

INFORMATION SYSTEM OF MARINE ENVIRONMENT INDICATORS IN CROATIA

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1. Introduction

As Croatian referral marine center (RCM) Institute of Oceanography and Fisheries has developed an interactive network system with databases for reporting to the Croatian and European environmental agencies (AZO and EEA respectively) the status of indicators related marine, fisheries and aquaculture. The main goal of this web oriented system is to simplify and make more effective reporting on the status and trends of the marine environment, fisheries and aquaculture in the Croatian national waters of the Adriatic Sea.

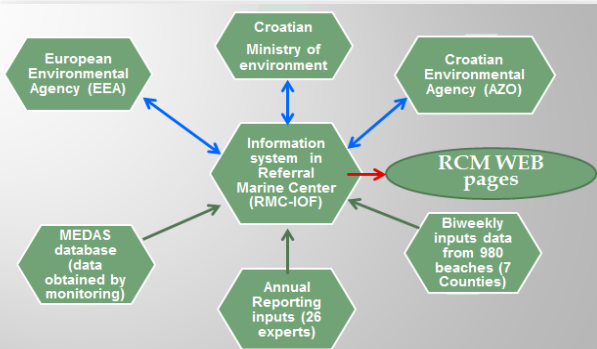


Fig.1 Data flow among participants included in management of marine Croatian indicators

3. Infrastructure & services

Approach of RCM for reporting to AZO and EEA is that all tasks from collaborators (more than 40 from numerous organizations and cities) must be performed through Internet and central web database system. For this purpose existing IOF MEADS data base (developed in Oracle_10e/11e DBMS) has been improved and extended with items related reporting on status of marine environment in Croatia. Open GIS server (Geoserver) has been adopted for presentation and analysis of geospatial layers using more different basic map layers following INSPIRE directive. According defined protocols all steps during uploading data and written reports into the system, two levels of their checking has been semi-automatically verified as: who, what, when, status of reporting, notice of their quality, their improvement, and at the end sending of data and reports to AZO and EEA, as well as their publishing through IOF web pages (<http://www.izor.hr/azo>).

Fig 3. Management of data in EIONET tables (i.e. dangerous substances in sediments) in Oracle RDBMS

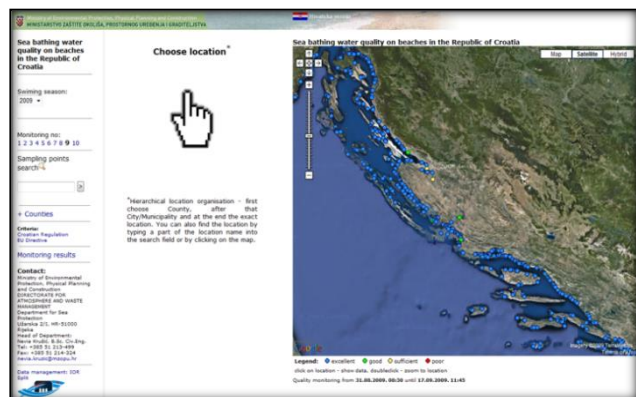


Fig 4. Reporting of water quality at the Croatian beaches

2. Main tasks of the RCM reporting system:

- Analysis "GAPs" considering EEA and specific national marine indicators and proposing additional monitoring stations in transitional, coastal and marine waters taking into account the spatial distribution of waters type bodies
- Annual and four-year national reporting on the state of the marine environment indicators, fisheries and aquaculture
- Creation of thematic layers in a "shp" GIS format of indicators for which it is possible and their publishing via IOF WEB site
- Annual reporting of "Core data set" of marine indicators to EEA in the form of "XLS" WISE-SoE-TCM and WISE-SoE-Biol-TC tables
- Reporting on implementation of MSFD strategy in Croatia through MSFD-DIKE tables
- Proposing of new ones and harmonization of adopted marine environment indicators for AZO.

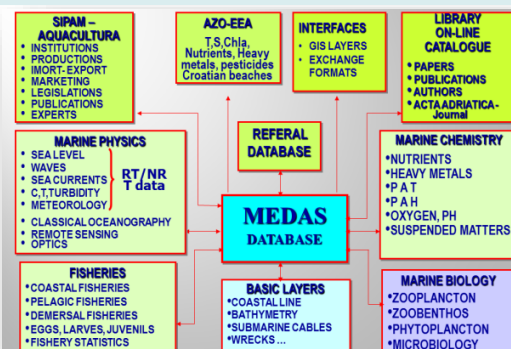


Fig.2 General data, parameters and GIS layers archived in the IOF central database (MEDAS)

4. Croatian set of marine indicators

Croatian marine indicators includes so-called EEA „Core set" of indicators and more indicators specific to the Republic of Croatia. All Indicators have been harmonized throughout last ten years. RCM collates data for 49 indicators, which consists of the following main groups:

- Quantitative assessment of ecological status in marine waters
- Biological quality of coastal and transitional waters (phytoplankton, fish, macrophytes and macroalgae)
- Invasive species
- Phytoplankton algae in transitional and coastal waters
- Blooms of toxic and harmful algae and the ratio of diatom and dinoflagellate
- The index of biomass main commercial species of fish
- Hazardous substances (metals and pesticides) in marine sediments and marine organisms
- Eutrophication status (transparency, oxygen concentration, saturation of oxygen, nutrients, chlorophyll a)
- Concentrations of oxygen at the sea bottom
- Suspended matters
- Thermohaline properties and density of the water masses
- Sea level
- Entry load rivers
- Traffic safety
- Water quality at the Croatian beaches
- Influence of human activities at land on the marine environment.

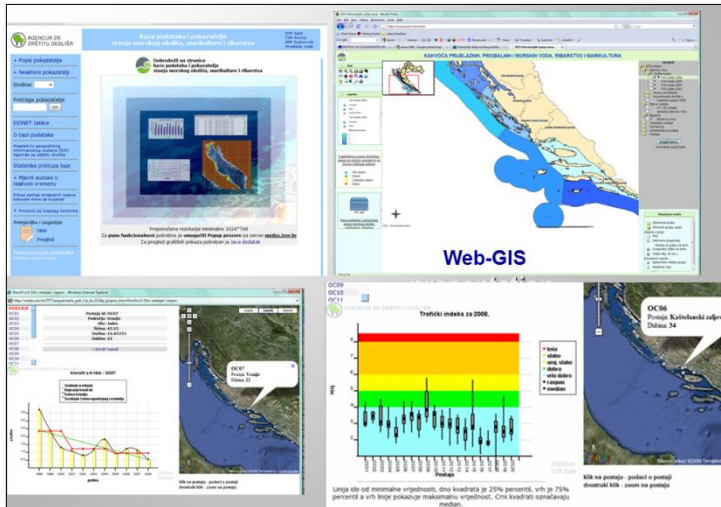


Fig 5 Some output results of marine indicators presented at the IOF web pages