Supplementary Materials

Establishment of regional phytoremediation buffer systems for ecological restoration in the Great Lakes Basin, USA. I. Genotype × environment interactions

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Table S1. Dates of planting for each phytoremediation buffer system (i.e., phyto buffer) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA and the Lake Michigan watershed of eastern Wisconsin, USA. Buffer groups correspond to year of planting.

Phyto buffer	Date of planting
---------- *2017 Buffer group* ----------	
BW: Bellevue (West)	20 June 2017
CE: Caledonia (East)	22 June 2017
ME: Menomonee Falls (East)	21 June 2017
MW: Menomonee Falls (West)	21 June 2017
SL: Slinger	20 June 2017
WH: Whitelaw	26 June 2017
---------- *2018 Buffer group* ----------	
BC: Bellevue (Central)	13 June 2018
BE: Bellevue (East)	13 June 2018
CW: Caledonia (West)	4 June 2018
MA: Manitowoc	6 June 2018
MQ: Marquette	30 May 2018
---------- *2019 Buffer group* ----------	
EE: Escanaba (East)	11 June 2019
EW: Escanaba (West)	11 June 2019
MU: Munising	11 June 2019
ON: Ontonagon (North)	13 June 2019
OS: Ontonagon (South)	13 June 2019

Table S2. Probability values from analyses of variance for poplar clones grown in sixteen phytoremediation buffer systems (i.e., phyto buffers) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA and the Lake Michigan watershed of eastern Wisconsin, USA. Buffer groups correspond to year of planting. Significant values highlighted in the Results are bolded.

	Buffer	Clone	Buffer × Clone
	---------- *2017 Buffer group* ----------		
$Health_{2017(2017)}$	<0.0001	<0.0001	**<0.0001**
$Health_{2017(2018)}$	<0.0001	<0.0001	**<0.0001**
$Health_{2017(2019)}$	<0.0001	<0.0001	**0.0152**
$MAI_{2017(2020)}$	<0.0001	<0.0001	**<0.0001**
	---------- *2018 Buffer group* ----------		
$Health_{2018(2018)}$	<0.0001	0.0009	**0.0029**
$Health_{2018(2019)}$	<0.0001	<0.0001	**<0.0001**
	---------- *2019 Buffer group* ----------		
$Health_{2019(2019)}$	<0.0001	0.0159	**0.0036**

MAI: Mean annual increment

Table S3. Probability values from repeated measures analyses of variance for poplar clones measured in 2017, 2018, and 2019 in sixteen phytoremediation buffer systems (i.e., phyto buffers) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA and the Lake Michigan watershed of eastern Wisconsin, USA. Buffer groups correspond to year of planting. Significant values highlighted in the Results are bolded.

	Buffer	Clone	Buffer × Clone	Year	Buffer × Year	Clone × Year	Buffer × Clone × Year
	2017 Buffer group						
Height	<0.0001	<0.0001	0.2394	<0.0001	<0.0001	<0.0001	**0.0483**
Diameter	<0.0001	<0.0001	0.0951	<0.0001	<0.0001	<0.0001	**0.0018**
Volume	<0.0001	<0.0001	0.0028	<0.0001	<0.0001	<0.0001	**0.0001**
	2018 Buffer group						
Height	<0.0001	0.0004	0.0335	<0.0001	<0.0001	0.0013	**<0.0001**
Diameter	<0.0001	0.0037	0.0247	<0.0001	<0.0001	0.0018	**<0.0001**
Volume	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0005	**<0.0001**
	2019 Buffer group						
Height	<0.0001	0.0021	0.0875	<0.0001	<0.0001	0.0027	**0.0079**
Diameter	<0.0001	0.0039	0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**
Volume	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**<0.0001**

Table S4. Height (m) (± one standard error) of twelve poplar clones tested in six phytoremediation buffer systems (i.e., phyto buffers) established in 2017 (i.e., **the 2017 Buffer Group**) in the Lake Michigan watershed of eastern Wisconsin, USA. Trees were measured following the 2017, 2018, and 2019 growing seasons.

	Clone					
Phyto buffer	99038022	99059016	9732-36	7300502	DM114	DN177
	2017 Measurement year					
BW: Bellevue (West)	0.5 ± 0.1	0.4 ± 0.1	0.5 ± 0.1	0.6 ± 0.1	0.6 ± 0.1	0.6 ± 0.1
CE: Caledonia (East)	0.6 ± 0.1	0.6 ± 0.1	0.9 ± 0.1	0.9 ± 0.1	0.9 ± 0.1	1.0 ± 0.1
ME: Menomonee Falls (East)	1.0 ± 0.1	0.8 ± 0.1	1.1 ± 0.1	0.9 ± 0.1	1.2 ± 0.1	1.3 ± 0.1
MW: Menomonee Falls (West)	1.1 ± 0.1	0.7 ± 0.1	0.9 ± 0.1	1.0 ± 0.1	0.9 ± 0.1	1.0 ± 0.1
SL: Slinger	1.4 ± 0.1	0.9 ± 0.1	1.2 ± 0.1	1.3 ± 0.1	1.3 ± 0.1	1.5 ± 0.1
WH: Whitelaw	0.5 ± 0.1	0.3 ± 0.1	0.5 ± 0.1	0.2 ± 0.1	0.5 ± 0.1	0.5 ± 0.1
	2018 Measurement year					
BW: Bellevue (West)	3.0 ± 0.2	2.9 ± 0.2	2.7 ± 0.2	2.6 ± 0.3	2.7 ± 0.2	3.1 ± 0.2
CE: Caledonia (East)	3.1 ± 0.2	3.3 ± 0.2	3.1 ± 0.2	2.8 ± 0.2	3.2 ± 0.2	3.6 ± 0.2
ME: Menomonee Falls (East)	3.8 ± 0.2	3.9 ± 0.3	3.8 ± 0.2	3.1 ± 0.2	3.5 ± 0.2	4.1 ± 0.2
MW: Menomonee Falls (West)	3.7 ± 0.2	3.6 ± 0.2	3.4 ± 0.2	3.3 ± 0.2	3.5 ± 0.2	3.8 ± 0.2
SL: Slinger	3.9 ± 0.2	3.4 ± 0.3	3.5 ± 0.2	2.7 ± 0.3	3.4 ± 0.2	4.0 ± 0.2
WH: Whitelaw	2.5 ± 0.2	2.0 ± 0.2	2.3 ± 0.2	1.5 ± 0.3	2.3 ± 0.2	2.5 ± 0.2
	2019 Measurement year					
BW: Bellevue (West)	5.0 ± 0.2	5.0 ± 0.3	4.8 ± 0.2	4.6 ± 0.4	4.6 ± 0.3	5.5 ± 0.2
CE: Caledonia (East)	5.3 ± 0.3	5.5 ± 0.3	5.3 ± 0.3	4.9 ± 0.3	5.5 ± 0.3	6.1 ± 0.3
ME: Menomonee Falls (East)	6.6 ± 0.2	6.2 ± 0.4	6.2 ± 0.2	5.3 ± 0.3	5.8 ± 0.2	6.8 ± 0.2
MW: Menomonee Falls (West)	5.9 ± 0.3	5.7 ± 0.3	5.5 ± 0.2	5.5 ± 0.3	5.3 ± 0.3	6.0 ± 0.2
SL: Slinger	5.7 ± 0.3	5.3 ± 0.4	5.5 ± 0.3	4.6 ± 0.4	5.2 ± 0.3	6.5 ± 0.3
WH: Whitelaw	4.2 ± 0.2	3.5 ± 0.3	3.9 ± 0.2	2.6 ± 0.4	3.9 ± 0.2	4.5 ± 0.2
Phyto buffer	NC14106	NM5	DN5	DN34	NM2	NM6
	2017 Measurement year					
BW: Bellevue (West)	0.5 ± 0.1	0.7 ± 0.1	0.6 ± 0.1	0.5 ± 0.1	0.6 ± 0.1	0.5 ± 0.1
CE: Caledonia (East)	0.7 ± 0.1	0.7 ± 0.1	0.9 ± 0.1	0.8 ± 0.1	0.9 ± 0.1	0.8 ± 0.1
ME: Menomonee Falls (East)	1.0 ± 0.1	1.3 ± 0.1	1.1 ± 0.1	1.1 ± 0.1	1.0 ± 0.1	1.2 ± 0.1
MW: Menomonee Falls (West)	0.8 ± 0.1	0.9 ± 0.1	0.9 ± 0.1	0.9 ± 0.1	1.0 ± 0.1	1.0 ± 0.1
SL: Slinger	1.2 ± 0.1	1.4 ± 0.1	1.3 ± 0.1	1.2 ± 0.1	1.4 ± 0.1	1.3 ± 0.1
WH: Whitelaw	0.4 ± 0.1	0.5 ± 0.1	0.6 ± 0.1	0.4 ± 0.1	0.4 ± 0.1	0.5 ± 0.1
	2018 Measurement year					
BW: Bellevue (West)	2.5 ± 0.2	3.4 ± 0.2	2.9 ± 0.2	3.1 ± 0.2	3.0 ± 0.2	2.8 ± 0.2
CE: Caledonia (East)	3.0 ± 0.2	2.9 ± 0.1	3.1 ± 0.2	3.2 ± 0.2	3.2 ± 0.2	3.2 ± 0.2
ME: Menomonee Falls (East)	3.4 ± 0.2	4.2 ± 0.2	3.8 ± 0.2	3.6 ± 0.2	3.8 ± 0.2	3.8 ± 0.2
MW: Menomonee Falls (West)	3.3 ± 0.2	3.4 ± 0.2	3.4 ± 0.2	3.4 ± 0.2	3.7 ± 0.2	3.6 ± 0.2
SL: Slinger	3.4 ± 0.2	4.0 ± 0.2	3.2 ± 0.2	3.5 ± 0.2	4.0 ± 0.2	3.7 ± 0.2
WH: Whitelaw	2.3 ± 0.2	2.4 ± 0.2	2.4 ± 0.2	2.2 ± 0.2	2.1 ± 0.2	2.1 ± 0.2
	2019 Measurement year					
BW: Bellevue (West)	4.3 ± 0.2	5.7 ± 0.3	4.6 ± 0.2	4.9 ± 0.2	5.1 ± 0.3	5.1 ± 0.2
CE: Caledonia (East)	5.6 ± 0.3	5.5 ± 0.2	5.3 ± 0.2	5.4 ± 0.3	5.9 ± 0.3	5.7 ± 0.3
ME: Menomonee Falls (East)	5.7 ± 0.2	7.3 ± 0.2	6.4 ± 0.2	6.1 ± 0.2	6.7 ± 0.2	6.6 ± 0.2
MW: Menomonee Falls (West)	5.4 ± 0.3	5.9 ± 0.3	5.6 ± 0.2	5.3 ± 0.3	5.9 ± 0.2	6.1 ± 0.2
SL: Slinger	5.2 ± 0.3	6.6 ± 0.3	5.1 ± 0.3	5.1 ± 0.3	6.6 ± 0.3	6.2 ± 0.3
WH: Whitelaw	4.0 ± 0.3	3.8 ± 0.3	3.9 ± 0.3	3.8 ± 0.2	3.5 ± 0.2	3.5 ± 0.3

Table S5. Diameter (cm) (± one standard error) of twelve poplar clones tested in six phytoremediation buffer systems (i.e., phyto buffers) established in 2017 (i.e., **the 2017 Buffer Group**) in the Lake Michigan watershed of eastern Wisconsin, USA. Trees were measured following the 2017, 2018, and 2019 growing seasons.

	Clone					
Phyto buffer	99038022	99059016	9732-36	7300502	DM114	DN177
	2017 Measurement year					
BW: Bellevue (West)	0.78 ± 0.09	0.61 ± 0.11	0.67 ± 0.09	0.72 ± 0.15	0.72 ± 0.10	0.67 ± 0.09
CE: Caledonia (East)	0.94 ± 0.11	0.93 ± 0.12	1.05 ± 0.12	1.13 ± 0.11	1.00 ± 0.11	1.10 ± 0.10
ME: Menomonee Falls (East)	1.26 ± 0.09	0.93 ± 0.15	1.19 ± 0.09	1.03 ± 0.10	1.17 ± 0.09	1.18 ± 0.09
MW: Menomonee Falls (West)	1.25 ± 0.10	0.82 ± 0.11	1.02 ± 0.09	1.32 ± 0.10	1.13 ± 0.12	1.14 ± 0.09
SL: Slinger	1.57 ± 0.13	1.10 ± 0.15	1.40 ± 0.13	1.80 ± 0.15	1.41 ± 0.13	1.42 ± 0.13
WH: Whitelaw	0.77 ± 0.09	0.57 ± 0.11	0.69 ± 0.09	0.35 ± 0.15	0.66 ± 0.09	0.59 ± 0.09
	2018 Measurement year					
BW: Bellevue (West)	4.25 ± 0.29	4.00 ± 0.33	3.73 ± 0.29	2.96 ± 0.47	3.55 ± 0.31	3.75 ± 0.29
CE: Caledonia (East)	3.77 ± 0.33	4.25 ± 0.36	4.18 ± 0.36	3.93 ± 0.33	4.01 ± 0.33	4.09 ± 0.31
ME: Menomonee Falls (East)	4.48 ± 0.29	4.69 ± 0.47	4.52 ± 0.29	3.62 ± 0.31	3.98 ± 0.29	4.34 ± 0.29
MW: Menomonee Falls (West)	4.89 ± 0.31	4.87 ± 0.33	4.30 ± 0.29	4.40 ± 0.31	4.16 ± 0.36	4.49 ± 0.29
SL: Slinger	4.51 ± 0.41	4.64 ± 0.47	4.54 ± 0.41	3.53 ± 0.47	3.94 ± 0.41	4.76 ± 0.41
WH: Whitelaw	3.34 ± 0.29	2.52 ± 0.33	2.75 ± 0.29	1.67 ± 0.47	2.82 ± 0.29	2.88 ± 0.29
	2019 Measurement year					
BW: Bellevue (West)	3.79 ± 0.31	3.85 ± 0.36	3.69 ± 0.31	3.70 ± 0.50	3.63 ± 0.33	4.01 ± 0.31
CE: Caledonia (East)	4.42 ± 0.36	4.30 ± 0.39	4.38 ± 0.39	4.18 ± 0.36	4.37 ± 0.36	4.41 ± 0.33
ME: Menomonee Falls (East)	4.88 ± 0.31	4.73 ± 0.50	4.94 ± 0.31	4.14 ± 0.33	4.10 ± 0.31	4.44 ± 0.31
MW: Menomonee Falls (West)	5.29 ± 0.33	5.00 ± 0.36	4.48 ± 0.31	4.97 ± 0.33	4.06 ± 0.39	4.43 ± 0.31
SL: Slinger	4.93 ± 0.43	4.50 ± 0.50	4.70 ± 0.43	3.33 ± 0.50	4.00 ± 0.43	5.45 ± 0.43
WH: Whitelaw	3.08 ± 0.31	2.48 ± 0.36	2.53 ± 0.31	1.93 ± 0.50	2.74 ± 0.31	3.11 ± 0.31
Phyto buffer	NC14106	NM5	DN5	DN34	NM2	NM6
	2017 Measurement year					
BW: Bellevue (West)	0.68 ± 0.09	0.83 ± 0.10	0.74 ± 0.09	0.70 ± 0.09	0.77 ± 0.10	0.68 ± 0.09
CE: Caledonia (East)	0.86 ± 0.11	0.81 ± 0.07	1.28 ± 0.09	1.03 ± 0.10	1.15 ± 0.10	1.02 ± 0.11
ME: Menomonee Falls (East)	0.99 ± 0.09	1.35 ± 0.09	1.17 ± 0.09	1.22 ± 0.09	1.07 ± 0.09	1.21 ± 0.09
MW: Menomonee Falls (West)	1.03 ± 0.11	1.12 ± 0.10	1.06 ± 0.09	1.15 ± 0.10	1.14 ± 0.09	1.17 ± 0.09
SL: Slinger	1.36 ± 0.13	1.54 ± 0.13	1.57 ± 0.13	1.45 ± 0.13	1.71 ± 0.13	1.53 ± 0.13
WH: Whitelaw	0.59 ± 0.10	0.60 ± 0.10	0.79 ± 0.10	0.68 ± 0.09	0.55 ± 0.09	0.65 ± 0.10
	2018 Measurement year					
BW: Bellevue (West)	2.98 ± 0.29	4.28 ± 0.31	4.33 ± 0.29	4.49 ± 0.29	3.77 ± 0.31	3.40 ± 0.29
CE: Caledonia (East)	3.53 ± 0.33	3.35 ± 0.16	4.38 ± 0.29	4.29 ± 0.31	4.11 ± 0.31	3.90 ± 0.33
ME: Menomonee Falls (East)	3.43 ± 0.29	4.94 ± 0.29	4.58 ± 0.29	4.17 ± 0.29	4.04 ± 0.29	3.95 ± 0.29
MW: Menomonee Falls (West)	3.93 ± 0.33	4.41 ± 0.31	4.69 ± 0.29	4.90 ± 0.31	4.76 ± 0.29	4.53 ± 0.29
SL: Slinger	3.82 ± 0.41	5.03 ± 0.41	4.29 ± 0.41	4.43 ± 0.41	5.66 ± 0.41	4.55 ± 0.41
WH: Whitelaw	2.62 ± 0.31	2.80 ± 0.31	3.66 ± 0.31	3.14 ± 0.29	2.38 ± 0.29	2.32 ± 0.31
	2019 Measurement year					
BW: Bellevue (West)	2.81 ± 0.31	4.36 ± 0.33	3.75 ± 0.31	3.79 ± 0.31	3.77 ± 0.33	3.36 ± 0.31
CE: Caledonia (East)	4.05 ± 0.36	4.09 ± 0.19	4.73 ± 0.31	4.14 ± 0.33	4.91 ± 0.33	4.33 ± 0.36
ME: Menomonee Falls (East)	3.64 ± 0.31	5.90 ± 0.31	5.01 ± 0.31	4.31 ± 0.31	4.83 ± 0.31	4.55 ± 0.31
MW: Menomonee Falls (West)	3.95 ± 0.36	4.73 ± 0.33	4.48 ± 0.31	4.14 ± 0.33	4.85 ± 0.31	4.70 ± 0.31
SL: Slinger	3.85 ± 0.43	6.00 ± 0.43	4.45 ± 0.43	4.43 ± 0.43	6.23 ± 0.43	4.65 ± 0.43
WH: Whitelaw	2.59 ± 0.33	2.63 ± 0.33	2.94 ± 0.33	2.83 ± 0.31	2.39 ± 0.31	2.20 ± 0.33

Table S6. Clonal rank for volume of twelve poplar clones tested in six phytoremediation buffer systems (i.e., phyto buffers) established in 2017 (i.e., **the 2017 Buffer Group**) in the Lake Michigan watershed of eastern Wisconsin, USA. Trees were measured following the 2017, 2018, and 2019 growing seasons.

		Phyto buffer					
Clone	Response group[b]	BW	CE	ME	MW	SL	WH
		2017 Measurement year					
99038022	Specialist	2	9	3	1	4	2
99059016	Generalist	12	12	12	12	12	11
9732-36	Specialist	10	7	7	10	10	3
7300502	Specialist	8	4	9	2	1	12
DM114	Generalist	5	8	8	8	8	4
DN177	Specialist	7	3	5	5	5	10
NC14106	Specialist	6	10	11	11	11	9
NM5	Specialist	1	11	1	7	6	7
DN5	Specialist	4	1	6	9	3	1
DN34	Specialist	9	6	4	6	9	5
NM2	Specialist	3	2	10	3	2	8
NM6	Specialist	11	5	2	4	7	6
		2018 Measurement year					
99038022	Specialist	3	9	3	1	4	2
99059016	Specialist	5	3	2	2	6	11
9732-36	Generalist	8	6	5	9	7	7
7300502	Generalist	12	10	11	10	12	12
DM114	Specialist	9	8	10	11	10	5
DN177	Specialist	7	2	6	6	3	4
NC14106	Generalist	11	12	12	12	11	8
NM5	Specialist	1	11	1	8	2	6
DN5	Specialist	4	1	4	5	9	1
DN34	Specialist	2	5	7	3	8	3
NM2	Specialist	6	4	9	4	1	9
NM6	Specialist	10	7	8	7	5	10
		2019 Measurement year					
99038022	Generalist	5	5	3	1	4	2
99059016	Specialist	4	9	7	3	8	11
9732-36	Generalist	7	8	5	9	6	9
7300502	Specialist	9	10	11	4	12	12
DM114	Specialist	10	6	10	11	10	5
DN177	Specialist	2	3	8	7	3	1
NC14106	Specialist	12	11	12	12	11	6
NM5	Specialist	1	7	1	6	2	7
DN5	Specialist	8	2	2	8	7	4
DN34	Specialist	6	12	9	10	9	3
NM2	Specialist	3	1	4	2	1	8
NM6	Specialist	11	4	6	5	5	10

[a] BW: Bellevue (West); CE: Caledonia (East); ME: Menomonee Falls (East); MW: Menomonee Falls (West); SL: Slinger; WH: Whitelaw

[b] Generalist = clone exhibiting stable $MAI_{2017(2020)}$ across phyto buffers (i.e., minimal rank changes); Specialist = clone exhibiting exceptional $MAI_{2017(2020)}$ at one or more phyto buffers relative to the other buffers (i.e., broad variation resulting in ≥ 5 rank changes for at least one buffer × clone × year pair).

Table S7. Height (m) (± one standard error) of twelve poplar clones tested in five phytoremediation buffer systems (i.e., phyto buffers) established in 2018 (i.e., the **2018 Buffer Group**) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA and the Lake Michigan watershed of eastern Wisconsin, USA. Trees were measured following the 2018, 2019, and 2020 growing seasons.

	Clone					
Phyto buffer	9732-11	9732-24	9732-31	9732-36	7300502	DM114
	2018 Measurement year					
BC: Bellevue (Central)	0.8 ± 0.1	0.7 ± 0.1	0.9 ± 0.1	0.6 ± 0.1	0.5 ± 0.1	0.5 ± 0.1
BE: Bellevue (East)	0.8 ± 0.1	0.7 ± 0.1	0.8 ± 0.1	0.7 ± 0.1	0.5 ± 0.1	0.4 ± 0.1
CW: Caledonia (West)	1.2 ± 0.1	1.0 ± 0.1	1.2 ± 0.1	1.1 ± 0.1	0.8 ± 0.1	1.0 ± 0.1
MA: Manitowoc	1.1 ± 0.1	1.1 ± 0.1	1.1 ± 0.1	1.1 ± 0.1	0.6 ± 0.1	0.8 ± 0.1
MQ: Marquette	0.5 ± 0.1	0.7 ± 0.1	0.8 ± 0.1	0.7 ± 0.1	0.6 ± 0.2	0.5 ± 0.1
	2019 Measurement year					
BC: Bellevue (Central)	2.2 ± 0.2	2.5 ± 0.2	2.6 ± 0.2	2.1 ± 0.2	1.6 ± 0.2	2.0 ± 0.2
BE: Bellevue (East)	2.4 ± 0.2	2.4 ± 0.2	2.5 ± 0.2	2.3 ± 0.2	1.5 ± 0.2	2.1 ± 0.2
CW: Caledonia (West)	3.2 ± 0.2	3.0 ± 0.2	3.9 ± 0.2	3.0 ± 0.2	3.0 ± 0.2	2.8 ± 0.2
MA: Manitowoc	3.4 ± 0.2	3.4 ± 0.2	3.5 ± 0.2	3.3 ± 0.2	2.6 ± 0.3	3.0 ± 0.2
MQ: Marquette	1.4 ± 0.2	1.8 ± 0.2	1.9 ± 0.2	1.8 ± 0.2	1.7 ± 0.5	1.6 ± 0.3
	2020 Measurement year					
BC: Bellevue (Central)	4.3 ± 0.3	4.7 ± 0.3	4.7 ± 0.3	4.6 ± 0.3	3.9 ± 0.3	4.0 ± 0.3
BE: Bellevue (East)	4.1 ± 0.3	4.4 ± 0.3	4.4 ± 0.3	4.2 ± 0.3	3.1 ± 0.3	3.8 ± 0.3
CW: Caledonia (West)	5.1 ± 0.3	4.6 ± 0.3	6.1 ± 0.3	4.6 ± 0.3	5.5 ± 0.4	4.8 ± 0.3
MA: Manitowoc	5.5 ± 0.3	5.5 ± 0.3	5.6 ± 0.3	5.2 ± 0.3	5.2 ± 0.4	5.0 ± 0.3
MQ: Marquette	2.4 ± 0.3	2.9 ± 0.4	3.3 ± 0.3	3.1 ± 0.4	2.8 ± 0.8	2.8 ± 0.4
Phyto buffer	DN2	NM5	DN5	DN34	NM2	NM6
	2018 Measurement year					
BC: Bellevue (Central)	0.7 ± 0.1	0.7 ± 0.1	0.6 ± 0.1	0.7 ± 0.1	0.6 ± 0.1	0.6 ± 0.1
BE: Bellevue (East)	0.8 ± 0.1	0.6 ± 0.1	0.6 ± 0.1	0.8 ± 0.1	0.6 ± 0.1	0.7 ± 0.1
CW: Caledonia (West)	0.9 ± 0.1	1.2 ± 0.1	1.0 ± 0.1	0.9 ± 0.1	1.0 ± 0.1	1.1 ± 0.1
MA: Manitowoc	0.9 ± 0.1	1.2 ± 0.1	0.7 ± 0.1	1.1 ± 0.1	1.2 ± 0.1	1.2 ± 0.1
MQ: Marquette	0.5 ± 0.1	0.5 ± 0.1	0.4 ± 0.1	0.6 ± 0.1	0.5 ± 0.1	0.6 ± 0.1
	2019 Measurement year					
BC: Bellevue (Central)	2.3 ± 0.2	2.4 ± 0.2	2.4 ± 0.2	2.4 ± 0.2	2.0 ± 0.2	2.1 ± 0.2
BE: Bellevue (East)	2.3 ± 0.2	2.3 ± 0.2	2.2 ± 0.2	2.3 ± 0.2	2.0 ± 0.2	2.3 ± 0.2
CW: Caledonia (West)	3.6 ± 0.2	3.9 ± 0.2	3.4 ± 0.2	2.9 ± 0.2	3.6 ± 0.2	3.5 ± 0.2
MA: Manitowoc	3.2 ± 0.2	3.7 ± 0.2	3.0 ± 0.2	3.5 ± 0.2	3.9 ± 0.2	3.9 ± 0.2
MQ: Marquette	1.4 ± 0.2	1.4 ± 0.3	1.1 ± 0.3	1.3 ± 0.3	1.4 ± 0.2	1.5 ± 0.3
	2020 Measurement year					
BC: Bellevue (Central)	4.3 ± 0.3	4.5 ± 0.3	4.5 ± 0.3	4.7 ± 0.3	4.2 ± 0.3	3.9 ± 0.3
BE: Bellevue (East)	4.1 ± 0.3	4.3 ± 0.3	4.0 ± 0.3	4.2 ± 0.3	3.9 ± 0.3	3.8 ± 0.3
CW: Caledonia (West)	6.2 ± 0.3	6.5 ± 0.3	5.9 ± 0.3	5.1 ± 0.3	6.0 ± 0.3	6.0 ± 0.3
MA: Manitowoc	5.6 ± 0.3	5.9 ± 0.3	5.3 ± 0.3	5.7 ± 0.3	6.1 ± 0.3	6.0 ± 0.3
MQ: Marquette	2.5 ± 0.3	2.5 ± 0.4	1.9 ± 0.5	1.9 ± 0.4	2.1 ± 0.3	2.4 ± 0.5

Table S8. Diameter (cm) (± one standard error) of twelve poplar clones tested in five phytoremediation buffer systems (i.e., phyto buffers) established in 2018 (i.e., the **2018 Buffer Group**) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA and the Lake Michigan watershed of eastern Wisconsin, USA. Trees were measured following the 2018, 2019, and 2020 growing seasons.

	Clone					
Phyto buffer	9732-11	9732-24	9732-31	9732-36	7300502	DM114
	2018 Measurement year					
BC: Bellevue (Central)	0.79 ± 0.08	0.74 ± 0.08	0.88 ± 0.08	0.64 ± 0.08	0.66 ± 0.08	0.65 ± 0.08
BE: Bellevue (East)	0.84 ± 0.08	0.78 ± 0.08	0.82 ± 0.09	0.73 ± 0.08	0.64 ± 0.09	0.55 ± 0.08
CW: Caledonia (West)	1.05 ± 0.08	1.00 ± 0.08	1.13 ± 0.08	1.05 ± 0.08	0.85 ± 0.10	0.97 ± 0.08
MA: Manitowoc	0.96 ± 0.08	0.88 ± 0.08	0.95 ± 0.08	0.92 ± 0.09	0.63 ± 0.12	0.76 ± 0.08
MQ: Marquette	0.50 ± 0.09	0.63 ± 0.10	0.67 ± 0.09	0.64 ± 0.10	0.54 ± 0.23	0.56 ± 0.12
	2019 Measurement year					
BC: Bellevue (Central)	3.04 ± 0.30	3.05 ± 0.30	3.07 ± 0.30	2.66 ± 0.30	2.17 ± 0.30	2.56 ± 0.30
BE: Bellevue (East)	2.92 ± 0.30	2.80 ± 0.30	2.79 ± 0.32	2.78 ± 0.30	2.27 ± 0.35	2.64 ± 0.30
CW: Caledonia (West)	3.86 ± 0.30	3.38 ± 0.30	4.28 ± 0.30	3.33 ± 0.30	3.25 ± 0.38	3.22 ± 0.30
MA: Manitowoc	4.31 ± 0.30	3.78 ± 0.30	3.95 ± 0.30	3.57 ± 0.32	3.15 ± 0.43	3.48 ± 0.30
MQ: Marquette	1.63 ± 0.32	1.86 ± 0.38	2.15 ± 0.32	2.26 ± 0.38	1.73 ± 0.85	1.76 ± 0.43
	2020 Measurement year					
BC: Bellevue (Central)	3.87 ± 0.41	3.96 ± 0.41	4.07 ± 0.41	3.29 ± 0.41	3.22 ± 0.41	3.17 ± 0.41
BE: Bellevue (East)	3.74 ± 0.41	3.64 ± 0.41	3.58 ± 0.44	3.26 ± 0.41	2.32 ± 0.48	2.99 ± 0.41
CW: Caledonia (West)	4.20 ± 0.41	3.69 ± 0.41	6.03 ± 0.41	3.43 ± 0.41	4.40 ± 0.52	3.80 ± 0.41
MA: Manitowoc	5.53 ± 0.41	4.83 ± 0.41	4.96 ± 0.41	4.54 ± 0.44	4.40 ± 0.58	4.14 ± 0.41
MQ: Marquette	1.36 ± 0.44	1.52 ± 0.52	2.04 ± 0.44	2.10 ± 0.52	1.40 ± 1.17	1.63 ± 0.58
Phyto buffer	DN2	NM5	DN5	DN34	NM2	NM6
	2018 Measurement year					
BC: Bellevue (Central)	0.72 ± 0.08	0.76 ± 0.08	0.70 ± 0.08	0.77 ± 0.09	0.67 ± 0.08	0.63 ± 0.08
BE: Bellevue (East)	0.85 ± 0.08	0.70 ± 0.08	0.68 ± 0.09	0.80 ± 0.09	0.66 ± 0.08	0.72 ± 0.08
CW: Caledonia (West)	1.11 ± 0.08	1.18 ± 0.09	1.08 ± 0.09	0.95 ± 0.08	1.04 ± 0.08	1.09 ± 0.09
MA: Manitowoc	0.80 ± 0.08	1.06 ± 0.08	0.70 ± 0.08	1.00 ± 0.08	1.19 ± 0.08	1.03 ± 0.08
MQ: Marquette	0.59 ± 0.09	0.54 ± 0.12	0.52 ± 0.13	0.57 ± 0.12	0.58 ± 0.09	0.58 ± 0.13
	2019 Measurement year					
BC: Bellevue (Central)	3.24 ± 0.30	3.14 ± 0.30	3.35 ± 0.30	3.50 ± 0.35	2.65 ± 0.30	2.62 ± 0.30
BE: Bellevue (East)	3.34 ± 0.30	2.79 ± 0.30	3.06 ± 0.32	3.26 ± 0.35	2.52 ± 0.30	2.67 ± 0.30
CW: Caledonia (West)	4.47 ± 0.30	4.47 ± 0.32	4.25 ± 0.32	3.69 ± 0.30	4.04 ± 0.30	3.82 ± 0.32
MA: Manitowoc	3.85 ± 0.30	4.88 ± 0.30	3.48 ± 0.30	4.23 ± 0.30	5.15 ± 0.30	4.69 ± 0.30
MQ: Marquette	1.80 ± 0.32	1.61 ± 0.43	1.43 ± 0.49	1.86 ± 0.43	1.47 ± 0.35	1.74 ± 0.49
	2020 Measurement year					
BC: Bellevue (Central)	3.61 ± 0.41	3.66 ± 0.41	3.86 ± 0.41	4.00 ± 0.48	3.26 ± 0.41	2.71 ± 0.41
BE: Bellevue (East)	3.69 ± 0.41	3.34 ± 0.41	3.13 ± 0.44	3.47 ± 0.48	2.86 ± 0.41	2.72 ± 0.41
CW: Caledonia (West)	5.89 ± 0.41	6.11 ± 0.44	5.27 ± 0.44	3.86 ± 0.41	5.40 ± 0.41	5.11 ± 0.44
MA: Manitowoc	4.83 ± 0.41	6.11 ± 0.41	4.49 ± 0.41	5.06 ± 0.41	6.05 ± 0.41	5.68 ± 0.41
MQ: Marquette	2.08 ± 0.44	1.20 ± 0.58	1.04 ± 0.67	2.47 ± 0.58	1.70 ± 0.48	1.03 ± 0.67

Table S9. Clonal rank for volume of twelve poplar clones tested in five phytoremediation buffer systems (i.e., phyto buffers) established in 2018 (i.e., the **2018 Buffer Group**) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA and the Lake Michigan watershed of eastern Wisconsin, USA. Trees were measured following the 2018, 2019, and 2020 growing seasons.

		Phyto buffer				
Clone	Response group[b]	BC	BE	CW	MA	MQ
		2018 Measurement year				
9732-11	Specialist	2	2	4	6	11
9732-24	Specialist	6	5	7	8	3
9732-31	Generalist	1	3	1	4	1
9732-36	Specialist	10	6	6	7	2
7300502	Specialist	9	7	12	12	8
DM114	Generalist	11	12	11	10	9
DN2	Specialist	4	1	10	9	7
NM5	Specialist	5	9	2	3	10
DN5	Specialist	7	10	5	11	12
DN34	Specialist	3	4	9	5	4
NM2	Specialist	8	11	8	1	6
NM6	Specialist	12	8	3	2	5
		2019 Measurement year				
9732-11	Specialist	7	3	7	4	9
9732-24	Specialist	6	5	9	8	3
9732-31	Generalist	5	6	2	5	2
9732-36	Specialist	11	8	10	9	1
7300502	Specialist	12	12	11	12	6
DM114	Specialist	9	10	12	11	4
DN2	Specialist	2	1	3	7	5
NM5	Specialist	4	7	1	2	10
DN5	Specialist	3	4	5	10	12
DN34	Specialist	1	2	8	6	7
NM2	Specialist	10	11	4	1	11
NM6	Specialist	8	9	6	3	8
		2020 Measurement year				
9732-11	Specialist	5	3	8	4	7
9732-24	Specialist	3	2	12	9	6
9732-31	Generalist	1	4	2	5	2
9732-36	Specialist	8	7	10	8	1
7300502	Specialist	11	12	7	11	9
DM114	Specialist	9	9	11	12	3
DN2	Specialist	7	1	3	7	4
NM5	Specialist	6	6	1	1	10
DN5	Specialist	4	8	6	10	12
DN34	Specialist	2	5	9	6	5
NM2	Specialist	10	10	4	2	8
NM6	Specialist	12	11	5	3	11

[a] BC: Bellevue (Central); BE: Bellevue (East); CW: Caledonia (West); MA: Manitowoc; MQ: Marquette

[b] Generalist = clone exhibiting stable volume across phyto buffers (i.e., minimal rank changes); Specialist = clone exhibiting exceptional volume at one or more phyto buffers relative to the other buffers (i.e., broad variation resulting in ≥ 5 rank changes for at least one buffer × clone × year pair).

Table S10. Height (m) (± one standard error) of twelve poplar clones tested in five phytoremediation buffer systems (i.e., phyto buffers) established in 2019 (i.e., the **2019 Buffer Group**) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA. Trees were measured following the 2019 and 2020 growing seasons.

	Clone					
Phyto buffer	99038022	9732-11	9732-24	9732-31	9732-36	DM114
	2019 Measurement year					
EE: Escanaba (East)	0.8 ± 0.1	0.7 ± 0.1	0.8 ± 0.1	0.8 ± 0.1	0.6 ± 0.1	0.6 ± 0.1
EW: Escanaba (West)	1.5 ± 0.1	1.2 ± 0.1	1.3 ± 0.1	1.4 ± 0.1	1.3 ± 0.1	1.2 ± 0.1
MU: Munising	0.8 ± 0.1	0.6 ± 0.1	0.7 ± 0.1	0.5 ± 0.1	0.6 ± 0.1	0.6 ± 0.1
ON: Ontonagon (North)	0.7 ± 0.1	0.6 ± 0.1	0.6 ± 0.1	0.6 ± 0.1	0.5 ± 0.1	0.6 ± 0.1
OS: Ontonagon (South)	0.7 ± 0.1	0.8 ± 0.1	0.8 ± 0.1	0.7 ± 0.1	0.6 ± 0.1	0.7 ± 0.1
	2020 Measurement year					
EE: Escanaba (East)	1.4 ± 0.2	1.3 ± 0.2	1.9 ± 0.2	1.7 ± 0.2	1.2 ± 0.2	1.5 ± 0.2
EW: Escanaba (West)	2.3 ± 0.2	2.4 ± 0.2	2.4 ± 0.2	2.4 ± 0.2	2.5 ± 0.2	2.6 ± 0.2
MU: Munising	2.0 ± 0.2	1.6 ± 0.2	2.1 ± 0.2	1.6 ± 0.2	2.0 ± 0.2	2.2 ± 0.2
ON: Ontonagon (North)	1.5 ± 0.2	1.0 ± 0.2	1.1 ± 0.2	1.2 ± 0.2	1.1 ± 0.2	1.3 ± 0.2
OS: Ontonagon (South)	1.3 ± 0.2	1.8 ± 0.2	1.8 ± 0.2	1.6 ± 0.2	1.4 ± 0.2	1.7 ± 0.2
Phyto buffer	DN2	DN177	NM5	DN34	NM2	NM6
	2019 Measurement year					
EE: Escanaba (East)	0.6 ± 0.1	0.7 ± 0.1	0.6 ± 0.1	0.7 ± 0.1	0.7 ± 0.1	0.7 ± 0.1
EW: Escanaba (West)	1.4 ± 0.1	1.3 ± 0.1	1.3 ± 0.1	1.3 ± 0.1	1.4 ± 0.1	1.3 ± 0.1
MU: Munising	0.5 ± 0.1	0.5 ± 0.1	0.7 ± 0.1	0.7 ± 0.1	0.6 ± 0.1	0.8 ± 0.1
ON: Ontonagon (North)	0.4 ± 0.1	0.4 ± 0.1	0.6 ± 0.1	0.5 ± 0.1	0.5 ± 0.1	0.6 ± 0.1
OS: Ontonagon (South)	0.6 ± 0.1	0.5 ± 0.1	0.6 ± 0.1	0.6 ± 0.1	0.6 ± 0.1	0.7 ± 0.1
	2020 Measurement year					
EE: Escanaba (East)	1.4 ± 0.2	1.6 ± 0.2	1.2 ± 0.2	1.4 ± 0.2	1.4 ± 0.2	1.5 ± 0.2
EW: Escanaba (West)	2.4 ± 0.2	2.3 ± 0.2	2.9 ± 0.2	2.4 ± 0.2	2.9 ± 0.2	2.9 ± 0.2
MU: Munising	1.8 ± 0.2	1.8 ± 0.2	2.1 ± 0.2	2.0 ± 0.2	1.8 ± 0.2	2.7 ± 0.2
ON: Ontonagon (North)	0.9 ± 0.2	0.8 ± 0.2	0.9 ± 0.2	0.9 ± 0.2	1.0 ± 0.2	1.2 ± 0.2
OS: Ontonagon (South)	1.5 ± 0.2	1.3 ± 0.2	1.0 ± 0.2	1.4 ± 0.2	1.3 ± 0.2	1.7 ± 0.2

Table S11. Diameter (cm) (± one standard error) of twelve poplar clones tested in five phytoremediation buffer systems (i.e., phyto buffers) established in 2019 (i.e., the **2019 Buffer Group**) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA. Trees were measured following the 2019 and 2020 growing seasons.

	Clone					
Phyto buffer	99038022	9732-11	9732-24	9732-31	9732-36	DM114
	2019 Measurement year					
EE: Escanaba (East)	0.93 ± 0.07	0.75 ± 0.07	0.90 ± 0.07	0.89 ± 0.08	0.73 ± 0.07	0.83 ± 0.07
EW: Escanaba (West)	1.54 ± 0.07	1.30 ± 0.07	1.13 ± 0.07	1.26 ± 0.07	1.46 ± 0.07	1.32 ± 0.07
MU: Munising	0.98 ± 0.07	0.64 ± 0.07	0.78 ± 0.07	0.62 ± 0.07	0.84 ± 0.07	0.76 ± 0.07
ON: Ontonagon (North)	0.81 ± 0.07	0.62 ± 0.07	0.60 ± 0.07	0.67 ± 0.07	0.56 ± 0.07	0.65 ± 0.07
OS: Ontonagon (South)	0.83 ± 0.07	0.77 ± 0.07	0.79 ± 0.07	0.67 ± 0.08	0.65 ± 0.07	0.75 ± 0.07
	2020 Measurement year					
EE: Escanaba (East)	1.71 ± 0.27	1.46 ± 0.27	2.21 ± 0.27	1.90 ± 0.29	1.49 ± 0.27	1.94 ± 0.27
EW: Escanaba (West)	3.06 ± 0.27	2.83 ± 0.27	2.94 ± 0.27	2.87 ± 0.27	3.40 ± 0.27	3.37 ± 0.27
MU: Munising	2.70 ± 0.27	2.03 ± 0.27	2.70 ± 0.27	2.07 ± 0.27	2.69 ± 0.27	3.01 ± 0.27
ON: Ontonagon (North)	1.93 ± 0.27	1.26 ± 0.27	1.27 ± 0.27	1.48 ± 0.27	1.44 ± 0.27	1.80 ± 0.27
OS: Ontonagon (South)	1.58 ± 0.27	2.07 ± 0.27	1.94 ± 0.27	1.69 ± 0.29	1.72 ± 0.27	2.02 ± 0.27
Phyto buffer	DN2	DN177	NM5	DN34	NM2	NM6
	2019 Measurement year					
EE: Escanaba (East)	0.80 ± 0.07	0.82 ± 0.07	0.76 ± 0.07	0.79 ± 0.07	0.74 ± 0.07	0.78 ± 0.07
EW: Escanaba (West)	1.62 ± 0.07	1.25 ± 0.07	1.43 ± 0.07	1.43 ± 0.07	1.53 ± 0.07	1.32 ± 0.07
MU: Munising	0.68 ± 0.07	0.59 ± 0.07	0.76 ± 0.07	0.85 ± 0.07	0.70 ± 0.07	0.87 ± 0.07
ON: Ontonagon (North)	0.51 ± 0.07	0.45 ± 0.07	0.63 ± 0.08	0.54 ± 0.07	0.59 ± 0.07	0.65 ± 0.07
OS: Ontonagon (South)	0.68 ± 0.07	0.56 ± 0.07	0.63 ± 0.07	0.63 ± 0.07	0.63 ± 0.07	0.70 ± 0.07
	2020 Measurement year					
EE: Escanaba (East)	1.79 ± 0.27	1.95 ± 0.27	1.63 ± 0.27	1.81 ± 0.27	1.79 ± 0.27	1.71 ± 0.27
EW: Escanaba (West)	3.32 ± 0.27	3.07 ± 0.27	4.51 ± 0.27	2.79 ± 0.27	4.97 ± 0.27	4.29 ± 0.27
MU: Munising	2.74 ± 0.27	2.21 ± 0.27	2.84 ± 0.27	3.01 ± 0.27	2.71 ± 0.27	3.49 ± 0.27
ON: Ontonagon (North)	1.27 ± 0.27	1.02 ± 0.27	0.97 ± 0.29	1.44 ± 0.27	1.37 ± 0.27	1.45 ± 0.27
OS: Ontonagon (South)	1.97 ± 0.27	1.40 ± 0.27	1.29 ± 0.27	1.77 ± 0.27	1.49 ± 0.27	1.93 ± 0.27

Table S12. Clonal rank for volume of twelve poplar clones tested in five phytoremediation buffer systems (i.e., phyto buffers) established in 2019 (i.e., the **2019 Buffer Group**) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA. Trees were measured following the 2019 and 2020 growing seasons.

		Phyto buffer				
Clone	Response group[b]	EE	EW	MU	ON	OS
		2019 Measurement year				
99038022	Generalist	3	1	1	1	1
9732-11	Specialist	6	8	10	5	3
9732-24	Specialist	1	12	4	8	2
9732-31	Specialist	2	10	11	4	6
9732-36	Specialist	10	4	5	10	8
DM114	Specialist	8	11	7	2	4
DN2	Specialist	9	2	9	11	7
DN177	Specialist	4	9	12	12	12
NM5	Specialist	12	5	6	7	11
DN34	Specialist	5	6	3	9	10
NM2	Specialist	11	3	8	6	9
NM6	Specialist	7	7	2	3	5
		2020 Measurement year				
99038022	Specialist	9	9	4	2	9
9732-11	Specialist	11	10	12	9	3
9732-24	Specialist	1	8	9	10	2
9732-31	Specialist	2	11	11	4	7
9732-36	Specialist	12	4	8	5	8
DM114	Generalist	3	5	2	1	1
DN2	Generalist	8	6	6	8	4
DN177	Specialist	4	7	10	11	11
NM5	Specialist	7	2	5	12	12
DN34	Specialist	5	12	3	7	6
NM2	Specialist	6	1	7	3	10
NM6	Specialist	10	3	1	6	5

[a] EE: Escanaba (East); EW: Escanaba (West); MU: Munising; ON: Ontonagon (North); OS: Ontonagon (South)

[b] Generalist = clone exhibiting stable volume across phyto buffers (i.e., minimal rank changes); Specialist = clone exhibiting exceptional volume at one or more phyto buffers relative to the other buffers (i.e., broad variation resulting in ≥ 5 rank changes for at least one buffer × clone × year pair).

Table S13. Classification of clones into generalist and specialist response groups based on volume production for *Populus* genotypes tested in a regional phytotechnologies network of sixteen phytoremediation buffer systems (i.e., phyto buffers) established from 2017 to 2019 in the Lake Superior watershed of the Upper Peninsula of Michigan, USA and the Lake Michigan watershed of eastern Wisconsin, USA.

Genomic group[a]	Clone	Clone group[b]	Initial response group[c]			Final response group[d]
			--- 2017 ---	*--- 2018 ---*	*--- 2019 ---*	
P. deltoides 'D'	7300502	Experimental	Specialist	Specialist	na[e]	Specialist
P. deltoides × *P. maximowiczii* 'DM'	DM114	Experimental	Generalist	Generalist	Generalist	Generalist
	NC14106	Experimental	Generalist	na	na	Generalist
P. deltoides × *P. nigra* 'DN'	99038022	NRRI	Generalist	na	Generalist	Generalist
	99059016	NRRI	Generalist	na	na	Generalist
	9732-11	NRRI	na	Generalist	Specialist	Generalist-Specialist
	9732-24	NRRI	na	Generalist	Specialist	Generalist-Specialist
	9732-31	NRRI	na	Generalist	Specialist	Generalist-Specialist
	9732-36	NRRI	Generalist	Generalist	Specialist	Generalist-Specialist
	DN2	Experimental	na	Specialist	Generalist	Generalist-Specialist
	DN5	Common	Specialist	Specialist	na	Specialist
	DN34	Common	Specialist	Specialist	Specialist	Specialist
	DN177	Experimental	Specialist	na	Specialist	Specialist
P. nigra × *P. maximowiczii* 'NM'	NM2	Common	Specialist	Specialist	Specialist	Specialist
	NM5	Experimental	Specialist	Specialist	Specialist	Specialist
	NM6	Common	Specialist	Specialist	Specialist	Specialist

[a] Species authorities: *P. deltoides* Bartr. Ex Marsh; *P. nigra* L.; *P. maximowiczii* A. Henry

[b] NRRI = promising genotypes bred, tested, and selected at the University of Minnesota Duluth, Natural Resources Research Institute (NRRI) for broad-ranging applications [46,56]; Experimental = genotypes with a rich history of testing but that are still at the experimental stage; Common = genotypes commonly used for commercial and/or research purposes in the region.

[c] Response group classifications for individual 2017, 2018, and 2019 buffer groups, based on **Tables S6**, **S9**, and **S12**.

[d] Final response groups after assessing changes in rank and magnitude of volume across all buffer groups.

[e] Not applicable; clone was not tested in the particular buffer group.

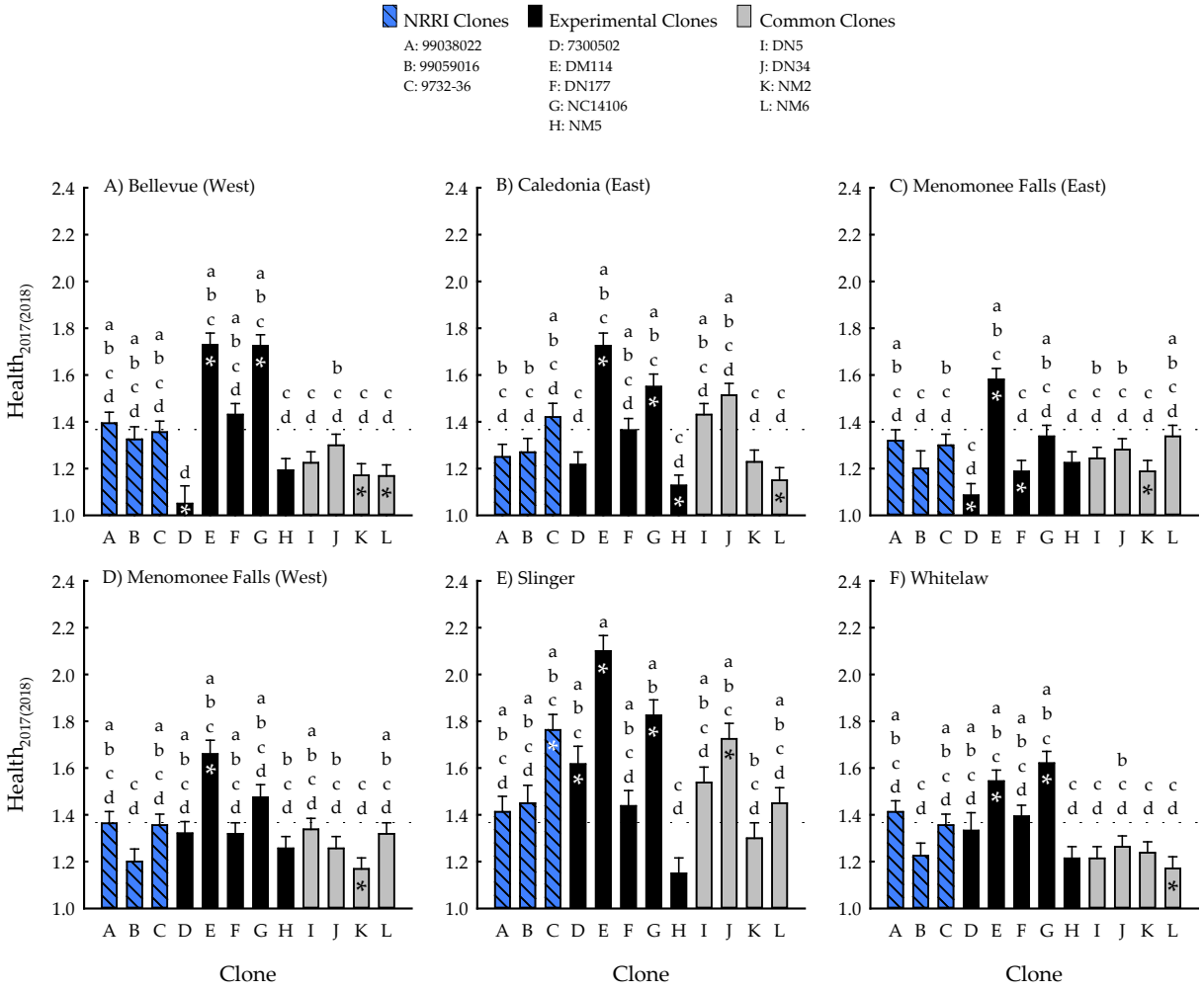

Figure S1. Tree health (± one standard error) determined after the 2018 growing season of twelve poplar clones tested in six phytoremediation buffer systems (i.e., phyto buffers) established in 2017 (i.e., the **2017 Buffer Group**) in the Lake Michigan watershed of eastern Wisconsin, USA. The dashed line represents the overall mean, and asterisks indicate means different than the overall mean at $P < 0.05$. Bars with different letters across all buffer × clone combinations are different at $P < 0.05$. See Materials and Methods for complete tree health definitions (1 = optimal health, 2 = good health, 3 = moderate health, 4 = poor health, and 5 = dead).

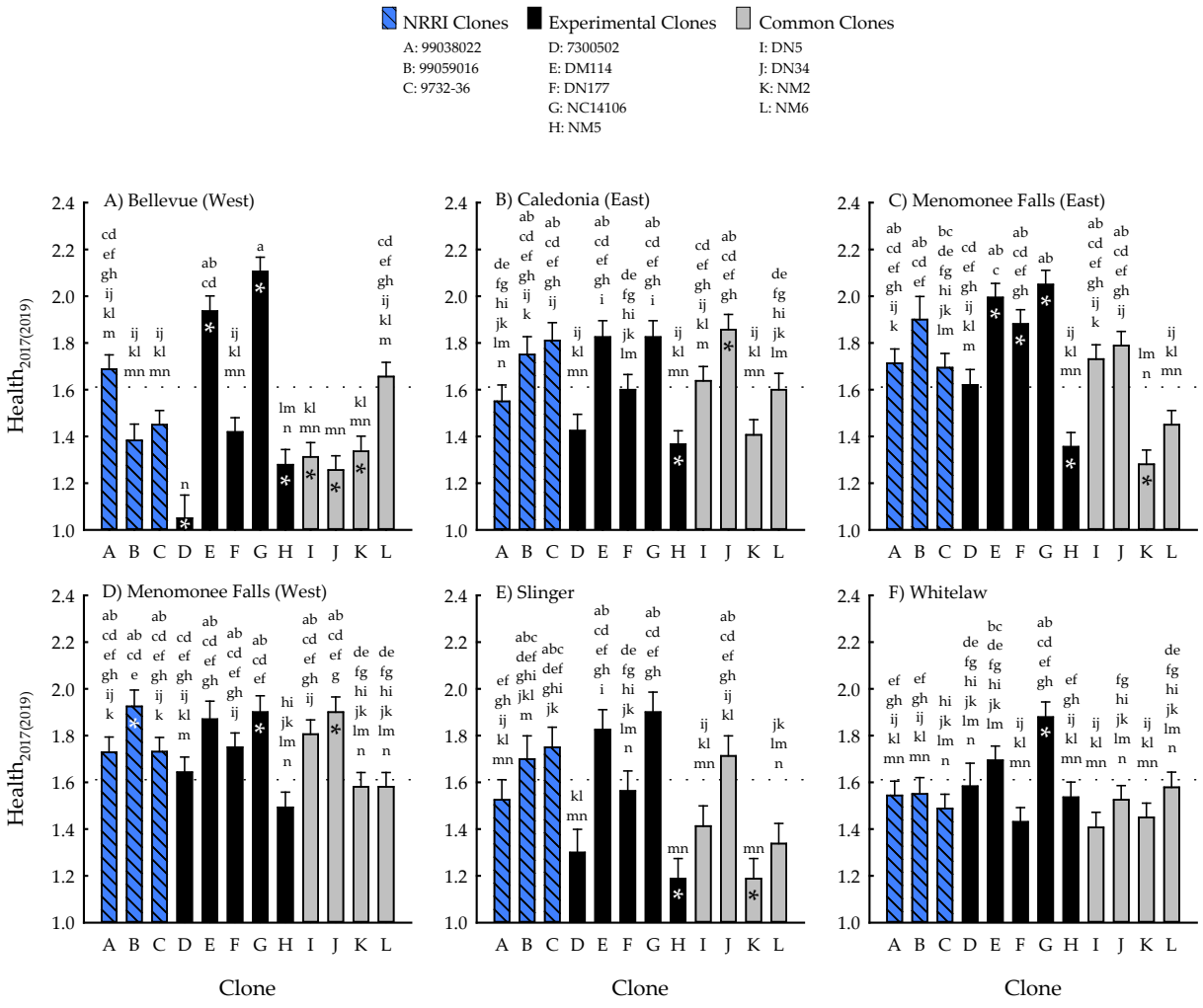

Figure S2. Tree health (± one standard error) determined after the 2019 growing season of twelve poplar clones tested in five phytoremediation buffer systems (i.e., phyto buffers) established in 2017 (i.e., the **2017 Buffer Group**) in the Lake Michigan watershed of eastern Wisconsin, USA. The dashed line represents the overall mean, and asterisks indicate means different than the overall mean at $P < 0.05$. Bars with different letters across all buffer × clone combinations are different at $P < 0.05$. See Materials and Methods for complete tree health definitions (1 = optimal health, 2 = good health, 3 = moderate health, 4 = poor health, and 5 = dead).

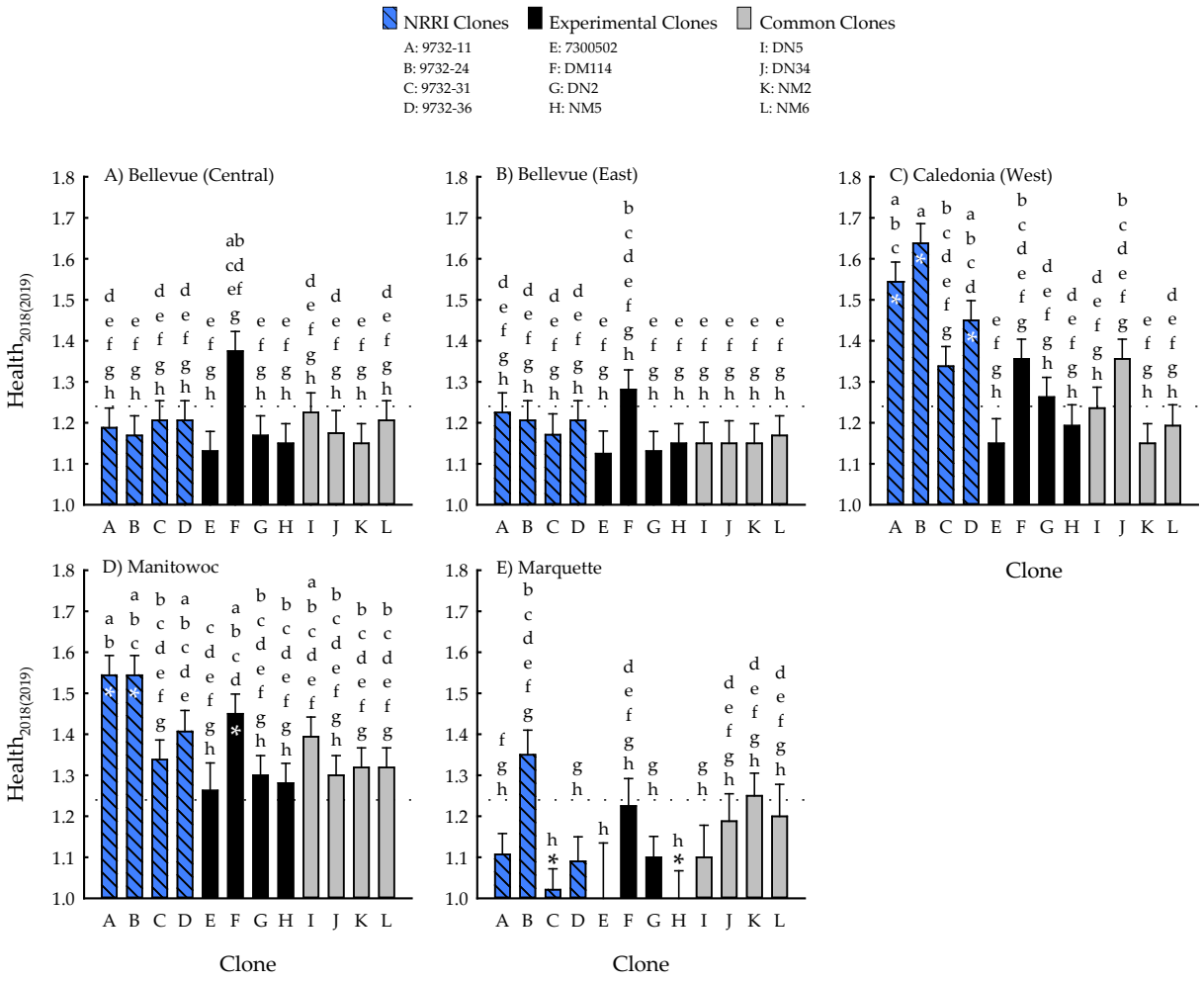

Figure S3. Tree health (± one standard error) determined after the 2019 growing season of twelve poplar clones tested in five phytoremediation buffer systems (i.e., phyto buffers) established in 2018 (i.e., the **2018 Buffer Group**) in the Lake Superior watershed of the Upper Peninsula of Michigan, USA and the Lake Michigan watershed of eastern Wisconsin, USA. The dashed line represents the overall mean, and asterisks indicate means different than the overall mean at $P < 0.05$. Bars with different letters across all buffer × clone combinations are different at $P < 0.05$. See Materials and Methods for complete tree health definitions (1 = optimal health, 2 = good health, 3 = moderate health, 4 = poor health, and 5 = dead).