

Changes of Norway Spruce Health in the Białowieża Forest (CE Europe) in 2013–2019 during a Bark Beetle Infestation, Studied with Landsat Imagery

Maja Bryk ¹, Beata Kołodziej ^{1,*} and Radosław Pliszka ²

¹ University of Life Sciences in Lublin, Institute of Soil Science and Environment Management, Leszczyńskiego 7, 20-069 Lublin, Poland; maja.bryk@up.lublin.pl

² University of Life Sciences in Lublin, Faculty of Agrobioengineering, Akademicka 13, 20-950 Lublin, Poland

*Corresponding author: Beata Kołodziej, beata.kolodziej@up.lublin.pl

Supplementary material

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Table S1. Statistical parameters of the quantitative NDVI distributions of the studied spruce stand

Parameter	19 Oct	2 Oct	8 Nov	20 Oct	Difference			
	2013	2015	2017	2019	2015–2013	2017–2015	2019–2017	2019–2013
Mean	0.798	0.697	0.639	0.620	–0.101	–0.058	–0.019	–0.178
Median	0.816	0.709	0.623	0.606	–0.107	–0.086	–0.017	–0.210
Standard deviation	0.074	0.079	0.095	0.080	0.005	0.016	–0.015	0.006
Kurtosis	0.017	–0.576	–0.253	0.471	–0.593	0.323	0.724	0.454
Skewness	–0.813	–0.497	0.584	0.573	0.316	1.081	–0.011	1.386
Minimum	0.521	0.433	0.417	0.273	–0.088	–0.016	–0.144	–0.248
Maximum	0.923	0.854	0.914	0.904	–0.069	0.060	–0.010	–0.019
Range	0.402	0.421	0.497	0.631	0.019	0.076	0.134	0.229

Table S2. Absolute differences in the area of the NDVI classes of the studied spruce stand

NDVI classes	Area (ha)				Difference in area (ha)			
	19 Oct 2013	2 Oct 2015	8 Nov 2017	20 Oct 2019	2015–2013	2017–2015	2019–2017	2019–2013
0.2–0.5	0.00	4.14	21.69	18.09	4.14	17.55	–3.60	18.09
0.5–0.6	6.66	82.53	224.37	270.45	75.87	141.84	46.08	263.79
0.6–0.7	68.85	199.80	224.01	231.84	130.95	24.21	7.83	162.99
0.7–0.8	187.74	294.66	104.76	79.92	106.92	–189.90	–24.84	–107.82
0.8–0.9	343.62	40.32	45.81	19.62	–303.30	5.49	–26.19	–324.00
0.9–1.0	13.14	0.00	0.81	0.09	–13.14	0.81	–0.72	–13.05
Total	620.01	621.45	621.45	620.01				

Table S3. Relative differences in the area of the NDVI classes of the studied spruce stand

NDVI classes	Area (%)				Difference in area (%)			
	19 Oct 2013	2 Oct 2015	8 Nov 2017	20 Oct 2019	2015–2013	2017–2015	2019–2017	2019–2013
0.2–0.5	0.00	0.67	3.49	2.92	n.a.	423.91	–16.60	n.a.
0.5–0.6	1.07	13.28	36.10	43.62	1139.19	171.86	20.54	3960.81
0.6–0.7	11.10	32.15	36.05	37.39	190.20	12.12	3.50	236.73
0.7–0.8	30.28	47.41	16.86	12.89	56.95	–64.45	–23.71	–57.43
0.8–0.9	55.42	6.49	7.37	3.16	–88.27	13.62	–57.17	–94.29
0.9–1.0	2.12	0.00	0.13	0.01	–100.00	n.a.	–88.89	–99.32