Western & Central Pacific Fisheries Commission

# Evaluation of Harvest Control Rules for North Atlantic albacore

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azti tecnalia

European Commission

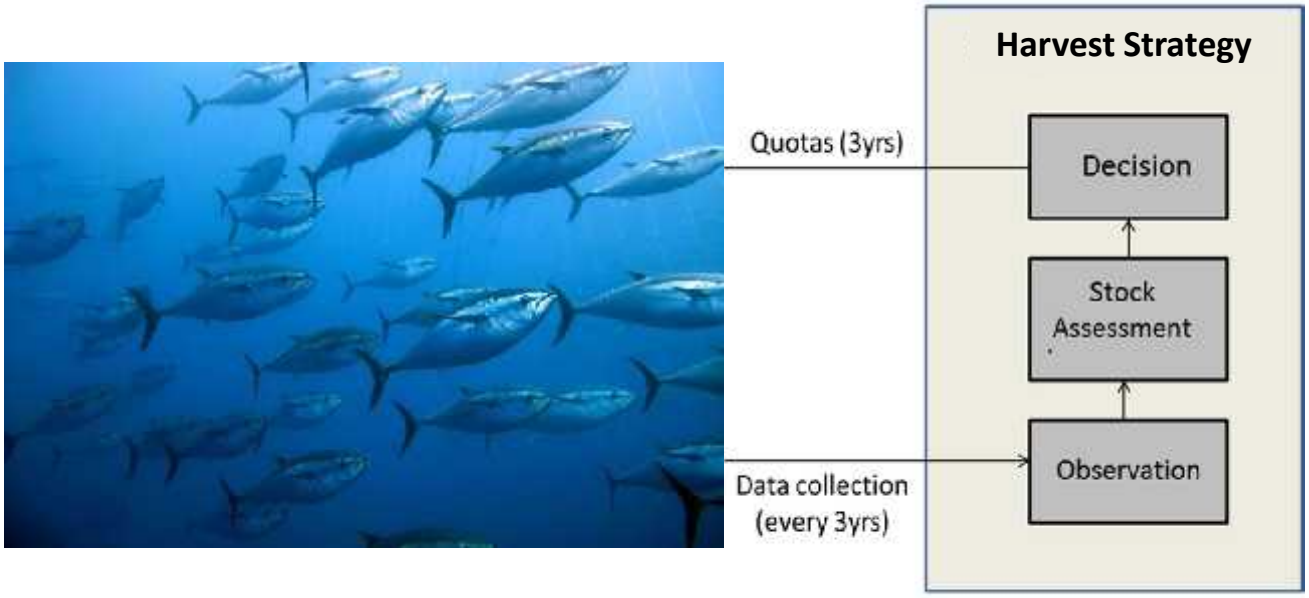
ICCAT

# Evaluation of HCR

- The performance of any HCR should be explored by simulation (MSE)

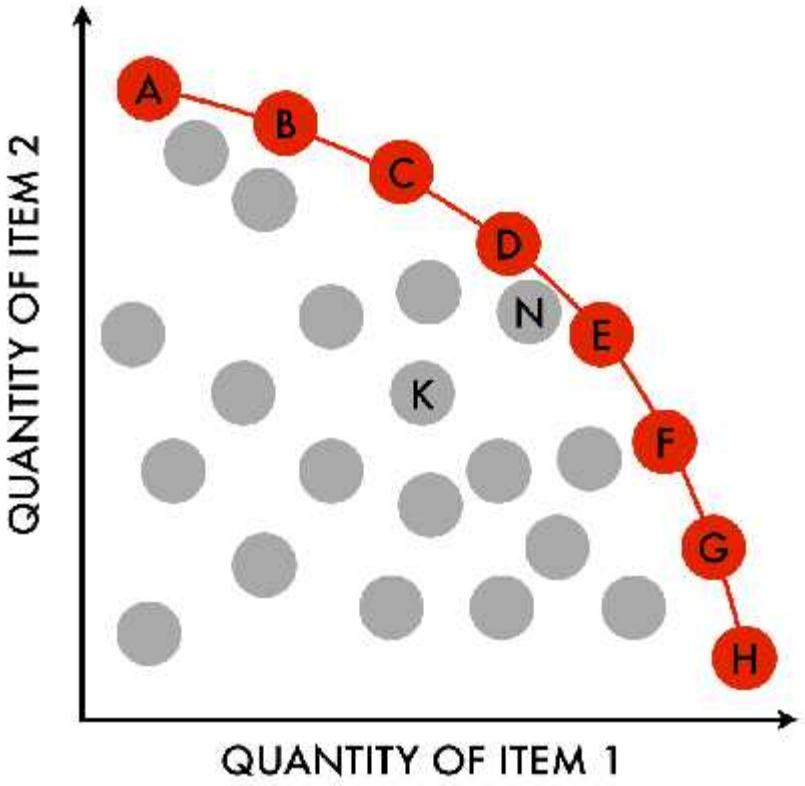
# Evaluation of HCR

*how well could NA ALB fishery perform if we had perfect knowledge and control*



# Evaluation of HCR

A **Pareto frontier** is a set of choices in which it is impossible to improve the performance of one variable without worsening the other.



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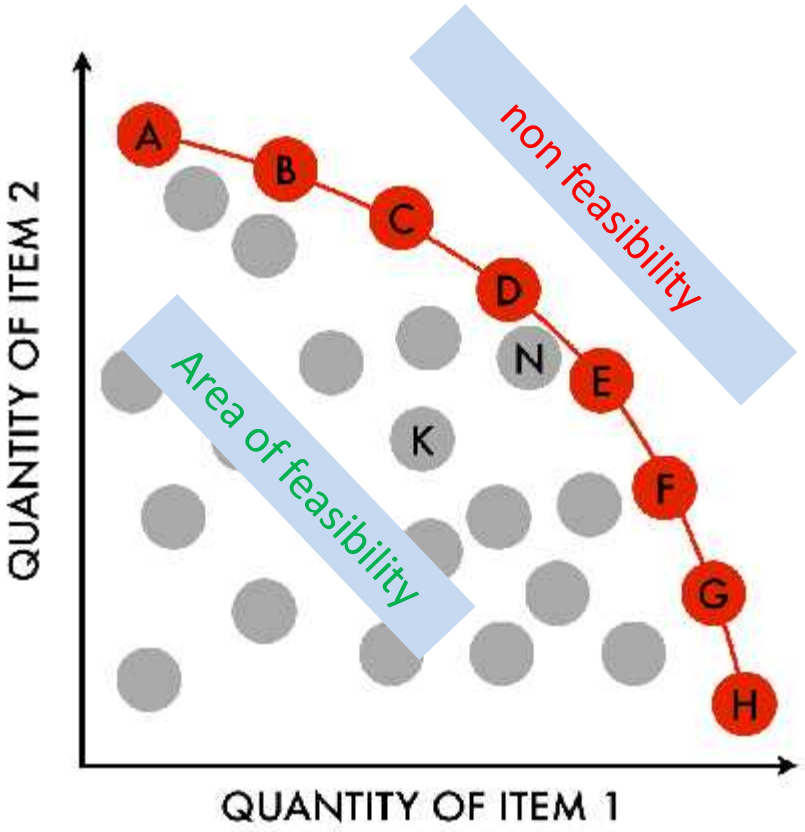
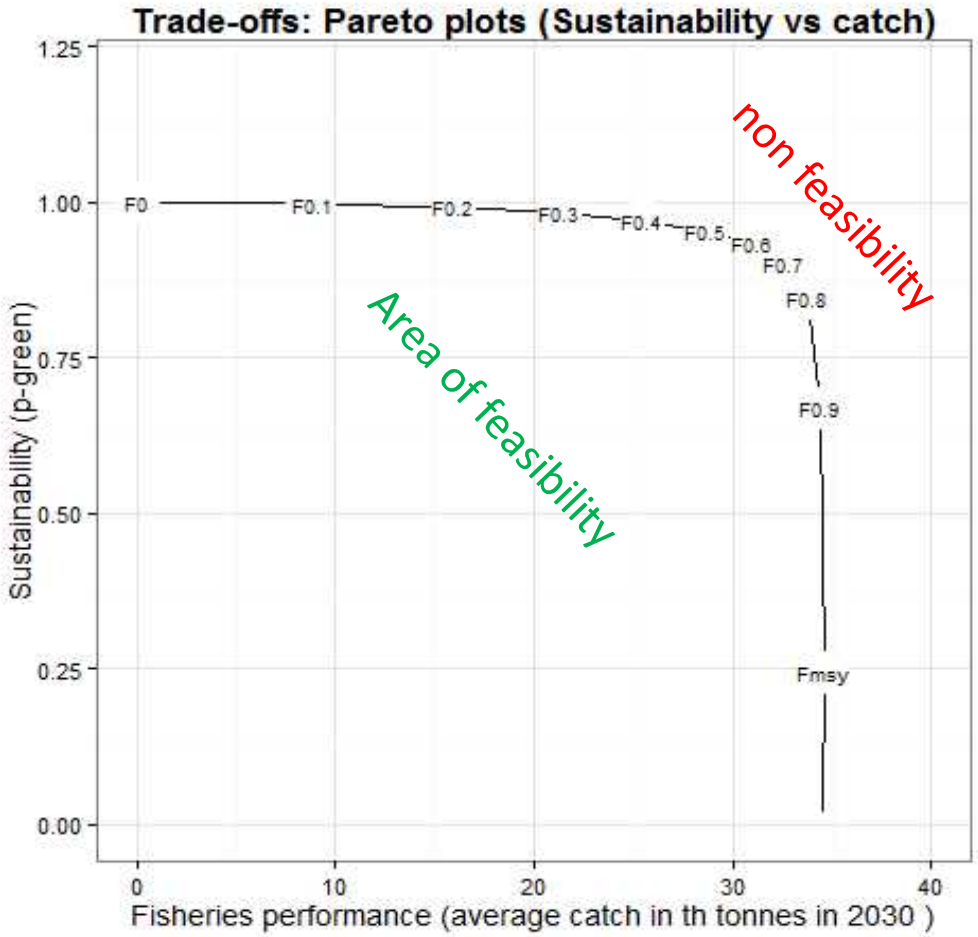



As many as required quantities….

# Evaluation of HCR

## Pareto frontiers for this “simulated fishery”

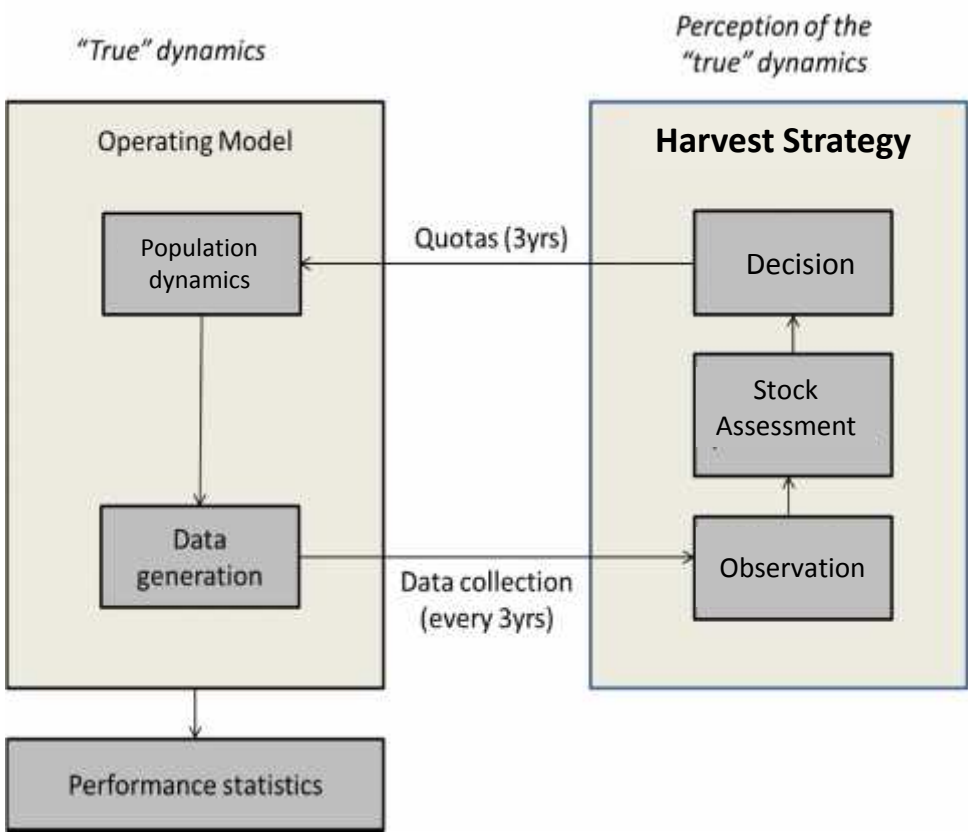
- If we had absolute control and knowledge of the system, we could not achieve better probability of being in the green zone for a given level of catch than that determined by the trajectory.
- The trajectory shows the best we can achieve for a system that is described by the Base OM.



# Evaluation of HCR

## Fisheries management and assessment are not perfect

They rely on “imperfect” observations, SA models which “simplify” fishery dynamics and have implementation errors etc…

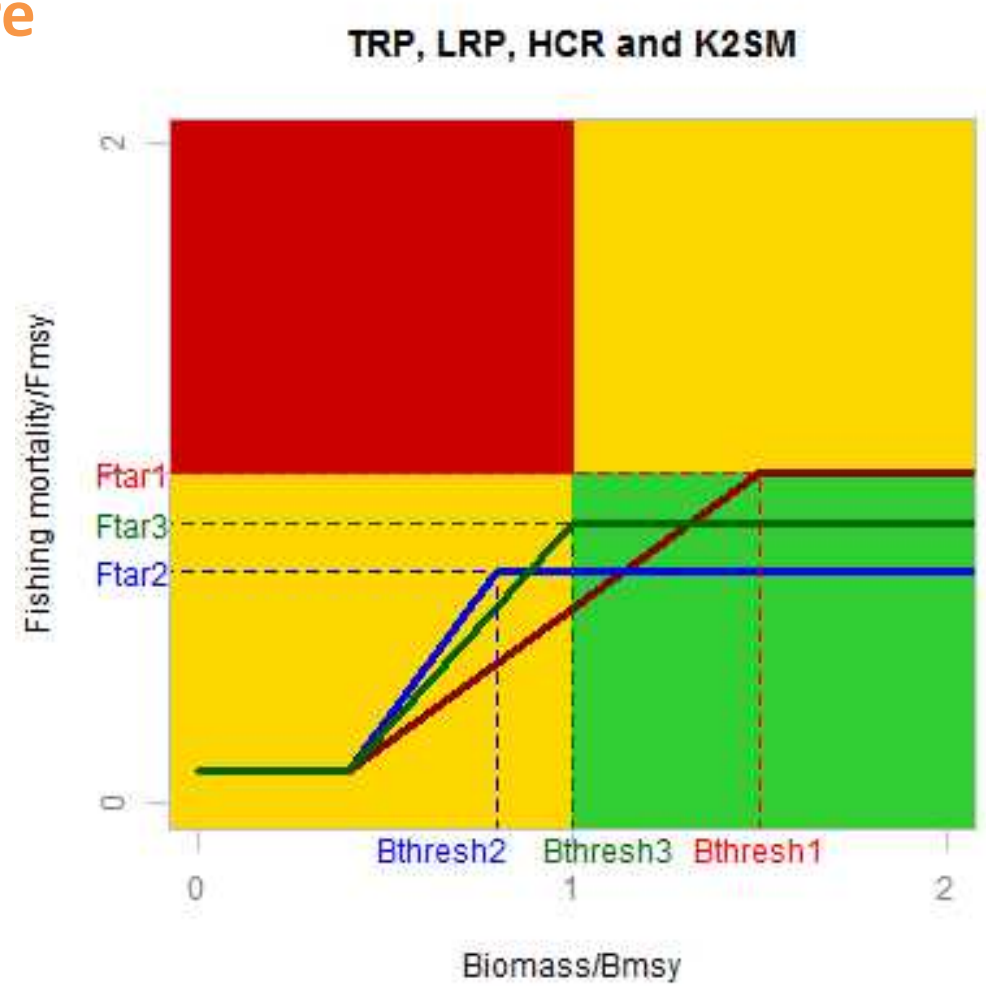


# Evaluation of HCR

## 4) Management Procedure

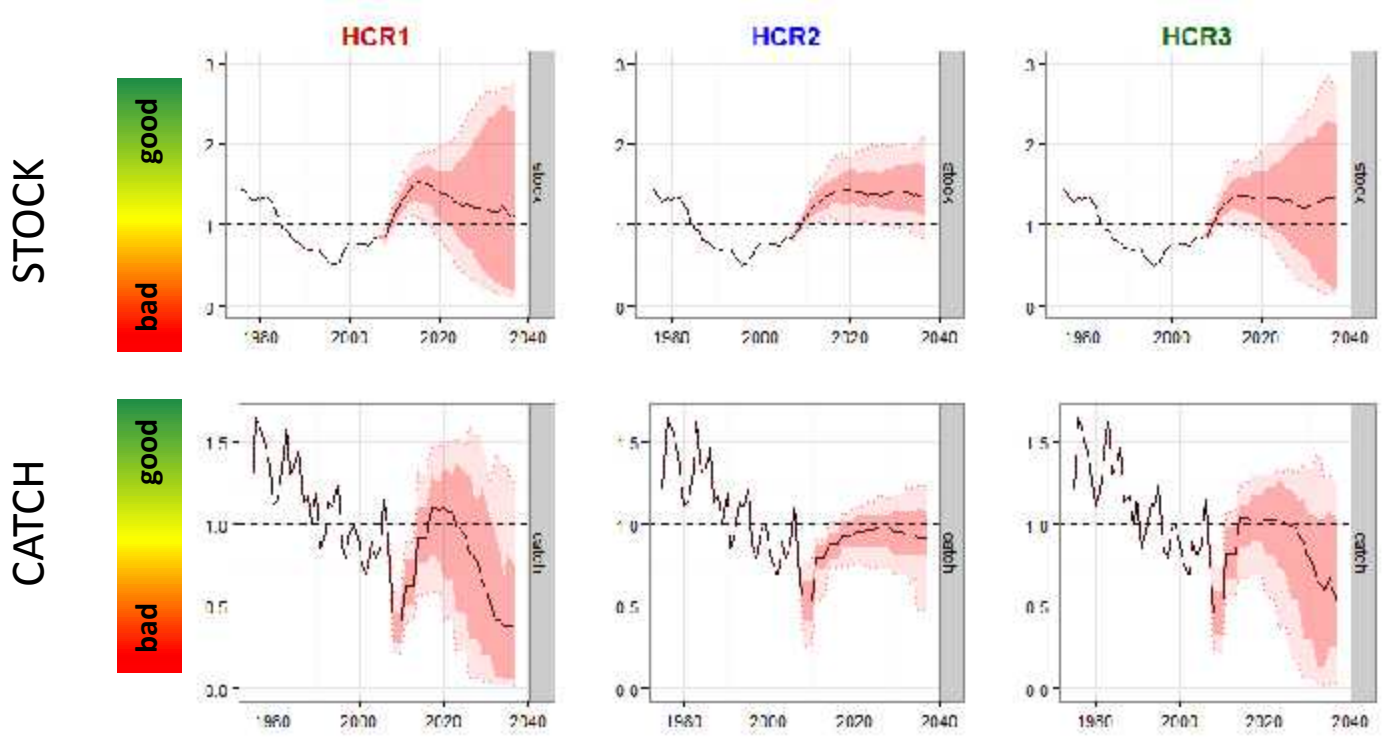
MP components:

3) HCR



# Evaluation of HCR

5) **Simulation testing:** how the "simulated reality" would evolve when driven by the MP used?

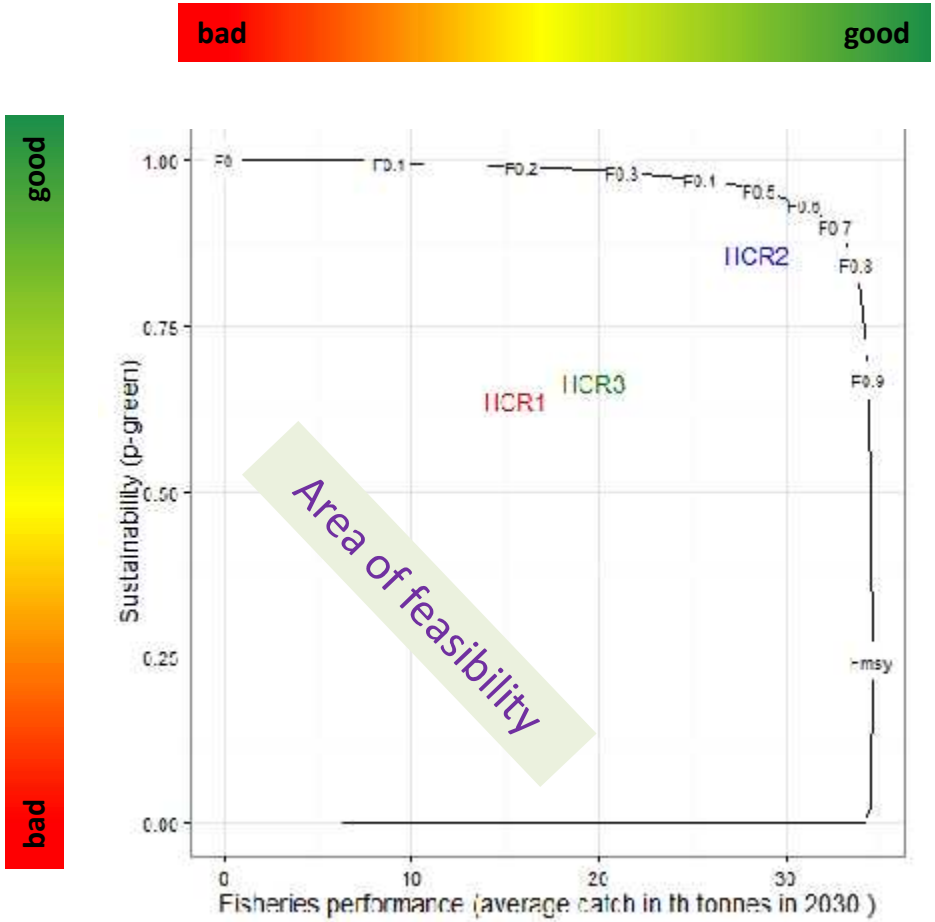


# Evaluation of HCR

5) **Simulation testing:** Do HCRs achieve management objectives?

**Trade off 1:**

**Catch vs Sustainability**



# Evaluation of HCR

5) **Simulation testing:** Do HCRs achieve management objectives?

long term

Discount rates

Safety

timeframes

Catch

red

Recovery time

Short term

overfishing

Stability

probabilities

yellow

The list of performance indicators can be expanded at request.

# Acknowledgments





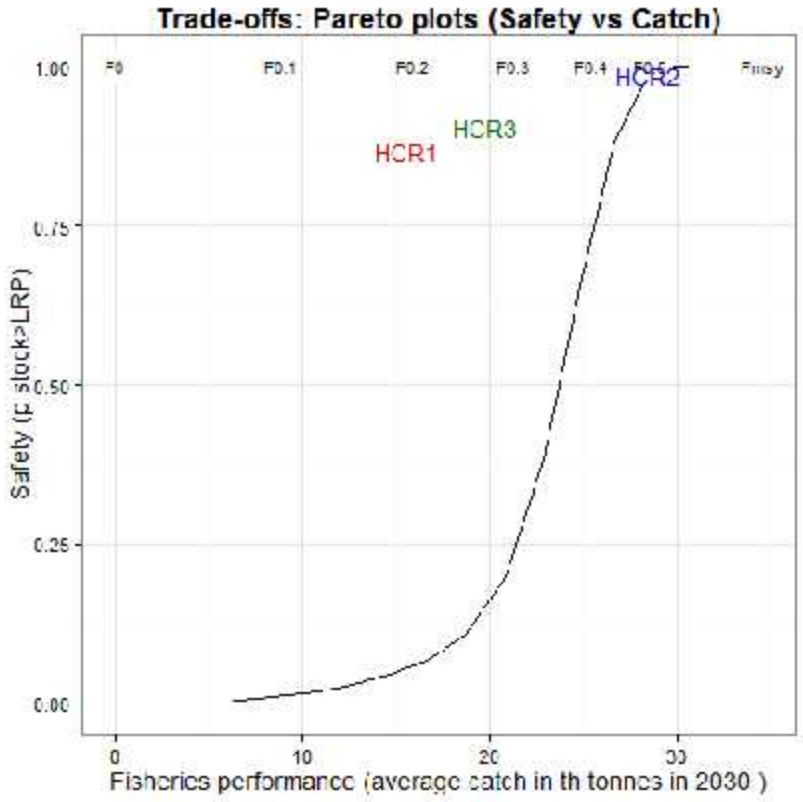






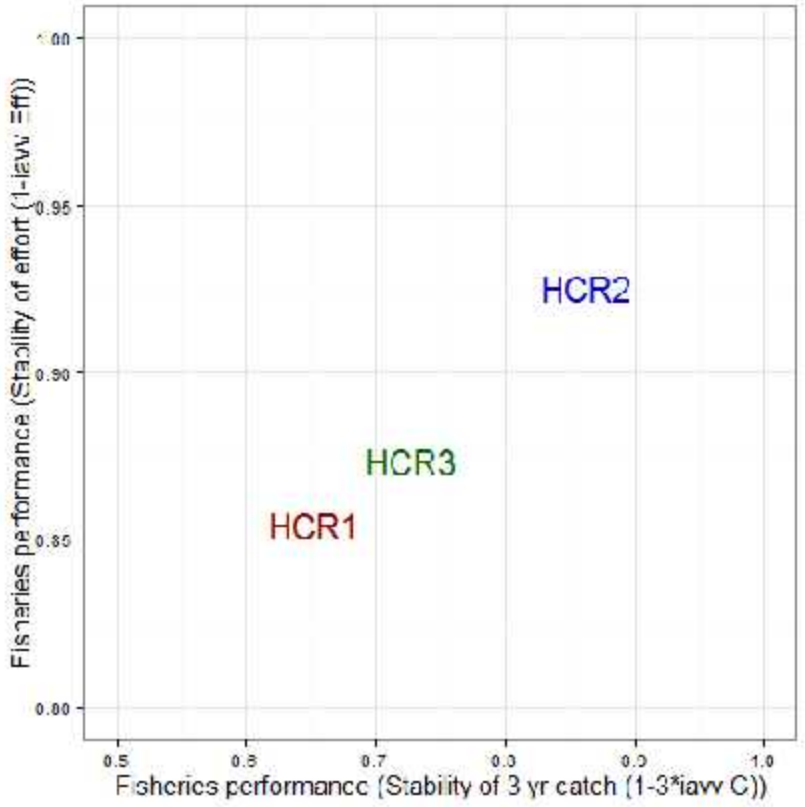
# Additional figures….

**Catch vs Safety**



# Additional figures….

**Industrial Stability**



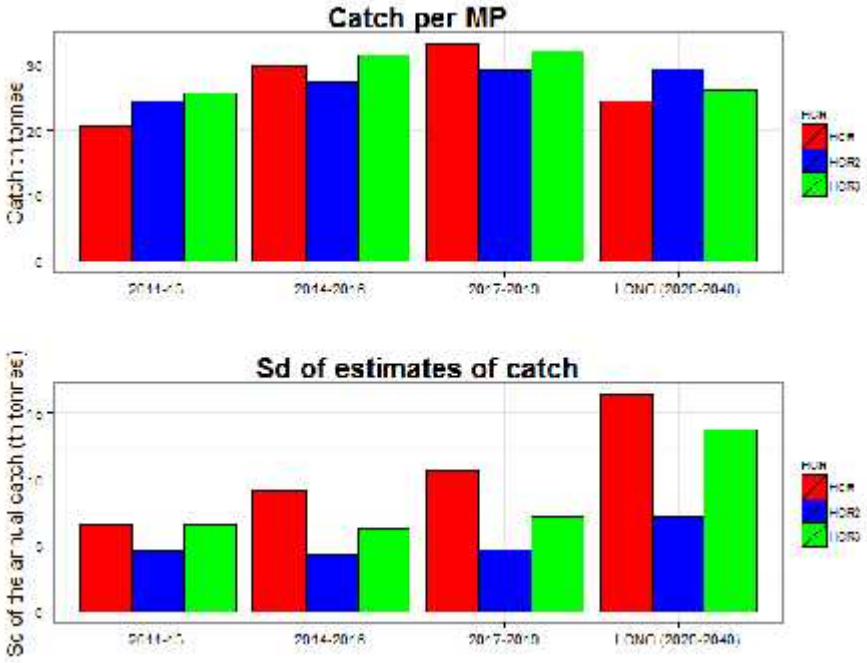
# Additional figures….

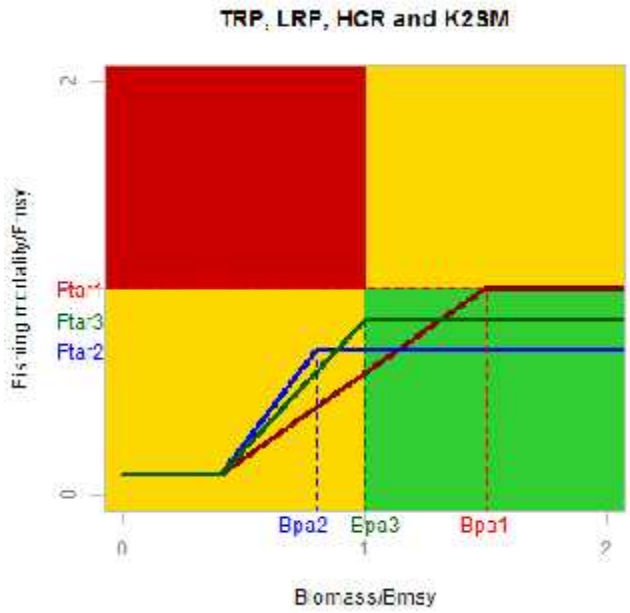
**Summary of indicators**

| | B/Bmsy | F/Fmsy | red | yellow | green | ovFishd | ovFshng | pLRP | catch 2040 | catch5 | catch10 | aavCatch | aavF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HCR1** | 1.36 | 0.65 | 0.26 | 0.10 | 0.64 | 0.28 | 0.34 | 0.87 | 15.61 | 19.85 | 10.39 | 0.12 | 0.15 |
| **HCR2** | 1.36 | 0.67 | 0.09 | 0.06 | 0.86 | 0.11 | 0.12 | 0.99 | 28.52 | 21.10 | 11.12 | 0.05 | 0.07 |
| **HCR2** | 1.30 | 0.74 | 0.25 | 0.09 | 0.67 | 0.26 | 0.32 | 0.90 | 19.77 | 18.96 | 10.13 | 0.09 | 0.13 |

# Additional figures….

| | 2013 SA | | SHORT-MEDIUM | | | LONG TERM |
|---|---|---|---|---|---|---|
| | MSY(SA) | SA(2014-2016) | 1-3 years | 4-6 years | 7-9 years | 2020-2040 |
| HCR1 | 31.68 | 28 | 20.60 | 29.65 | 33.20 | 24.32 |
| HCR2 | 31.68 | 28 | 24.40 | 27.37 | 29.06 | 29.39 |
| HCR3 | 31.68 | 28 | 25.60 | 31.49 | 32.19 | 26.18 |



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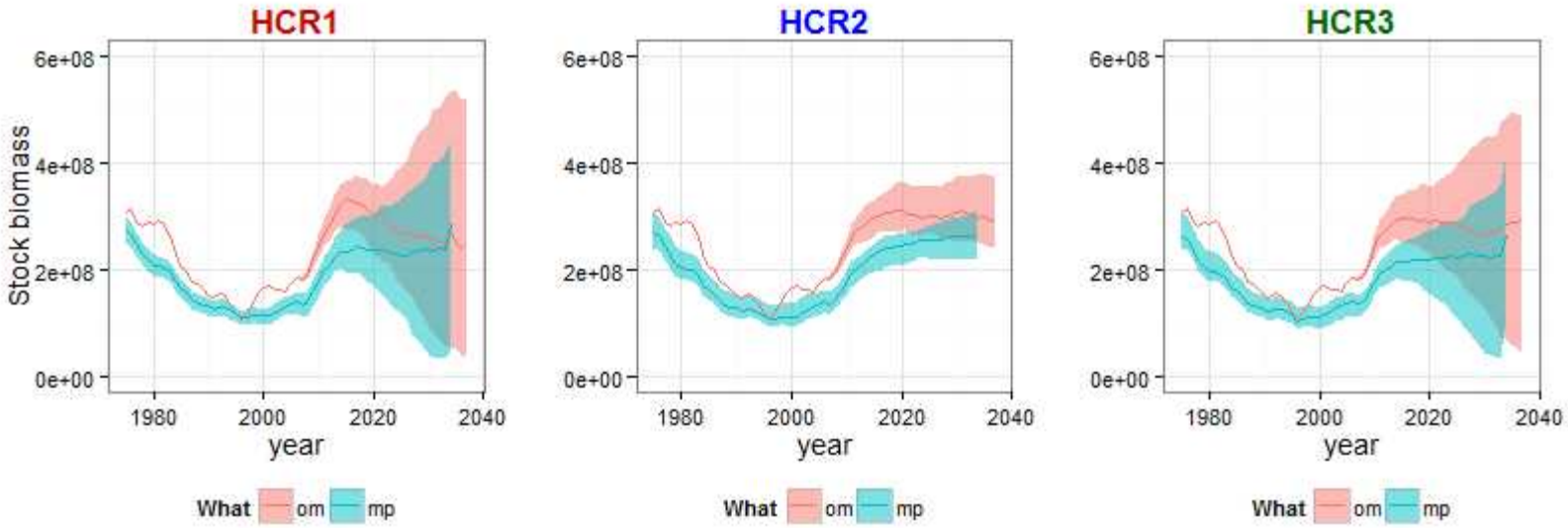

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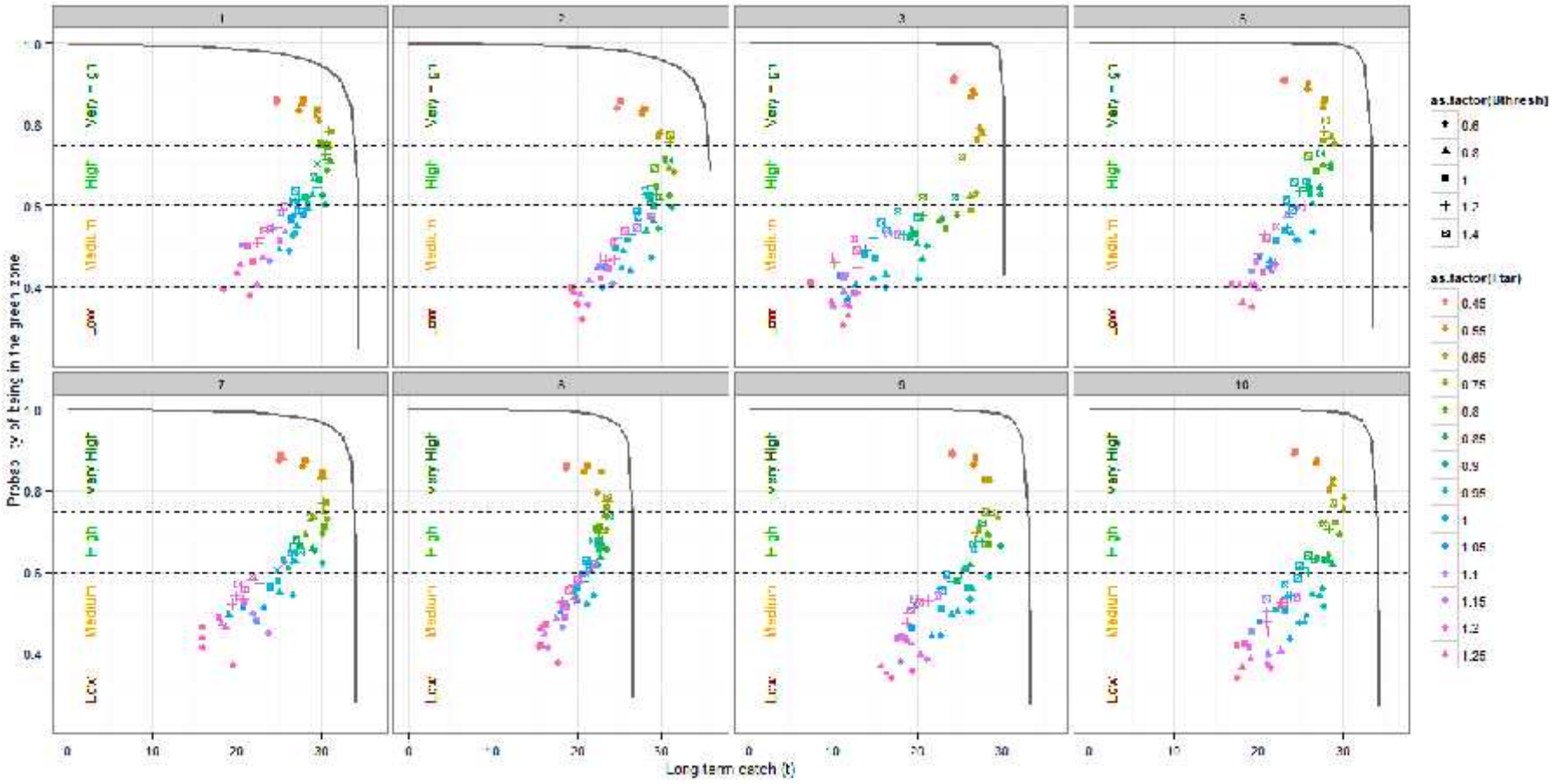

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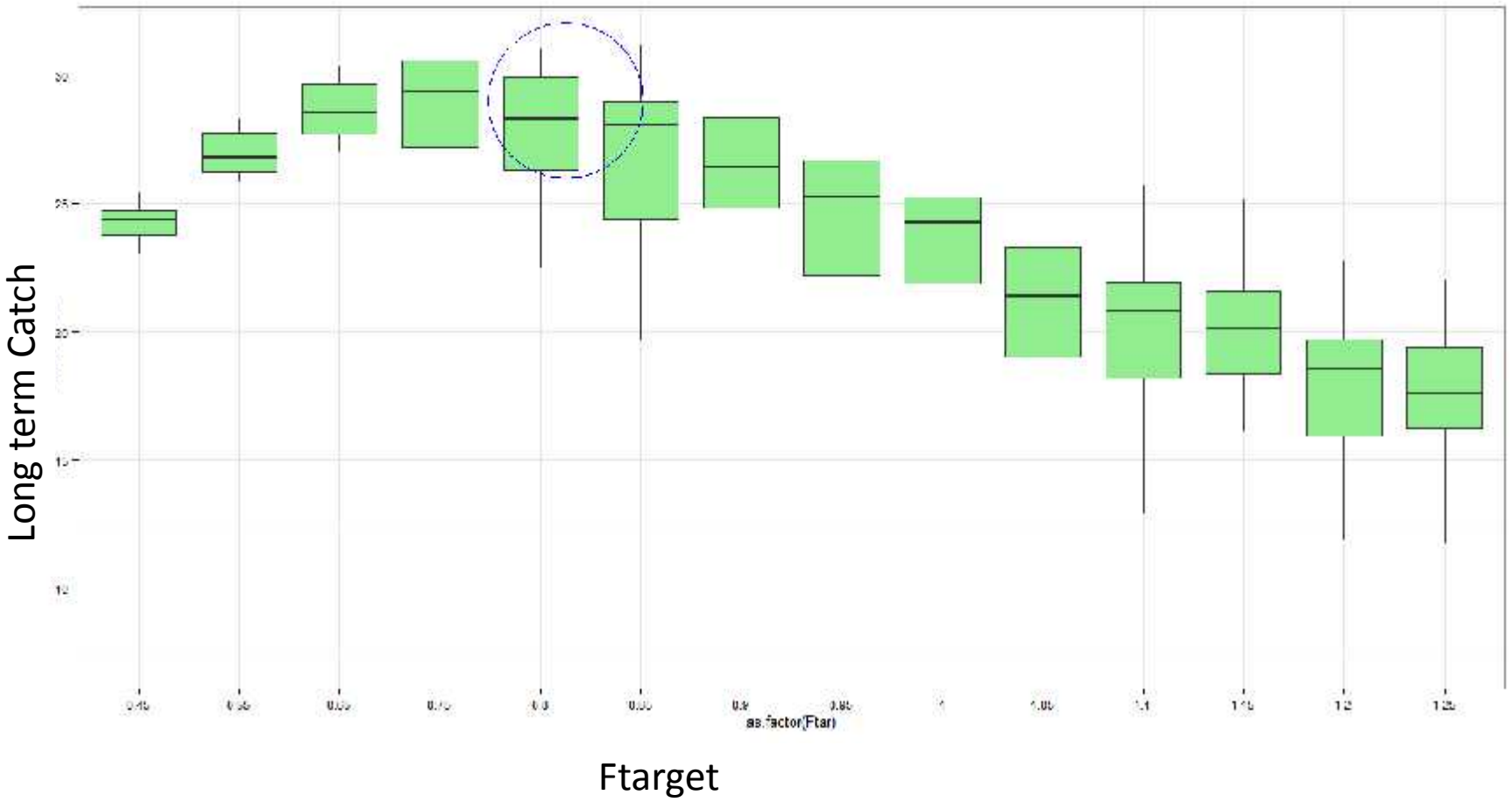

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