

NWWAC Focus Group Seabass

The ICES MSY approach to reference point estimation is not precautionary

What it means for sea bass advice in NW Waters

Laurence Kell — Sea++ & Imperial College London

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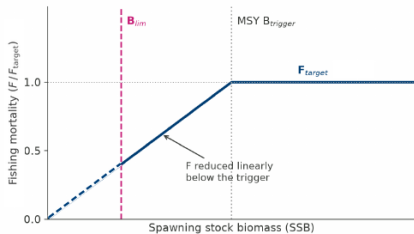
After Winker, Cardinale, Gerritsen, Gil Herrera, Castellanos, Farias, Sampedro, Moura, Mosqueira & Kell (2025), *ICES Journal of Marine Science* 82: fsaf204

Outline

Precaution is a property of the **whole advice system**, not of the stock assessment alone, and it has to be evaluated that way.

- ① How ICES sets MSY reference points
- ② What the study did, and what it found
- ③ Why the cost of precaution is small
- ④ What this means for sea bass (bss.27.4bc7ad-h)
- ⑤ Moving towards a bass-specific, multi-objective harvest strategy
- ⑥ Points for NWWAC

ICES reference points



Below B_{lim} : Additional rebuilding considerations;
zero-catch advice may apply.

- ▶ B_{lim} : the level below which productivity is impaired; zero-catch advice may apply
- ▶ $MSY\ B_{trigger}$: F is cut if SSB falls below it, to reduce the risk of falling below B_{lim} .
- ▶ F_{target} : the fishing-pressure setting in the advice rule; it need not equal F_{MSY} .

Precaution: $P(SSB < B_{lim}) \leq 5\%$ in the long term, i.e. $F_{target} \leq F_{P05}$.

Yield: subject to precaution, F maximises median long-term landings.

Operational, not biological: ICES F_{MSY} is a control point in the advice rule, not the F that delivers B_{MSY} .

Everything rests on how the risk of breaching B_{lim} is calculated.

Advice-rule derivation versus evaluation

Open loop: no response to new stock estimates. **Closed loop:** estimates inform subsequent fishing.

ICES Advice Rule derivation (EqSim)

- ▶ Derives reference points for a specified rule
- ▶ Includes rule-based feedback and simplified error
- ▶ Omits explicit forecast and advice lag
- ▶ One sex, one season, one fleet

Advice-system evaluation (RPETool)

- ▶ Short-cut MSE: closed-loop simulation
- ▶ Emulates SSB and F errors; no assessment refitting
- ▶ Rule → forecast → catch → stock
- ▶ Includes the data-to-implementation lag

EqSim is software; MSE is an evaluation framework

Source: Winker et al. (2025)

ICES MSY approach is not precautionary (Winker et al., 2025)

- ▶ Four benchmarked stocks (ICES WKBSS3, 2025):
 - ▶ White and Black-Bellied Anglerfish (8.c, 9.a);
 - ▶ Pollack (6–7)
 - ▶ Blackspot Seabream (9).
- ▶ ICES guidelines followed exactly:
 - ▶ B_{lim} and MSY $B_{trigger}$ then
 - ▶ F_{P05} and F_{MSY} from EqSim.
 - ▶ Advice Rule evaluated using short-cut MSE (RPETool), including advice feedback and timing
- ▶ Performance Metrics:
 - ▶ $P(SSB < B_{lim})$
 - ▶ catch/MSY, SSB/B_{MSY} ,
 - ▶ $P(SSB > 0.8B_{MSY})$,
 - ▶ catch variability

Source: Winker et al. (2025)

What Winker et al. (2025) found

ICES F_{target} breached **precautionary criterion**, $P(SSB < B_{lim}) > 5\%$ in 3 out of 4 stocks

F_{MSY} settings from EqSim and short-cut MSE.

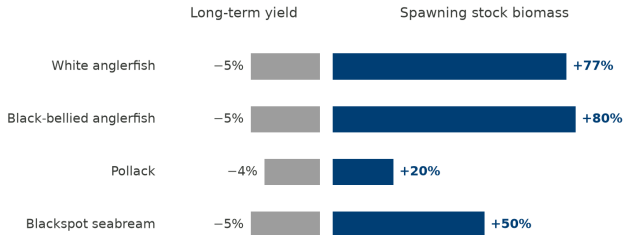
Stock	EqSim	RPETool
White anglerfish	0.198	0.179
Black-bellied angl.	0.530	0.367
Pollack	0.337	0.288
Blackspot seabream	0.110	0.099

- ▶ Blackspot seabream: precautionary, but $F_{target} > F_{MSY}$.
- ▶ Pollack: same population model in both tools, so differences are not solely due to biological simplification.
- ▶ EqSim is used for $\sim 75\%$ of ICES data-rich stocks.

Source: Winker et al. (2025), Table 4

Yield is nearly flat, biomass is not

Effect of setting the advice F at about 60% of the ICES (EqSim) F_{target}



Long-term yield cost was small in the study stocks

In these stocks, the flat-topped yield curve meant a large cut in F gave a large gain in biomass for little loss in long-term catch.

- ▶ Fishing at 75% of F_{MSY} gives $> 95\%$ of MSY (Restrepo et al., 1998).
- ▶ Lower F also reduced year-to-year variation in advised catch.
- ▶ More, older fish means a more resilient stock.

Source: Winker et al. (2025); Restrepo et al. (1998)

Why this matters for sea bass

2025 benchmark and advice for 2026: the sea bass MSY target is set by an EqSim-derived precautionary cap

0.170

F_{MSY} (ages 4–15)

Technical basis: $F_{PA} = F_{P05}$
from EqSim

19 339 t

MSY $B_{trigger} = B_{PA}$

$B_{lim} = 15\,666$ t, 2025
benchmark

5 180 t

Advice for 2026

Total removals, up from
2 620 t (+98%)

- ▶ $F_{MSY} = F_{PA} = F_{P05}$: the target is capped by a 5% risk calculation made using EqSim.
- ▶ If the derivation understates risk, the cap is too high: the short-cut MSE found this for three of the four study stocks.
- ▶ The near-doubling reflects both a revised assessment and new information, e.g. more catch data and longer recruitment series.

Source: ICES advice `bss.27.4bc7ad-h` (2025)

Consequences for sea bass

The binding constraint is EqSim-derived

The four-stock results give reason to test whether $F = 0.170$ meets the intended risk criterion for bass.

Treat F_{MSY} as an upper limit, not a target

Advising at F_{MSY} does not establish that there is sufficient headroom for errors arising through the full advice and implementation process. The MAP F_{lower} of 0.145 already sits inside a 5% yield band.

Sea bass carries extra implementation risk

Recreational removals are now better estimated, but a mixed fishery managed through effort, size and bag limits rather than a single quota still adds implementation uncertainty requiring explicit evaluation.

Ask for the reference points to be re-derived

A bass-specific MSE, at the next benchmark or via a special request, would evaluate whether 0.170 is precautionary under the scenarios tested, and if not, what F would be.

Targets need not be SSB alone

Ifremer: fleet economics; Welsh study specification: recreational and community benefits.

Social

Recreational catch rates; coastal communities; fair allocation.

Economic

Profitability; catch rates; value per fish; stable catches.

Ecological

Spatial distribution; nursery areas; ecosystem role.

Demographic

Large fish; age and size structure; older spawners.

Alongside biomass targets, agree measurable social, economic and ecological objectives, with explicit timeframes and performance measures.

Source: Kell et al. (2026); Ifremer (2025); Welsh study specification

Beyond MSY: what bass management needs

The ICES MSY framework is designed to optimise long-term yield. Bass management has wider goals: benefits to coastal communities, both commercial and recreational sectors, and stock age/size structure.

- ▶ Clearly defined **objectives, targets and timeframes**, co-designed with stakeholders.
- ▶ Candidate harvest strategies **evaluated by MSE** against biological, economic, social and ecological objectives.
- ▶ **Large-fish and age-structure** objectives, not only SSB.
- ▶ **Rebuilding-time reference points**, activated if indicators fall below agreed thresholds.
- ▶ A **transparent policy structure**: objectives, performance metrics, decision rules and sectoral allocations that can be explained.

Rebuilding time as a common currency

A forward-looking alternative to generic biomass limits

- ▶ $B_{rebuild}$: the lowest biomass from which a stock can rebuild to its target within an agreed time frame under a specified fishing scenario.
- ▶ $T_{rebuild}$: the time needed to rebuild from the current state, reported as a probability distribution and updated each year.
- ▶ Shifts the focus from *recruitment impairment* (rarely observed) to *rebuilding capacity* (monitorable).
- ▶ Makes the trade-off with foregone yield during rebuilding explicit.

Relevance to bass

A long-lived, late-maturing stock: recovery depends on conserving strong immature year classes and rebuilding age structure, not only SSB.

Generic limits (e.g. $0.2B_0$, hockey-stick breakpoints) are not risk-equivalent across stocks.

Source: Kell et al. (2026); Winker et al. (2026)

A staged route

From generic MSY advice to a bass-specific, precautionary, multi-objective strategy tested by MSE

Now: 1–2 years

Evaluate a MAP-consistent interim F target ($F_{lower} \approx 0.145$) against a small set of alternatives; build on improved recreational estimates.

Next: 2–5 years

Agree objectives and indicators; build operating models and a short-cut MSE; define reference points and compare trade-offs.

Later: 5+ years

Implement the selected strategy through ICES and EU–UK processes, then review routinely.

- ▶ Timescales are indicative: research and implementation through ICES and EU–UK processes may take longer.
- ▶ Recreational monitoring is improving: Cefas estimates from the Sea Angling Diary and MRP modelling, confirmed by CatchWise beach surveys, and a planned EU recreational catch app.

Recommendations

- 1 **Phase out EqSim** for estimating F reference points, and use feedback-loop simulation at benchmarks.
- 2 **Recalculate existing EqSim-derived F reference points** rather than carrying them forward untested.
- 3 **Treat F_{MSY} as an upper limit** and set the advice target below it: the yield cost is small and the biomass gain is large.
- 4 **For sea bass**, test whether $F = 0.170$ holds $P(SSB < B_{lim})$ at 5% once the advice loop, the forecast lag and recreational implementation error are simulated.

EqSim-derived reference points should be evaluated through MSE that represents the advice process, its timing and relevant uncertainties.

Possible points for the NWWAC advice on 2027

Offered as input to the next agenda item, for the Focus Group to discuss.

- ▶ **Set advice below F_{MSY}** (e.g. at the MAP F_{lower} of 0.145) while the bass reference points remain unevaluated through a bass-specific MSE of the advice process.
- ▶ **Request an MSE-based re-estimation** of the bass reference points, at the next benchmark or through a special request to ICES.
- ▶ **Account for recreational removals and implementation error** when judging whether advice is precautionary.
- ▶ **Support bass-specific objectives and an MSE**, including large-fish, age-structure and rebuilding-time indicators, co-designed with the commercial and recreational sectors.

Thank you and questions

Precaution is a property of the whole advice system, not of the assessment alone, and it has to be tested that way.

- ▶ EqSim-derived targets exceeded the risk criterion for 3 of 4 stocks when evaluated using short-cut MSE.
- ▶ The sea bass F_{MSY} is set using the same EqSim reference-point derivation approach.
- ▶ Fishing below F_{MSY} costs little yield and buys biomass, age structure and stability.
- ▶ Bass is well placed to move to an explicit, precautionary, multi-objective harvest strategy.

laurie@seaplusplus.co.uk • Code: github.com/akatan999/MSErefpts

References I

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