Supplementary Materials

Table S1. Description of study plots.

Characteristics	Study Plots			
	P1	P1control [P1c]	P2	P2control[P2c]
Location/ Forest compartment*	233b FWTP	272i	233c FWTP	306 a-99
Stand composition/ Share of the species in the study plot [by crown cover]	Scots pine 100%	Scots pine 100%	Scots pine 100%	Scots pine 70%, European oak 20%, Birch 10%
The age of the pine trees/				
Forest habitat	Oligotrophic Mixed Coniferous Forest			
Soil type	Brunic Arenosols	Albic Podzols	Brunic Arenosols	Eutric/Dystric Brunic Arenosols
Stand density before starting FWTP* in 2020	Fully stocked stand			
	Understocked stand	Fully stocked stand	Understocked stand	Fully stocked stand
Tree height [m]	25	30	26	29 m
The degree of damage to the stand [%]	50%	0%	40%	0%

Explanation: * Data source: https://www.bdl.lasy.gov.pl/portal/mapy; **FWTP – The Forest Wastewater Treatment Plant [FWTP], data about stand density in years before starting FWTP based on Forest Management Plan for Iława Forest District (In Polish) and Habitat Elaborate for Iława Forest District (archival materials in the Iława Forest District).
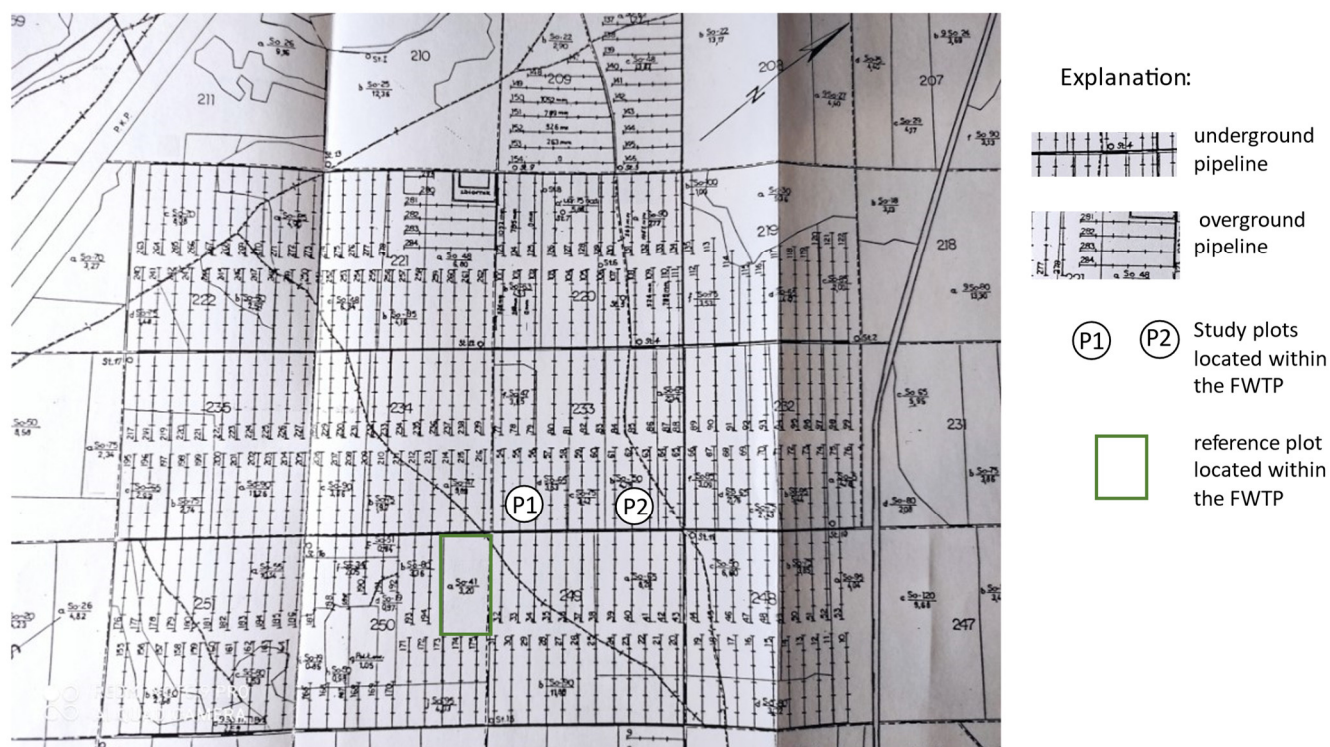

Figure S1. Layout diagram of pipelines in the Forest Wastewater Treatment Plant [FWTP], (source: Iława Forest District).
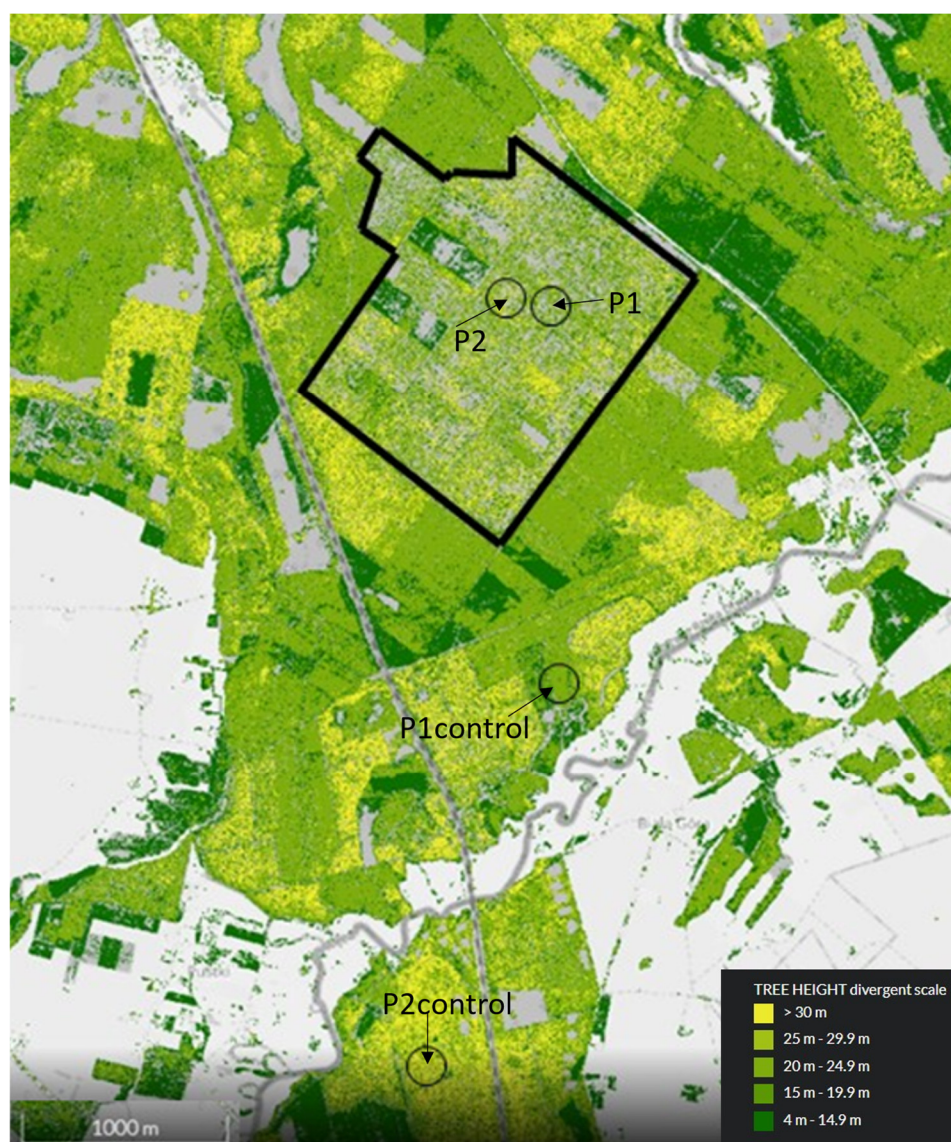
Figure S2. The local tree crown map for the Forest Wastewater Treatment Plant and adjacent forest areas (current condition, research plots are marked with circles, the density of pixels reflects the density of the stand (source: https://mytreemap.com/).
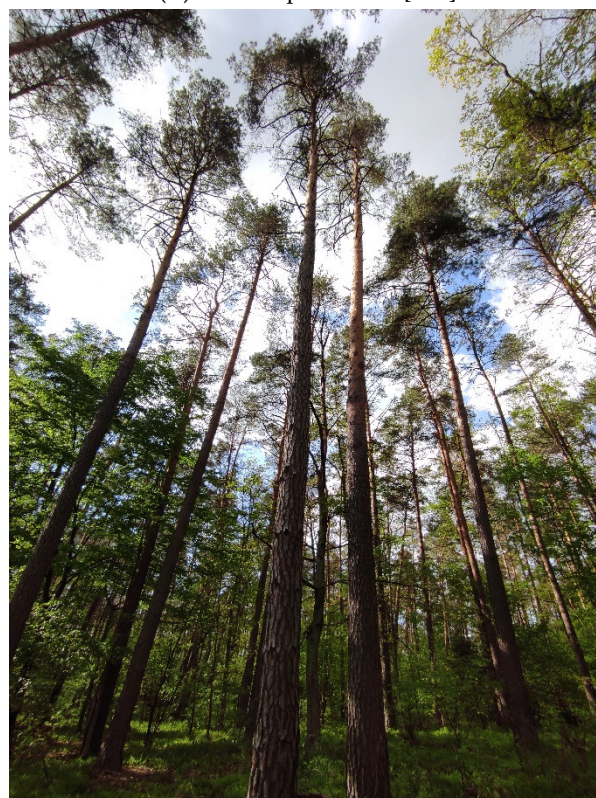
(**a**) Study plot No.1 [P1]

(**b**) Control plot for P1 [P1c]

(**c**) Study plot No.2 [P2]

(**d**) Control plot for P2 [P2c]

Figure S3. Photos of study plots (**a–d**) (May 2020), all photos J. Lendzion, the arrow marks the traces of the pipeline.

Table S2. The basic dendrochronological statistics of Scots pine at research plots in different period**s.**

Parameter	Characteristics	Study plots							
		Plot 1 [P1]				Control plot - P1c			
		1945-2020	1960- 1984	1985-1995	1996-2012	1945-2020	1960 1984	1985-1995	1996-2012
Tree-ring width TRW	Mean [mm]	1.86	1.78	2.13	**1.11****	2.34	1.89	1.94	**2.17****
	Series intercorrelation	0.691	0.742	0.49	0.574	0.533	0.527	0.503	0.404
	Mean sensitivity	0.266	0.24	0.221	0.346	0.257	0.286	0.211	0.178
	Standard deviation	0.967	1.011	0.558	0.511	1.213	1.47	0.43	0.556
	Autocorrelation	0.785	0.727	0.347	0.579	0.721	0.707	0.39	0.452
Earlywood EW	Mean [mm]	1.22	1.05	**1.36****	**0.72****	1.45	1.12	**1.03****	**1.16****
	Series intercorrelation	0.652	0.706	0.342	0.311	0.44	0.464	0.493	0.372
	Mean sensitivity	0.315	0.307	0.232	**0.361**	0.301	0.344	0.193	0.287
	Standard deviation	0.877	1.038	0.326	0.357	1.221	1.572	0.301	0.478
	Autocorrelation	0.78	0.752	0.395	0.537	0.765	0.344	0.271	0.352
	Share in TRW [%]	65.81	58.86	**63.56****	**64.37****	62.09	59.09	**53.39****	**53.38****
Latewood LW	Mean [mm]	0.64	0.73	0.78	**0.40****	0.89	0.77	0.90	**1.01****
	Series intercorrelation	0.576	0.55	0.43	0.595	0.602	0.526	0.68	0.648
	Mean sensitivity	0.346	0.296	0.385	0.415	0.367	0.418	0.456	0.263
	Standard deviation	0.322	0.231	0.315	0.298	0.336	0.444	0.276	0.288
	Autocorrelation	0.526	0.292	0.067	0.546	0.31	0.185	0.323	0.264
	Share in TRW [%]	34.19	41.14	**36.4**	**35.63**	37.91	40.91	**46.61**	**46.62**
	LW/EW ratio	0.52	0.70	0.57	0.55	0.61	0.69	0.87	0.87
		Plot 2 [P2]				Control plot - P2c			
		1915-2020	1960- 1984	1985-1995	1996-2012	1915-2020	1960- 1984	1985-1995	1996-2012
Tree-ring width TRW	Mean [mm]	2.07	1.39	**2.05****	**1.32****	2.17	1.572	**1.456****	**1.84****
	Series intercorrelation	0.566	0.651	0.55	0.541	0.637	0.59	0.618	0.594
	Mean sensitivity	0.267	0.252	0.286	0.292	0.267	0.273	0.274	0.25
	Standard deviation	1.003	0.979	0.566	0.772	1.123	1.206	0.515	0.526
	Autocorrelation	0.757	0.688	0.342	0.737	0.786	0.752	0.206	0.523
Earlywood EW	Mean [mm]	1.19	0.823	**1.292****	**0.827****	1.4	0.911	**0.818****	**1.029****
	Series intercorrelation	0.53	0.554	0.262	0.498	0.584	0.611	0.55	0.532
	Mean sensitivity	0.315	0.312	0.274	0.334	0.314	0.339	0.308	0.255
	Standard deviation	0.854	0.893	0.343	0.49	0.933	1.055	0.359	0.301
	Autocorrelation	0.744	0.665	0.331	0.663	0.721	0.7	0.169	0.385
	Share in TRW [%]	63.30	59.02	63.06	**62.65****	64.52	57.58	56.17	**55.882****
Latewood LW	Mean [mm]	0.69	0.59	**0.73***	**0.49****	0.77	0.70	**0.66***	**0.81****
	Series intercorrelation	0.593	0.602	0.571	0.571	0.655	0.644	0.582	0.615
	Mean sensitivity	0.346	0.321	0.371	0.361	0.421	0.399	0.494	0.447
	Standard deviation	0.334	0.278	0.295	0.302	0.36	0.362	0.281	0.321
	Autocorrelation	0.558	0.461	0.156	0.315	0.397	0.383	0.117	0.346
	Share in TRW [%]	36.70	40.98	36.63	**36.89****	35.48	42.42	42.24	**43.98****
	LW/EW ratio	0.58	0.69	0.58	0.58	0.55	0.74	0.73	0.78

Asterisks indicate a significant difference amongst mean tree-rings widths of Scots pine on study plots; * represents that $0.01 < p\text{-value} < 0.05$; ** represents that $0 < p\text{-value} < 0.01$.
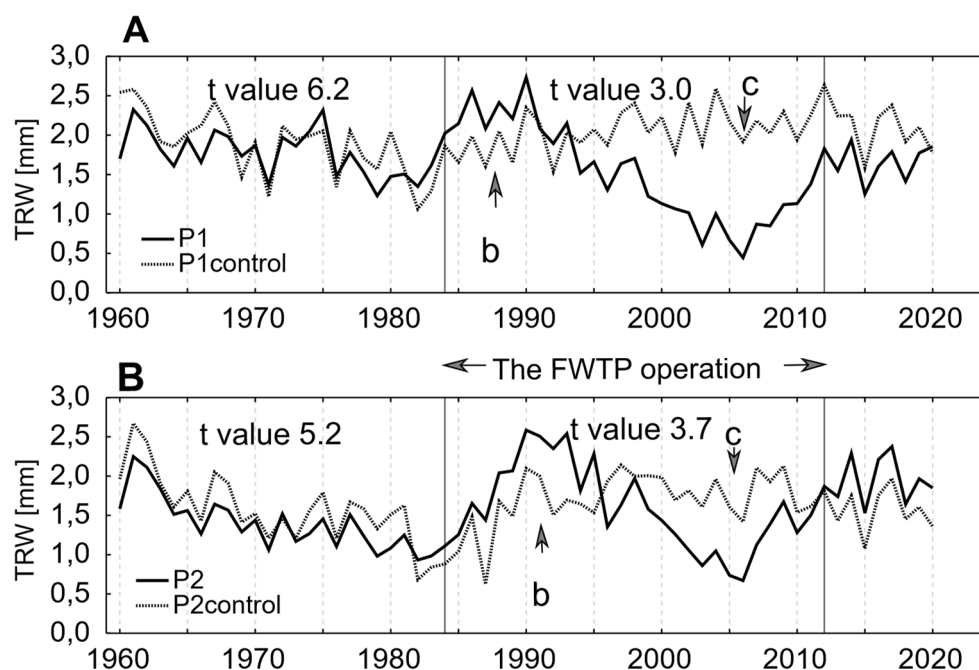
Figure S4. Comparison of raw chronologies of Scots pine from study plots. The vertical lines indicate the period of operation of the Forest Wastewater Treatment Plant [FWTP]; A–plots with younger trees; B–plots with older trees. the letters marked: b–the first decade of sprinkling with sewage of stands; c– subsequent years of the fertilization with sewage.
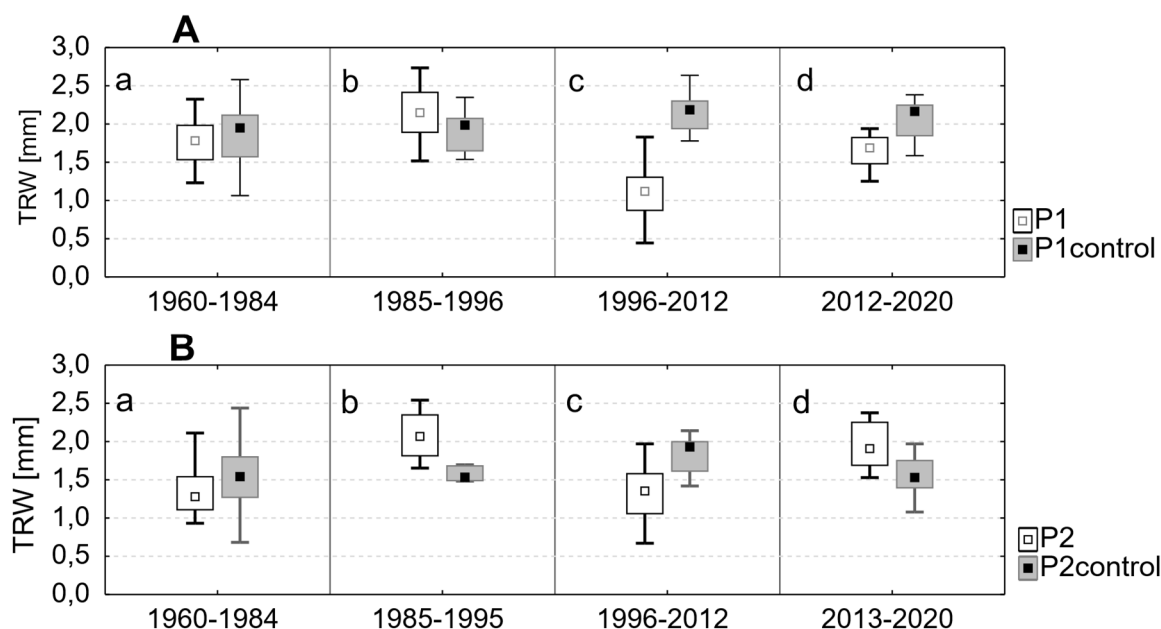

Figure S5. Mean tree-ring width [mm] of the study pines in the different tree growth periods: a – 25 years before the start of FWTP activity; b – the first 11 years of the FWTP operation; c– next years of the FWTP operation; d – years after the FWTP was closed. A–plots with younger trees; B–plots with older trees. Asterisks indicate a significant difference amongst mean tree-rings widths of Scots pine on study plots; * represents that 0.01 <p-value <0.05; ** represents that 0 <p-value <0.01. .