EL CEIBO STREAM UNDER THE MICROSCOPE:

Impact of human activity on an aquatic ecosystem

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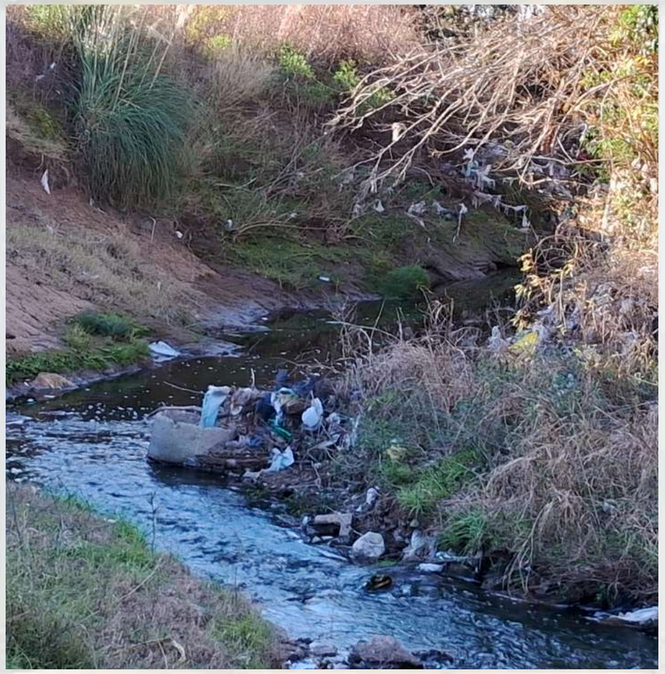
INTRODUCTION



El Ceibo Stream

Municipal Landfill

Huarte SA Slaughterhouse

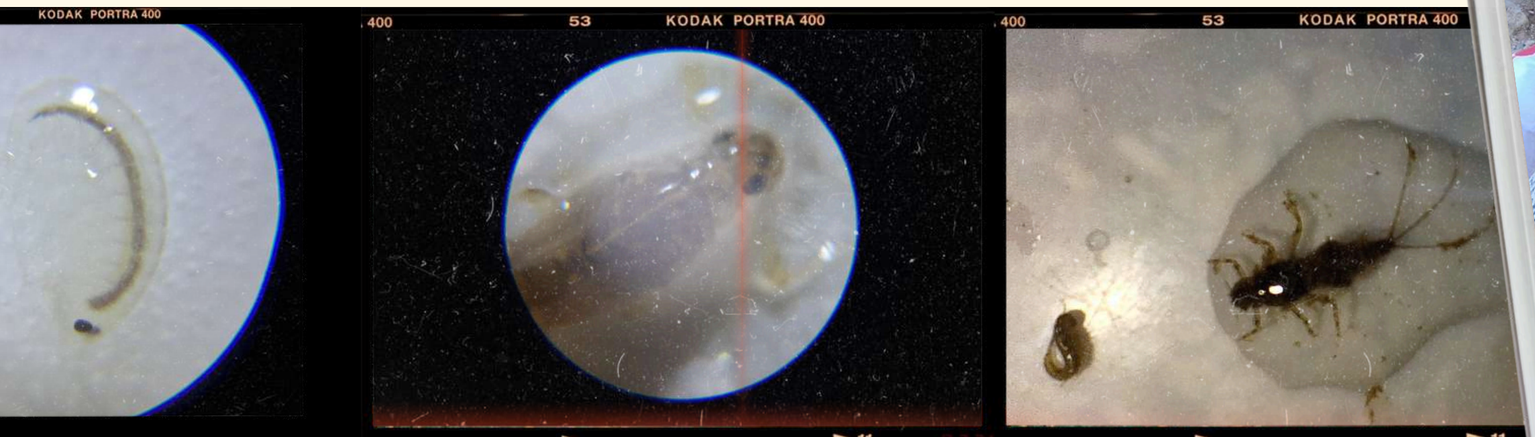
ASSESSED THE WATER QUALITY USING GLOBE PROTOCOLS


Site 3
Abadía del Niño Dios
Site 2
Municipal Slaughterhouse
Site 1
Huarte SA Slaughterhouse
Municipal Landfill
Victoria
Victoria del Agua

RESEARCH QUESTIONS

DO THE WATERS OF EL CEIBO STREAM PRESENT BIOCHEMICAL MODIFICATIONS AS THEY PASS THROUGH THE URBAN AREA OF THE CITY OF VICTORIA, ENTRE RÍOS, ARGENTINA?

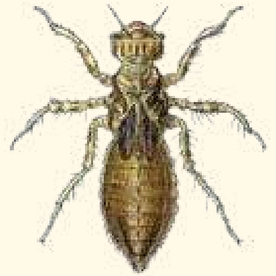
HOW DO MACROINVERTEBRATES VARY ALONG THE STUDIED SECTION OF THE STREAM?



HYPOTHESES

THE WATERS OF EL CEIBO STREAM PRESENT BIOCHEMICAL MODIFICATIONS FROM THEIR ENTRY INTO THE CITY OF VICTORIA, ENTRE RÍOS, ARGENTINA, TO THEIR EXIT.

MACROINVERTEBRATE SPECIES DIFFER ACCORDING TO HABITAT TYPE.



THE NUMBER OF MACROINVERTEBRATE TAXA VARIES ALONG THE STUDIED SECTION OF EL CEIBO STREAM.

• GENERAL OBJECTIVE

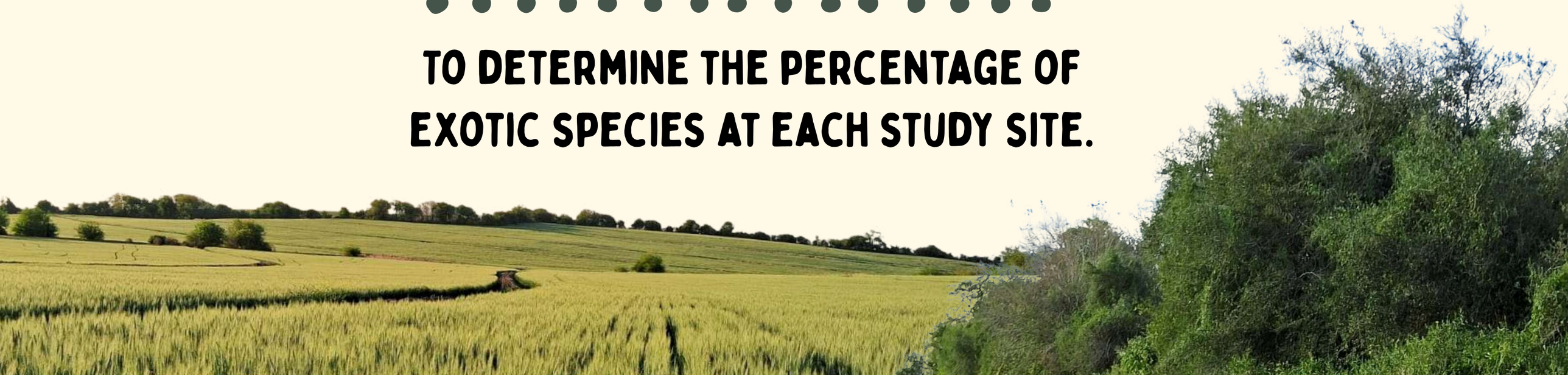
TO CHARACTERIZE THE WATER QUALITY OF EL CEIBO STREAM THROUGH THE ANALYSIS OF PHYSICOCHEMICAL AND BIOLOGICAL VARIABLES.

SPECIFIC OBJECTIVES

TO COMPARE BIOCHEMICAL CHARACTERISTICS OF EL CEIBO STREAM WATER IN THREE SECTIONS ALONG ITS COURSE.

TO EVALUATE TREE SPECIES IN THE AREA SURROUNDING THE STREAM.

TO DETERMINE THE PERCENTAGE OF EXOTIC SPECIES AT EACH STUDY SITE.



Different GLOBE protocols were used in the methodology:

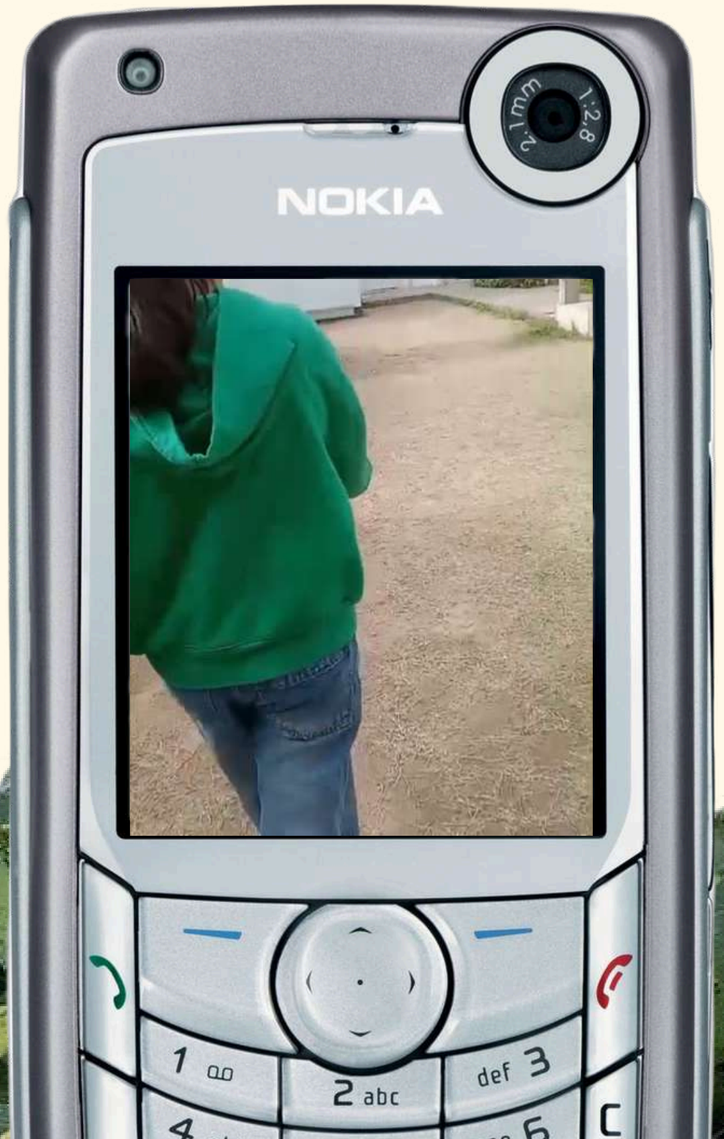
Biosphere protocols

Hydrosphere protocols

Pedosphere protocols

MESSAGES now

Atmosphere protocols



sampling macro-invertebrates

collecting samples

implementing the transparency protocol

checking the stream bank fertility and pH

DATA SUMMARY AND ANALYSIS OF RESULTS

Table 1. Results of the chemical analyses of the water from the three study sites.
CAA: *Argentine Food Code*

Analytical Determinations	Site 1	Site 2	Site 3	Required values for drinking water according to Article 982 (CAA)
Nitrates – ppm NO3-	1,7	1,83	3,75	máx. 45 ppm
Nitrites - ppm NO2-	0,053	0,04	0,546	máx. 0.10 ppm
Ammonium - ppm	0,23	0,3	0,5	máx.: 0,20 ppm
DBO	5	N/D	0,4	

Source: Vivot-Gieco Water Laboratory of the National University of Entre Ríos -Argentine

Table 2. Results of the GLOBE protocols used according to the season of the year

Site Name	Date	Season of the Year	pH	Transparency	Water Temperature (°C)	Air Temperature (°C)	Cloud Cover (%)
Site 1	30/6/2025	Fall	7,9	120	3,3	5	10
	20/10/2025	Spring	7,7	85,83	15,3	24	0
Site 2	2/6/2025	Fall	8.3	99,33	9,67	12	0
	3/11/2025	Spring	8,2	109,17	22	20	50
	10/11/2025		7,9	52,07	18	19	0
Site 3	9/6/2025	Fall	8,4	79,53	6,33	7	0
	27/6/2025		8,5		1	13	0
	15/10/2025	Spring	7,9	42,67	20	26	80

Source: Own authorship

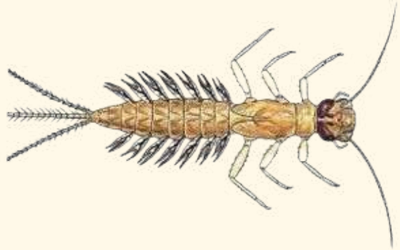


Table 3. Comparison of macroinvertebrate taxa at each study site and at each sampling location (riffle and pool). The total number of individuals recorded is also indicated

ORDER/FAMILY	SITE 1		SITE 2		SITE 3	
	Corredera	Poza	Corredera	Poza	Corredera	Poza
Amphipoda-Hyalellidae	7	66	2	13	16	90
Bivalvia-Sphaeriidae				3		
Coleoptera			1			
Coleoptera-Noteridae		1				
Coleoptera-Scirtidae		22				
Diptera			5			
Diptera-Chironomidae		3	3			5
Diptera-Culicidae	3					
Diptera-Simuliidae						
Ephemeroptera-Baetidae	68	28	26		6	
Ephemeroptera-Caenidae		2				12
Ephemeroptera-Leptophlebiidae				21		
Ephemeroptera-Prosopistomatidae				1		
Gastropoda-Ancylidae		8				
Gastropoda-Physidae					3	1
Hemiptera-Corixidae				1		17
Hirudinea		12	2	1	2	12
Megaloptera-Corydalidae		1				
Odonata		2				
Plecoptera-Diamphinoidae						2
Rombidiformes-Hydracarina				1		
Tricoptera (vida libre)	4	2		2		
Tricoptera-Hydropsychidae			24			
Totales	82	147	63	43	27	139

Source: Own authorship

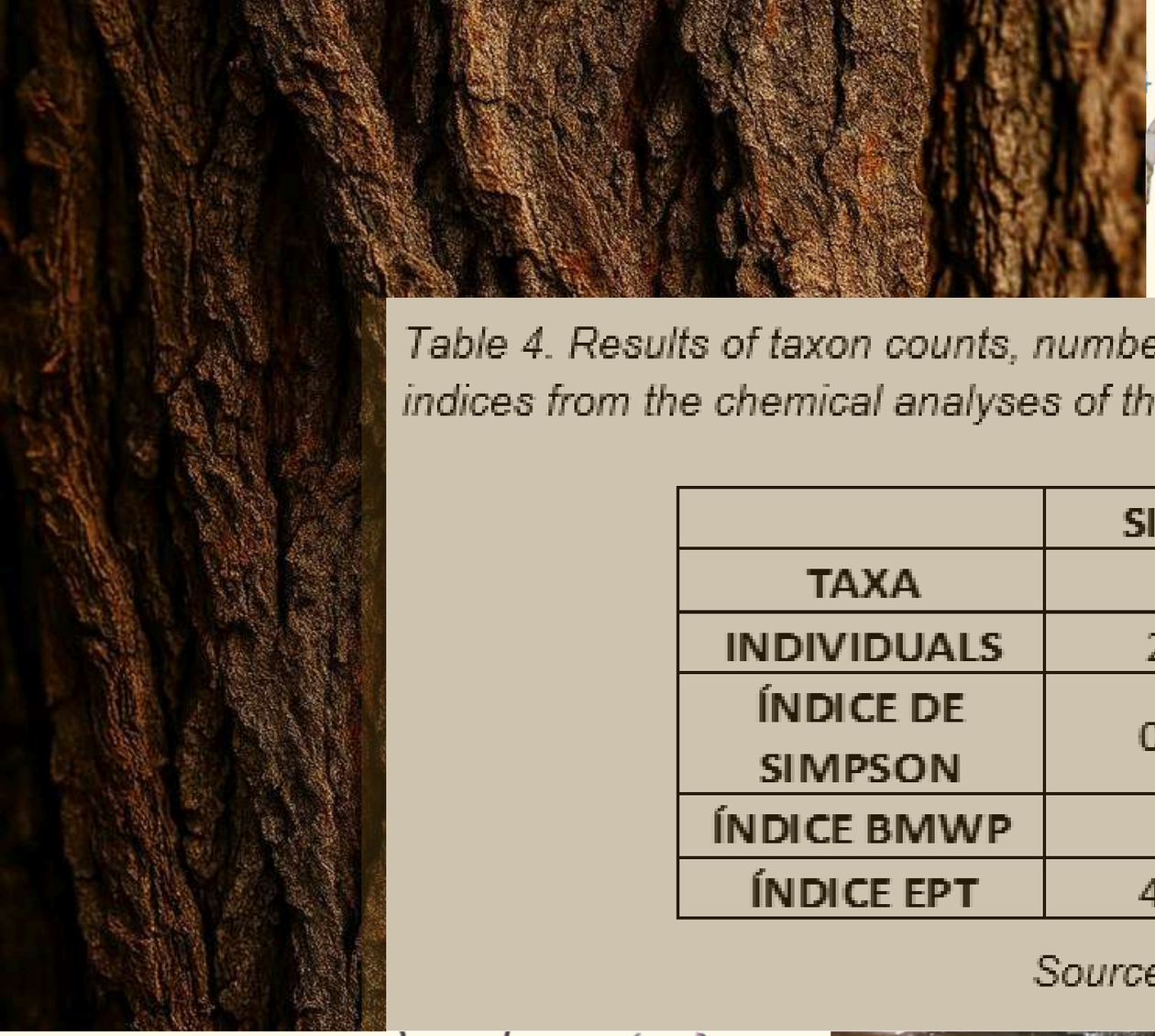


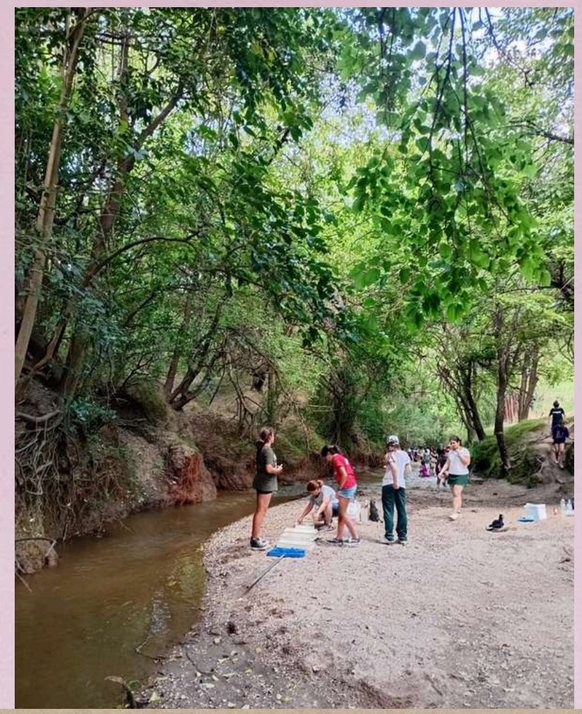
Table 4. Results of taxon counts, number of individuals, and biodiversity and water quality indices from the chemical analyses of the water at the three study sites.

	SITE 1	SITE 2	SITE 3
TAXA	12	14	8
INDIVIDUALS	229	106	166
ÍNDICE DE SIMPSON	0,71	0,83	0,57
ÍNDICE BMWP	61	55	38
ÍNDICE EPT	45%	49%	12%

Source: Own authorship

DISCUSSION

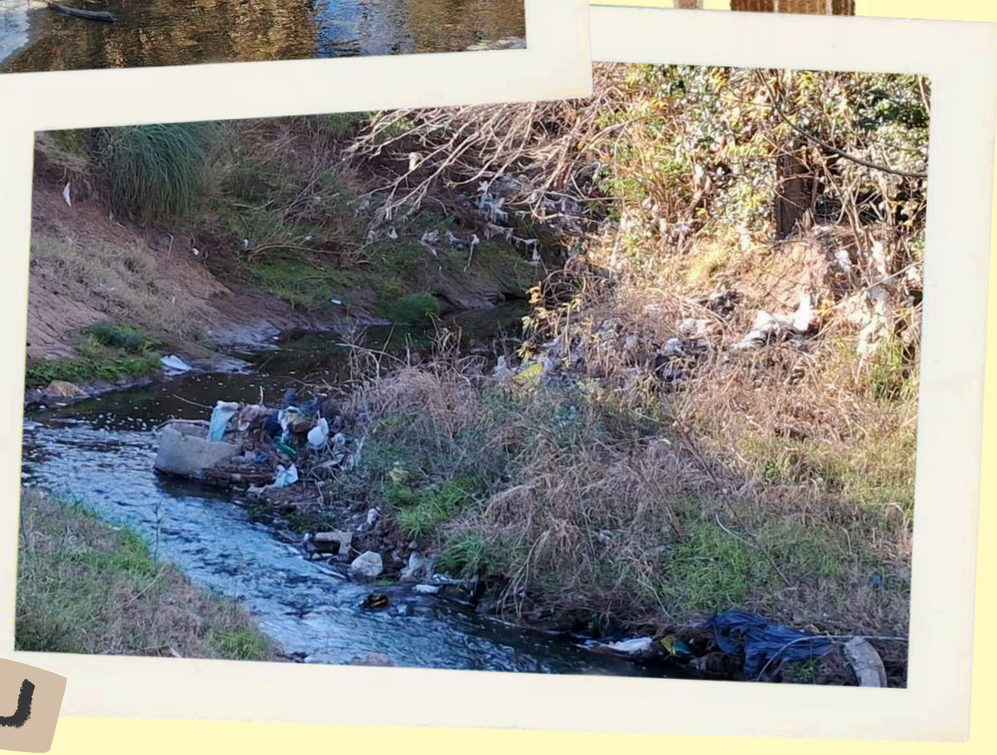
CONCLUSION



THE STREAM REQUIRES ATTENTION, MONITORING, AND PREVENTIVE ACTIONS.

Site 1

corresponding to the rural area, the solid waste was not observed

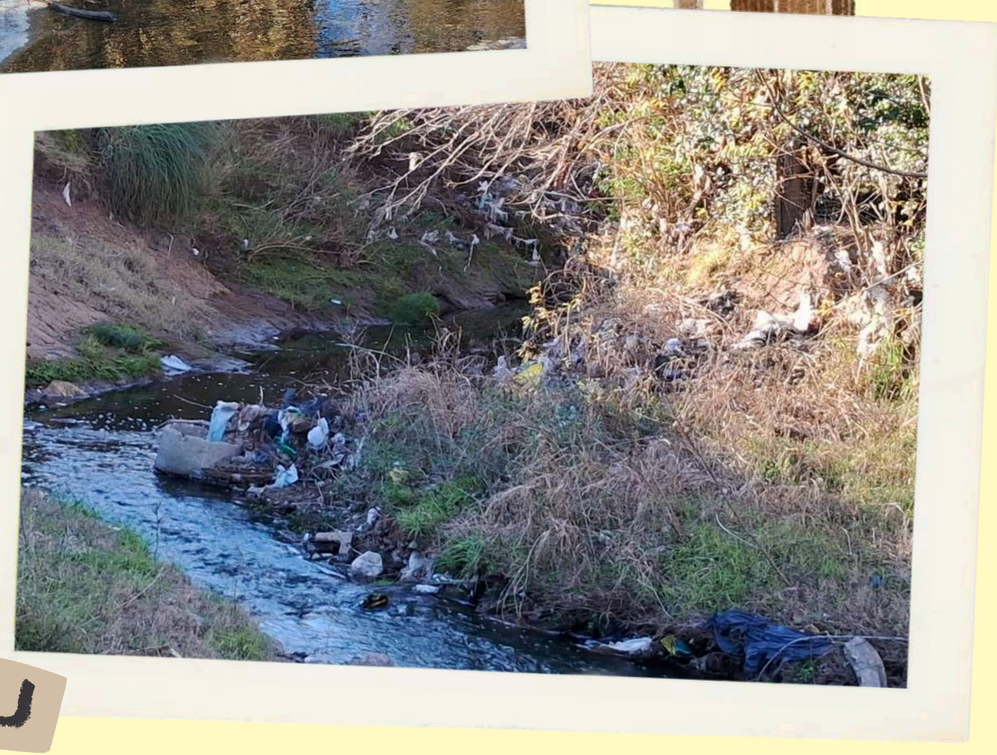


Site 3

in the urban area, presence of solid waste of anthropogenic origin can be observed

Site 1

corresponding to the rural area, the solid waste was not observed



Site 3

in the urban area, presence of solid waste of anthropogenic origin can be observed

System message

How was the experience for some of the students in the project?

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Irupé: “Before doing the macroinvertebrates identification, I didn't know there were a lot of different types of organisms living in the river, and now I know there are a lot of them, and they are so important for the environment.”

Emilia: “Well, my experience was very adventurous and exciting. I had never noticed the life in the rivers. I felt like a National Geographic scientist!”


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STREAMS ARE SOURCES OF LIFE.
TO CARE FOR THEM IS TO RECONIZE OURSELVES
AS PART OF THE EARTH,
SHARING LIFE
WITH COUNTLESS UNSEEN BEINGS.