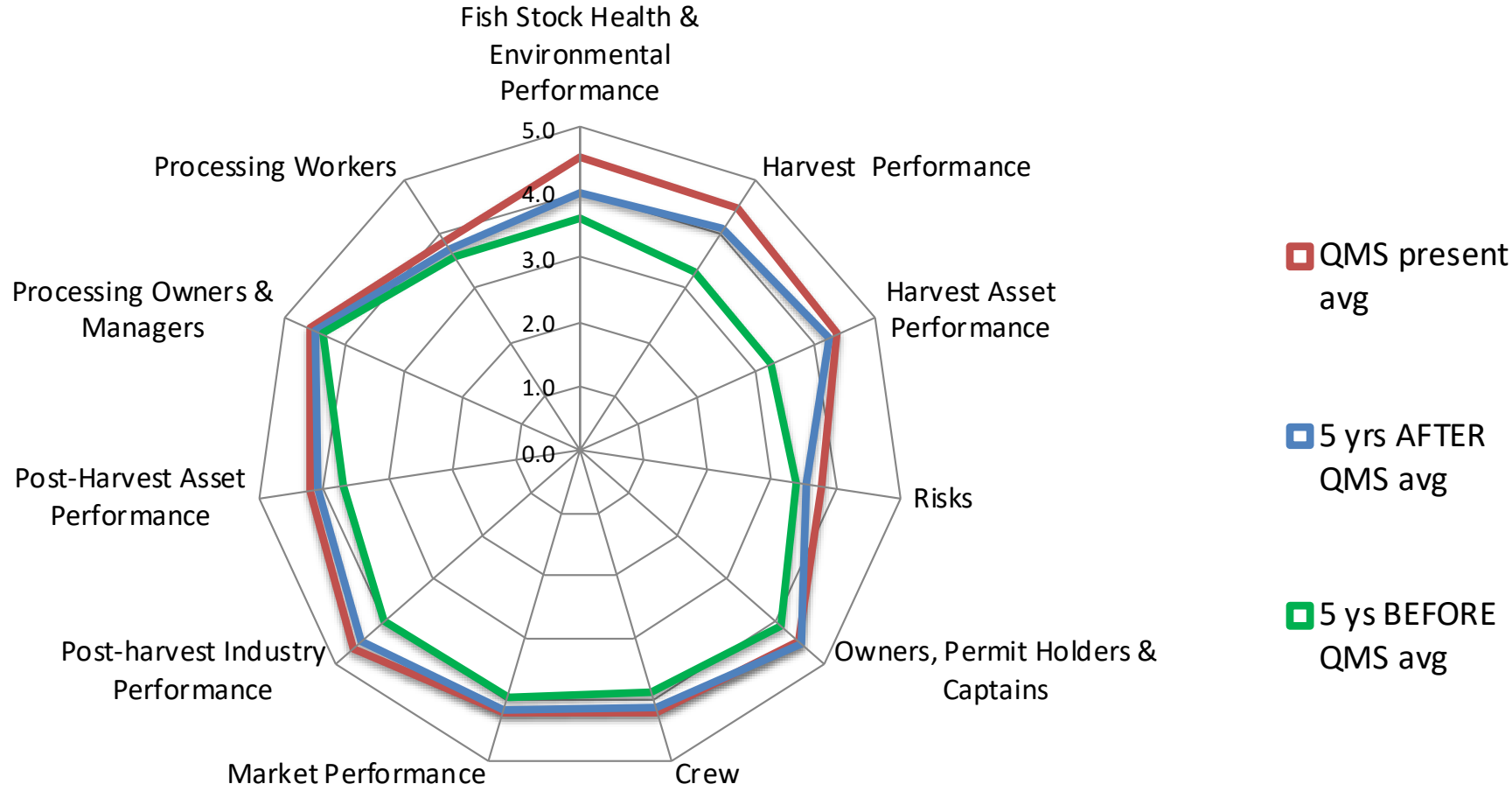
QMS present avg    5 ys BEFORE QMS avg    5 yrs AFTER QMS avg



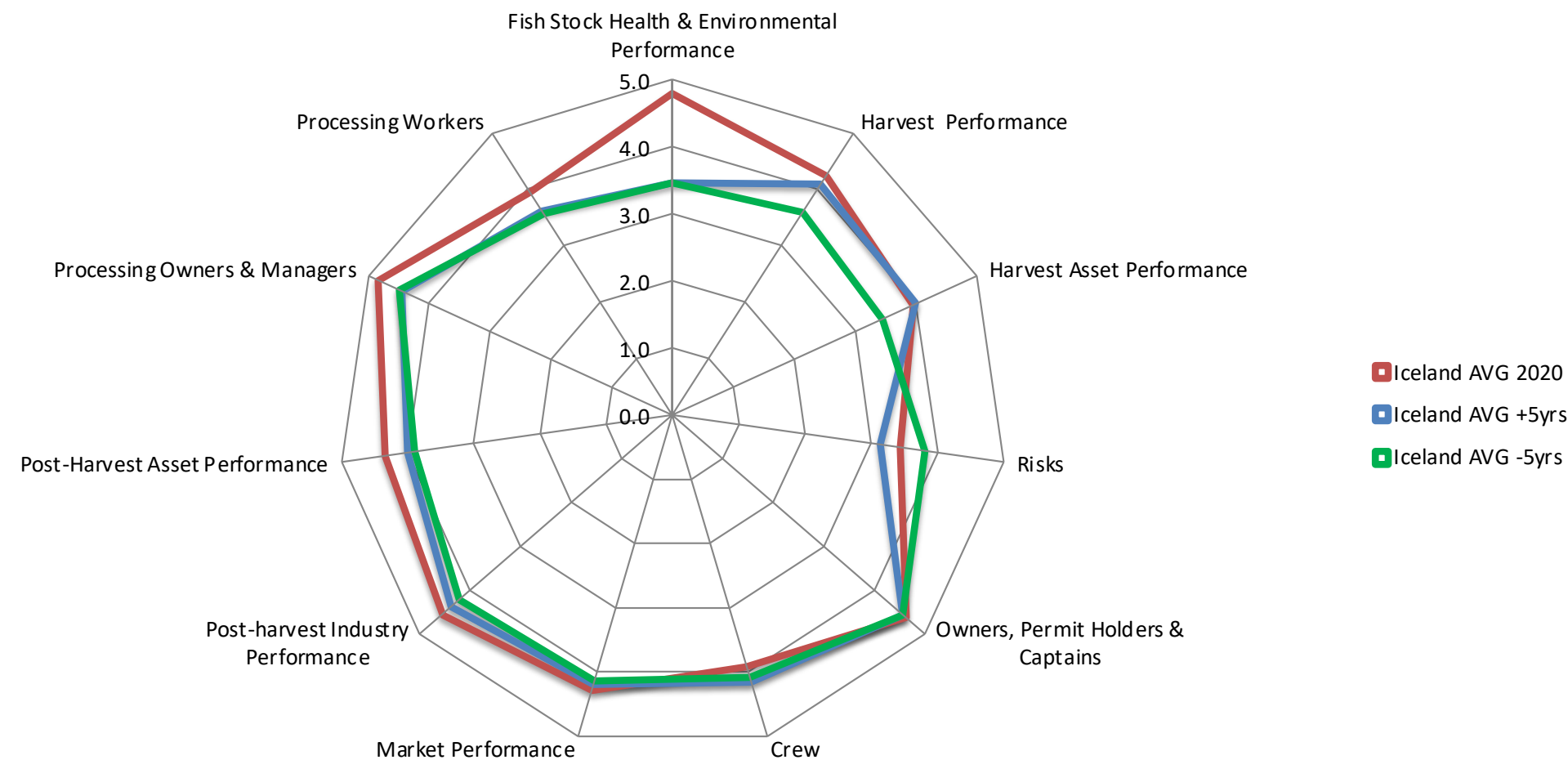
## Present, pre & post QMS AVGs Ecology, Economics, Community



**Present, pre & post QMS AVGs**  
**Stock Performance, Harvest and Post-Harvest Asset Performance**

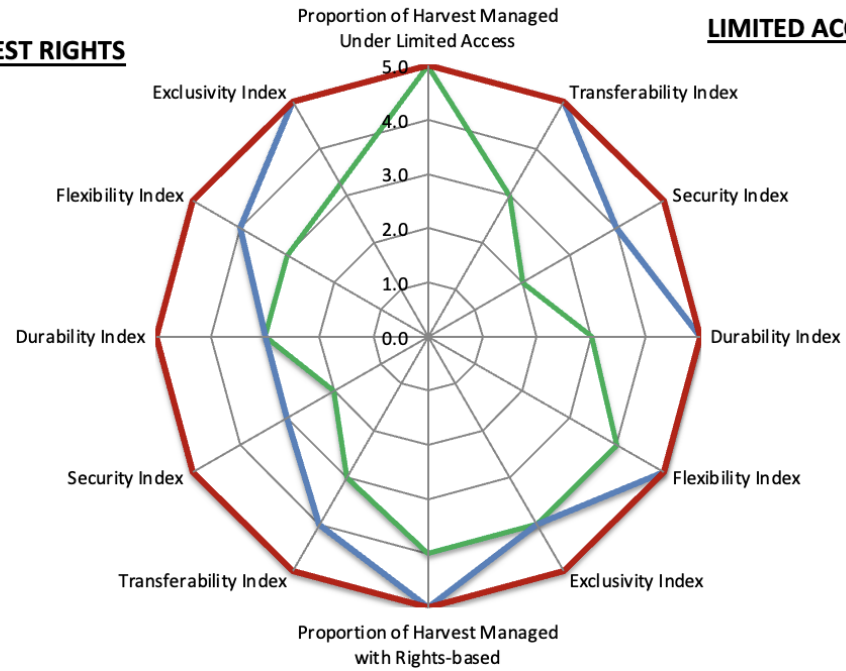


**Iceland AVG**  
**Stock Performance, Harvest and Post-Harvest Asset Performance**



## ICELAND PELAGIC

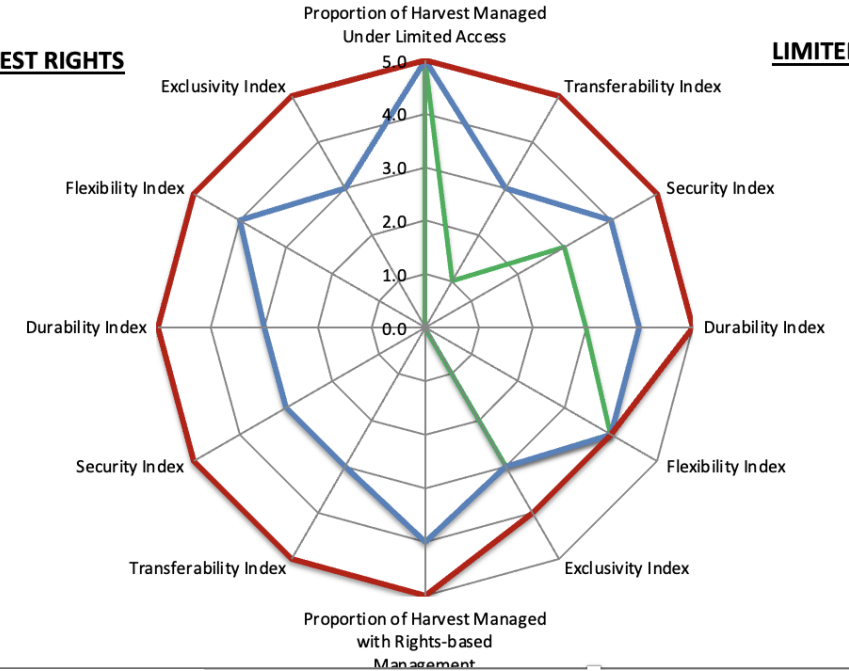
### HARVEST RIGHTS



### LIMITED ACCESS

## ICELAND DEMERSAL (larger scale)

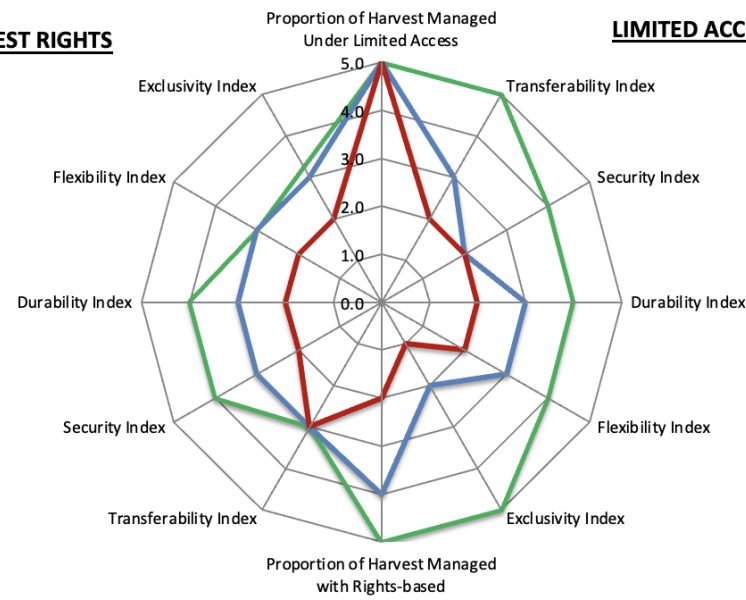
### HARVEST RIGHTS



### LIMITED ACCESS

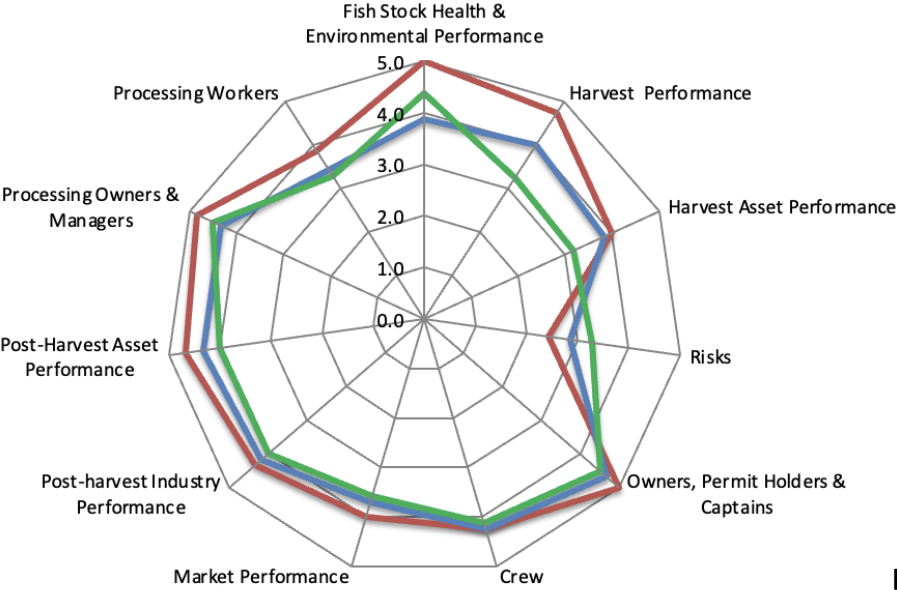
## ICELAND DEMERSAL smaller-scale

### HARVEST RIGHTS

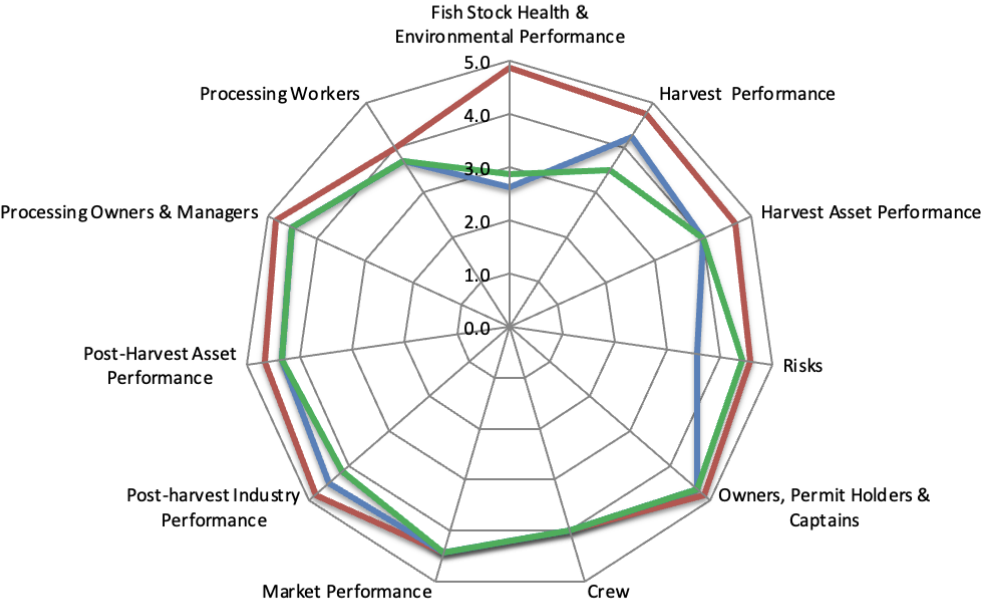


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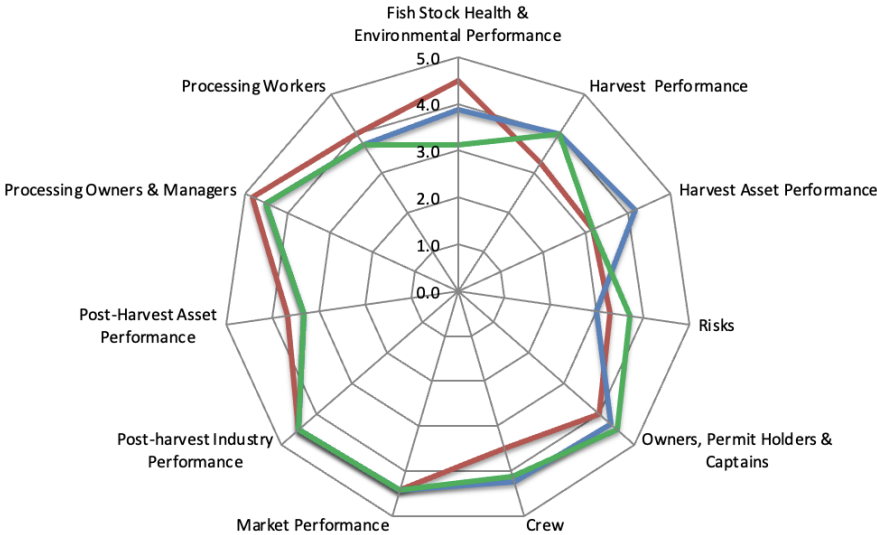
**Iceland pelagic**  
**Stock Performance, Harvest and Post-Harvest Asset Performance**



**Iceland demersal**  
**Stock Performance, Harvest and Post-Harvest Asset Performance**

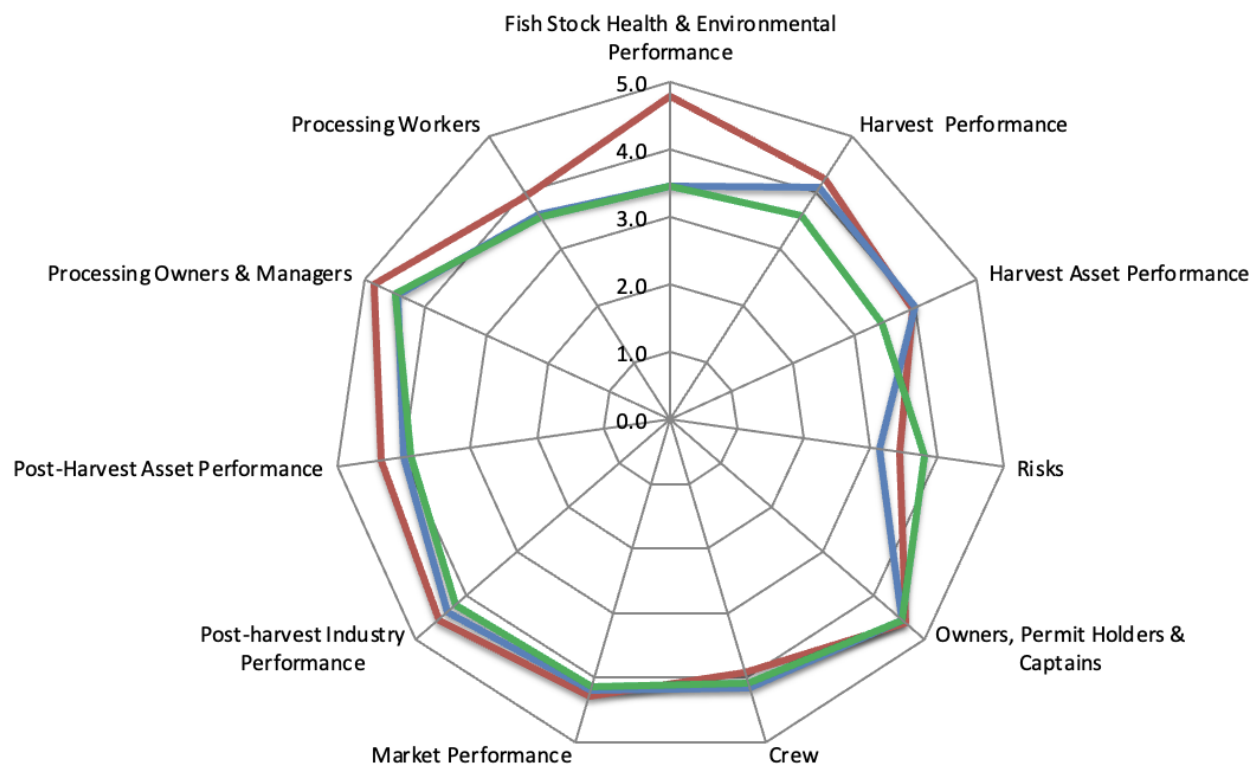


**Iceland small-scale demersal**  
**Stock Performance, Harvest and Post-Harvest Asset Performance**



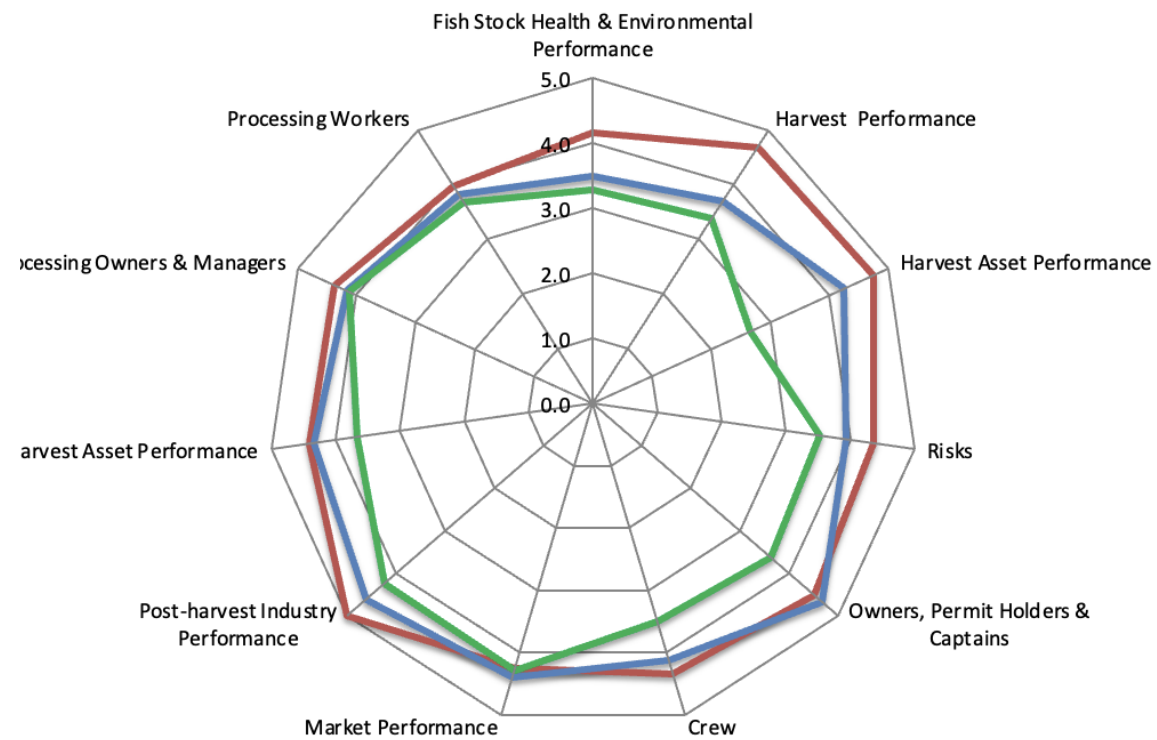
### Iceland AVG

## Stock Performance, Harvest and Post-Harvest Asset Performance



### NZ AVG

## Stock Performance, Harvest and Post-Harvest Asset Performance







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