

Outline

1. Background
2. The BH concept
- 3. Policy and management implications**
4. Economic insights
5. Conclusions

3

Management implications (1)

Assessment:

1. Performance of present fishing and protection regimes in relation to the CBD norm (all species and fleets in that ecosystem).
2. Impacts of existing constraints (e.g. species protection; discard policies) on BH implementation of the CBD norm
3. New options for long-term management and conservation strategies using Management Strategy Evaluation procedures and models

Management:

4. Strategy will depend on starting point (ecological, economic, social conditions); fishery scale (small, large); area (coastal, offshore, high seas); ecological domain (pelagic, demersal); local culture (Asia, Africa, Europe)
5. Need to add ecosystem-based strategic (long term) regulations to single-species (shorter time) regulations
6. The reform to reduce overcapacity and overfishing is a prerequisite.
7. Use a multiple selectivity tool box: gear, time, area, market controls, rights, ecosystem tax, incentives, compensations, ecolabelling, novel food technology, MPAs

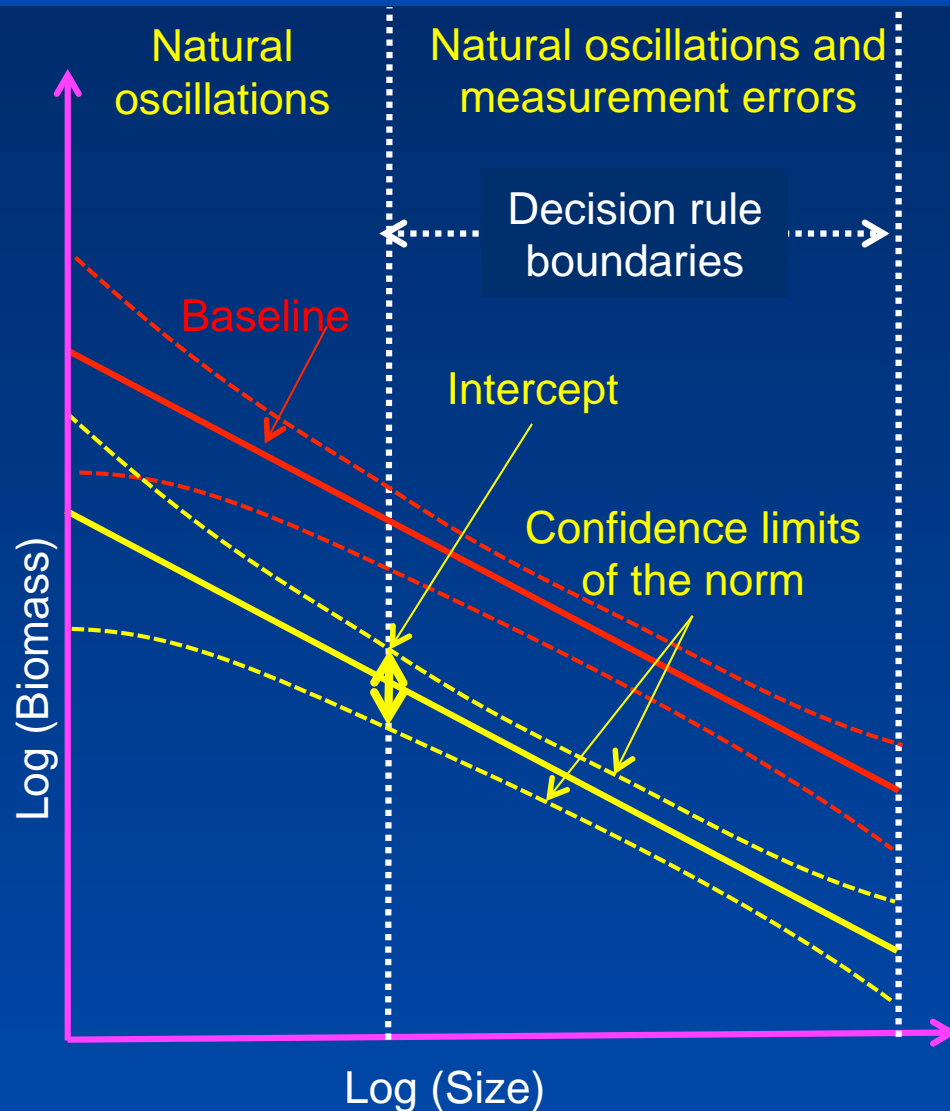
3

Management implications (2)

8. Use incentives to convince fishers to broaden harvest diversity when appropriate
9. Increase policy focus on diversification: of fishing operations, species and sizes caught while protecting old spawners (BOFFFs)
10. Be worried and double-check management strategies that tend to increase specialization and selectivity, looking for **alternatives that help balance overall pressure across the wider spectrum of species and sizes.**
11. Discuss the impact and performance of fisheries and conservation measures **TOGETHER !**

3

Some BH norm issues



- Which management unit?
- Which boundaries?
- Which reference: Size distribution? species mix? Trophic levels?
- Which baseline slope / intercept?
- Which norm (desirable state)?
- How precise can the norm be to be both useful and implementable (e.g. in terms of statistical significance of slopes/intercepts)
- What is the cost/benefit of that precision? And of not applying the norm?
- Is there an acceptable second-best option (e.g. reversibility?)

Outline

1. Background
2. The BH concept
3. Policy and management implications
- 4. Economic insights**
5. Conclusions

4

BH decision tree

CBD Goal: Maintain Ecosystem Structure and Productivity

Since this is an important societal goal but not the only one, what priority does it have relative to social and economic objectives?

Since this goal can be pursued in various ways, should BH be a component of the mix?

If so, how much BH is desired? What are the tradeoffs as 'balance' grows toward 'pure' BH?

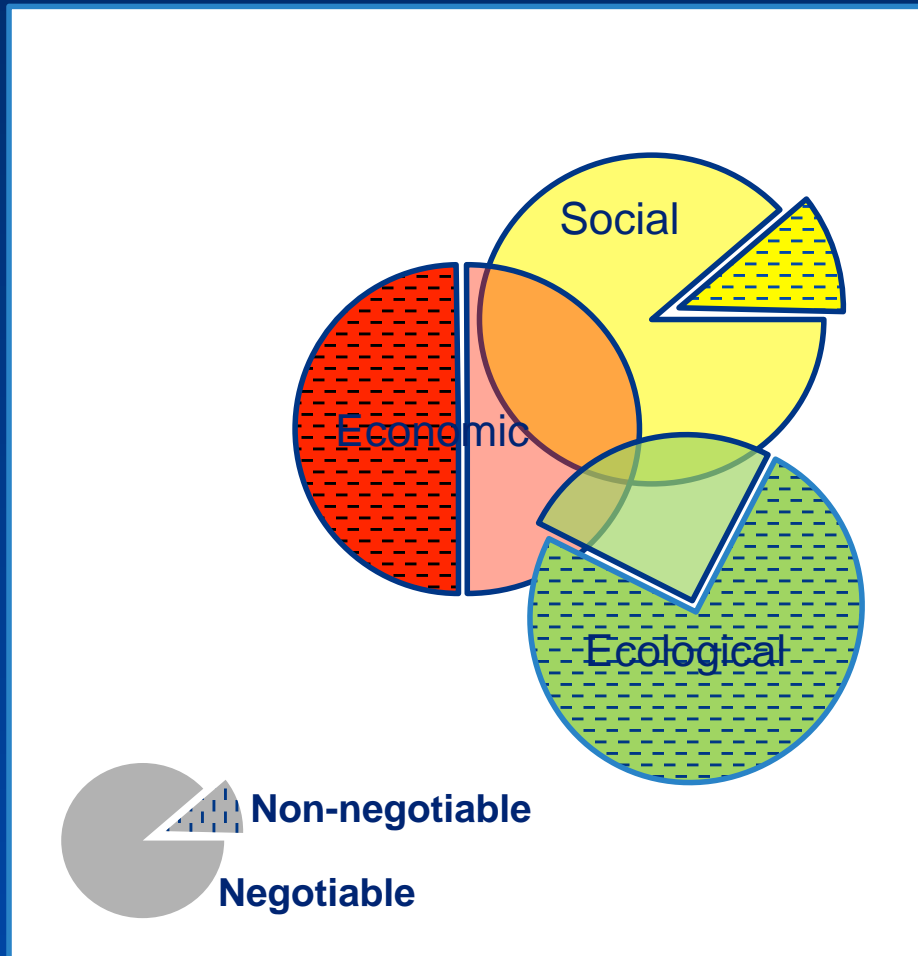
For the desired level of balance, what are the best means to achieve that BH target, e.g. changing species caught, size range, etc.?

4 Multiple objectives & trade-offs

- Utility in economics aggregates the value of society's multiplicity of objectives (i.e. ecological, social and economic goals).
- In this case, achieving a specific state of the marine ecosystem (BH) is one of multiple societal (and specifically ecological) goals.
- Tradeoffs: a shift to BH may have ecological and food provision benefits (e.g. higher total yield and lower extirpation probabilities), but possible negative impacts on other societal objectives.
- In that context, understanding the range of costs and benefits, and how these interact, is crucial, since given multiple objectives, a comprehensive analysis is needed across the full range of goals.

4

Trade-off potential



How negotiable (transparent areas) or non-negotiable (darker dotted areas) are the 3 sustainability pillars?

The larger the negotiable part of each circle, the more the degree of substitutability through trade-offs.

4

“Partial equilibrium” and marginal analysis

- Balanced harvesting, as modelled to date, involves ‘perfectly tuned’ harvesting of all species, and all sizes of each species, in the ocean. The resulting costs in fishing operations and in management may be seen as infeasible and unacceptable to society.
- For example, society may prefer not to shift fully, by choosing not to harvest every species in the ocean (such as plankton or whales).
- If that is so, then how much implementation of BH (i.e. ‘how much balance’) is optimal? Whatever the current situation, what are the societal trade-offs between a bit more or a bit less ‘balance’?
- Do the benefits of BH accrue monotonically? Is incremental change always beneficial (e.g. shifting just one fishery to be less selective)? Or could such a move be negative, due to ecosystem interactions?
- And there is great uncertainty underlying all this – what is the right baseline, the relevant oscillations, the confidence limits throughout?

4

BH transition choices

BH Options: (1) Broaden species caught and landed, (2) Broaden size ranges, (3) Reduce excessive exploitation rates

Could compensation for reduced harvests come from greater stability of catch/profit or from profits transferred from 'new' fisheries?

Should all fleet sectors adjust 'equally' or should some modify less while others start new, perhaps subsidized fisheries?

If the latter, could new fishery components be subsidized to fish low value species, by taxes paid by those continuing conventional fishing?

Widespread change may include landing all catch (no discards), protecting old spawners, changing gear to broaden catches, possibly lowering exploitation rates.

4

Market value vs. Economic value

- While total yield in a fishery is usually considered as economically relevant (determining total revenue), in this case the yield is from the ecosystem overall, and thus includes species without market value.
- Hence no conclusion can be drawn on total economic net benefits without drilling down into the species composition.
- Yield from the ecosystem may be important for food security, and while a higher ecosystem biomass and a lower rate of extirpations do not translate directly into market value, they may have economic value in a broader sense, i.e. in option value and existence value.
- Overall, then, it is important to assess economic costs and benefits of balanced harvesting not only in market terms but covering the full breadth of economic values.

4

Distributional impacts

- Would a move to BH cause harm, or provide benefits, to some fishers more than others?
- Could some gear types or fleet sectors in a particular fishery be penalized disproportionately?
- Within any given fleet sector, could there be free-riders not fulfilling obligations to broaden the range of sizes/species?
- Can new regulations or taxes help resolve these situations?
- Will benefits flow to the relatively poor small-scale fishers, those who are already following traditional practices of harvesting widely across marine ecosystems?
- In such cases, can we ensure food security needs are met and overall fishing pressure is sufficiently low to keep impacts within bounds and with sufficient reversibility?

4

Discounting: Distributional impacts over time

- Balanced harvesting, like ecosystem-based fisheries management, seeks to create the right conditions for a sustainable future.
- BH can be seen as an investment in natural capital (ecosystem productivity and wellbeing), or an insurance policy against future ecosystem destruction.
- As such it runs directly into issues of discounting over time. The higher society's discount rate, the more impatient society will be about waiting for those future benefits, since there are immediate costs of moving to BH.
- Analyses to date do not address the transition issue of how short-term costs compare with long-term benefits, but this distributional issue (along with that of who wins and loses in the short term) is among the major challenges in fisheries.

4 Markets & Consumer Demand

- “Markets and the processing sector will need incentives to accommodate a wider range of catch components, including many not currently utilized in Western countries but commonly used in multispecies, multi-gear fisheries...”
- Also needed: a shift of consumer interests in seafood toward “consuming less-utilized fish species”, a move that would be advantageous from a food security perspective.
- Species less desired in the human consumption market might be used as animal feed, if this is considered ethically acceptable.
- In any case, it will be crucial to determine how to sustainably complete the chain from harvesting a broader range of marine life (at a lower rate of exploitation) to properly utilizing that production to meet human needs.

4

Option: Increase range of sizes harvested of a given species

- Is the issue one of regulations, technology, markets? (Could also be past fishing practices (e.g. leading to a lack of remaining large fish.)
- If regulations, those can be changed, e.g. landing of small fish.
- If technology, is there a lack of financial capability, or a need for subsidies, recognizing that there will be a cost to change?
- If markets, may need new markets, marketing channels, marketing campaigns. If the markets have not appeared spontaneously, why is that? Are subsidies or new seafood technologies needed?
- Balanced harvesting, being a high-level idea, should not be seen as dictating requirements for every single fish stock. Broadening the range of sizes caught of a particular stock may be so uneconomical that it may be preferable to focus on other species (unless there are exceptionally strong biological reasons for that particular specie).

4

Option: Increase range of species harvested in the ecosystem

- The range of species caught is an issue relevant at the high-level perspective of the ecosystem – not one necessarily requiring every fleet, sector, or individual to change their practices.
- The desired extent of progress toward BH will depend on how its benefits and costs ‘balance’ with other societal objectives & values.
- Dumping. Compared with more selective harvesting, dumping of bycatch does spread mortality more across the ecosystem. But its wastefulness is unacceptable from a food security perspective, and it increases uncertainty in the data, contrary to good management.
- Catching all species. What is the cost-benefit analysis of insisting on catching species that society has no interest in utilizing? Specifically, what is the ‘balance’ between BH (as implementation of CBD norms) and other societal values, in deciding whether to harvest a species that society does not consider appropriate to kill?

4

Economics of Management

- What are the appropriate transition paths if a move to BH is desired, i.e. to shift away from management that increases target specialization and selectivity?
- How suitable are incentives to move to BH, e.g. to broaden harvest diversity?
- What are the economics of changing by-catch policies to broaden catches?
- Economics of ecosystem-based strategic vs. single-species short-term tools?
- What are the economic issues relating to the tools for moving to BH? Gear, time, area, market controls, rights, ecosystem tax, incentives, eco-labelling?
- How do the economics of BH vary with fishery scale (small, large), area (coastal, offshore, high seas), domain (pelagic, demersal), fishery culture?
- How does BH thinking change the economics of MPAs and reserves?
- Are the ecosystems containing so-called “well-managed fisheries” closer to or further from BH than other ecosystems? What are the economic implications?
- Are tropical ecosystems, with their many species caught in multi-species, multi-gear fisheries, closer to BH than other ecosystems? What are the implications?

Outline

1. Background
2. The food chain
3. The BH concept
4. Policy and management implications
5. Economic insights
6. Conclusions

Conclusions (1)

- The present fishing regime is based on an outdated single-species paradigm and recent scientific advances confirm the concern regarding the impact of that regime on the ecosystem structure and function
- If ALL species could be simultaneously fished at MSY ($F=M$) conventional fishing management would amount to «Balanced Harvest». The concept is not new but its feasibility should be re-assessed within the Ecosystem Approach.
- The robust relations between individual size and abundance can be used to analyze the impact of present fishing regimes on ecosystem structures and properties and develop appropriate indicators.
- Models generally support the intuition that concentration of fishing on a narrow selection of species and sizes may not maintain ecosystem processes and properties.
- Balanced Harvest distributes a moderate fishing mortality across the widest possible range of species, stocks, and sizes in an ecosystem, in proportion to their natural productivity, so that the relative size and species composition is maintained.

Conclusions (2)

- BH improves also yield and resilience and it reduces oscillations and risk of collapse or extirpations and genetic impact, particularly if BOFFFS are protected
- Efforts should continue to verify empirically the ecosystem impacts predicted by the models
- The operational and economic implications of implementing a BH norm may be significant and should be assessed.
- For mature fishery systems, in which most of the size/species structure is being used by fishing (in African SSFs, the Mediterranean, or SE Asia) might not be far away from BH if excess capacity could be reduced and BOFFFs protected.

It is worth noting that wildlife scientists have reached similar conclusions regarding the deleterious effect for conservation of targeting the large animals.



Selective Fishing and Balanced Harvest in Relation to Fisheries and Ecosystem Sustainability

S. M. Garcia, (Ed.)



Thank you for your attention

