

SUPPLEMENTARY MATERIAL

Sewage management threaten protected Nature 2000 habitats in the Plonia River catchment – North-Western Poland

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Table S1. Characteristics of sewage treatment plants in the Płonia River catchment area in 2019 (the location of facilities within the catchment area is marked in Figure 1)

Signature	Type of sewage	Sewage recipient / final recipient	Type of treatment plant	Annual amount of sewage discharged (m ³)
A	municipal sewage	drainage ditch / Płonia River	biological	7,164
B	municipal sewage	drainage ditch / Płonia River	mechanical-biological	33,553
C	agricultural sewage	drainage ditch / Zaborsko Lake	out of order	–
D	municipal sewage	drainage ditch	rinse water from the water intake / no sewage treatment plant	1,855
E	municipal sewage	drainage ditch / Zaborsko Lake	mechanical-biological	10,356
F	municipal sewage	drainage ditch / Będgoszcz Lake	mechanical-biological	25,542
G	municipal sewage	drainage ditch / Babiński Channel	mechanical-biological-chemical	47,220
H	municipal sewage	pipeline / channel / the Sicina River	biological	1,852,029
I	salt water	lagoons / the Sicina River	no sewage treatment plant	1,382
J	municipal sewage	pipeline / drainage ditch / Płoń Lake	mechanical-biological-chemical	22,152
K	municipal sewage	drainage ditch / Płoń Lake	mechanical-biological	16,193
L	municipal sewage	drainage ditch / Płoń Lake	mechanical-biological	8,868
M	municipal sewage	pipeline / inflow from Lake Barlineckie / the Płonia River	mechanical-biological-chemical	1,050,898
N	municipal sewage	Płoń Lake inflow	biological	n.d.
O	municipal sewage	Lubiatowski Channel	out of order	–
P	municipal sewage	Lubiatowski Channel / Zaborsko Lake	biological	n.d.
R	municipal sewage	pumping channel Grzędziec	out of order	–
S	municipal sewage	Miedwie Lake	out of order	–
T	municipal sewage	Kunowski ditch	out of order	–
U	municipal sewage	Gowienica River	mechanical-biological	6,228
V	municipal sewage	Gowienica River	mechanical-biological	49,874
W	municipal sewage	Gowienica River	mechanical-biological	4,263
X	municipal sewage	drainage ditch / Płonia River	biological	n.d.

Explanation: n.d. = no data.

Source: own study.

Table S2. Assessment of parameters for the habitat 3140

Parameter	Indicator	Lake (transect)			
		Żydowo	Modre Kłociowisko	Koryto	Miedwie (12)
Area		FV	FV	FV	FV
Specific structure and functions	share of <i>Chara</i> spp. (%)	U1	FV	FV	U2
	characteristic species	FV	FV	FV	U2 (5 transects – U1, 7 transects – U2)
	species indicating habitat degradation, including invasive alien species	FV	FV	FV	U1 (4 transects – FV, 5 transects – U1, 3 transects – U2)
	pH (auxiliary indicator)	FV	FV	FV	FV
	EC	FV	FV	FV	FV
	plankton: zooplankton	XX	XX	XX	U1
Protection perspectives		U1	U1	U1	U2
Overall rating		FV	FV	FV	U2

Explanations: FV = favourable state, U1 = unfavourable – inadequate state, U2 = unfavourable – bad, XX = not analysed, EC = electrolytic conductivity.

Source: own study.

Table S3. Assessment of parameters for the habitat 3150

Parameter	Indicator	Lake (transect)									
		Będgoszcz (5)	Zaborsko	Szybel	Płoń	Racze	Plonno	Żelewko	Elżbietka	Sitnik	Trzcinnno
Area		FV	FV	FV	FV	FV	FV	FV	FV	FV	FV
Specific structure and functions	water colour	U2	U2	U1	U2	FV	FV	FV	FV	FV	U1
	characteristic combination of communities within the transect	U1	U1	U1	U2	U1	U1	U1	FV	U1	U2
	species indicating habitat degradation, including invasive alien species	FV	FV	FV	FV	FV	FV	FV	FV	FV	FV
	water transparency	U1	U1	U1	U2	FV	U1	FV	FV	U1	U2
	EC	U1	U2	U1	FV	FV	U1	FV	FV	XX	FV
	plankton	U1	XX	XX	U2	XX	XX	XX	XX	XX	XX
	pH (auxiliary indicator)	FV	U1	FV	U1	FV	FV	FV	FV	FV	FV
Protection perspectives		U1	U1	U1	U1	U1	U1	U1	FV	U1	U1
Overall rating		U2	U2	U1	U2	U1	U1	U1	FV	U1	U2

Explanations as in Tab. S2.

Source: own study.