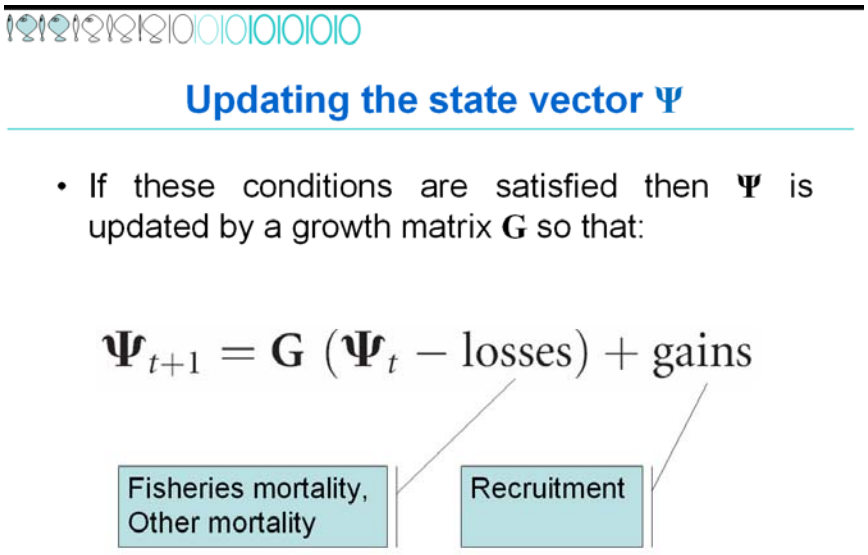
Theme Session F
Size is almost everything! Size and trait based processes and models in ecosystems and management

Co-Convenors: John Pope and Ken Haste Andersen

Minutes recorded by: Julia Blanchard and John Pinnegar

DAY 1

The theme session opened, following the plenary given by Jake Rice, with studies of empirical patterns of biomass size spectra. Gómez-Canchong *et al.* showed that non-linearities can occur in the benthic/demersal communities and fits to a *pareto* (type II) model were shown to be appropriate for size spectra impacted by fishing. Connelly and Houde demonstrated results showing strong seasonal and interannual variability in the spectrum, sparking off a discussion of the contributing factors that can lead to variability and dome structure in the community, how the shape of "sub-domes" are affected by sampling and the need to understand seasonal fluctuations and effects of recruitment pulses. An analysis of the effect of fishing on size-diversity indicators constructed for the piscvivore and benthivore components of the Aegean Sea ecosystem was presented by Graeme Pierce (paper by Longo *et al.*). Henrik Gislason presented a re-analysis of Pauly's (1980) natural mortality estimates showing that natural mortality is size-dependent and emphasised the importance of going back to the original data when studying patterns in natural mortality. John Pope presented the proto-moments as a



ICES CM 2008/F:05. Using moment based approaches to investigate the structure and behaviour of size spectra. John G. Pope

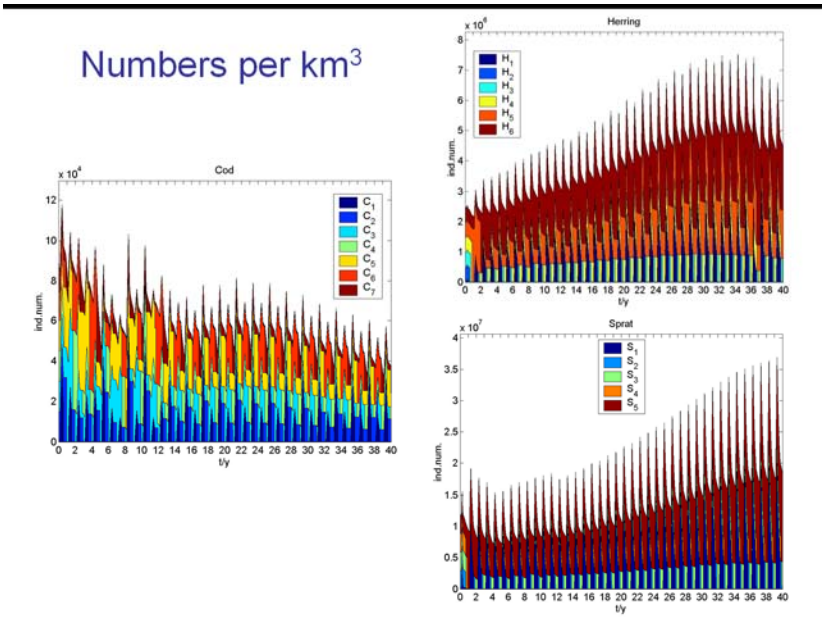
versatile approach for predicting and analysing the size spectrum as well as a convenient approach for making predictions at the relevant scales for management and for investigating life-history trade-offs. A trophic–level model of biomass distribution was presented by Didier Gascuel and produced results that relate explicitly to "trophic status in community" and for answering questions related to "fishing down food webs". Stephen Holmes presented a paper showing how length-based and age-based analyses of cod-seal predation could be compared, using standard age-structured models and the proto-moments approach. The advantage of the proto-moments method for data poor situations was noted. An adaptive trait-based approach for predator-prey models, was presented by Agostino Merico.

The afternoon closed with a discussion session including comments on Jake Rice's plenary lecture. This started with John Pope bringing attention to some of the striking results from the papers shown. The presence and significance of seasonal changes in biomass size spectra was discussed. Past studies have tended to remove 0-group fish (due to catchability issues) but the need to try and incorporate them accepting that they change throughout the year was raised. The utility of new theories as identifiers for different data collection requirements was raised. A general discussion of steady state versus seasonally fluctuating size spectra and the dynamic processes affecting them ensued. More general topic on how to move forward with size –based models followed this.

John Pope closed the first day of the theme session with proposal for a 2009 theme session to pay homage to Rodney Jones (to be organised by John Pope and Daniel Pauly) entitled: "Standing on the shoulders of giants".

DAY 2

M. Heino presented a paper by Boukal *et al.* on fisheries induced evolution showed gear-effects on maturatian, gonoado-somatic index and growth. M. Heino then presented a talk on size-structure and age-size dynamics showing some interesting results on how the ratio of mortality:growth parameters is smaller in deep sea and can affect the size-distribution. John Pinnegar presented data on historic feeding patterns and size-structure in the North Sea by comparing data from the early 1900s to data from the present day. Historic data were similar to unexploited levels. Julia Blanchard showed links between predator-prey mass ratios, food web stability and variability of fish populations using dynamic size spectrum model and predator-prey mass ratio and abundance time-series data. Population variability increased with predator-prey mass ratios with the exception of tunas and swordfish. Paul Gómez-Canchong presented on topological changes in virtual ecological networks. He showed the slope of the relationship between tropic level and size, the predator-prey mass ratio and the functional response affected the community biomass stability. Ken Andersen presented on trophic cascades in size spectra and showed that fishing more evenly across sizes can reduce the extent of trophic cascades and that fishing on small individuals caused larger sized individuals to grow more slowly and truncated large sizes. Amit Tandon presented on the variability of a linear non-local ecosystems model and showed that predator–prey interactions can introduce oscillations through time. Wolfgang Fennel presented a food web model and a discussion of whether a moment –based approach could be incorporated to account for size variables. Emma



ICES CM 2008/F:01. Food‐web models ‐ theory, processes and parameterization, Wolfgang Fennel

Guirey presented a size-based ecosystem model that is being developed as a tool for ecosystem-based fisheries management. The model is parameterized for species and functional groups in the North Sea and is a flexible framework. The need to consider benthic-pelagic coupling was raised as an important point.

The general discussion started by recapping questions related to talks and then broadened to the question of what extent the models can be made operational for management. Jake Rice raised the point that spatial processes need to be considered and how abrupt life-history changes can occur as a result of changes in habitat during life history. The way models are communicated to managers was also raised as something that needs to be kept in mind when trying to make a particular modeling approach operational. Whether these models incorporate competition effects, since managers would consider competition between species an important process, was discussed. Jeremy Collie raised the important point that the next challenge is to fit the models to data, in a statistically rigorous way, in order to make them operational. The session closed following a brief description about the European Science Foundation “Sizemic” network and a reminder for the proposed 2009 theme session to honour the work of Rodney Jones “Standing on the Shoulders of Giants”.