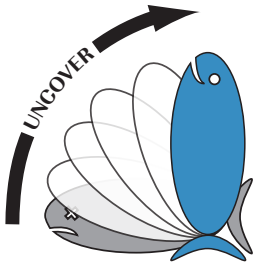
UNCOVER report



Policy Implementation Plan

April 2010

*The UNCOVER project (**Un**derstanding the Mechanisms of Stock Re**cover**y) is one of the biggest fisheries research projects funded under the EU's 6th Framework Programme (FP6). Starting in 2006, with a four year duration, the project has involved more than 100 scientists from 17 research institutes and 10 subcontractors from 14 countries (12 EU, Norway and Russia).*

POLICY IMPLEMENTATION PLAN

1. The UNCOVER project's aims and scope

UNCOVER has produced a rational scientific basis for developing Long-Term Management Plans (LTMPs) and recovery strategies for some of the ecologically and socio-economically most important fish stocks/fisheries in European seas, *i.e.*, *Norwegian/Barents Seas*: Northeast Arctic cod, Norwegian spring-spawning herring, capelin; *North Sea*: North Sea cod, Autumn-spawning herring and plaice; *Baltic Sea*: Eastern Baltic cod and Baltic sprat; and *Bay of Biscay/Iberian Peninsula*: Northern hake, Southern hake, and Bay of Biscay anchovy. UNCOVER aimed to identify changes experienced during stock depletion/collapses, understand recovery prospects, enhance understanding of stock recovery mechanisms, and formulate recommendations for implementing LTMPs/recovery plans.

2. Criteria for successful fish stock/fishery recovery

UNCOVER's analysis of world-wide fish stock/fishery recovery plans showed that the four best combined factors enabling successful stock/fishery recovery were:

a) 'Rapid reduction in fishing mortality';
b) 'Environmental conditions during the recovery period',
c) 'Life history characteristics' of the fish stock; and
d) Management performance'.

Recovery is more likely when fishing effort reductions occur by regulating days at sea and decommissioning, and inclusion of harvest control rule (HCR) schemes, and positive recruitment events arise during the recovery period stimulated by or coincident with effort reductions. Accordingly, UNCOVER focused on addressing the following:

- ***Management strategy evaluations (MSE)***

  MSEs are powerful tools for performance testing of entire fisheries management systems. In all UNCOVER's Case Study (CS) areas they have shown the importance of:

  i) Changes in stock productivity (especially recruitment);
  ii) Biological interactions (predation, competition) within/ between stocks; and
  iii) Interactions between stocks and fisheries (including mixed-fisheries aspects and discarding), each with important uncertainties, when designing/testing HCRs and management plans. Most HCRs/management plans were highly sensitive to implementation failure.

- ***Timely response and management plans to counteract negative events***

  Substantial and rapid reduction in fishing mortality (F) is a key factor contributing to the recovery plan's overall success: 'too little, too late' catch reductions delay or prevent the onset of recovery. A central part of most LTMPs are HCRs, which define thresholds/limits of stock size and related measures (*e.g.*, adaptation of TACs or fishing effort) for not exceeding those limits.

- ***Accounting for environmental and ecosystem conditions***

  Preserving the stock's reproductive potential: Sexual maturation schedules are linked to growth rates and are related to population densities/sizes. Earlier age maturation tends to be linked with lower population sizes rather than larger populations. Individual egg production varies with the mature female's size and condition, so large good-condition fish produce more eggs. Thus, egg production not only depends on the stock's size structure but also on the 'well being' of its individuals.

  Consequences of changing habitats: Stock production and recovery dynamics depend on the availability/status of preferred habitats at various ontogeny stages for optimal growth, spawning, recruitment and survival. Habitats are defined by abiotic and biotic conditions including pollution and

other human encroachment. A fluctuating 'ocean climate' also affects habitat quality and stock productivity. Predicting environmental forcing influences is constrained by the complexity of the processes and their integration. So, a pragmatic approach is needed to address the effects of climate change on stocks for incorporation into management plans. This comprises: a) Drivers affecting carrying capacity, including key indicators of stock/ecosystem status as an early warning system; b) Dynamics of exploited species depend on specific habitats, so spatially-specific management strategies are needed to avoid critical bycatch or to conserve key stock components; and c) Population models including biological variation and environmental drivers, as a short-term indicator of stock dynamics.

Effects of multispecies interactions: Trophic controls influence stock recovery, and effects depend on prevailing environmental conditions. Predation on small fish has a high impact on recruitment success and recovery potential. Trophic interactions lead to different, mostly slower recovery rates compared to single species predictions. When trophic conditions are beneficial, the speed/magnitude of recovery is more effective compared with unfavourable conditions. Furthermore, one cannot simultaneously achieve Maximum Sustainable Yields (MSY) predicted from single-species assessments for interacting species. Target Fs and stock reference limits for prey species cannot be defined without considering changes in predator biomass and for predator species they cannot be defined without considering prey biomass changes. Fisheries-related multispecies models need *inter alia* supplies of data and knowledge, concerning: i) Stock/species distributions, from periodic survey data with good spatio-temporal coverage; and ii) Diet composition data from regular stomach sampling.

- ***Significance of life history traits***

  Taking life history traits into account in management plans involves understanding the species' biology throughout all life stages, its specific environmental requirements and role in the ecosystem. Fisheries induced evolution occurs in some stocks and rapid evolutionary effects may arise in collapsing stocks. But evolutionary responses probably are small compared to the direct effects of overfishing. So, tackling fishing induced evolution is less urgent than reducing the direct, detrimental effects of overfishing. Management goals should be developed for genetic diversity and explicitly implemented in fisheries management to allow stocks to fully rebuild lost attributes.

3. Tackling major uncertainties and bias

Reducing assessment uncertainties may be crucial for the success of a LTMP/recovery plan. Partial survey coverage of stocks, unrecognized fishing trends and changes in stock distributions may all cause bias. These must be identified and corrected at the data collection level or considered within the models. Model formulation errors also may be important, *e.g.*, viewing processes as constant when they show trends, such as in fishing efficiency and stock productivity. Monitoring is vital to identify trends and update models. Uncertainty arises from time lags between data collection and assessment implementation, critically deferring responding to reduced stocks/full collapse. Sometimes reducing this gap has improved stock management, whereas a delay may be inevitable but management rules should then be able to respond quickly to an evident decline. An important factor determining success/failure of a recovery plan/LTMP is whether it is implemented and complied with. The total induced fishery mortality, including IUU fishing and discards, is the driving factor, not merely the part which is the landed, targeted catch. Importantly:

a) Managers and politicians should use transparent decision-making that takes proper account of scientific advice and which avoids setting TACs/effort limits higher than recommended;
b) For the plan to be successful, the agreed measures must be effectively implemented and complied with;
c) For assessing implementation and compliance, appropriate inspection and monitoring schemes must be operationalized, the data quality-assured and the conclusions made quickly and openly available; and
d) Importantly, the political will to support the recovery plan/LTMP must not waver.

4. Importance of a suite of management tools

Enforced management on measures like area closure, minimum landing size, bycatch from other fisheries, minimizing discards, and capacity/gear controls, besides target F levels, are an integral part of precautionary management plans. Additional measures include partial F allocation to specific fleet segments, or incentives to phase out certain fleets. Not all such measures are useful unless they act cohesively. UNCOVER emphasizes: a) When designing/evaluating a recovery strategy/plan, other fishing regulations and the stock's biology must be considered holistically; and b) Performance of spatio-temporal fishing closures must take into account environmental regimes.

5. Social and economic impacts

Social impact assessments (SIAs) and community profiling are important tools for assessing the impact and viability of recovery plans/LTMPs, but their methodology needs further development. Properly evaluating the social and economic consequences of recovery plans is frequently hindered by lack of appropriate data. Methods for community profiles developed by UNCOVER have been adopted and used by DG MARE in new initiatives. UNCOVER's innovation was to use economic analysis as an assessment tool to understand the implications of the structure of fishing fleets for support and compliance with recovery plans/LTMPs. The economic and social analysis pointed to the ability of fishing operations to diversify as being the critical variable determining industry response to required recovery plans.

6. Governance

Stock recovery plans have been focal points for collective action around reforming fisheries management with divers objective setting processes carrying these reforms forward. At the highest level, objective setting is framed by international and EU agreements. Regional Advisory Councils (RACs) have played a critical role in bringing about stakeholder consensus concerning ways to make these high level objectives operational. Joint work by RACs, fishing organizations, scientists, and NGOs on recovery has, in several cases, gone beyond generating passive support in the form of legitimacy and increased compliance to new research and innovative implementation programmes. Such activities generate socio-ecological resilience as an asset for responding to future demands of sustainable fisheries. All of these activities have required support from science and government and this kind of support needs to be continued and expanded. The greatest challenges to the legitimacy of recovery plans have stemmed from their focus on single species with the worst problems arising in mixed-fisheries. The advantages of effort management in mixed-fisheries, combined with the ongoing need for quota management to share stocks, have resulted in hybrid effort and quota management schemes that have greatly increased bureaucracy. To meet the challenge of mixed-fisheries, the active support generated by recovery plans needs to be harnessed through collaborative research.

7. UNCOVER's primary recommendations and scientific support for policy

It is essential to set 'realistic' long-term objectives/strategies for achieving successful LTMPs/recovery plans. Such plans ideally should include:

a) Stock-regulating environmental processes;
b) Fisheries effects on stock reproductive potential;
c) Changes in habitat dynamics due to global change;
d) Biological multispecies interactions;
e) Technical multispecies interactions and mixed fisheries issues;
f) Economically optimized harvesting;
g) Exploration of the socio-economic implications and political constraints;
h) Investigations on the acceptance of plans by stakeholders and specifically incentives for fishery compliance; and
i) Agreements with and among stakeholders.

UNCOVER has provided imperative scientific support for policy underpinning the following areas:

a) Evolution of the Common Fisheries Policy with respect to several aims of the 'Green Paper';
b) Contributing to the Marine Strategy Framework Directive with respect to fish stocks/communities; and
c) Furthering the aims of the 2002 Johannesburg Declaration regarding achieving MSY for depleted fish stocks.

This has been done by contributing to the design and evaluation of LTMPs/recovery plans, demonstrating how to shift advice based on limit reference points towards setting and attaining targets, and furthering ecosystem-based management through incorporating multispecies, environmental and habitat, climate change, and human dimensions into these plans.

For further information, please visit www.uncover.eu. UNCOVER is an EU 6th Framework Programme (FP6) SSP-4-FISH Specific Targeted Research Project (STREP), 2006-2010. The information contained in this policy implementation plan does not reflect the Commission's views and in no way anticipates its future policy in this area.