

Integrating Marine Reserves with Fisheries Management

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What Does Integration Mean?

- Main goals of reserves are biodiversity and ecosystem protection
- Marine reserves not a replacement for fish mgt, but can be complementary
- Considerations for integration:
 - Need to minimize potential adverse impacts of reserves on fisheries
 - Use marine reserves to fill gaps: insurance, bycatch/serial depletion, virgin biomass estimates, estimating habitat impacts

Potentially Adverse Impacts

- Very large or numerous marine reserves may displace significant amounts of fishing effort
 - Capacity management will benefit both reserves and conventional management
- Marine reserves will displace individuals, with disproportionate impact on small vessels that used to fish in reserve waters
 - Extensive consultation to identify people who are disproportionately impacted
 - Minimize costs by choosing low-cost sites that don't compromise ecological value

Gap: Bycatch and Serial Depletion

- Conventional management does not adequately address these issues
- Not many species have been assessed
- Already know that low- and high-productivity species are caught together (bycatch)
- Result: serial depletion, lowest to highest
- Expectation: more of the same
- Marine reserves in areas of high species diversity (high bycatch rates) could help

Gap: Whole Ecosystem Protection

- Federal fisheries management lacks a clear ecosystem protection mandate
- Marine reserves could become a good complement to measures aimed at complying with Essential Fish Habitat requirements to assess and minimize fishing impacts
- Baseline for defining ecosystem health
- “Source” areas for seeding depleted habitats

Gap: Reducing Uncertainty

- Reserves offer reference areas for studying fishing impacts and different fishing strategies
- After abundance trends level off in reserves, use as “virgin biomass” proxies
- Marine reserves might help stabilize catches, reducing regulatory uncertainty
- Buffer Zones: Test new fishing techniques to enhance ecosystem protection
- Enhancement of basic understanding of ecosystem structure and function

Gap: Insurance

- Conventional management lacks sufficient insurance against management error
 - Since many species are not assessed, the full extent of overfishing is unknown but likely to increase
 - If insurance is the objective, don't count biomass in reserve as part of total assessed biomass when calculating ABC
 - Conservative assumptions in stock assessments provide some insurance
 - Reserves can complement that policy by protecting real fish and habitats

Gap: Protecting Age Structure

- Efficacy of size limits? Slot limits?
- Good evidence that reserves protect age structure, especially older individuals
- Higher fecundity
- Genetic integrity
- Spillover of large individuals to sport fishery?

Enhance Rebuilding and Yield

- Empirical evidence lacking
- Absence of evidence doesn't necessarily mean evidence of absence
- Few marine reserves or networks large enough to create discernable signal
- Few empirical studies of yield enhancement on regional or metapopulation level
- Models suggest yield enhancement is possible