

## HOW DO THE TURKISH MARINE ECOSYSTEMS PERFORM? RECOMMENDATIONS FOR THE FUTURE

**Ayşe GAZİHAN-AKOĞLU<sup>a</sup>, Barış SALİHOĞLU<sup>a</sup>, Ekin AKOĞLU<sup>b</sup>, Alida  
BUNDY<sup>c</sup>, Ahsen YÜKSEK<sup>d</sup>, Temel OĞUZ<sup>a</sup>**

<sup>a</sup> *Institute of Marine Sciences, Middle East Technical University, Po Box 28, 33731 Erdemli,  
Turkey*

<sup>b</sup> *Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Borgo Grotta Gigante 42/C,  
34010 Sgonico, TS, Italy*

<sup>c</sup> *Bedford Institute of Oceanography, Dartmouth, Nova Scotia B2Y 4A2, Canada*

<sup>d</sup> *Institute of Marine Sciences and Management, University of Istanbul, 34470 Vefa, Istanbul,  
Turkey*

[ayse@ims.metu.edu.tr](mailto:ayse@ims.metu.edu.tr)

**Objective:** Turkish marine ecosystems have been heavily exposed to anthropogenic and natural pressures within the last decades which resulted in adverse impacts on the ecological and socio-economic structures of the regions. The present study attempts to elucidate the long term progressions of the Black Sea, Marmara Sea, Aegean Sea and Mediterranean Sea ecosystems and predict their future states from an ecological, social and economic perspective by using end to end ecosystem modelling tools.

**Methods:** To examine the long term progressions observed in the regional seas, Ecopath with Ecosim (EwE) ecosystem model was set and validated for the years 1990-2010. The validated models were then used to carry out forecast simulations for the 2010-2030 period and EwE Policy Search Tool was utilized to predict the impact of different management options on the Turkish marine ecosystems.

**Results and Discussion:** Past simulations indicated that the structure and functioning of regional ecosystems have deteriorated under the impact of anthropogenic pressures; most notably fisheries, eutrophication and introduction of alien species. Results showed that under changing climatological conditions, the most important factor that determined the consequences of the changes in the regional ecosystems was fisheries. Analyses highlighted that precautionary management practices that could be applied to fisheries policies are likely to prevent catastrophic fluctuations in the quality of the goods and services that the fisheries sector provides in each marine ecosystem. As a result, a contribution to the understanding of the structure and functioning of the partially-connected Turkish regional ecosystems was provided by this study. Further, recommendations for the future Ecosystem-Based Fisheries Management (EBFM) options in the four Turkish seas were provided.

**Keywords:** Turkish seas, ecosystem modelling, fisheries, anthropogenic impacts.