

## Interreg-IPA Cross-border Cooperation Programme Romania-Serbia

**Academic Environmental Protection Studies** on surface water quality in significant cross-border nature reservations Djerdap / Iron Gate national park and Carska Bara special nature reserve, with population awareness raising workshops

= **RORS-462** =

**PA2.OI3 Studies in the field of environmental protection and emergency management.**

**STUDY ON SURFACE WATER QUALITY OF CARSKA-BARA SPECIAL NATURE RESERVE AND DELTA (BALTA) NERA NATURE RESERVATION – Part.1**



[www.aeps.upt.ro](http://www.aeps.upt.ro)

5<sup>th</sup> – 6<sup>th</sup> February 2021, Timisoara, Romania

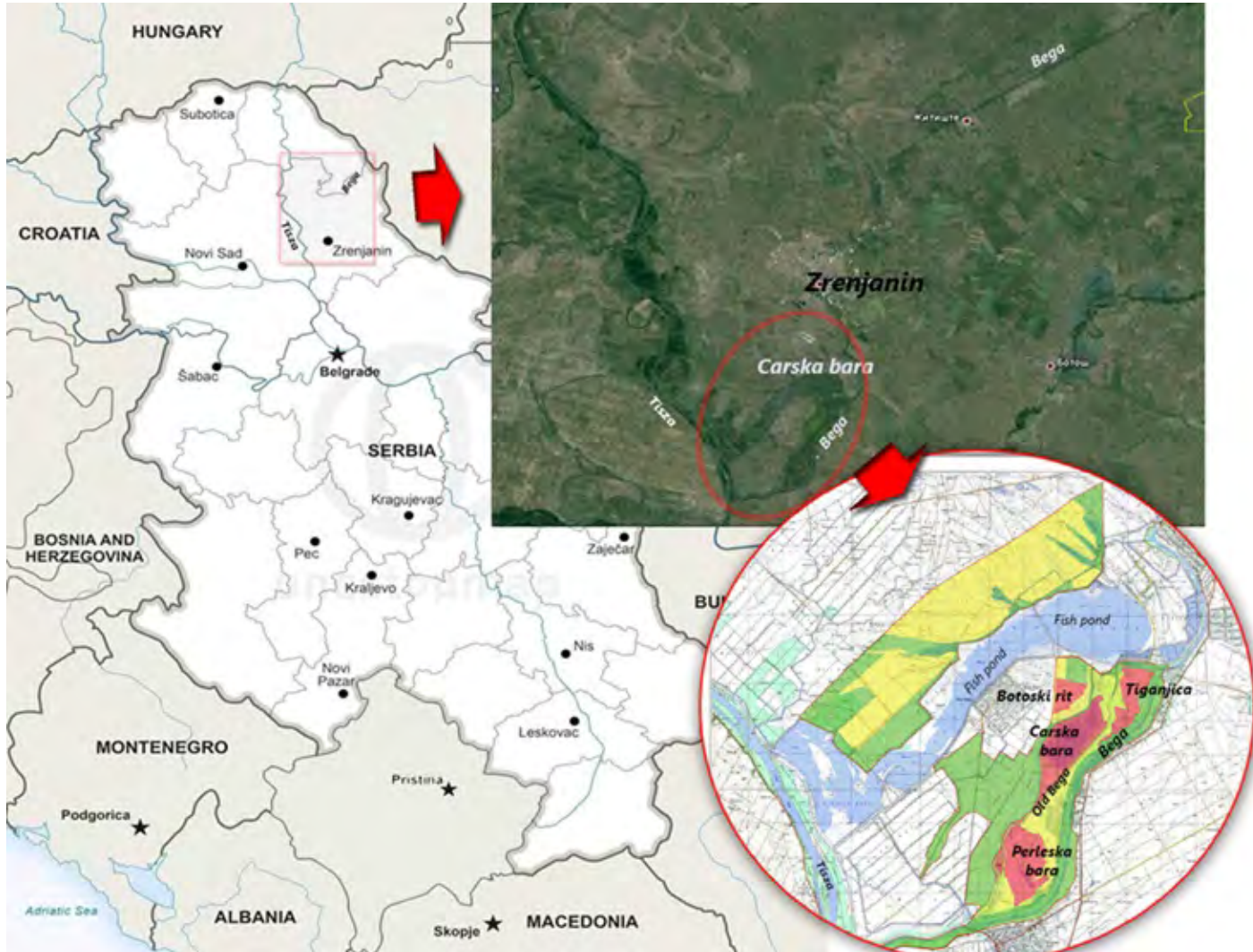
8<sup>th</sup> – 9<sup>th</sup> February, Bor, Serbia

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# Some facts...



# National and international classification

According to the **Law on nature protection**, Special Nature Reserve “Carska bara” is classified as I category - protected area of international, national and exceptional importance [5].

According to the classification of the [International Union for Conservation of Nature](#) (IUCN), Special Nature Reserve “Carska bara” is classified as „IUCN Category IV“ - Habitat and species management area

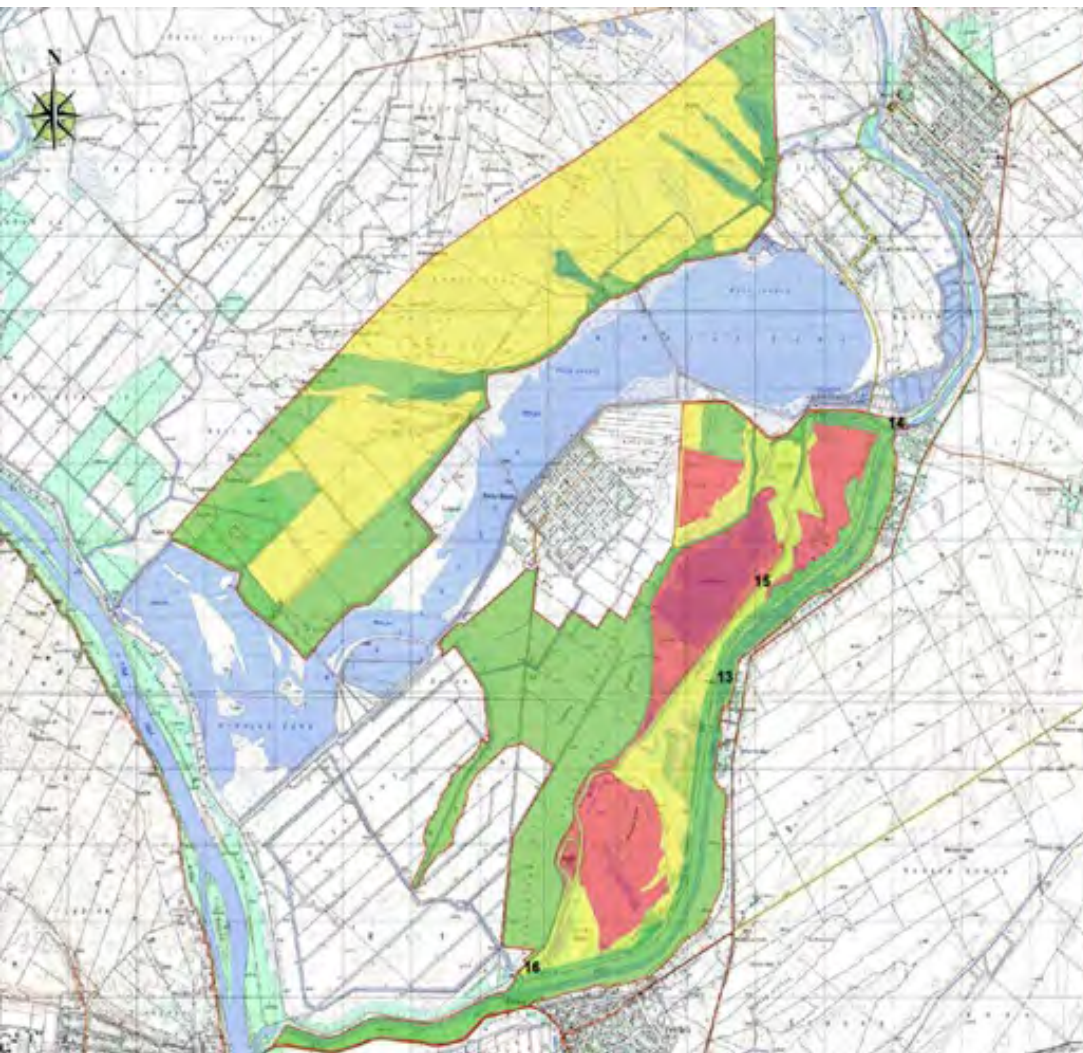
International status of Special Nature Reserve “Carska bara” is classified as follows

- Ramsar area - wetland of international importance (International Convention on wetlands -Ramsar Convention)
- IBA area- Important Bird and Biodiversity Area (IBA) for Europe
- IPA area -Indigenous Protected Areas important for Central and East Europe
- Emerald Network of Areas of Special Conservation Interest-area of exceptional importance for nature protection

500 plants,  
239 birds  
20 fish and  
30 mammals

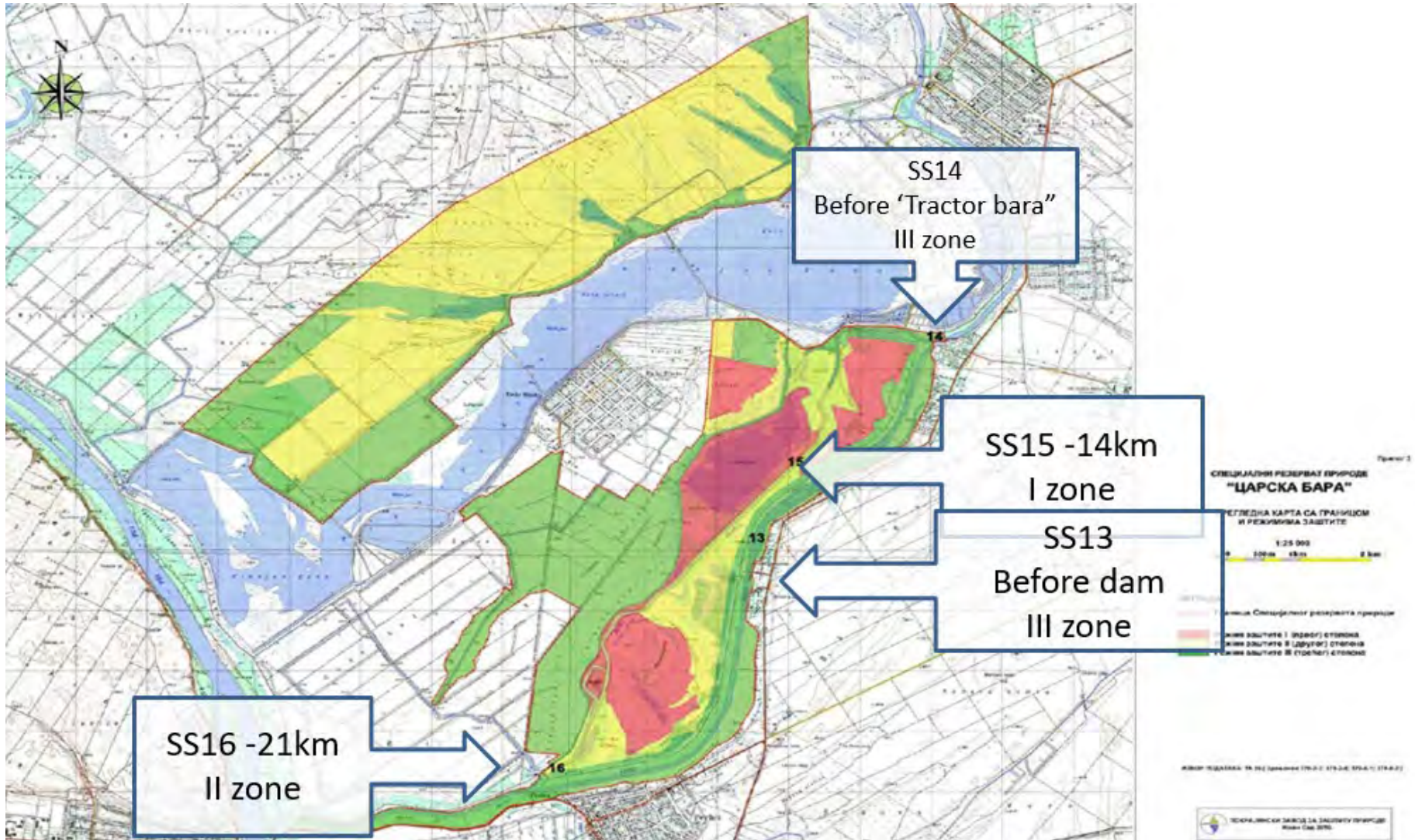


# Environmental pressures



# MATERIAL AND METHODS

## Sampling sites



# Sampling





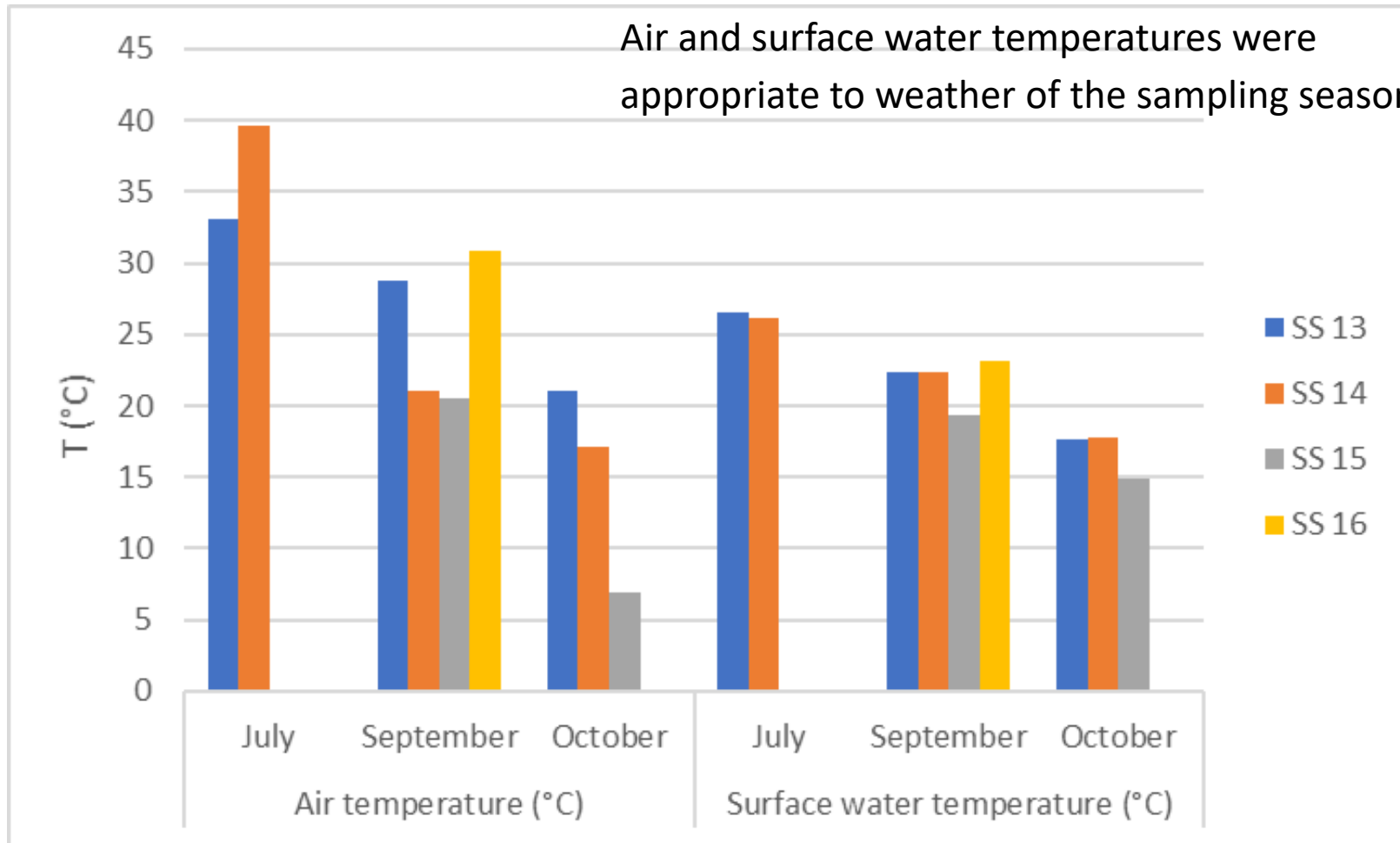
Parameters	Measurement methods
Water temperature, pH dissolved oxygen, conductivity, TDS	User manual for multi-parameter handheld instrument (Lovibond® Water Testing Tintometer® Group SensoDirect 150 (Set 1) pH / Con / TDS / Oxi / Temp)
Air teperature	Termometar



Parameters	Measurement methods
BOD	Manometrijski, upustvo proizvođača opreme
COD	Bihromatna metoda/Spektrofotometry
NH <sub>4</sub> -N	Spektrofotometry, uUser manual for Photometer HANNA HI 83200 (Adaptation of the ASTM Manual of Water and Environmental Technology, D1426-92, Nessler method )
NO <sub>3</sub> -N	Spektrofotometry, User manual for Photometer HANNA HI 83200 (Adaptation of the cadmium reduction method)
NO <sub>2</sub> -N	Spektrofotometry, Use manual for Photometer HANNA HI 83200 (Adaptation of the EPA Diazotization method 354.1)
(PO <sub>4</sub> -P)	Spektrofotometry, Use manual for Photometer HANNA HI 83200 (Adaptation of the Ascorbic acid method)
SO <sub>4</sub> <sup>2-</sup> [Sulfates]	Spektrofotometry, Use manual for Photometer HANNA HI 83200 (Sulphate is precipitated with barium chloride crystals)
Metals	ICP-OES equipment - Perkin Elmer Optima 8300 i verzion 5.0 WinLab softwer.

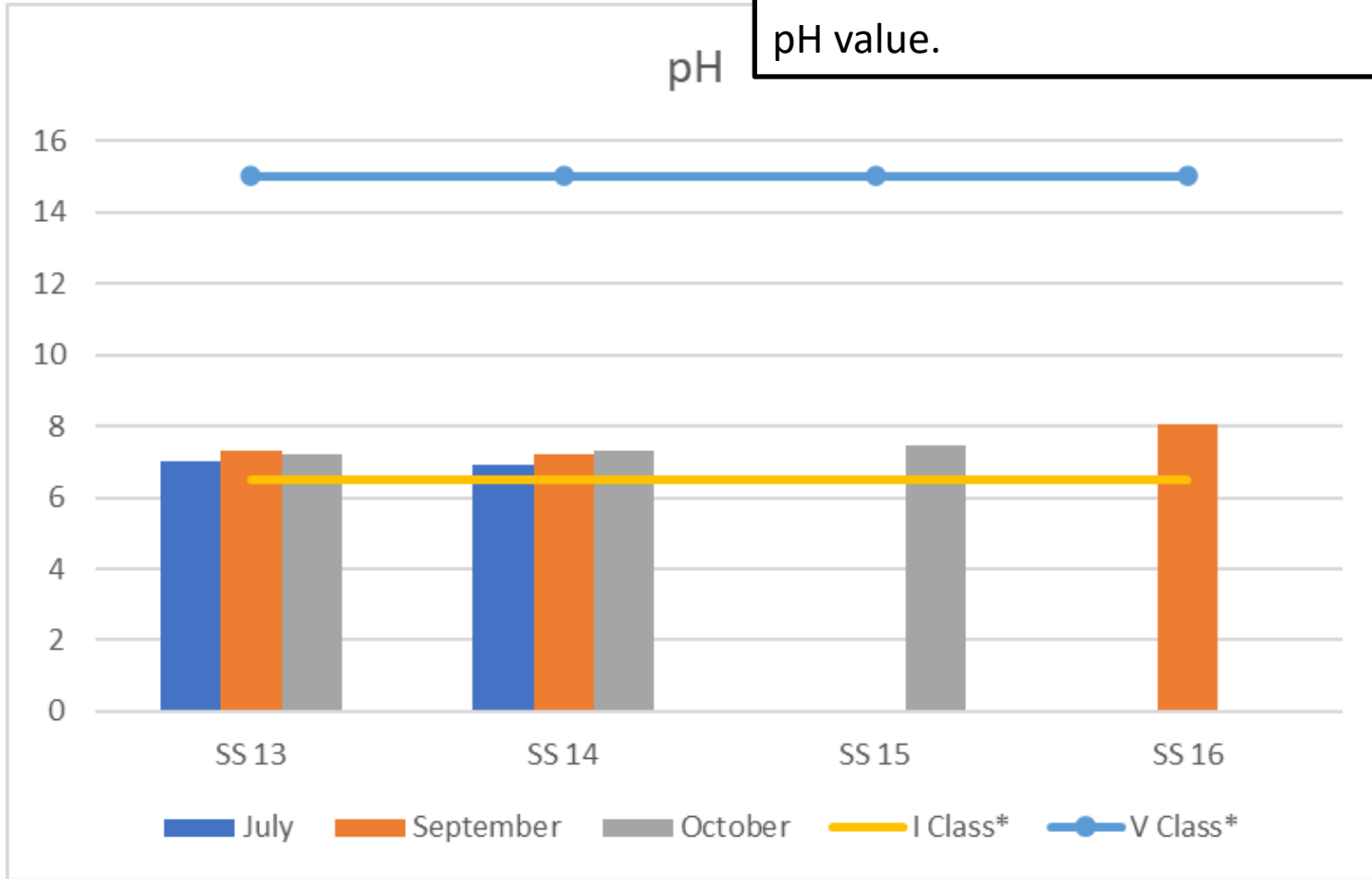


Air and surface water temperatures were appropriate to weather of the sampling season.

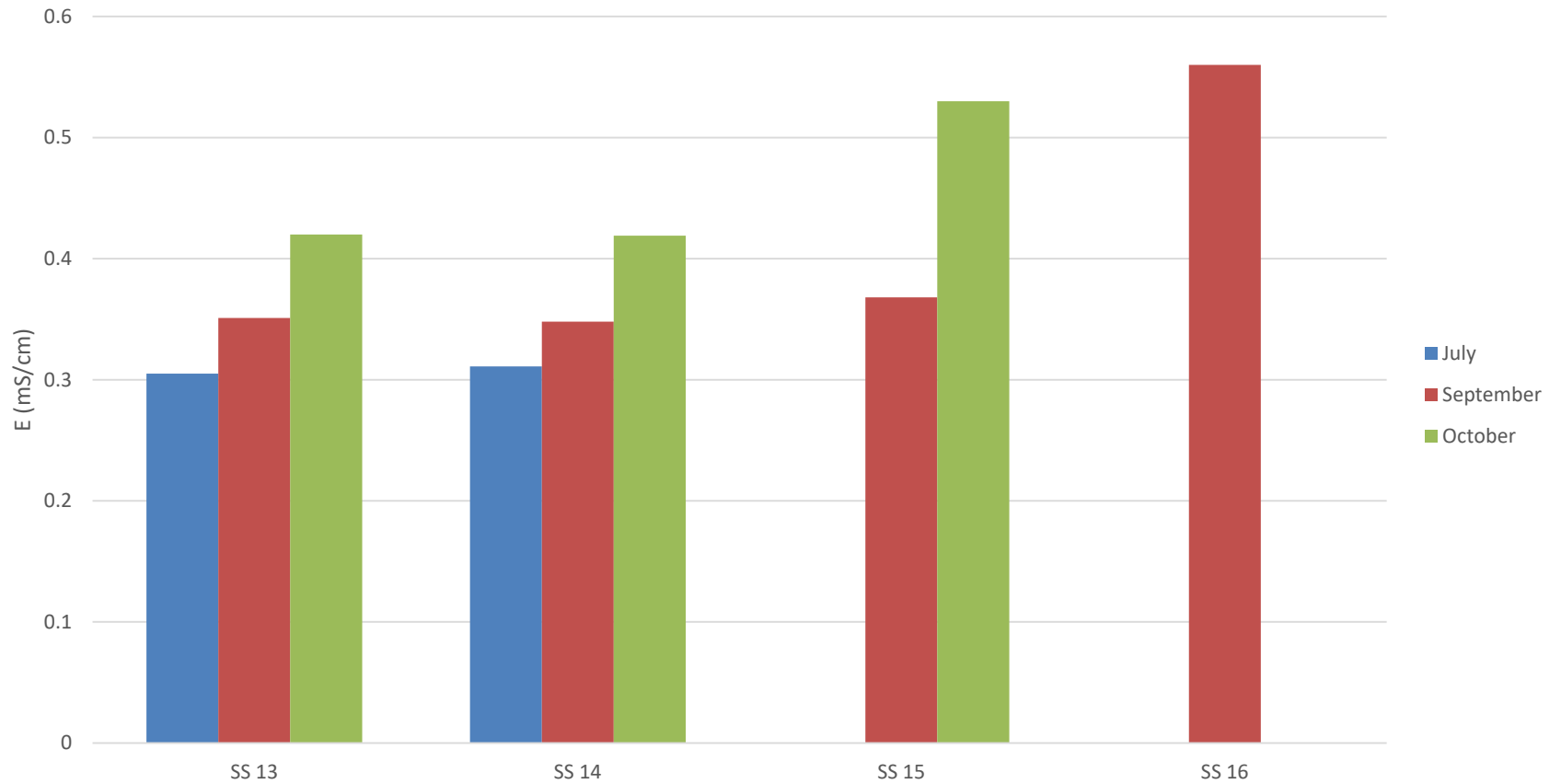


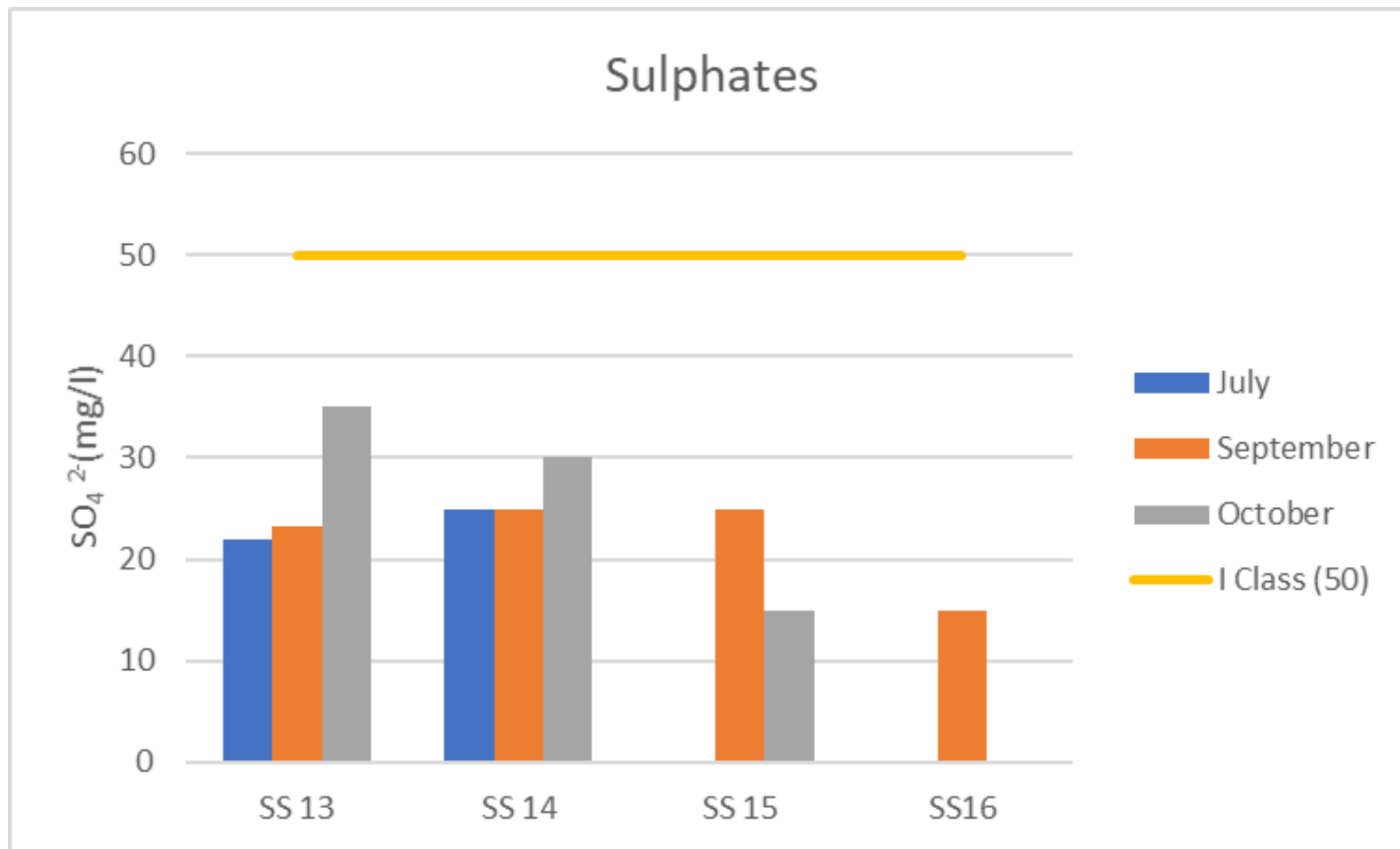
All samples in all sampling campaigns had a low turbidity. Samples had no odor.

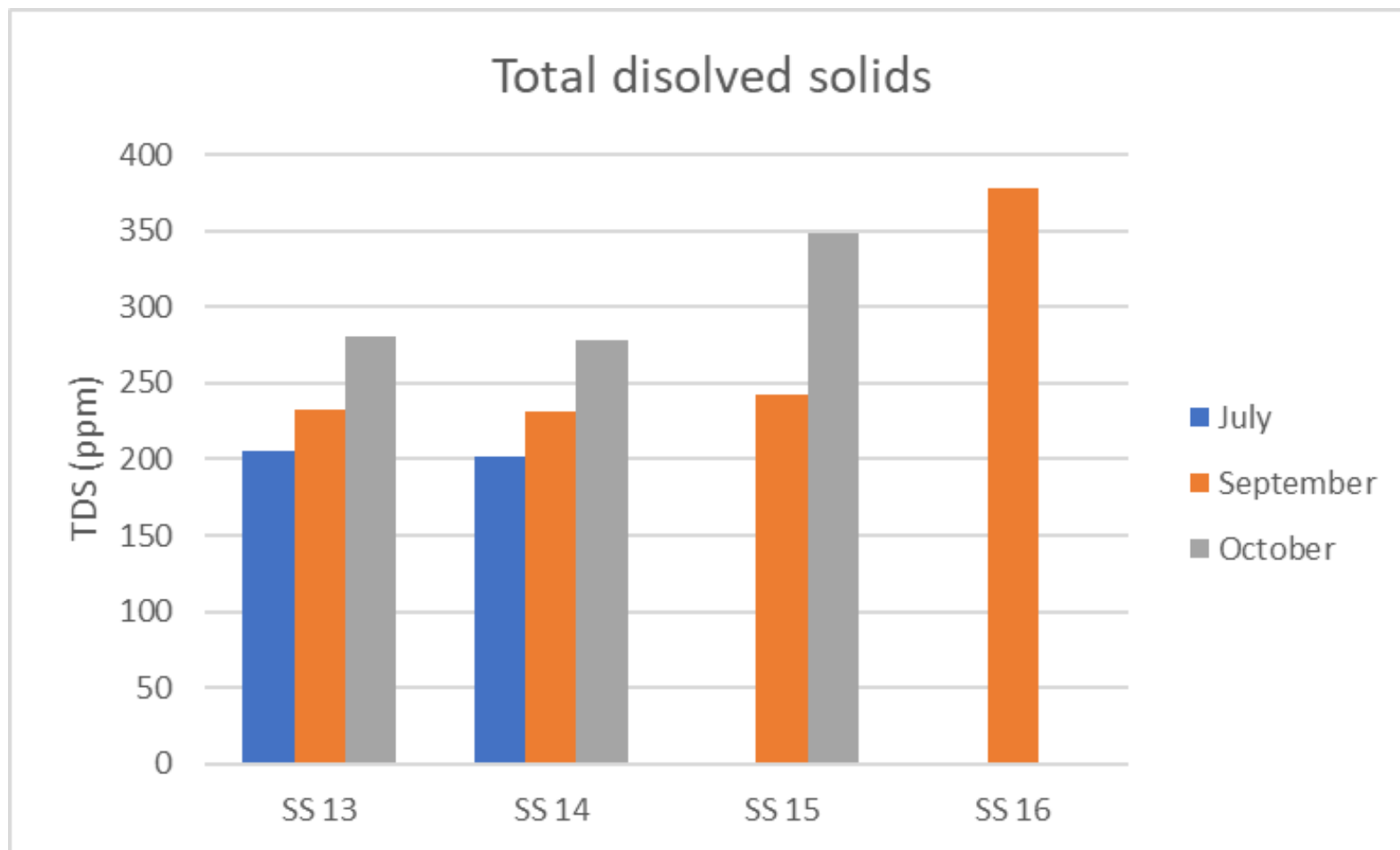
I, II, and III class have a same limit values for pH. All rivers that have  $6,5 < \text{pH} < 8,6$  are the rivers classified like IV and V class of quality. Samples in all three sampling season were classified into the I class according to the pH value.



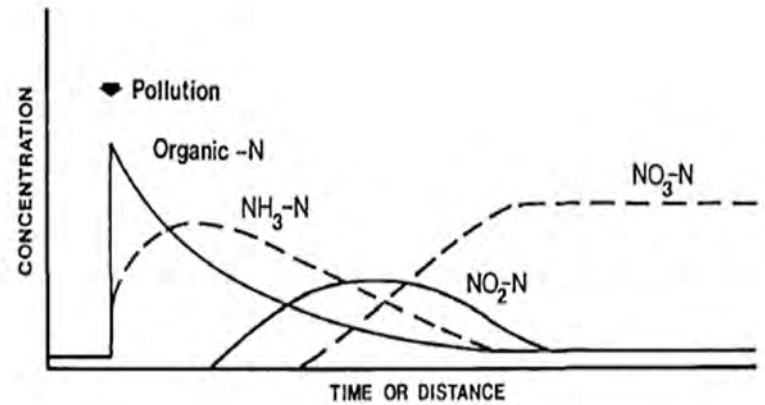
### Conductivity



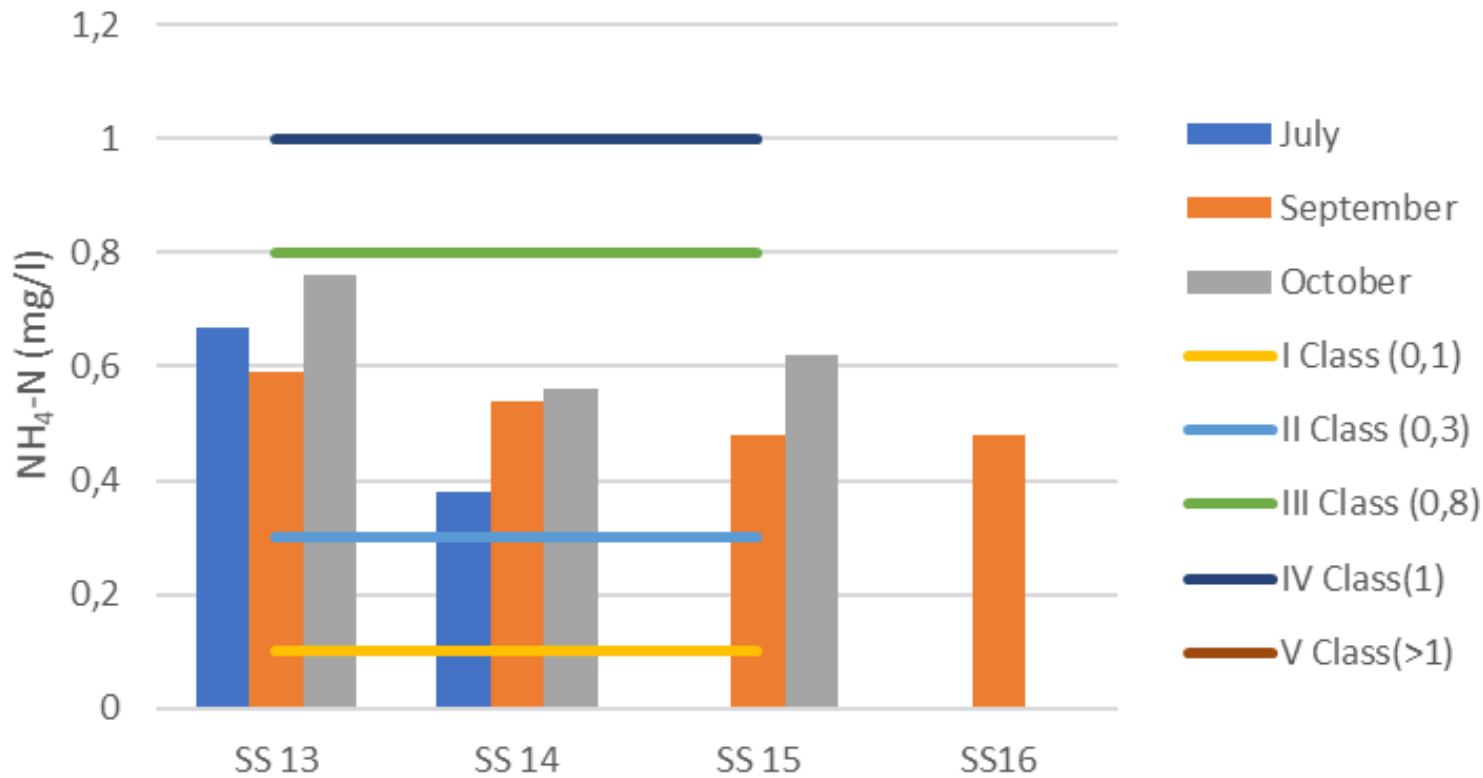




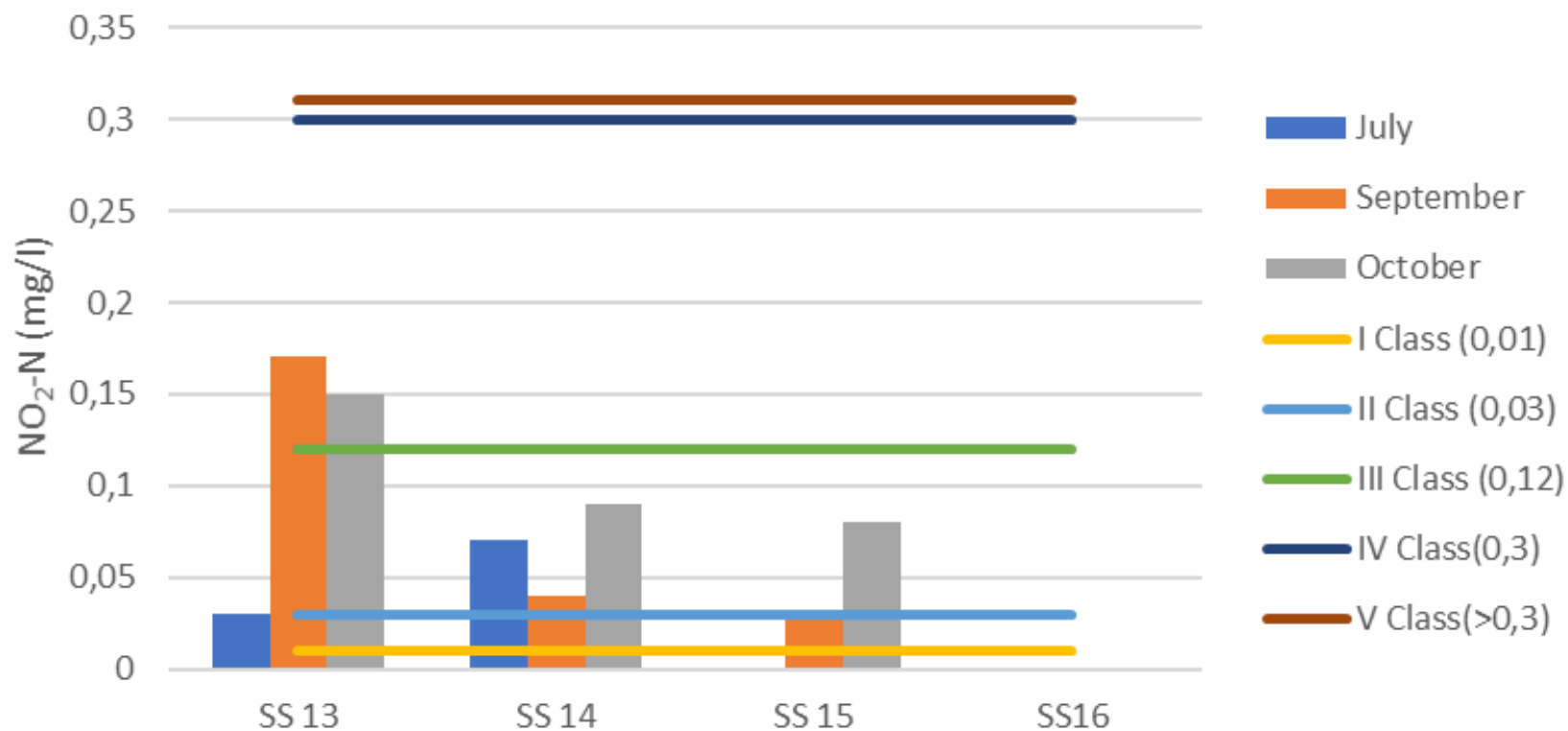




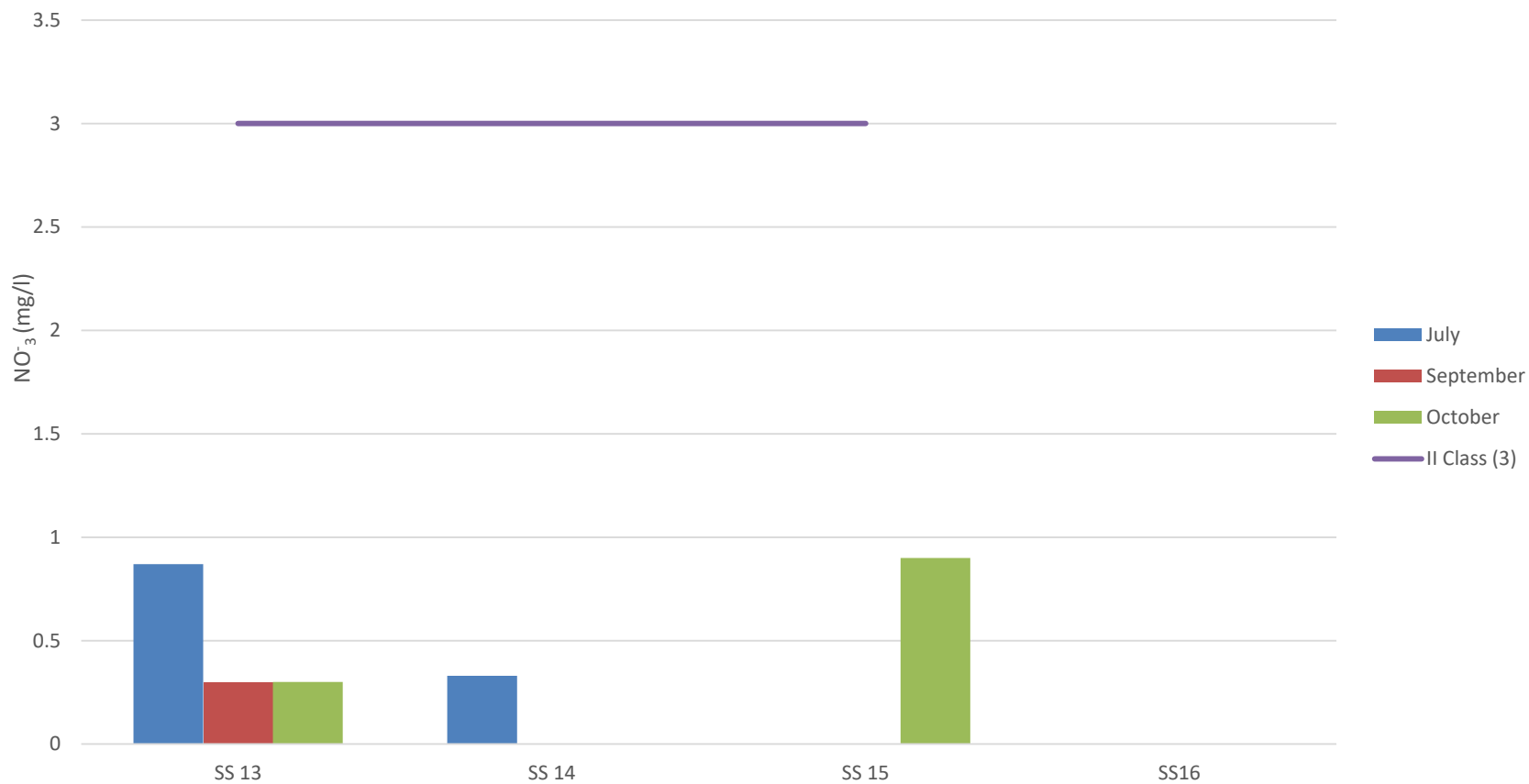
### Amonium ion

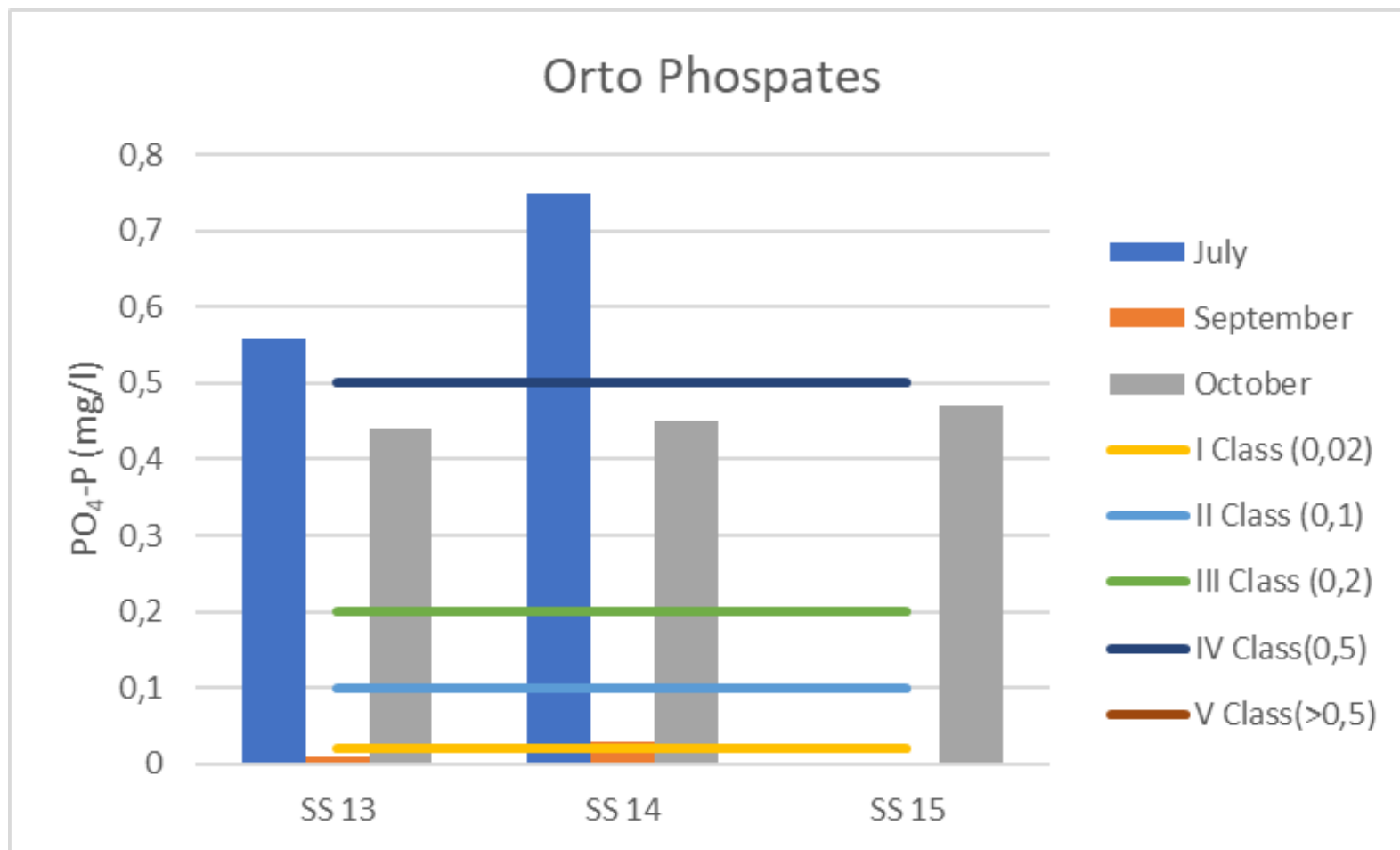


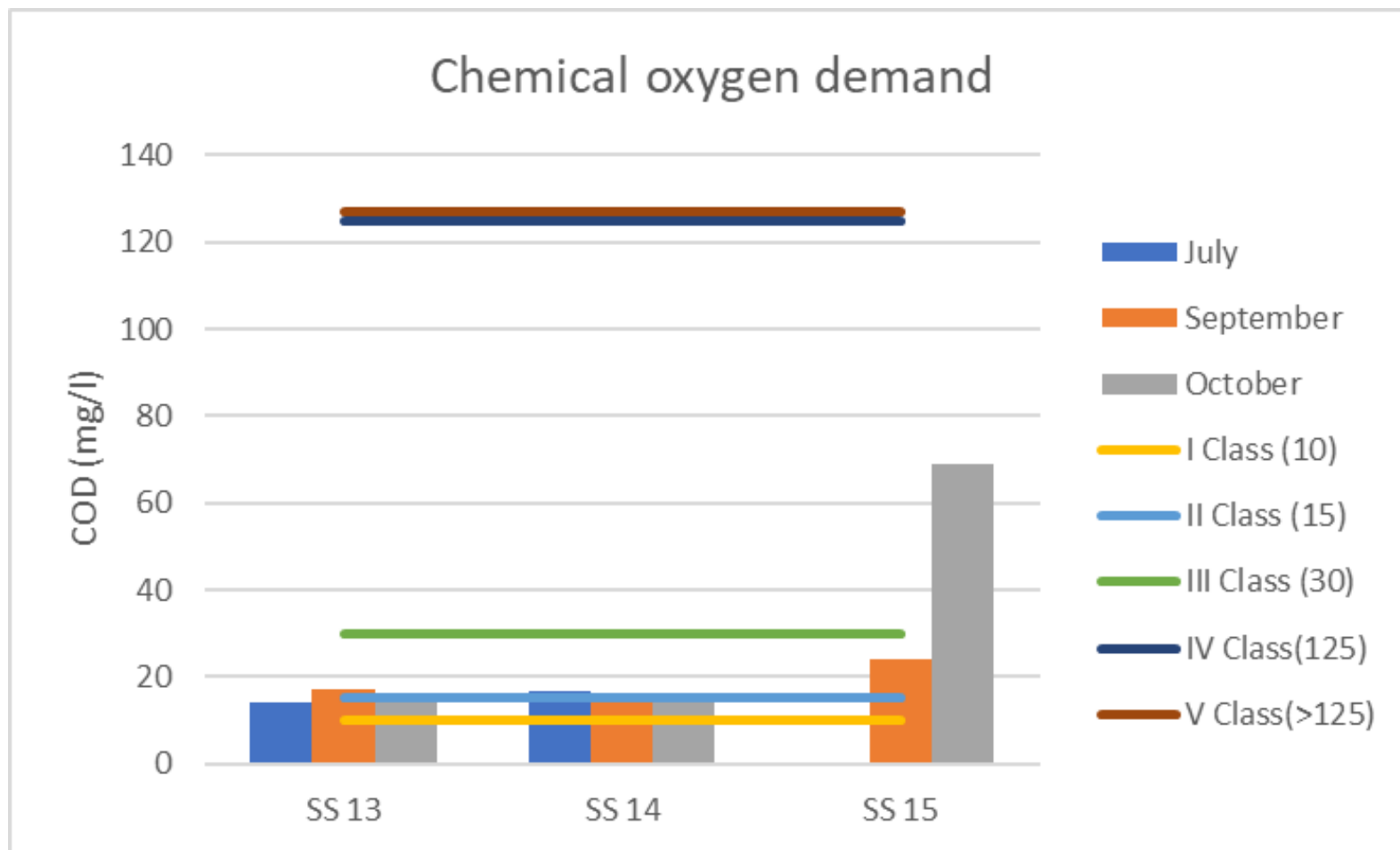
## Nitrites

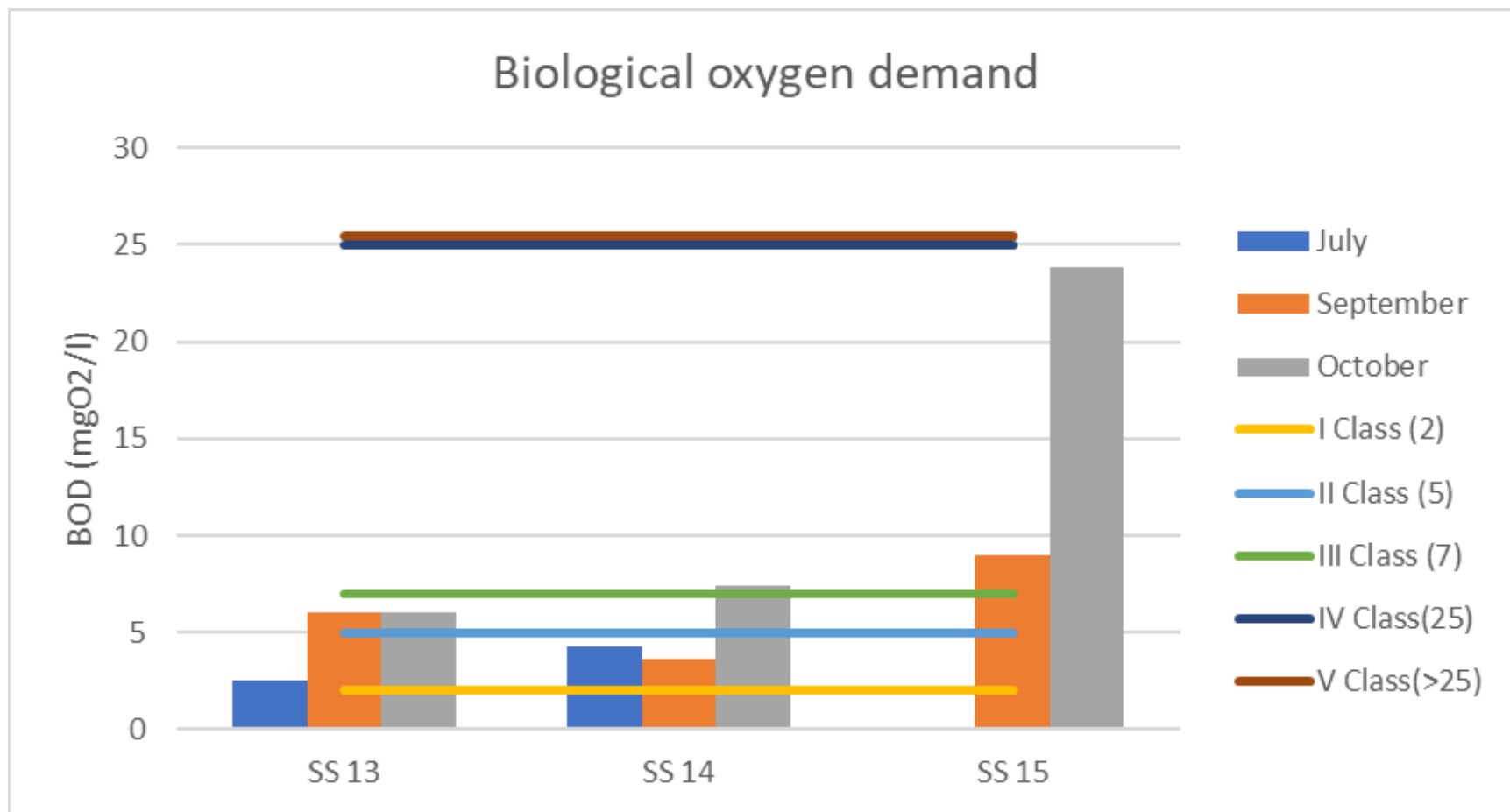


### Nitrates

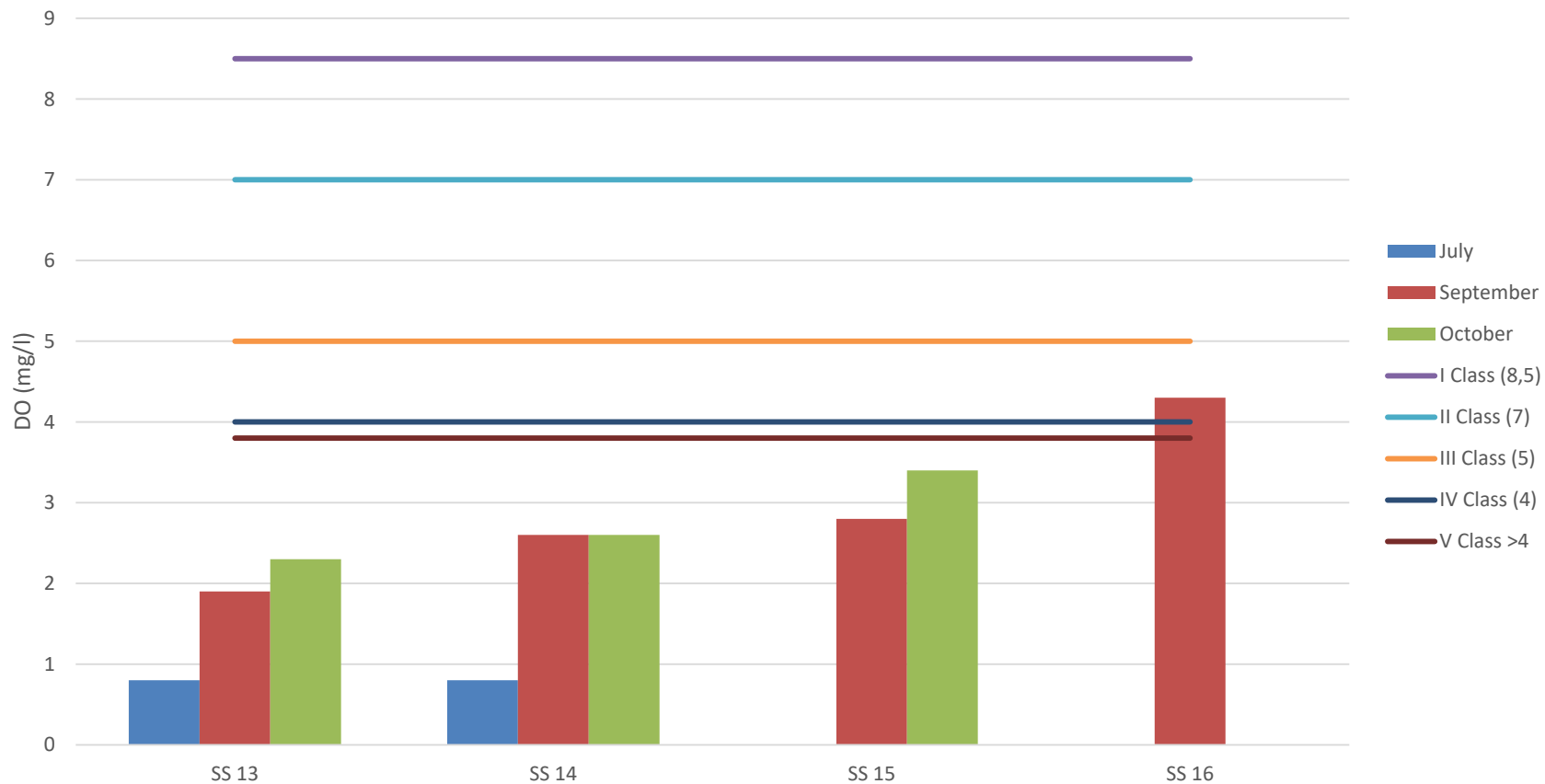








### Disolved Oxigen



- Metals concentration in surface waters

### Arsenic

- Arsenic was detected only in July. In sample S13 were detected 37,30 µg/l, and in S14 22,64 µg/l. In all samples taken during the monitoring campaigns in September in October concentration of As were below instrument detection limit (0,0041mg/l).

### Cadmium, Cobalt, Mercury, Copper and Nickel

- In all samples concentration of these metals were below instrument detection limit (DL: Cd-0,0019mg/l, Co-0,021mg/l, Hg-0,0378mg/l, Co-0,006 mg/l, Ni-0,0025 mg/l).

### Lead

- Maximal allowed concentration (MAC) for lead is 14mg/l. Concentration measured at all measurement sites were extremely low or below the instrument detection limit (0,0013mg/l). Maximal lead concentration (31,88 µg/l) were measured at SS14 in October.



