



SERCON

zasnovano na istinitom događaju

System for Evaluating Rivers for Conservation

SERCON sistem za procenu konzervacione vrednosti reka

Snežana Radulović & Dušanka Cvijanović

RHS (*River Habitat Survey*) metod za karakterizaciju i procenu fizičkih karakteristika reka u najširem smislu

- RHS se sprovodi na standardnoj sekciji rečnog toka dužine 500 m
- Metoda pogodna za male i srednje reke (širina rečnog korita <100m)
- Rezultati primene RHS su dva skora HMS i HQA
 - Diverzitet rečnog staništa i karakteristike okolnog pejzaža (***Habitat Quality Assessment - HQA score***)
 - Obim i stepen veštačkih modifikacija rečnog kanala (***Habitat Modification Score – HMS score***)

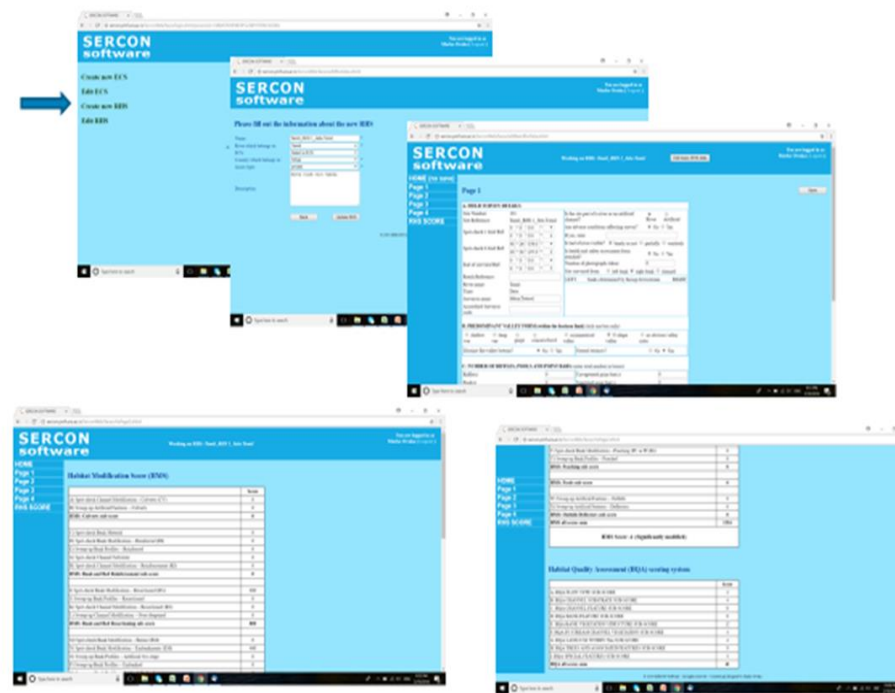
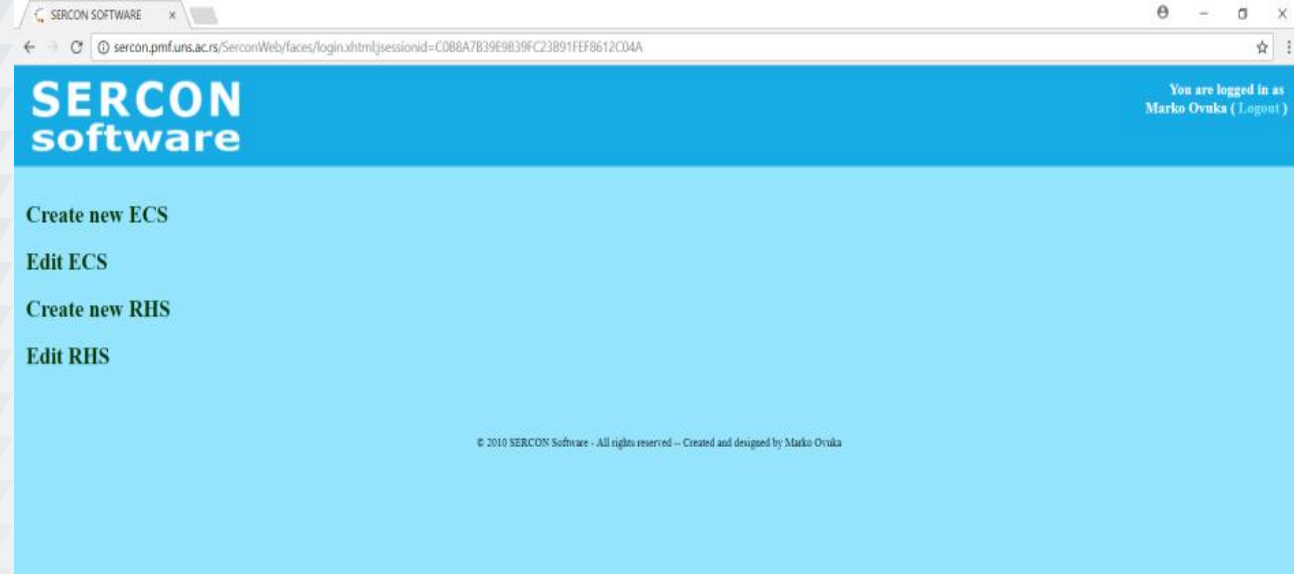
SERCON softver

Izračunava RHS skorove

Izračunava SERCON skorove

<http://sercon.pmf.uns.ac.rs/SerconWeb>

Ovuka M, Racković M, Radulović S, Cvijanović D, Živković M, Novković M and Boon P. SERCON Software (System for Evaluating Rivers for Conservation), Version 3.1 (2012-2015): Faculty of Science, Department of Biology and Ecology, Novi Sad, Serbia



Unos hidromorfoloskih parametara i RHS skorovanje



Kompletna lista karaktera koji se koriste u SERCON:

Fizičke karakteristike:

PD1: Lokacija ECS deonice

PD2: Dužina ECS deonice

PD3: Gradijent rečnog korita u ECS

PD4: Sinusoidnost deonice ECS

PD5: Red vodotoka na nizvodnoj granici deonice ECS

PD6: Stabilnost protoka na nizvodnoj granici deonice ECS

PD7: Prosečni dnevni protok na nizvodnoj granici deonice ECS

PD8: Dijapazon nadmorskih visina u slivu deonice ECS

PD9: Veličina slivnog područja na nizvodnoj granici deonice ECS

PD10: Tip zemljišta u slivnom području deonice ECS

PD11: Geološka podloga u slivnom području deonice ECS

The screenshot displays the SERCON software interface, specifically the 'Physical Data' form. The form is titled 'Physical Data' and includes a 'Save' button. It is divided into several sections:

- PD 1. Location of ECS:** This section contains several input fields for grid references and altitudes. The fields are: 'Grid reference for the upstream limits of the ECS:', 'Grid reference for the downstream limits of the ECS:', 'Grid reference for the mid-point:', 'Altitude at mid-point of ECS:', 'Altitude of source of river:', and 'Distance from source of mid-point of ECS:'. Each of these fields has a numerical input box and a unit label (m or km). There is also a dropdown menu for 'The number(s) of the OS 1:50,000 map(s) on which the ECS appears:' and a dropdown menu for 'Hydrometric area within which the ECS lies:'.
- PD 2. Length of ECS:** This section contains one input field: 'The length of the river channel within the ECS:' with a numerical input box and a unit label (km).
- PD 3. Channel Gradient of ECS:** This section contains three input fields: 'Altitude of the river at the downstream end of the ECS:', 'Altitude of the river at the upstream end of the ECS:', and 'Channel Gradient of ECS:'. Each field has a numerical input box and a unit label (m or m/km).
- PD 4. Channel Sinuosity of ECS:** This section is currently empty.

The interface also features a sidebar on the left with navigation options: HOME (no save), Physical data, Catchment Land-use, Water Quality, Naturalness, Representativeness, Rarity, Species Richness, Special Features, Impacts, AFIs, and SERCON SCORE. The bottom of the screen shows a Windows taskbar with the search bar and system tray icons.

Način upotrebe zemljišta u slivnom području:

CL1: Tipovi zemljišta u slivnom području
CL2: Gustina ljudske populacije

Working on ECS: **Zemlj ECS 2** Country: Srbija, Area: Srbija Edit basic ECS data
RHS in this ECS: **land rhs @_DUSKA, date 27/07/201*** Edit this RHS

You are logged in as Marko Ovaka (Logout)

HOME (no save)

Physical data
Catchment Land-use
Water Quality
Naturalness
Representativeness
Rarity
Species Richness
Special Features
Impacts
AFIs
SERCON SCORE

Catchment Land-use Save

CL 1. Catchment Land Types

Enter percentage for these fields:

1. Rough Pasture, Dune, Heath, Moor	0.0
2. Coniferous Evergreen Woodland	0.0
3. Tilled (Arable), Inland Bare Ground	0.0
4. Inland Water	0.0
5. Suburban Rural Development, Urban	0.0
6. Agricultural and Unimproved Grassland, Bracken	0.0
7. Deciduous Broad-leaf/Mixed Woodland	0.0
8. Bog, Fen, Marsh, Swamp	0.0
9. Montane	0.0

CL 2. Human Population Density

Human Population Density Select a human population density

Save

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Kvalitet vode:

WQ1: Nacionalna klasa kvaliteta vodotoka
WQ2: Koncentracija orto-fosfata
WQ3: Biološka klasa
WQ4: Klasa kvaliteta vode

Working on ECS: **Zemlj ECS 2** Country: Srbija, Area: Srbija Edit basic ECS data
RHS in this ECS: **land rhs @_DUSKA, date 27/07/201*** Edit this RHS

You are logged in as Marko Ovaka (Logout)

HOME (no save)

Physical data
Catchment Land-use
Water Quality
Naturalness
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AFIs
SERCON SCORE

Water Quality Save

Save

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Konzervacioni kriterijumi:

Fizička raznolikost:

PDY1: Tip supstrata (materijala) rečnog korita

PDY2: Tip toka i habitata

PDY3: Struktura akvatične vegetacije

Prirodnost:

NA1: Horizontalna projekcija i profil rečnog korita

NA2: Obim preduzetih mera u rečnom koritu i na obalama

NA3: Objekti u rečnom koritu i na obalama

NA4: Vodni režim

NA5: Biljne zajednice na obalama

NA6: Priobalje

NA7: Akvatične i marginalne makrofite

NA8: Akvatične makroinvertebrate

NA9: Ribe

NA10: Ptice starnarice

SERCON software interface showing the 'Naturalness' section. The 'NA 1a. Planform' table is visible, listing SERCON scores from 0 to 5 with their corresponding descriptions. The 'NA 4. Flow Regime' section is also visible below it.

SERCON score	Description
0	>50% of ECS river artificial, re-aligned, or constrained.
1	>25-50% of ECS river artificial, re-aligned, or constrained.
2	>10-25% of ECS river artificial, re-aligned, or constrained.
3	>5-10% of ECS river artificial, re-aligned, or constrained.
4	>0-5% of ECS river artificial, re-aligned, or constrained.
5	No evidence of channel re-alignments or constraint.

SERCON software interface showing the 'Naturalness' section. The 'NA 1a. Planform' table is visible, listing SERCON scores from 0 to 5 with their corresponding descriptions. The 'NA 4. Flow Regime' section is also visible below it.

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4	>0-5% of ECS river artificial, re-aligned, or constrained.
5	No evidence of channel re-alignments or constraint.

Reprezentativnost:

RE1: Akvatične makrofite

Retkost:

RA1: Vrste obuhvaćene EC habitat direktivom

RA2: Vrste zaštićene nacionalnim zakonom

RA3: Vrste sa crvene liste

RA4: Vrste obuhvaćene EC habitat direktivom

RA5: Ostale ugrožene vrste

RA6: Vrste makrofita neuobičajene za istraživačko područje

RA7: Ptice stonarice neuobičajene za istraživačko područje

The screenshot shows the SERCON software interface. The header includes the SERCON logo, project information (Working on ECS: Tamiš ECS 2, Country: Srbija, Area: Srbija), and user information (You are logged in as Marko Ovuka). The main content area is titled 'Representativeness' and features a table with columns for 'Species' and 'RMS' (1-9). The table lists various species under the heading 'RE 1. Aquatic Macrophytes' and 'RE 1b. Assemblage'. A dropdown menu is open, showing options 1 through 10. The table cells contain checkboxes for each species and RMS value.

Species	RMS 1	RMS 2	RMS 3	RMS 4	RMS 5	RMS 6	RMS 7	RMS 8	RMS 9
Apium nodiflorum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Carex riparia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Epilobium hirsutum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eupatorium cannabinum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Glyceria maxima	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lycopus europaeus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mentha aquatica	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Myosotis scorpioides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Phalaris arundinacea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rorippa nasturtium-aquaticum/microphylla agg.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Salix sp(p)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scrophularia auriculata	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solanum dulcamara	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sparganium erectum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Veronica beccabunga	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bogatstvo vrsta:

- SR1: Akvatične i marginalne makrofite
- SR2: Akvatične makroinvertebrate
- SR3: Ribe
- SR4: Ptice stanarice

Posebni objekti/pojave:

- SF1: Kompleksnost i karakter priobalja
- SF2: Mikrohabitati zavisni od rečnog korita
- SF3: Marginalni habitati za makroinvertebrate
- SF4: Ptice koje prezimljuju u plavnim zonama
- SF5: Ostali kičmenjaci

SERCON SOFTWARE

Working on ECS: **Tamiš ECS 2** Country: Srbija, Area: Srbija Edit basic ECS data

RHS in this ECS: **Tamiš RHS 6_DUSKA, date: 27/07/201** Edit this RHS

You are logged in as Marko Ovuka (Logout)

HOME (no save)

Physical data

Catchment Land-use

Water Quality

Naturalness

Representativeness

Rarity

Species Richness

Special Features

Impacts

AFis

SERCON SCORE

Species richness

Save

SR 1. Aquatic and Marginal Macrophytes

River Macrophyte Survey check-list:

Species	Present	Present	
Achillea ptarmica	<input type="checkbox"/>	Marchantia polymorpha	<input type="checkbox"/>
Alisma lanceolatum	<input type="checkbox"/>	Marsipella sp(p)	<input type="checkbox"/>
Alisma plantago-aquatica	<input type="checkbox"/>	Mentha aquatica	<input type="checkbox"/>
Alopecurus geniculatus	<input type="checkbox"/>	Menyanthes trifoliata	<input type="checkbox"/>
Amblystegium flaviatile	<input type="checkbox"/>	Molinia caerulea	<input type="checkbox"/>
Angelica sylvestris	<input type="checkbox"/>	Montia fontana	<input type="checkbox"/>
Apium inundatum	<input type="checkbox"/>	Myosotis scorpioides	<input type="checkbox"/>
Apium nodiflorum	<input type="checkbox"/>	Myosoton aquaticum	<input type="checkbox"/>
Batrachospermum sp(p)	<input type="checkbox"/>	Myrica gale	<input type="checkbox"/>
Berula erecta	<input type="checkbox"/>	Myriophyllum alterniflorum	<input type="checkbox"/>
Bidens cernua	<input type="checkbox"/>	Myriophyllum spicatum	<input type="checkbox"/>
Bidens tripartita	<input type="checkbox"/>	Nardia sp(p)	<input type="checkbox"/>
Blinia acuta	<input type="checkbox"/>	Nardus stricta	<input type="checkbox"/>
Bolboschoenus maritimus	<input type="checkbox"/>	Narthecium ossifragum	<input type="checkbox"/>
Brachythecium plumosum	<input type="checkbox"/>	Nitella sp(p)	<input type="checkbox"/>
Brachythecium rivulare	<input type="checkbox"/>	Nuphar lutea	<input type="checkbox"/>
Brachythecium rutabulum	<input type="checkbox"/>	Nymphaea alba	<input type="checkbox"/>
Bryum pseudotriquetrum	<input type="checkbox"/>	Octodicea fontanum	<input type="checkbox"/>
Butomus umbellatus	<input type="checkbox"/>	Oenanthe crocata	<input type="checkbox"/>
Calliergon cuspidatum	<input type="checkbox"/>	Oenanthe fistulosa	<input type="checkbox"/>

SERCON SOFTWARE

Working on ECS: **Tamiš ECS 2** Country: Srbija, Area: Srbija Edit basic ECS data

RHS in this ECS: **Tamiš RHS 6_DUSKA, date: 27/07/201** Edit this RHS

You are logged in as Marko Ovuka (Logout)

HOME (no save)

Physical data

Catchment Land-use

Water Quality

Naturalness

Representativeness

Rarity

Species Richness

Special Features

Impacts

AFis

SERCON SCORE

Special features

Save

SF 2. Corridor Water dependent Habitats

Data or local specialist knowledge indicate that of wetland habitats present in the RHS site are of high conservation interest.

SF 4. Wintering Birds on Floodplain

Wintering birds regularly recorded on the floodplain of the ECS:

Species	Present	National Importance	Internal Importance
Anas acuta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anas clypeata	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anas crecca	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anas penelope	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anas platyrhynchos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anas strepera	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anser albifrons flavirostris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anser anser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anser brachyhyachus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anser fabalis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aythya ferina	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aythya fuligula	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Branta bernicla bernicla	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Utjecaji:

- IM1: Zakišeljavanje
- IM2: Utjecaji gradova, industrije i poljoprivrede
- IM3: Kanalizacioni ispusti
- IM4: Crpljenje podzemnih voda
- IM5: Vodozahvati površinskih voda
- IM6: Transfer unutar reke i unutar sliva
- IM7: Kanalisanje
- IM8: Upravljanje odbranom od poplava
- IM9: Veštački objekti
- IM10: Utjecaji rekreativnih aktivnosti
- IM11: Unete vrste

Dodatni važni objekti/pojave

Impact Save

IM 1. Acidification

Choose IM 1 SERCON score: Select score: ▼

Question: How severe is the impact of acidification from atmospheric deposition on the ECS?

IM 1 additional information:

SERCON score	Description
0	No deviation from the natural chemical regime as a result of acidification. Biota normal.
1	Acidification just detectable, but minimal impact on river biota. Limited length of ECS affected.
3	pH lower than expected. Some expected (acid-sensitive) biota absent (e.g. mayfly nymphs).
5	Regular low pH levels, high aluminium concentrations (likely to lead to elimination of fish and acid sensitive invertebrates and the domination of acid tolerant species, e.g. stonefly nymphs). Majority of ECS affected.

IM 2. Urban, Industrial and Agricultural Inputs

Choose IM 2 SERCON score: Select score: ▼

Question: How severe is the impact of urban, industrial and agricultural inputs (i.e. other than sewage) on the ECS?

IM 2 additional information:

SERCON score	Description
0	No effluent discharge affecting ECS. Biota normal.
1	Quality of discharge (or mean quality of several discharges) high in relation to quality of receiving water, minimal impact on natural water chemistry. Limited length of ECS affected.

HOME (no save)

Physical data

Catchment Land-use

Water Quality

Naturalness

Representativeness

Rarity

Species Richness

Special Features

Impacts

AFIs

SERCON SCORE

Additional features of importance (AFIs) Save

'Unique' features:

Other positive features:

Unlisted positive features:

Negative features:

Unlisted negative features:

HOME (no save)

Physical data

Catchment Land-use

Water Quality

Naturalness

Representativeness

Rarity

Species Richness

Special Features

Impacts

AFIs

SERCON SCORE

SERCON obuhvata nekoliko grupa podataka:

Opisni podaci (ne ulaze u skor):

PD grupa
CLT grupa
WQ grupa

Ulazni podaci iz RHS-a (ulaze u skor):

PDY grupa
NA1b, NA2a, NA2b, NA3a, NA3b, NA5, NA6
SF1, SF2, SF3

Podaci vezani za spiskove vrsta (ulaze u skor):

Makrofite: NA7, RE1, RA1, RA2, RA3, RA4, RA5, RA6, SR1
Makroinvertebrate: NA8, SR2, SF5
Ribe: NA9, SR3
Ptice: NA10, RA7, SR4, SF4

- **Nezavisni ulazni podaci (ulaze u skor):**
 - NA1a, NA4, NA5
 - SF5
 - IM grupa

- **Ulazni podaci iz RHS-a (ulaze u skor):**
 - PDY grupa (PDY 1-3)
 - NA1b, NA2a, NA2b, NA3a, NA3b, NA5, NA6
 - SF1, SF2, SF3

SERCON MODULI I IZVEŠTAJI

- **Obnavljanje rečnih ekosistema**
- **Procena uticaja na životnu sredinu**
- **Procena pojedinih lokaliteta (kraćih rečnih deonica)**
- **Izveštaj o posebnim prirodnim karakteristikama**
- **Taksonomska istraživanja**
- **Monitoring**

No animals were harmed in the making of this product