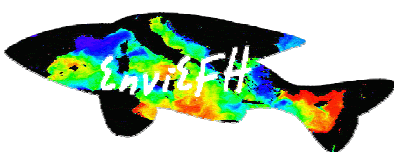


## “EnviEFH”

### Mapping essential fish habitats in the Mediterranean

*In the last decade, the degradation of aquatic habitats essential for sustainable fish production has become a growing concern everywhere in the world. The importance of such essential fish habitats (EFH) – which can be defined as the waters and substrata necessary for fish to spawn, breed, feed, or grow to maturity – has since then been widely recognised.*

*EFH mapping and designation can support the spatial component of fisheries management, a component that has often been overlooked in previously enforced fishery policies. With the introduction of the ecosystem-based approach to fisheries management in the Common Fisheries Policy (Council Regulation (EC) No 2371/2002), however, the clear identification and protection of essential fish habitats and their inclusion in new fishery policies is now required.*



Fishery management goals cannot be achieved if the managed species do not have sufficient suitable habitat available. The identification and spatiotemporal mapping of EFH represents the main scientific task of the spatial component of fisheries management. The main objective of the **EnviEFH** project was to **facilitate this spatial component by applying an environmental approach to the mapping and designation of Essential Fish Habitats in the Mediterranean Sea.**

During the first year of the project, an extensive inventory of available environmental and fisheries datasets was made and acquired data were organized in a commonly georeferenced GIS database (i.e. a Geographic Information Systems database, linking data to locations). Specifically, environmental data, including time series of satellite imagery for the whole Mediterranean basin (e.g. sea surface temperature, chlorophyll-a, photosynthetically active radiation, altimetry, salinity and bathymetry) as well as fisheries surveyed data, including data on small pelagic (e.g. sardine, anchovy), large pelagic (e.g. swordfish, small tuna), demersal species (hake, shrimp) and certain egg-feeding parasites (e.g. *Mnemiopsis*) were uniformly processed under GIS.

The **oceanographic part of the GIS database** was used to derive time series maps of certain oceanic processes that affect species distribution and create favouring habitats throughout the various stages of species life cycles (e.g. thermal fronts, marine productivity hotspots, upwelling). The **biological part of the GIS database** was then combined with the environmental data: each fishery surveyed point from acoustic, plankton, and trawl surveys was linked to each of the assembled environmental parameters.

These joined fisheries-environmental datasets provided the basis for the development models that allowed for the deduction of minimum and maximum environmental ranges preferred by the surveyed species. After deducting these ranges, they were applied in satellite images, which enabled the modellers to map those areas that included the deducted environmental ranges of all environmental parameters, thus giving **an overview of the Essential Fish Habitats for the studied species in the Mediterranean.**

Initial analysis produced interesting results, **revealing the spatiotemporal distribution of EFH of various species and life stages.** Points of interest included

**Project acronym:**

EnviEFH

**Full title of Project:**

Environmental approach to essential fish habitat designation

**EU contract number:**

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**Web-site:**

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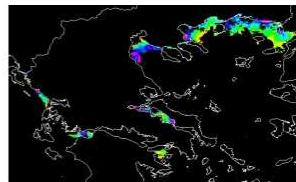
the EFH mapping between Western and Eastern Mediterranean for small pelagic species where, although different areas from the oceanographic perspective, EFH environmental descriptors were very similar in both areas. In addition, the EFH mapping of *Mnemiopsis*, an anchovy egg-feeding parasite, for the whole Mediterranean basin was based on surveyed data from the north-eastern Mediterranean but it revealed the main anchovy spawning areas in western Mediterranean as well. Finally, verification of anchovy habitat environmental descriptors based on north-eastern Mediterranean surveys for 2003-2005 were applied during the 2006 survey and the forecasted EFH map was very similar with the surveyed data, a case that applies to various species groups.

mapping of various species such as anchovy, sardine, hake, shrimp, squid, and swordfish as well as explaining the teleconnection patterns of large-scale phenomena (e.g. North Atlantic Oscillation) to corresponding local environmental variation in the Mediterranean. It is expected to appear in the summer of 2008.

By using new concepts in fisheries management (the spatiotemporal mapping of EFH as part of the ecosystem-based approach) and new scientific developments (remote sensing, GIS technologies, ...), EnviEFH will enhance the efficacy of technical measures: the ability of the **Essential Fish Habitat Designation Tool** to identify spawning, nursery and feeding aggregation regions as well as over-exploited areas and alternative fishing grounds will contribute to healthy marine ecosystems by allowing the growth of an economically viable and competitive fisheries industry. It will, moreover, be of particular use for the application of the Council Regulation (EC) No 1967/2006 "concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea", which was adopted on December 21, 2006, and requires Members States to draw up a list of protected areas in which fishing activities are restricted for biological reasons.



INITIAL DATA:  
Surveyed acoustic presence/absence data (July 2004)



RESULTING EFH MAP:  
EFH Map based on habitat environmental descriptors

**EXAMPLE OF AN EFH MAP USING THE EFH DESIGNATION TOOL. SOURCE: VASILIS VALAVANIS, HCMR (GREECE).**

**“THE ESSENTIAL FISH HABITAT DESIGNATION TOOL DEVELOPED DURING ENVIEFH WILL CONTRIBUTE TO HEALTHY MARINE ECOSYSTEMS “**

During the second year of the project, EFH mapping was finalised using fishermen input and other statistical techniques, while the EnviEFH Consortium produced a **Special Issue on Essential Fish Habitats in the Mediterranean** through the international journal of aquatic sciences *Hydrobiologia*. This issue will include a publication series of 20 contributions dealing with EFH