Journal of Young Scientist, Volume I, 2013
ISSN 2344 - 1283; ISSN CD-ROM 2344 - 1291; ISSN Online 2344 - 1305; ISSN-L 2344 – 1283

JUDGING CRITERIA FOR WATER BODIES STATUS IN ROSCI 0226 – SEMENIC CHEILE CARAŞULUI SITE

Cristina ILIE, Iulian Zoltan BOBOESCU, Diana ANDREI

University „Politehnica" of Timisoara

Abstract

The paper analyzes the status of the water bodies in ROSCI 0226 site-Semenic Cheile Carasului. The analysis was performed according to the criteria for assessing the status of water bodies specified by Water Framework Directive 2000/60/EC.

Key Words: Improving water, ecological status

INTRODUCTION

Improving water status is an important factor in areas proposed for the protection of habitats or species. Law no. 49/2011 on the regime of protected natural habitats, flora and fauna represent the most current Romanian legislation transposing Directive 92/43/EEC, relating to this problem .

ROSCI 0226 - Semenic Cheile Carasului was designated on 02.07.2008 as site of community importance, part of European ecological network Natura 2000.

This site is situated in south-west of the country, Caras-Severin county south, south-est of Resita town and along with ROSPA 0086 Semenic Mountains -Cheile Carasului site of National Park Semenic -Cheile Carasului . Geographically, the site is located at 48°8'7" N latitude, 21°25'34" E longitude and stretches on a surface of 37729.79 ha. Minimum altitude is 105 m, and maximum altitude 1445 m, also average altitude is 816 m. (Figure 1).

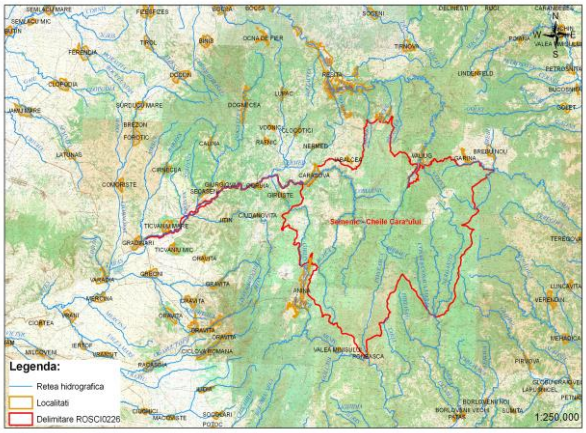

Figure 1 The geographic position of ROSCI0226 – Semenic Cheile Carasului site

corresponding to ROSCI0226 – Semenic Cheile Carasului site is complex, including both surface water courses and underground courses. The most important rivers are Timis, Caras, Barzava, Nera, Semenic, Trei Ape reservoire, Gozna reservoire. The hydrographic network in limestone is disorganized with numerous catchments and emergement's.

Analysis of water bodies

a. Ecological status – biologic elements – phytoplankton – Rivers.

To assess the status of water bodies by phytoplankton, 5 indexes were selected for lotic systems, to which a list of corresponding species was added.

The ranges size for the ecological status was determined on a statistical basis of quality classes. The limits among ecological status were established by reference conditions method. Twenty types of rivers limitswere established. For unsteady river courses values were not proposed. In some cases, where data was not sufficient, we resorted to proposal values via aggregation of types, by realization of an average between the adjacent types or substitution. For every type of river course guideline values for referencestate were proposed.

As a first step of the quality evaluation of lotic aquatic systems (rivers) were selected the following indices**:**

- Saprobity index
- Clorophyl concentration
- Simpson diversity index
- Taxon number
- Numerical abundance (Bacillariophyceae)
- Species list

b. Ecological Status – biological elements – macro invertebrates benthic – Rivers.

The evaluation of water bodies on the basis of macroinvertebrates communities is performed upon the list of species from a station and calculation of
every one of the 7 proposed indexes.
1. Saprobity index(IS)
2. EPT_I index (individuals) (IEPT_I)
3. Shannon-Wiener index (ISH)
4. Number of families (FAM)
5. OCH index (Oligochaeta-Chironomidae) (IOCH/O)
6. Functional group index (IGH)
7. Water cours preference index (reofil 7.A orlimnofil 7.B) (REO/LIM).

c. Ecological status – biological elements – fish fauna – Rivers

For evaluating and classifying water bodies on the basis of fish fauna EFI+ method was used. To achieve this index over 10 000 cases were processed in most EU countries. There have been considered 254 fish species which were grouped in 15 categories of guilds, every one having between 3 and 7 groups of species. Data was processed using fish typology
model resulted from FAME project.
The selected matrices for EFI+ are:

- salmonid water bodies
- Cyprinid water bodies

Field collected data were registered on a sheet which permits data processing through automated software and contributes to achieve a national data base.

d. Ecological status – hydro morphologicalelements – Rivers

Hydromorphological elements used to assess the status of water bodies are:

- Discharge
- Connectivity with underground water bodies
- Continuity of river flow

Morphological parameters

- River depth and width variation
- Cross section modification
- Alteration of reduction coefficient – major riverbed
- Major riverbed bed structure and substrate
- Structure and substrate of riverbed bed
- Riveran area structure

e. Ecological status – physic-chemical elements: general physic-chemical elements Rivers

For assessing ecological status the following physic-chemical elements were taken into account:
Thermo conditions water temperature
In order to evaluate the ecological status temperature limits for the following surface water types are defined: salmonid water, cyprinid waters.
Acidification status – pH
Ecological status data, for assessment, are obtained by analysis of pH indicator, P90 percentile is calculated for a number of 12 measurements a year.
Oxygen regime – dissolved oxygen in concentration terms
Data is obtained on the basis of analysis made on dissolved oxygen indicator, P10 percentile is calculated for a number of 12 measurements per year.
Nutrients – $N\text{-}NH_4$, $N\text{-}NO_2$, $N\text{-}NO_3$, $P\text{-}PO_3$, P_t

f. Ecological status – physic chemical elements: specific pollutants

An analysis of synthetic and non-synthetic pollutants (organic and metals) is performed for surface waters – natural bodies, artificial water bodies, as well for heavily modified water courses.
For this, a few steps must be made: use the monitoring software which ensures minum 12

of concentration values per year for the followed substances; calculate the yearly average, which is the arithmetic average, then the yeraly average is evaluated in relation to limit values which delimitates the 3 ecological states, namely: very good status, good status, moderate status.

For evaluating of the chemical status of hazardous and priority hazardous substances, both synthetic (organic) and non-sinthethic (metals), for surface water bodies (rivers, natural lakes, ponds) – natural bodies and modified bodies (modified in terms of hydro morphological) the specific software is run – which must ensure a minimum 12 concentration values per year for every followed chemical substance. Every primary statistical monitored parameter of a substance will be calculated/determined especially:

- Yearly average concentration (arithmeticaverage);
- Yearly maximum concentration of those substances that EQS are provided for that value.

Case study- ROSCI 0226 Semenic Cheile Caraşului site

In this study, the ecological status/ecological potential as to chemical status of surface water bodies was determined on a number of 14 river water bodies (of which 13 natural water bodies and one heavily modified water bodies).(Figure 2).

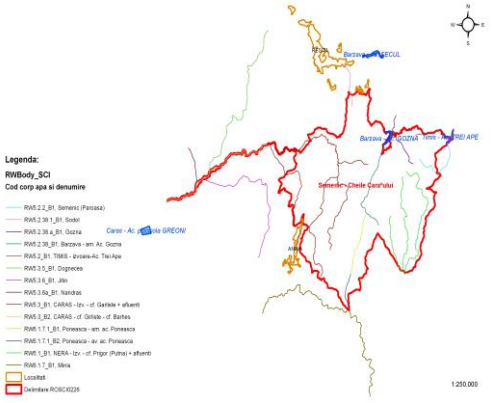

Figure 2 – Water bodies ROSCI 0226 Semenic Cheile Caraşului site

Table 1 Grade on sections corresponding to water bodies

Station	Average indicators for macrozoobentos						Grade
	density	Indicators Oligo O	Indicatoes beta β	Indicators alfa α	Indicatorspoli p	Index Saprob	
RORW5.2.2_ Semenic (Păroasa)-B1	1,83	0,75	2,71	11,00	0,00	0,50	Very Good
RORW5.2.38.1_B (Secul)	1,99	0,74	2,43	7,00	0,00	0,53	Good
Gozna-RORW5.2.38.a_B1	1,40	0,59	2,78	20,00	0,05	0,41	Very Good
Bârzava - am. Ac. Gozna-RORW5.2.38_B1	1,89	0,79	2,77	13,00	0,00	0,47	Very Good
TIMIŞ - izvoare-Ac. Trei Ape-RORW5.2_B1	1,40	0,59	2,78	20,00	0,05	0,41	Very Good
Dognecea-RORW5.3.5_B1	2,03	0,71	2,43	7,50	0,00	0,53	Very Good
RW5.3.6_B1 (Jitin)	1,93	0,67	2,72	11,67	0,03	0,51	Very Good
RW5.3.6a_B1 (Nandraş)	2,25	0,00	1,58	6,00	0,00	0,10	Good
RW5.3_B1 (CARAŞ - Izv. - cf. Gârlişte + afluenţi) - Loc. Carasova (MZB)	1,99	0,58	2,78	11,00	0,00	0,54	Good
RW5.3_B1 (CARAŞ - Izv. -	1,86	0,61	2,54	11,67	0,02	0,48	Very Good

cf. Gârlişte + afluenţi) - Am.cf.Caraş pe râul Gîrlişte							
Poneasca – am. Ac. Poneasca – RORW6.1.7.1_B1	1,89	0,79	2,77	13,00	0,00	0,47	Very Good
Poneasca - av. ac.Poneasca – RORW6.1.7.1_B2	1,74	0,80	2,77	10,00	0,00	0,42	VeryGood
RORW6.1_B1, NERA - Izv. - cf. Prigor (Putna) + afluenţi	1,94	0,71	2,57	9,50	0,00	0,50	Good
RORW6.1_B1, NERA - Izv. - cf. Prigor (Putna) + afluenţi	1,79	0,63	2,65	10,00	0,00	0,35	VeryGood

In Table 1 indicator values calculated from ROSCI 0226 Semenic Cheile Caraşului site are presented.

In table 1 the results from application of classical method based on saprobity system developed by Kolkwitz and Marsson, revised by Liebmann, which covers a large number of species that characterizes different grades of water loading with organic substances .

CONCLUSIONS

After all interpretation and determinations performed on monitored sections of water bodies in ROSCI 0226 Munţii Semenic – Cheile Caraşului site according to Saprobity System, the following results were obtained:

Of a total of 14 characteristic sections corresponding of water bodies of ROSCI 0226 Munţii Semenic – Cheile Caraşului site

2 sections class I

11 sections class II

1 section class III

1 section without monitoring

Of a total of 2 hydrotechnical catchments:

1 hydrotechnical catchment fits mesothrophycqualityclass according to eutrophication degree indicators, and pursuan to physic-chemicalindicators/specific pollutants in global class I.

1 hydrotechnical catchment fits Eutrophic quality class according to eutrphicationgrade indicators pursuanttophysic-chemic indicators/specific pollutants in global class I.

REFERENCES

[1] Diana Andrei , 2011. Studiul stării corpurilor de apă aflate în situl ROSCI 0226-Semenic Cheile Caraşului. Lucrare de disertaţie . Universitatea "Politehnica" din Timişoara, Facultatea de Hidrotehnică.

[2] Adrian Carabeţ, Vasile Gherman, Mircea Vişescu, Iulian Boboescu, 2012. Criterii de apreciere a stării corpurilor de apă din situl ROSCI 0226-Semenic Cheile Caraşului. Buletinul Ştiinţific al Universităţii "Politehnica" din Timişoara, Seria Hidrotehnica, fascicola 1.

[3] Directiva 2000/60/EC a Parlamentului şi Consiliului European care stabileşte un cadru de acţiune pentru ţările din Uniunea Europeană în domeniul politicii apei, 2000. Jurnalul Oficial al Comunităţii Europene.

[4] Directiva 79/409/CEE privind conservarea păsărilor sălbatice *(Directiva Păsări)*.

[5] Directivei 92/43/EEC privind conservarea habitatelor naturale, a florei şi faunei sălbatice*(Directiva Habitate).*

[6] HG 1284/2007 - actul normativ de desemnare a ariilor de protecţie specială avifaunistică (SPA) ca parte integrantă a reţelei Natura 2000.

[7] OM 1964/2007 - actul normativ privind instituirea regimului de arie naturală protejată a siturilor de importanţă comunitară (SCI) ca parte integrantă a reţelei Natura 2000.

[8] Planul de Management al Spaţiului Hidrografic Banat, 2009 . Direcţia Apelor Banat şi INHGA.

[9] Registrul Zonelor Protejate din Spatiul Hidrografic Banat, 2011. Administraţia Bazinală de Apă Banat.

[10] Sinteza anuală, 2010 . Administraţia Bazinală de Apă Banat.

[11] Studiu pentru elaborarea sistemului de clasificare şi evaluare globală a potenţialului corpurilor de apă artificiale şi puternic modificate în conformitate cu prevederile Directivei Cadru , 2008. Institutul Naţional de Cercetare-Dezvoltare pentru Protecţia Mediului, ICIM Bucureşti.