

Least-Cost Bycatch Reduction Through the Biodiversity Mitigation Hierarchy

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NAAFE, La Paz, Mexico March 22, 2017

How should biodiversity conservation goals be achieved?

- The Biodiversity Impact Mitigation (BIM) hierarchy provides an overarching conservation framework to achieve these goals.
 - Systematic way of thinking about bycatch reduction.
- Making it least-cost gives greatest conservation with fixed budgets.

Organization

- 1. Biodiversity Mitigation Hierarchy
- 2. Legal Framework
- 3. Conservatory Offsets
- 4. Least-Cost Biodiversity Mitigation Hierarchy
- 5. Recap of Main Points

1. Biodiversity Mitigation Hierarchy

BIM's application proceeds sequentially to:

- (1) avoid any impact,
- (2) minimize unavoidable impact,
- (3) restore biodiversity, in that order and as much as practicable, before considering to
- (4) compensate residual impact (offsets).

- First three steps are *conservatory* and applied *onsite* (vessel, at sea)
- 4th is *compensatory* and applied off-site and on different albeit comparable resources.
- In fisheries, BIM is never referred to, but it is used in practice

Step 1: Avoidance

- Fishers change fishing location away from areas with more bycatch
- Time-area closures
- Some Marine Protected Areas
- Real-time spatial management (dynamic ocean management)

Step 2: Minimization...(1)

- Change fishing methods
 - (1) change fishing times,
 - (2) change tow duration, yielding higher frequency information on bycatch and enabling quicker location changes when encountering concentrated bycatch;
 - (3) shift away from trawls toward more selective gear

Step 3: Minimization...(2)

- Performance Standards
 - Quotas, limits, etc.
- Technology Standards
 - Prescribed gear and equipment
 - Turtle Excluder Devices, sorting grids, etc.
 - Prescribed operating methods
 - Fishing methods

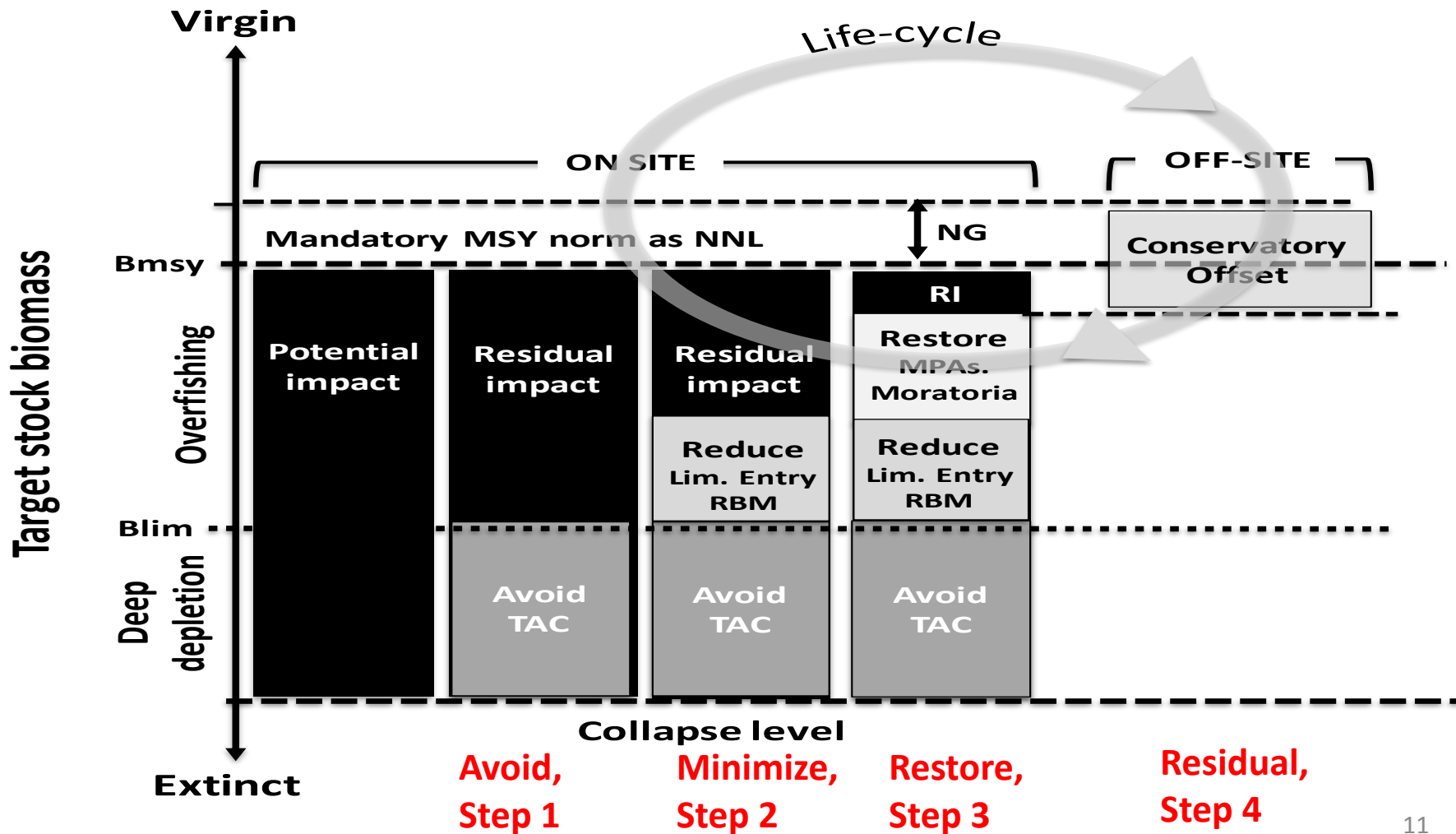
Restoration

- Bycatch restoration is realized through stock rebuilding
- Avoidance and minimization rebuild stocks

Step 4: Compensation

- Compensation is the fourth step of the BIM hierarchy.
- Used when a residual impact cannot be further reduced, or restored.

Biodiversity Mitigation Hierarchy in Fisheries Management



2. Legal Framework

Legal Framework Target Species

- United Nations Law of the Sea Conference (LOSC)
- Baseline for first three steps of BIM hierarchy is MSY
 - No net loss or NNL

Compensation and Target Species

- Offsets for target species are not allowed in the LOSC and related instruments (UN Fish Stocks Agreement and FAO Code of Conduct for Responsible Fisheries)
- Target species should all be maintained at MSY (NNL level)

Legal Framework and Offsets...(1)

- Compensation (offsets) clearly accepted in the IUCN and CBD frameworks of biodiversity conservation.
- We also argue that they may therefore be used, under the LOSC for species for which the MSY norm is irrelevant
 - Non-fishery aquatic species (snakes, crocodiles), seabirds, protected species, vulnerable habitats, etc.

Legal Framework and Offsets...(2)

- Other offsets, which we call *conservatory offsets*, are usable in fisheries for both target and non-target species.
- Compensation (offsets) clearly accepted in the IUCN and CBD frameworks of biodiversity conservation.

3. Conservatory Offsets

What are Conservatory Offsets?

- What we call *conservatory offsets* are *offsets* because they are obtained “off-site”, away, and sometimes very far from the impact area/fishing ground, e.g. for species with extensive migrations.

What are Conservatory Offsets?

- They are *conservatory* because, contrary to other offsets, they are applied on the impacted population, within its life cycle, to restore it.
- Can be used in the first 3 steps
- Voluntary complement or substitute to other mitigation measures.
- Incentive-based policy instrument
 - Prices bycatch
 - Least-cost

Polluter Pays Principle

- Party inflicting biodiversity loss (the external cost) is responsible for paying or otherwise compensating for it.

Examples

- Fishing fleets pay for protection of sea turtle nesting sites, seabird rookeries, marine mammal congregations, shark pupping grounds
- Fishing fleets pay for other fleets to use ecofriendly gear when fishing on same species-stocks
- Fisheries harvesting sinks pay for source conservation in meta-populations on rare occasions of species with density-dependent movement.

4. Least-Cost Biodiversity Mitigation Hierarchy

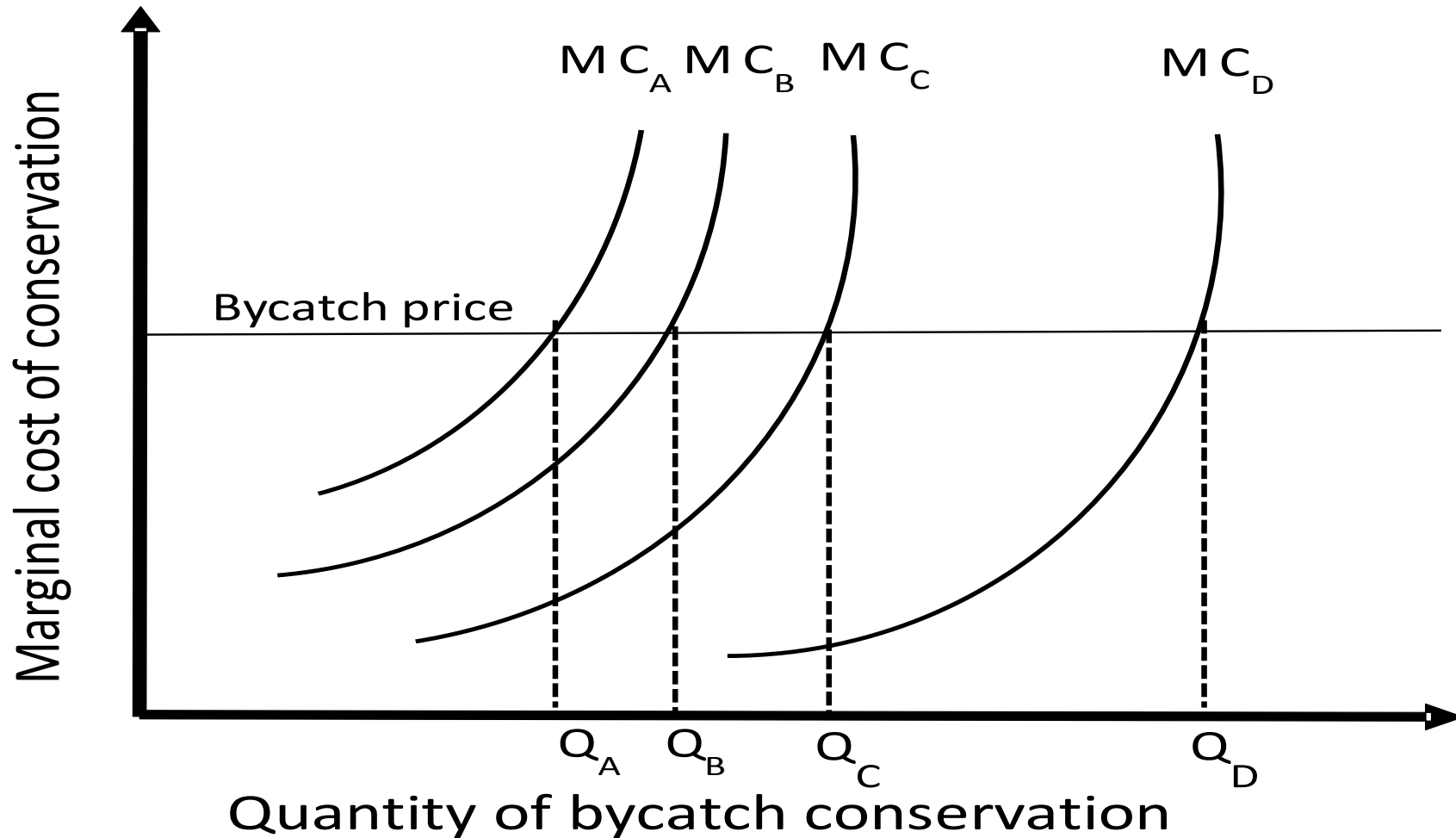
Classical Sequencing of Biodiversity Impact Mitigation

- Sequentially follow each step of the BIIM hierarchy to maximum extent practicable leads to diminishing conservation returns per dollar spent.
- Fails to achieve the maximum bycatch reduction possible with limited conservation budgets.

Least-Cost Sequencing of Biodiversity Impact Mitigation

- Least-cost achieved by equating marginal costs across all four steps of mitigation hierarchy
- Also across all methods of mitigation and across all producers.
- See following figure.

Least-Cost Biodiversity Across 4 Steps of Mitigation Hierarchy



5. Recap of Main Points

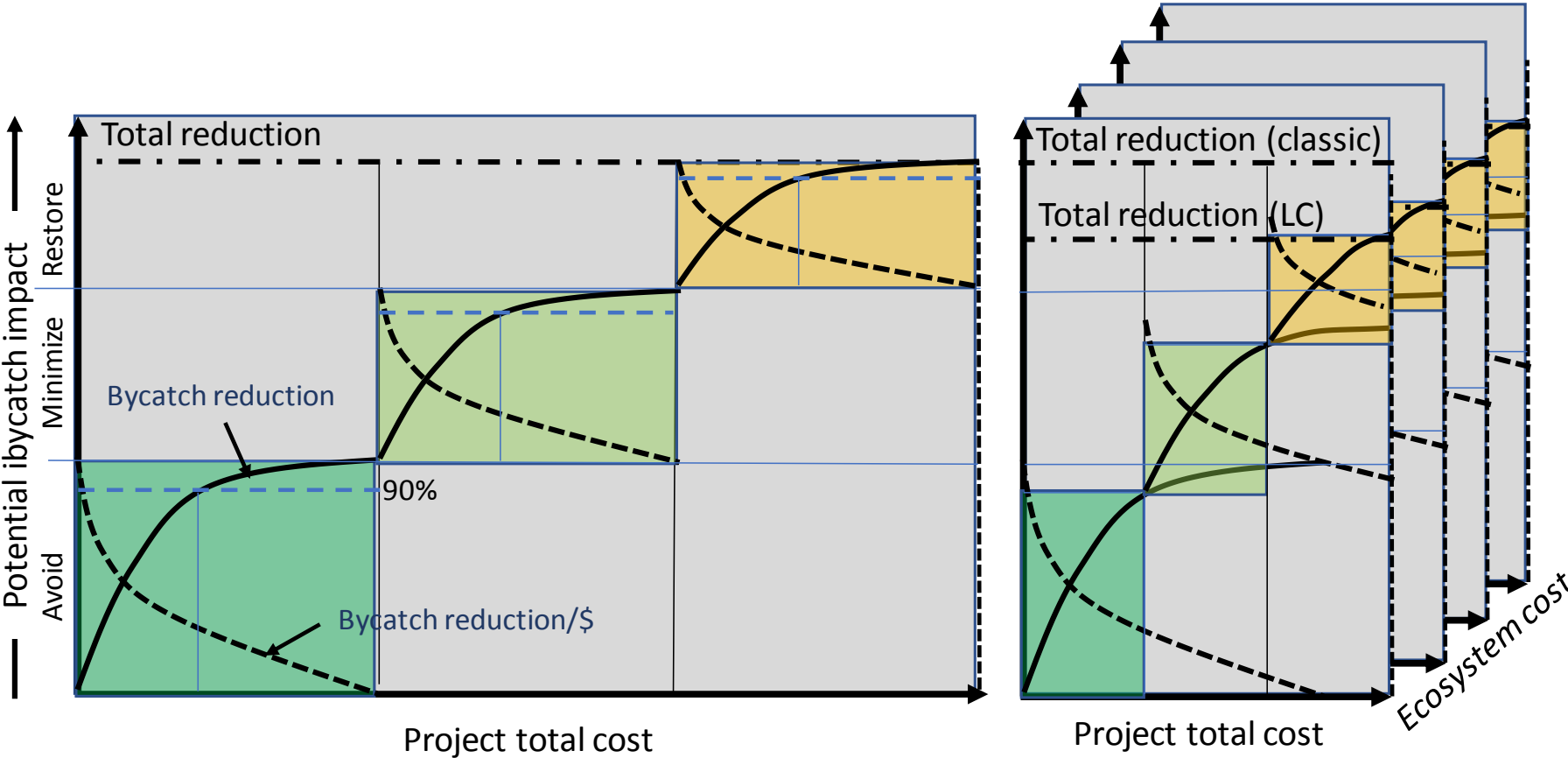
- The least-cost BIM framework, induced through incentive-based policy instruments provides a way to maximally reduce fisheries bycatch for given conservation budgets and political economy constraints.
- Includes conservatory offsets.
- Consistent with the Law of the Sea and the Convention on Biological Diversity.

Thanks!.....Questions?

Supplemental Material

- Not for presentation, but to illustrate any discussion about classical sequencing vs. least-cost sequencing of biodiversity mitigation hierarchy.

Optimal Sequencing of Biodiversity Impact Mitigation: Classical Sequencing (A) vs. Least-Cost Sequential



A – Classical sequential mitigation

B - Least cost sequential mitigation