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Electronic Supplementary File 1

Table S1. Physico-chemical water parameter definitions.

Water Parameters	Abbreviation	Unit	Definition
Hydrogen potential <i>In situ</i>	pH <i>In situ</i>	/	The hydrogen ion activity of the water column, measured directly at the sampling point using a calibrated probe. pH governs the speciation of dissolved constituents and the bioavailability of essential nutrients, with deviations from neutrality progressively constraining aquatic metabolic processes (Seifi & Riahi 2020).
Dissolved oxygen <i>In situ</i>	DO <i>In situ</i>	mg/L	The concentration of molecular oxygen freely dissolved in the water column, quantified at the sampling site without prior sample manipulation. Dissolved oxygen constitutes a master indicator of aquatic ecosystem health; its depletion below critical thresholds signals organic enrichment, elevated biological oxygen demand, or reduced photosynthetic activity (Díaz & Rosenberg 2008).
Electrical conductivity <i>In situ</i>	EC <i>In situ</i>	μS/cm	A field measurement of the water's ability to transmit electrical current, expressed in μS/cm. Electrical conductivity serves as a proxy for the total dissolved ion load and overall mineralisation of the water body, increasing proportionally with ionic concentration (Kaushal & al. 2021).

Temperature <i>In situ</i>	T	°C	Water temperature, recorded in degrees Celsius directly at the sampling point. As a master abiotic variable, temperature governs the solubility of dissolved gases, modulates the kinetics of biogeochemical reactions, and exerts a controlling influence on the metabolic rates and phenological cycles of aquatic organisms (Parmesan & al. 2022).
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Table S2. Sensorial and physiographic characteristics measured.

Characteristic	Abbreviation	Unit	Scale and Ranks
Hydrological regime	Hyd	/	1 = Permanent, 2 = Semi-permanent, 3 = Temporary
Color	Col	/	1 = No abnormal change, 2 = Yellowish, 3 = Brown
Smell	Sml	/	1 = Absence, 2 = Presence
Distance from agglomeration	Dist	Km	1 = <5, 2 = 5–7.4, 3 = 7.5–10, 4 = >10
Surface area	Sur	Ha	1 = <50, 2 = 50–150, 3 = 151–300, 4 = >300
Altitude	Alti	m	1 = <5, 2 = 5–10, 3 = 11–20, 4 = >20
Temporality and facies	Tmp and facs	/	1 = st (temporary stagnation), 2 = sp (permanent stagnation), 3 = ct (temporary current)
Perimeter	Per	Km	1 = <4, 2 = 4–8, 3 = 9–12, 4 = >12
Slope	Slo	%	1: <5%, 2: <5–10%, 3: >10%
Depth	Dep	cm	1 = <50, 2 = 51–100, 3 = 101–200, 4 = 201–300, 5 = >300
Exposure	Expo	/	1 = East, 2 = North-east, 3 = South-west, 4 = South-east
Woody and herbaceous species cover rate	Wspr	%	1 = 25–50%, 2 = 51–75%, 3 = 76–100%
Grazing, fire and agricultural activity	Gra, Fire and Agr	/	1 = absent, 2 = minimal activity, 3 = slight activity

Pumping	Pum	/	1 = absent, 2 = minimal activity, 3 = slight activity
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Table S3. Benthic macrophytes of high patrimonial value recorded in the Guerbes-Senhadja wetland complex.

Taxon	Rarety	Law 2012	IUCN 2026
<i>Ceratophyllum submersum</i> L.	VR	P	LC
<i>Lemna gibba</i> L.	R		LC
<i>Lemna trisulca</i> L.	R		LC
<i>Ludwigia palustris</i> (L.) Elliott	VR	P	LC
<i>Myriophyllum alterniflorum</i> DC.	R		
<i>Nitella opaca</i> (Bruzellius) C. Agardh	R		
<i>Nymphaea alba</i> L.	VR	P	
<i>Nymphoides peltata</i> (S.G. Gmel) Kuntze	VR*		
<i>Potamogeton lucens</i> L.	R		LC
<i>Salvinia natans</i> (L.) All.	VR	P	LC
<i>Utricularia australis</i> R. Br.	R	P	LC
<i>Utricularia gibba</i> L.	VR	P	LC
<i>Veronica anagalloides</i> Guss.	R		
<i>Wolffia arrhiza</i> (L.) Horkel ex Wimm.	VR	P	LC

R: Rare; VR: Very Rare; *: Modified rarity status based on our own field observations; P: Protected; LC: Least Concern.

Table S4. Physico-chemical, sensorial and physiographic characteristics measured.

Site	Hyd	Tmp and facs	Color	Smell	Wspr (%)	Gra, Fire and Agr	Pum	Mean pH±SD pH	Mean DO±SD DO (mg/L)	Mean EC±SD EC (µS/cm)	Mean Temp±SD Temp (°C)
DAT	Permanent	Permanent stagnation	Brown	Presence	80	Slight activity	Slight activity	6.848±0.059	3.697±0.74	392±10.44	24.467±1.7
GBM	Semi-permanent	Temporary current	No abnormal change	Absence	45	Minimal activity	Absence	8.372±0.96	6.722±0.42	1391±2	31.722±0.6
GCH	Permanent	Permanent stagnation	Brown	Presence	70	Slight activity	Slight activity	7.052±0.125	3.612±0.577	509.333±3.055	25.122±0.577
GHT	Permanent	Permanent stagnation	Brown	Absence	85	Absence	Minimal activity	7.147±0.04	3.967±0.097	1865±1.732	24.789±0.153
GKH	Semi-permanent	Temporary stagnation	Yellowish	Absence	40	Slight activity	Slight activity	8.637±0.257	3.723±0.283	888.667±6.506	24.9±0.404
GOU	Temporaire	Temporary stagnation	Brown	Presence	70	Slight activity	Slight activity	6.862±0.088	4.51±0.678	3.117±0.006	24.089±0.3
GSM	Permanent	Permanent stagnation	Brown	Presence	65	Slight activity	Slight activity	7.559±0.382	6.043±1.054	428.667±15.044	26.9±0.436
LSF	Permanent	Permanent stagnation	Brown	Presence	45	Slight activity	Slight activity	8.863±0.167	9.62±0.034	458±29.513	30.5±0.208
GHA	Semi-permanent	Temporary current	No abnormal change	Absence	40	Minimal activity	Absence	7.343±0.345	3.197±1.063	567±13.229	24.054±0.603

Hyd: Hydrological regime; Tmp and facs: Temporality and facies; Col: Color; Sml: Smell; Wspr: Woody and herbaceous species cover rate (% Category: 1 = 25–50%, 2 = 51–75%, 3 = 76–100%); Gra, Fire and Agr: Grazing, fire and agricultural activity; Pum: Pumping, Mean DO±SD DO (mg/L): Dissolved oxygen; Mean EC±SD EC (µS/cm): Electrical conductivity; Mean Temp±SD Temp (°C): Temperature.

Table 7. Quantitative values of other environmental variables.

Site	Hyd	Col	Sml	Dist (Km)	Sur (Ha)	Alti (m)	Tmp & facs	Per (Km)	Slo (%)	Dep (cm)	Expo	Wspr (%)	Gra, Fire and Agr	Pum
DAT	1	3	2	2	3	1	2	3	2	5	4	3	3	3
GBM	2	1	1	3	4	1	3	4	1	2	2	1	2	1
GCH	1	3	2	1	1	3	2	1	1	5	1	2	3	3
GHT	1	3	1	1	2	4	2	3	3	5	1	3	1	2
GKH	2	2	1	1	1	3	1	1	2	3	3	1	3	3
GOU	3	3	2	1	1	3	1	1	1	2	4	2	3	3
GSM	1	3	2	1	1	2	2	2	1	5	2	2	3	3
LSF	1	3	2	1	2	4	2	2	2	4	2	1	3	3
GHA	2	1	1	4	3	1	3	3	1	1	1	1	2	1

Hyd: Hydrological regime; Col: Color; Sml: Smell; Dis: Distance from agglomeration; Sur: Surface area; Alti: Altitude; Temp & facs: Temporality and facies; Per: Perimetre; Slo: Slope; Dpth: Depth; Exp: Geographical Exposure; Wspr: Woody and herbaceous species cover rate; Graz, Fir & Agra: Grazing, Fires & Agricultural activity; Pum: Pumping.