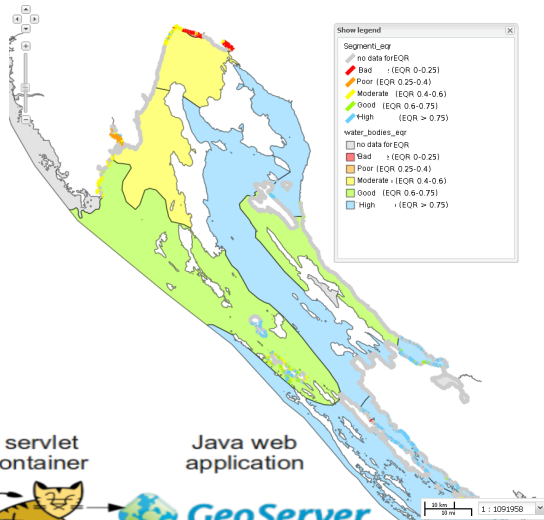


Using GeoServer and spatial database for receiving and analyzing of georeferenced data

Damir Ivankovic, Institute of Oceanography and Fisheries, ivankovic@izor.hr (Croatia)
 Ivan Vucic, Institute of Oceanography and Fisheries, vucic@izor.hr
 Vlado Dacic, Institute of Oceanography and Fisheries, dadic@izor.hr

In the frame of operational monitoring according to Water Framework Directive benthic macroalgae were used as a biomonitoring tool in the Adriatic Sea using CARLIT method (Cartography of littoral rocky-shore communities). The result of CARLIT method application is assignation of water quality status expressed as EQR value (Ecological Quality Ratio) to coastline sectors and an average EQR to the whole water body. Each segment was predefined, and problem was how to enter acquired data and associate data to particular segment. As EQR have 5 classes (High, Good, Moderate, Poor and Bad) another problem was how to show segment EQR on the map and calculate and show EQR for water body (calculated as average from all segments that are inside in particular water body).



As server platform we choose CentOS 5.8, Linux operating system. For GIS publishing software we choose GeoServer, because of good references and easy implementation. GeoServer is running under Tomcat 5 application server. GeoServer allows users to share and edit geospatial data. Designed for interoperability, it publishes data from any major spatial data source using open standards. GeoServer functions as the reference implementation of the Open Geospatial Consortium Web Feature Service standard, and also implements the Web Map Service and Web Coverage Service specifications. GeoServer is open source free software.



As we already use Oracle database on Institute, for storage and spatial analysis we use Oracle database (instead of files). Geoserver also can be used with open source spatial relational databases as is Postgres database.

For data insertion and validation is very convenient to have web application because it supports field work and it is basically independent to client side hardware and OS. For georeferenced data maps are almost mandatory and web oriented GIS is native solution. Resulting layers can be shown and overlapped with many other layers and this adds possibilities for additional use of acquired data. Although Geoserver by itself has possibilities for spatial data analyses they become more easily and quicker in case of using spatial database as data source.

To calculate average EQR for water bodies spatial analysis should provide connections between segments and water bodies. For this purpose Oracle spatial operator SDO_ANYINTERACT were used. At the end using spatial function SDO_ANYINTERACT (segments_geom_column, water_bodies_geom_column) crossover table was populated in the way that for each water_body id all segments id's that have any interaction (spatial interaction) with that water body were found. After that average EQR for each water body was found (group by with crossover table).

```

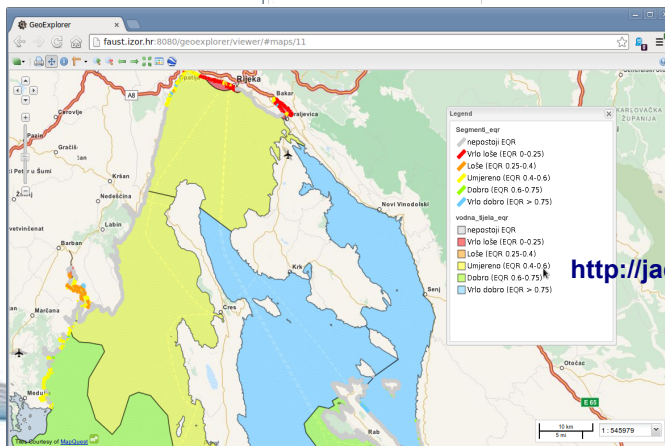
SELECT water_bodies_id,
       (SELECT AVG(segment_eqr) FROM segments WHERE SDO_ANYINTERACT(segments_geom_column, water_bodies_geom_column) = 'TRUE') AS avg_eqr
FROM water_bodies

```

SEGMENTS			
ID	NUMBER (38)	EX_4	
DUZINA	NUMBER		
C_MORFO	VARCHAR2 (254)		
SUBSTRATE	VARCHAR2 (254)		
SLOPE	VARCHAR2 (254)		
ORIENTAT	VARCHAR2 (254)		
C_TYPE	VARCHAR2 (254)		
RUGOSITY	VARCHAR2 (254)		
EXPOSURE	VARCHAR2 (254)		
COMMUNITY	VARCHAR2 (254)		
RIBARJ	VARCHAR2 (254)		
PRISTINE	VARCHAR2 (254)		
PODVELA	VARCHAR2 (254)		
URCHINS	VARCHAR2 (254)		
GEOM	SDO_GEOMETRY	EX_1	
EQR	NUMBER		

SEGMENTS_VODNA			
SEGMENT_ID	NUMBER		
VODNA_TJELA_ID	NUMBER		

SEGMENTS_VODNA_TJELA			
ID	NUMBER (38)	EX_3	
ID_POT	NUMBER		
ID_ORG	NUMBER		
IME	VARCHAR2 (110)		
PODRUCJE	VARCHAR2 (50)		
TP	VARCHAR2 (31)		
RUEKA	VARCHAR2 (12)		
VRESTA	VARCHAR2 (1)		
GEOM	SDO_GEOMETRY	EX_4	
SALIN	VARCHAR2 (100)		
DUBNA	VARCHAR2 (50)		
SEGMENT	VARCHAR2 (50)		
PRIORITET	VARCHAR2 (100)		
BB	VARCHAR2 (50)		
MORFOLOGI	VARCHAR2 (50)		
BIO_STANE	VARCHAR2 (100)		
UMRNO_STA	VARCHAR2 (100)		
PRESAK	VARCHAR2 (100)		
UR_EKAJ	VARCHAR2 (100)		
REDJ_NERO	VARCHAR2 (100)		
ID	NUMBER		



<http://jadran.izor.hr/geo/eqr.html>