

THE ECOSYSTEM APPROACH TO MANAGEMENT: FIDDLING WITH THE DETAILS WHILE ROME BURNS?

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HUMAN PRESSURES & ECOSYSTEMS

ECOSYSTEM APPROACH TO MANAGEMENT:

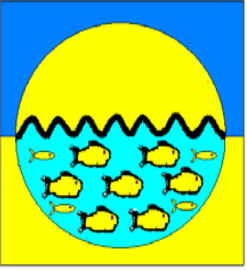
INTEGRATED MANAGEMENT OF HUMAN ACTIVITIES BASED ON KNOWLEDGE OF ECOSYSTEM DYNAMICS TO ACHIEVE SUSTAINABILITY OF ECOSYSTEM GOODS & SERVICES, & MAINTENANCE OF ECOSYSTEM INTEGRITY

PRECAUTIONARY PRINCIPLE:

WHERE THERE ARE THREATS OF SERIOUS OR IRREVERSIBLE DAMAGE, LACK OF SCIENTIFIC CERTAINTY SHALL NOT BE USED AS A REASON FOR POSTPONING COST-EFFECTIVE MEASURES TO PREVENT ENVIRONMENTAL DEGRADATION

HIGHEST IMPACTS: FISHERIES, TRACE ORGANIC CONTAMINANTS, NUTRIENTS
UPPER INTERMEDIATE IMPACTS: OIL & PAHs, OTHER HAZARDOUS SUBSTANCES, HEAVY METALS, BIOLOGICAL IMPACTS (E.G. ALIEN SPECIES, MICROBIAL POLLUTION)
LOWER INTERMEDIATE IMPACT: LITTER & DISTURBANCE I, DREDGING & DUMPING, ENGINEERING OPERATIONS, MARICULTURE
LOWEST IMPACT: LITTER & DISTURBANCE II

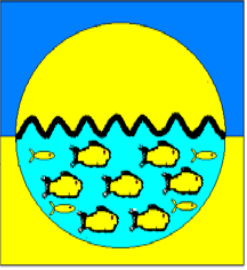
NEED CLEAR OBJECTIVES, REDRESS 'ROOT CAUSES' OF HARMFUL PRACTICES: IMPLEMENT ACTIONS FOR CONSERVATION, RESTORATION OF SPECIES, HABITATS, ECOSYSTEMS



OVERFISHING & IMPACTS SINCE 1950s

(1)

- **Fishing effort (number of boats * catch days plus technological development) greatly exceeds the status of the fisheries resources (e.g. fish & shellfish): This is the most important factor driving the overexploitation of living marine resources. Additionally, there are high & 'perverse' subsidies that result in the absence of a market economy.**
- **Fisheries statistics & control & enforcement**
 - ◆ **Insufficiently effective to hinder illegal activities & uncertainties (e.g. catch statistics misreporting & landings outside legal channels). Misleading data affects the dependability of information regarding fisheries, exceeded catches & quotas, fishing in 'closed' areas & unwanted by-catches & discards.**
- **Demersal & planktivorous fish**
 - ◆ **Overfishing has caused most stocks of target demersal fish (e.g. cod) to be outside 'safe biological limits' (unsustainable). Stocks/catches historically low.**
 - ◆ **Decrease in larger fish caused shifts to smaller body-sized communities. Catches increasingly directed to lower trophic levels. Spawning stocks comprised of fewer & small individuals & year-classes. Particularly vulnerable species (e.g. sharks, rays, deep-sea species) seriously depleted & some have become locally extinct.**
 - ◆ **Depleted stocks of piscivorous fish (e.g. cod) have reduced predation on stocks of small pelagic fish (e.g. herring, sandeels) & allowed expansion of pelagic & industrial fisheries (for reduction to fish meal & oil)**



OVERFISHING & IMPACTS SINCE 1950s

(2)

■ Seabirds

- ◆ Drowning in fisheries (e.g. longlines, & gill & static nets)
- ◆ On one hand: increased food supply (offal, discards, & reduced competition). On other hand: competition with fisheries for fish & shellfish food-species

■ Marine mammals

- ◆ Death or injury of cetaceans (e.g. harbour porpoise by-catch in bottom set gill nets)
- ◆ Competition with fisheries for fish food species

■ Benthos & bottom habitats

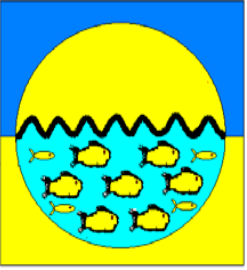
- ◆ Death, injury, degradation & disturbance from physical impacts of bottom gear (e.g. beam trawls, otter trawls, shellfish dredges) of vulnerable species & habitats (e.g. large bivalve molluscs, biogenic reefs & coldwater corals & serpulid worms)

■ By-catches & discards

- ◆ Excessively high levels of commercial and other species as by-catch . Most do not survive discarding: direct impacts on biota suffering mortality & damage, & changes community structure of fish, birds & benthos - favours opportunistic species with plastic life history characteristics

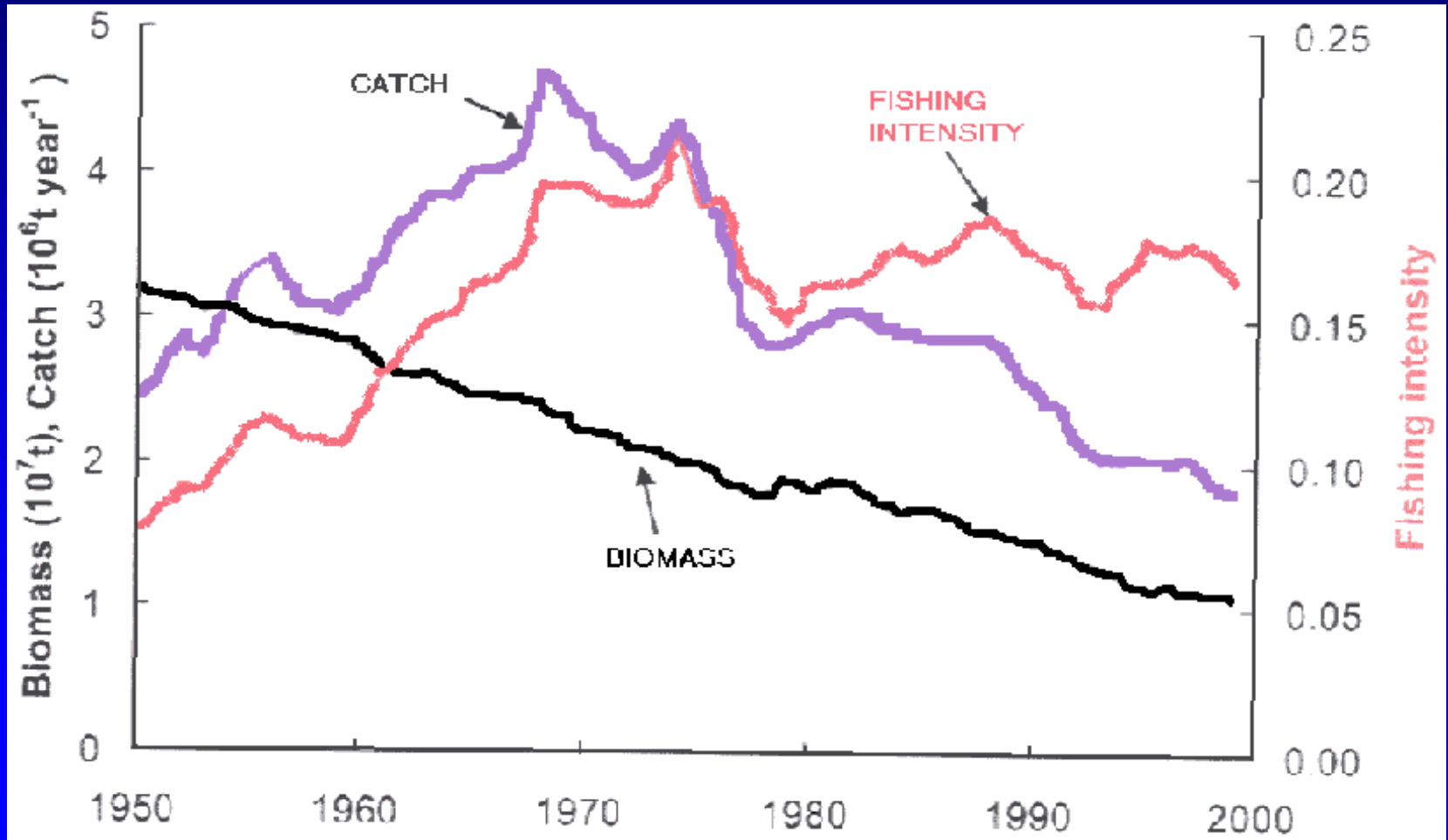
■ Additional biodiversity Impacts

- ◆ Vulnerable & declining species, degradation of habitats, & distortion of ecosystem structure, function & integrity

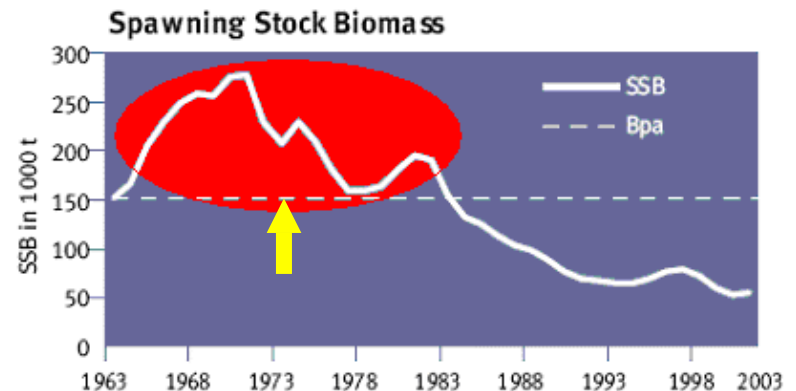
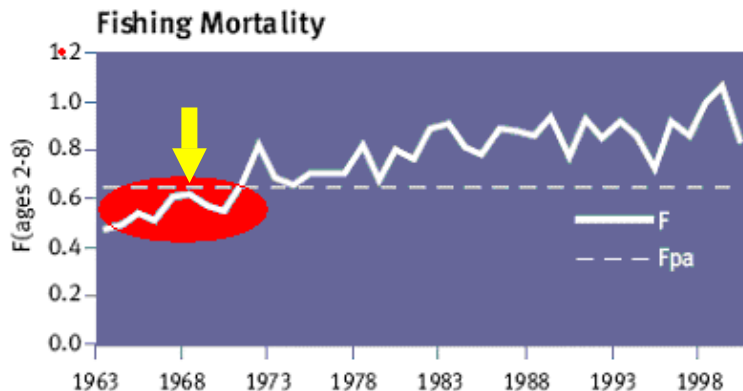
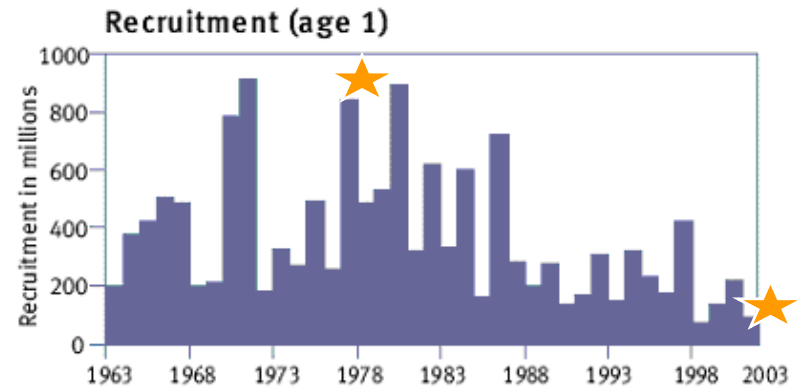
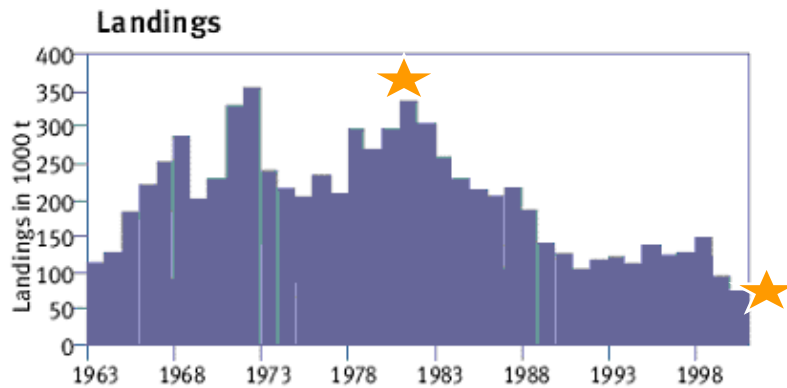


STATUS & TRENDS: TRADITIONALLY IMPORTANT FISH STOCKS (1950-?)

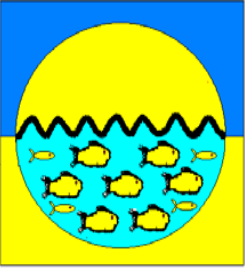
- Large fish-eating fish (e.g. cod, halibut, tuna) in the North Atlantic (Christensen et al. 2001)



NORTH SEA COD: OUTSIDE 'SAFE BIOLOGICAL LIMITS'

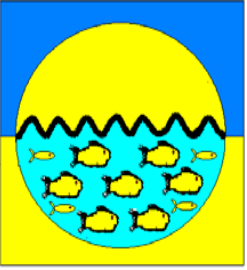


Limit reference points proposed -But what are targets for long-term recovery? Not decided by EU & Norway: but surely ca. $F = 0.4$ & SSB ca. 200 K tonnes. Devise fisheries strategy for recovery of top predator fish & set targets for other species taking into account multispecies interactions & fishing. Iceland's strategy: catching only 25% of the stock 4+ years-old!



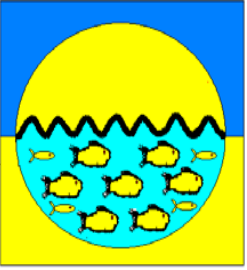
HOW LARGE IS THE 'CATCH'? NOMINAL CATCH + BY-CATCH + DISCARDS + 'MISREPORTING'

- World catch ca. 100 mill. tonnes not including 25% discards. Few studies of by-catch: nearly all on commercial target species. More catch effective gear has been developed for target species but little aimed at reducing by-catches & damage to ecosystems.
- North Sea catch (1990) = 2.7 mill. tonnes. Not incl. 945K tonnes by-catch & discards – gadoids & flatfish=580K tonnes (61%). Elasmobranchs=15K tonnes. Zoobenthos= 287K tonnes. Offal= 63K tonnes.
- North Sea: greatest by-catch by beam trawls = 50% of biomass.
- North Sea: Harbour porpoise (1994) = ca. 268000. Annual by-catch UK = ca. 600, DK = ca. 8000/year, Norway & others = unknown. Sum = above 3.2% of population/year. NS States agreed (2002) limit = 1.7%.
- ICES fisheries advice: catch levels of demersal fish too high – must reduce by ca. 50% - use of TACs alone are insufficient. Substantial reductions in fishing effort will give positive effects for fisheries resources & ecosystems.



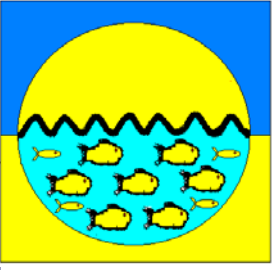
ECOSYSTEM MANAGEMENT: POLICY, STRATEGY, OBJECTIVES & ACTIONS

- For marine & coastal management comprehensive, establish & implement integrated:
 - ◆ POLICIES, STRATEGIES & OBJECTIVES, ACTIONS at the appropriate regional/local levels (e.g. Regional Advisory Councils) - involving long-term perspectives – applying the precautionary principle & ecosystem approach
 - ◆ starting with a wider definition of *VISION & PERSPECTIVES*: *What do we want to achieve & why?? Unless we have a clear Vision for the Mission, we will not be able to agree on the specifics (i.e. the Devil lies in the details?)*
- Development of targets & limits for environmental/ecological quality (indicators: to measure progress):
 - ◆ *Ecological quality* is an expression of the ecosystem's status. It encompasses biological, physical & chemical aspects, including the results of human pressures/impacts.
 - ◆ *Ecological quality objectives* (EcoQOs) for an ecosystem indicate the desired status of the system relative to a reference point
 - ◆ *Reference points* indicate the quality status in an essentially undisturbed system
- Where are we, where have we come from, & where do we wish to go??



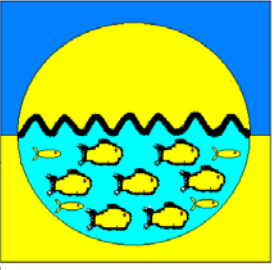
ECOSYSTEM MANAGEMENT: POLICY, STRATEGY, OBJECTIVES & ACTIONS (2)

- For delivering an ecosystem approach to the North Sea, Ministers (2002 North Sea Conference) stressed the importance of developing a coherent & integrated set of EcoQOs. 10 'issues' identified:
 - ◆ commercial fish species; threatened & declining species; sea mammals; seabirds; fish communities; benthic communities; plankton communities; habitats; nutrient budgets & production; oxygen depletion.
- BUT, hardly any of the proposed 'metrics' for EcoQOs currently relate to fisheries & those that do are not sufficiently proactive to work in an effective & concerted manner. C.f. Citation from 2002 North Sea Ministerial Declaration:
 - ◆ *'Spawning stock biomass of commercial fish species: Above precautionary reference points where these have been agreed by the competent authority for fisheries management'*!! [Yes BUT what is new & what about targets for recovery?]
- We KNOW what is wrong and in what DIRECTION we need to move by affecting ACTIONS for RECOVERY. Let's focus on EFFECTIVE & RELEVANT targets & indicators for fisheries related objectives (EcoQOs).



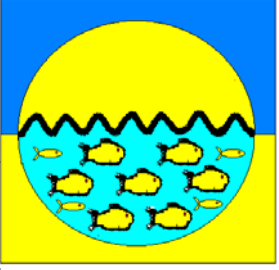
DEVELOP & VISION: STRATEGY & OBJECTIVES FOR RECOVERY (1)

- **Mission**: 'Sustainable fisheries in sustainable ecosystems' by applying the Ecosystem Approach to Management following the Precautionary Principle. Management objectives to include in the policy & strategy (not exclusive):
 - ◆ Reduce excessive fishing effort, fleet overcapacity & overcapitalization, & perverse subsidies in the fishing industry at sea & on land. Financial support & incentives are required for the fishing industry to meet these objectives.
 - ◆ Build diverse fish communities, with larger numbers of bigger & older individuals & hence larger spawning stocks, especially for larger species.
 - ◆ Introduce & promote fishing methods (e.g. gear substitution & modification) that a) reduce physical impact on the seabed & habitats, & b) minimize by-catches & discards by introduction & promotion of use of selectivity devices & other appropriate devices (e.g. 'pingers'). Promote & reward use of 'eco-friendly gear'.



DEVELOP VISION: STRATEGY & OBJECTIVES FOR RECOVERY (1)

- ◆ **Implement medium- and long-term management plans in accord with the precautionary approach (pa) for commercial stocks & other key living resources, by establishment of required pa limit & target reference points (e.g. biomass & mortality). The risk of transgressing limit reference points must be very low. For stocks where there is insufficient data available, establish pa reference points & rules for exploitation, taking into account exploitation history, yield & likely biological outcomes of exploitation. TAC regimes & other management measures should be extended to species that are currently unregulated.**
- ◆ **Devise & implement simple, effective, manageable & controllable multiannual recovery plans for fish stocks outside pa limits, having clear longer-term objectives (e.g. 5-10 years), anticipated recovery trajectories, & considering multispecies interactions (work 'outwards' from large fish)**
- ◆ **Establish networks of Marine Protected Areas (MPAs) with clearly defined management goals, including 'no-take /no-trawl zones', undisturbed areas to enhance protection of juvenile fish, spawning areas, & vulnerable species & habitats. Identify & establish effective habitat restoration programmes.**
- ◆ **Develop & apply relevant, simple & robust EcoQOs/indicators relative to these objectives & measure progress.**



OTHER NEEDS/ACTIONS

- **Comprehensive evaluations of performance of fisheries systems including scientific & management regimes.** Most are not working (c.f. results). Is the form & efficacy of the scientific advice appropriate (i.e. *Same procedure as last year? Same procedures as every year!*). Rather than simply delivering technical products for perpetuating the *status quo*, efforts should be devoted towards providing a more relevant advisory, evaluation & certification process with respect to whether the particular fishery is meeting the principles & criteria for sustainable fisheries. Include review of monitoring, assessment & control systems, impacts on target & non-target species, elaboration of harvest rules & recovery plans, environmental impact assessments of fishing gear(s).
Background: clearly outlined & meaningful policy & vision statement setting framework for the fishery in the longer term. Once in place, strategy required to implement a series of appropriate actions according to specified timetables in order to achieve the objectives. *On an appropriately regular basis, a forthright evaluation of performance progress, using a scoring system, should be conducted.*
- **Apply the 'polluter pays' principle & the 'burden of proof'** for environmental impacts, as applied in most other industrial fields but not in fisheries.
- **Implement radical governance changes:** Establish inclusive stakeholder forums at all levels, with openness & transparency of information & data. Particularly integration of representation from environmental Ministries & NGOs. Prioritize mechanisms enhancing co-responsibility in fisheries advice & management including RACs.