Croatian Science Foundation

Accumulation, Subcellular Mapping and Effects of Trace Metals in Aquatic Organisms (AQUAMAPMET)

Bivalves and crustaceans - important bioindicators in ecotoxicological and water quality assessment

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Freshwater bivalves

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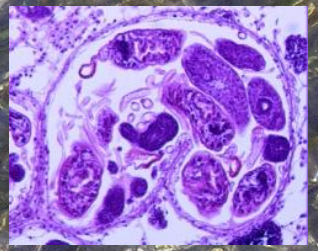

Research interests:

Ecotoxicology, histopathology

Malacology; ecology, biology and phylogeny of freshwater gastropods and bivalves

Invasive mollusc species, distribution and impact on native species

Current projects:

NATURA 2000 species: snail *Anisus vorticulus* and bivalve *Unio crassus*

Malacofauna of the river Krka

Freshwater bivalves

AQUAMAPMET project responsibilities:

- **field work:** bivalve sampling, measurement and determination of species

- **lab work:** disection of bivalves

Crustaceans

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Research interests:

Speleobiology, Freshwater ecology, Environmental assessment

Biology, ecology, taxonomy and phylogeny of groundwater, spring, stream and river crustaceans.

Invasive crustaceans, distribution and impact on native species

Current projects:

Multimetric evaluation of crenobiocoenosis

Amphipods of peat bogs

Crustaceans

AQUAMAPMET project responsibilities:

- **field work:** measurement of physical and chemical water parameters, amphipod sampling using benthos net on representative substrata

Crustaceans

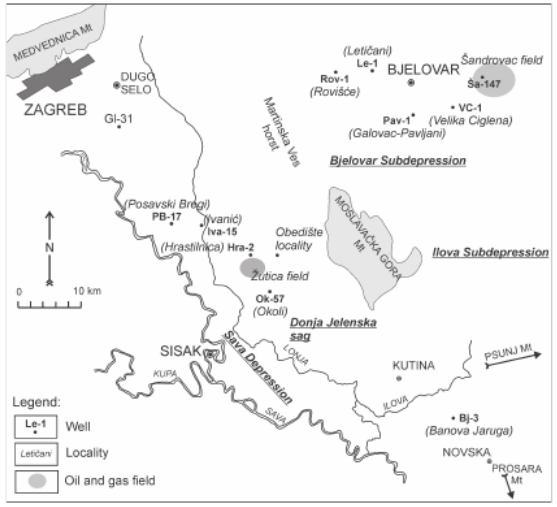
AQUAMAPMET project responsibilities:

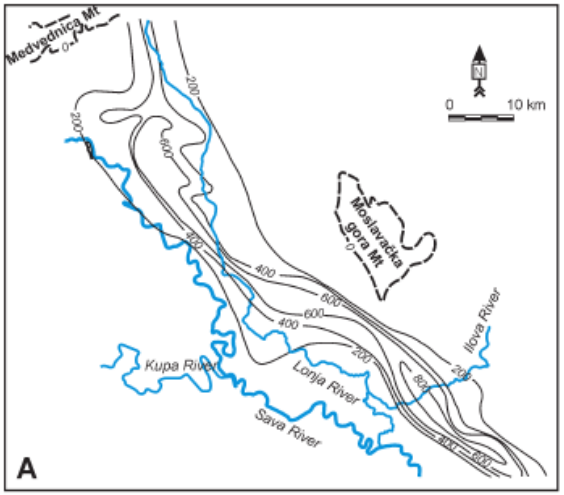
- lab work: identification and enumeration of amphipod (invasive) species → amphipods infected with acanthocephalans

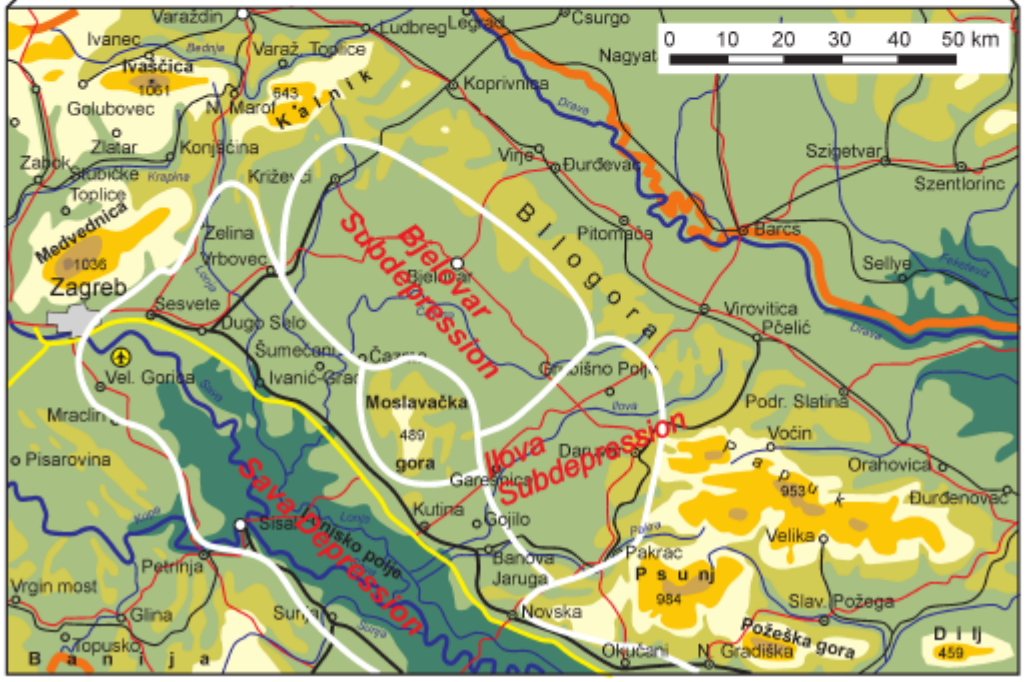
STUDY AREAS


Ilova River
Krka River
SLOVENIJA
ITALIJA
MADARSKA
SRBIJA
BOSNA
HERCEGOVINA
CRNA GORA
100 km

ILOVA RIVER







Altitude:

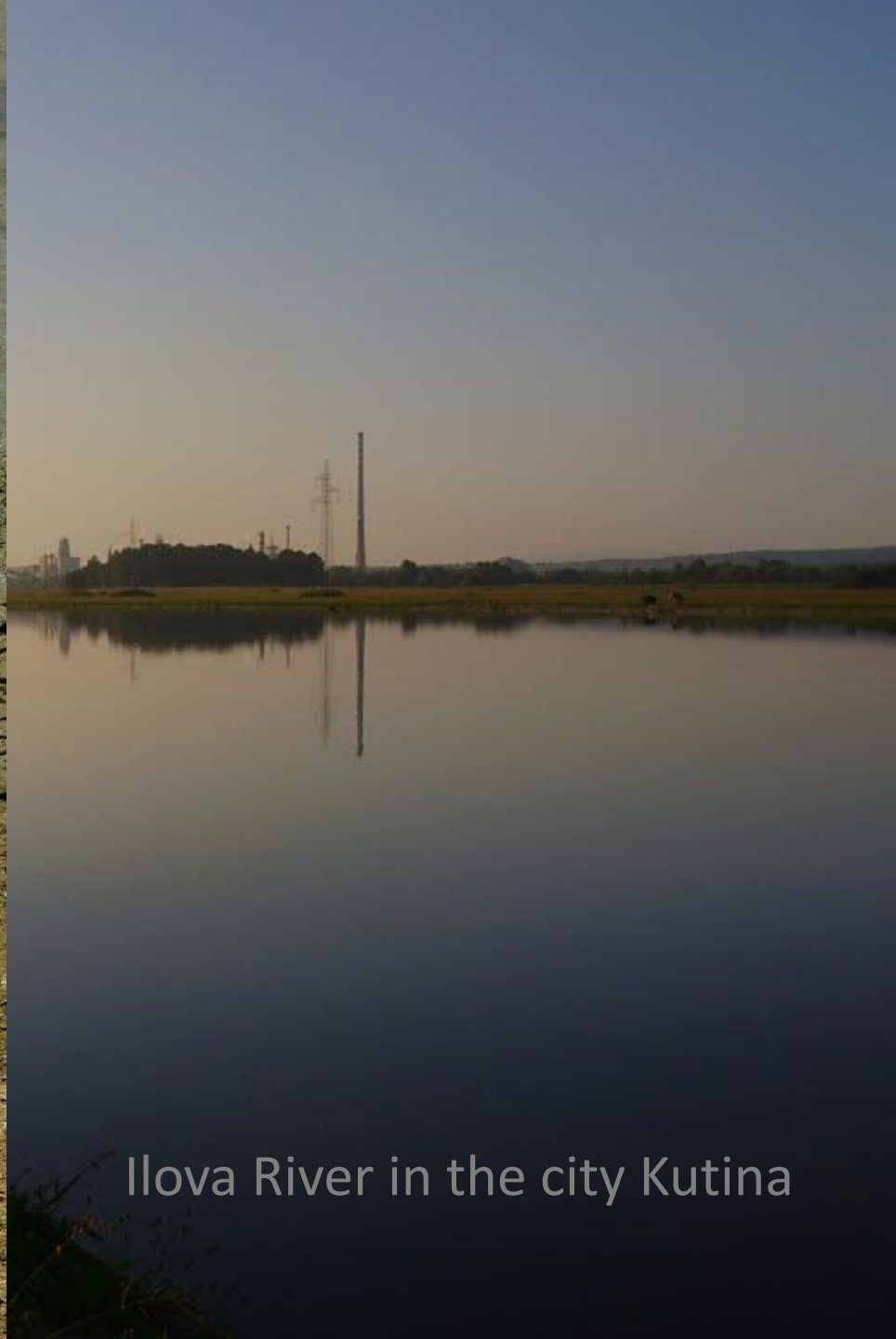
	1000 – 1500 m
	750 – 1000 m
	500 – 750 m
	300 – 500 m
	200 – 300 m
	100 – 200 m
	0 – 100 m

The Ilova River catchment:
- Spring: 185 m a.s.l.
- Area: 1600 km^2
- Length: 85 km


Ilova River

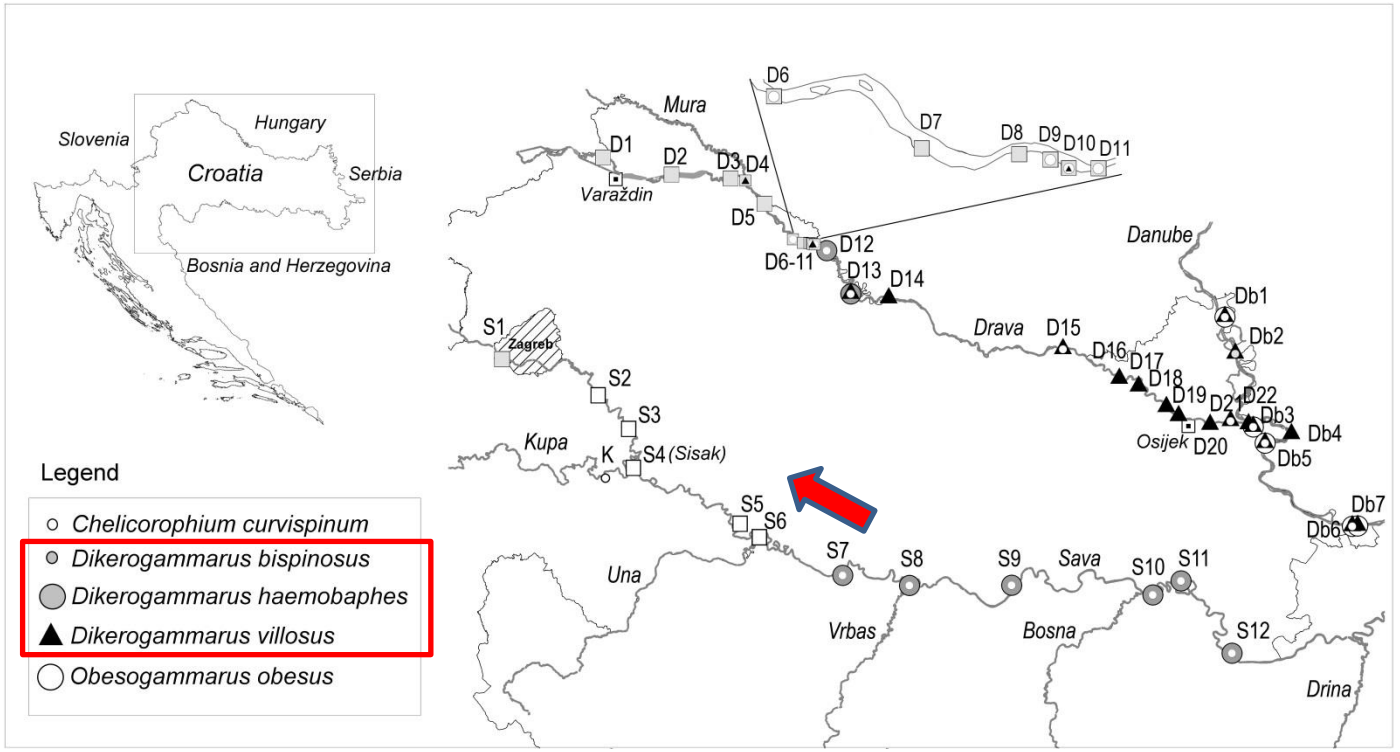
Ilova River in Tomašica, upstrem of the city Kutina

Ilova River in Piljenice upstrem of the city Kutina



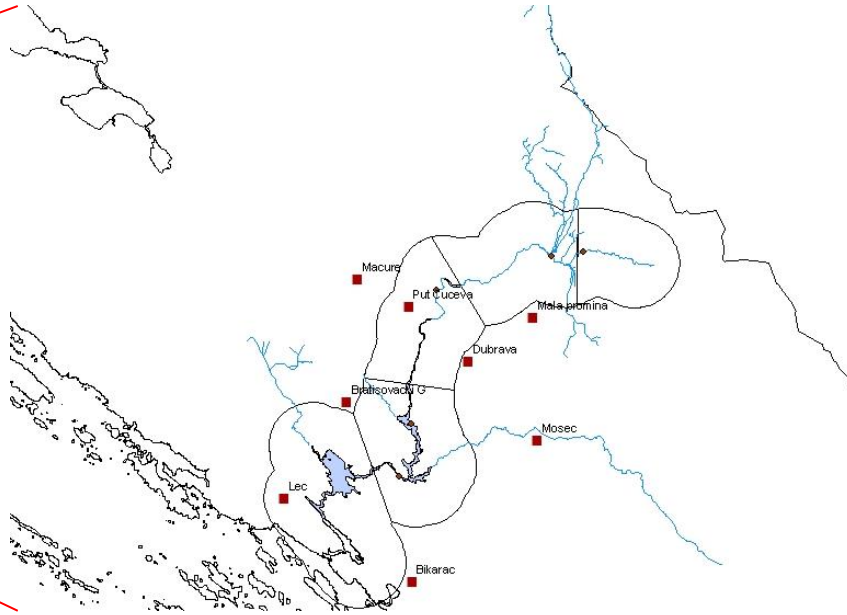
Ilova River in the city Kutina

INVASIVE AMPHIPOD SPECIES



KRKA RIVER

The Krka River catchment:
- Spring: 222 m a.s.l.
- Area: 2500 km^2
- Length: 53 km



KRKA RIVER

N1	Grad	Naziv industrije
1.	Benkovac	BADEL 1862 d.d.
2.	Benkovac	TCG metalni lijev
3.	Benkovac	PAPE & SONS
4.	Stankovci	Klaonica MILETIĆ
5.	Drniš	Klaonica GRCIĆ
6.	Drniš	Dalmacijavino d.d.
7.	Drniš	BRAMAC
8.	Drniš	TOF
9.	Drniš	Klaonica MALENICA
10.	Knin	HŽ
11.	Knin	Knauf
12.	Knin	Opća bolnica
13.	Skradin	ACI d.d.
14.	Šibenik	Klaonica SLADIĆ
15.	Šibenik	Klaonica VLAIĆ
16.	Šibenik	IVANAL
17.	Šibenik	N.P. Krka - ugost. Objekt
18.	Šibenik	N.P.Krka-sanit.čvor na L.ob.
19.	Šibenik	N.P. Krka - sanit.čvor na D. ob

N1	Grad	Naziv industrije
19.	Šibenik	N.P. Krka - sanit.čvor na D. ob
20.	Šibenik	Autotransport d.d.
21.	Šibenik	Remontno brodogradilište d.o.o.
22.	Šibenik	TLM d.d.
23.	Šibenik	TLM d.d. - Površinska zaštita
24.	Šibenik	VINOPLOD VINARIJA d.d.
25.	Šibenik	SOLARIS d.d.
26.	Šibenik	Opća bolnica Šibenik
27.	Vodice	Uljara TRIBUNJ
28.	Vodice	ACI d.d.
29.	Vodice	Hotel IMPERIJAL
30.	Vodice	Uljara ANIVA
31.	Vodice	Hotel Olympia
32.	Vodice	Hotel Punta
33.	Vodice	TD Vodice - betonara
34.	Primošten	Autokamp ADRIATIC
35.	Primošten	Marina KREMIK
36.	Primošten	Uljara FALKON
37.	Primošten	PZ DOLAC

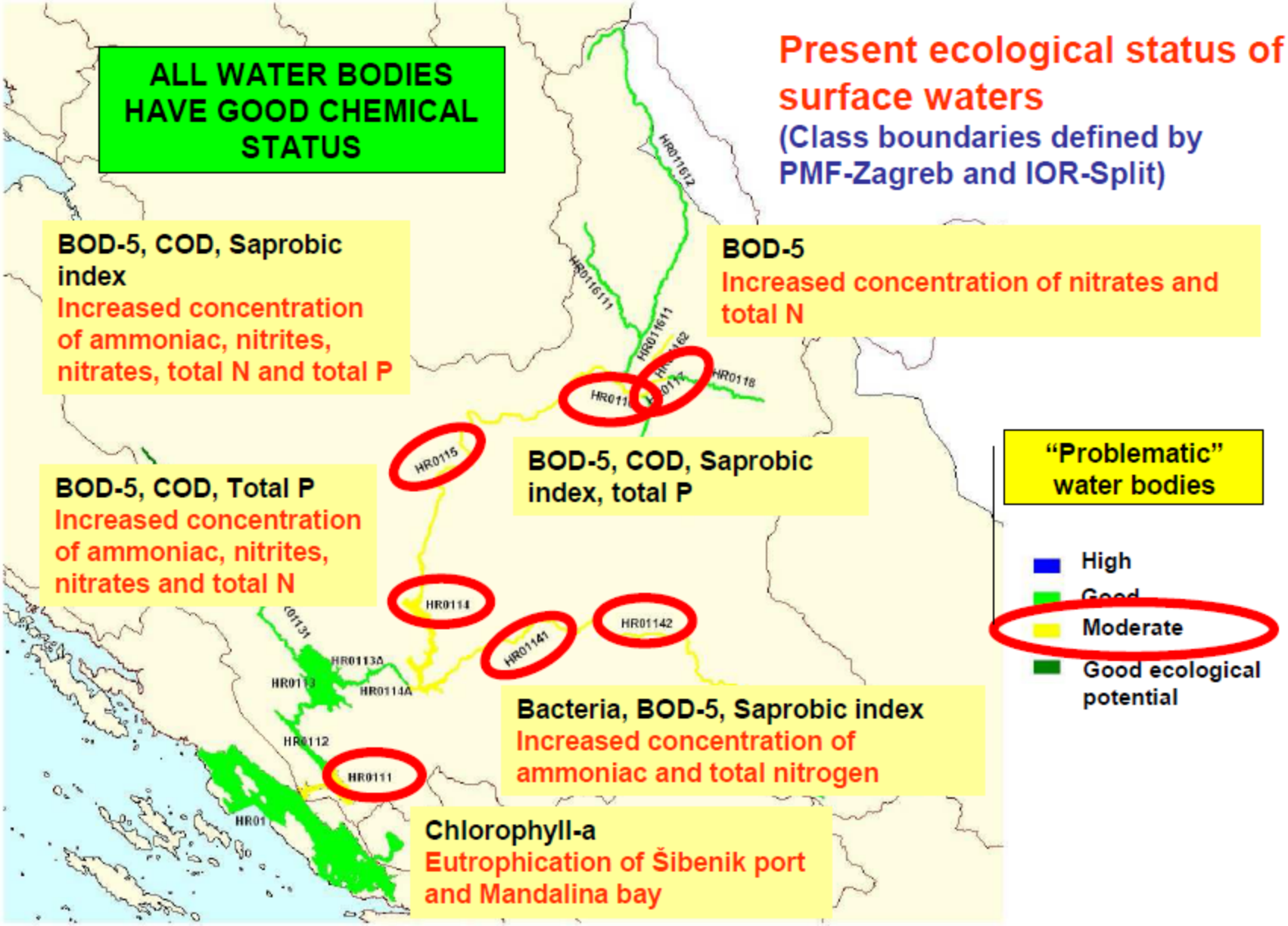
Point source pollutions

- **(37 polluters in CW register only 3 significant)**

Urban waste waters

- **(9 municipalities > 2000PE)**

KRKA RIVER


ALL WATER BODIES HAVE GOOD CHEMICAL STATUS
Present ecological status of surface waters
(Class boundaries defined by PMF-Zagreb and IOR-Split)
BOD-5, COD, Saprobic index
Increased concentration of ammoniac, nitrites, nitrates, total N and total P
BOD-5
Increased concentration of nitrates and total N
BOD-5, COD, Saprobic index, total P
BOD-5, COD, Total P
Increased concentration of ammoniac, nitrites, nitrates and total N
"Problematic" water bodies
High
Good
Moderate
Good ecological potential
Bacteria, BOD-5, Saprobic index
Increased concentration of ammoniac and total nitrogen
Chlorophyll-a
Eutrophication of Šibenik port and Mandalina bay
HR0115
HR0114
HR01141
HR01142
HR0113Δ
HR0113
HR0114Δ
HR0112
HR0111
HR0118

AMPHIPOD DIVERSITY IN THE KRKA SPRING

12 taxa

Echinogammarus acarinatus (Karaman S., 1931)
Echinogammarus pungens (Milne Edwards, 1840)
Echinogammarus veneris (Heller, 1865)
Fontogammarus dalmatinus dalmatinus Karaman S., 1931
Fontogammarus dalmatinus krkensis Karaman S., 1931
Gammarus balcanicus Schaferna, 1922
Hadzia fragilis S. Karaman, 1932
Niphargus hebereri Schellenberg, 1933
***Niphargus* cf *orcinus* Joseph, 1869**
Niphargus salonitanus S. Karaman, 1950
***Synurella ambulans* (Müller, 1846)**
Typhlogammarus mrazeki (Schaferna, 1906)

11 species
7 genus
4 families

Gottstein et al. 2007


Thank you for the attention!!!