Project AC0109 – Future patterns of ammonia emissions across the UK and the potential impact of local emission reduction measures

Appendix 3 - Effects of mitigation scenarios on Critical Level exceedance on UK habitats and SAC/SSSIs

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This appendix is intended as an extension to the following sections on Critical Level (CLE) exceedance in the main project report, providing additional materials in the form of figures and tables:

- Section 3.2. - Effects of UK-wide mitigation scenarios on CLE exceedance for SAC/SSSIs
- Section 3.3. - Effects of spatially targeted mitigation scenarios on CLE for SAC/SSSIs
- Section 3.5. - Differences in the exceedance of CLE between UK countries (UK-wide and spatially targeted scenarios for SACs and SSSIs)

Table 1. Exceedance of the NH_3 Critical levels (1 and 3 µg m^{-3}) for all scenarios, UK-wide coverage across land-surface area (in addition to SAC/SSSI specific data provided in the main report)

	3 µg NH_3 m^{-3}		1 µg NH_3 m^{-3}	
Scenario	**Area(km^2)**	**Area (%)**	**Area(km^2)**	**Area (%)**
2008	51,514	20.5%	180,636	71.7%
2020	50,585	20.1%	181,397	72.0%
Woodland	30,453	12.1%	180,061	71.5%
LowEmSpr	28,961	11.5%	177,663	70.5%
Mitig1	27,553	10.9%	177,247	70.4%
Mitig2	30,177	12.0%	176,078	69.9%
Mitig3	24,665	9.8%	175,460	69.7%
Mitig4	22,413	8.9%	172,658	68.5%
Mitig2 NVZ	36,974	14.7%	179,396	71.2%
Mitig4 500m SAC	49,340	19.6%	180,623	71.7%
Mitig4 1km SAC	48,242	19.2%	194,382	71.5%
Mitig4 2km SAC	46,129	18.3%	179,262	71.2%
Mitig4 5km SAC	40,193	16.0%	177,255	70.4%
Mitig4 Variable buffer SAC	42,605	16.9%	179,631	71.3%
Mitig4 protectability SAC	38,904	15.4%	179,074	71.1%
Mitig4 500m SSSI	48,106	19.1%	180,387	71.6%
Mitig4 1km SSSI	45,570	18.1%	179,578	71.3%
Mitig4 2km SSSI	40,103	15.9%	177,977	70.7%
Mitig4 5km SSSI	28,142	11.2%	174,619	69.3%
Mitig4 Variable buffer SSSI	35,224	14.0%	179,529	71.3%
Mitig4 protectability SSSI	25,096	10.0%	178,375	70.8%

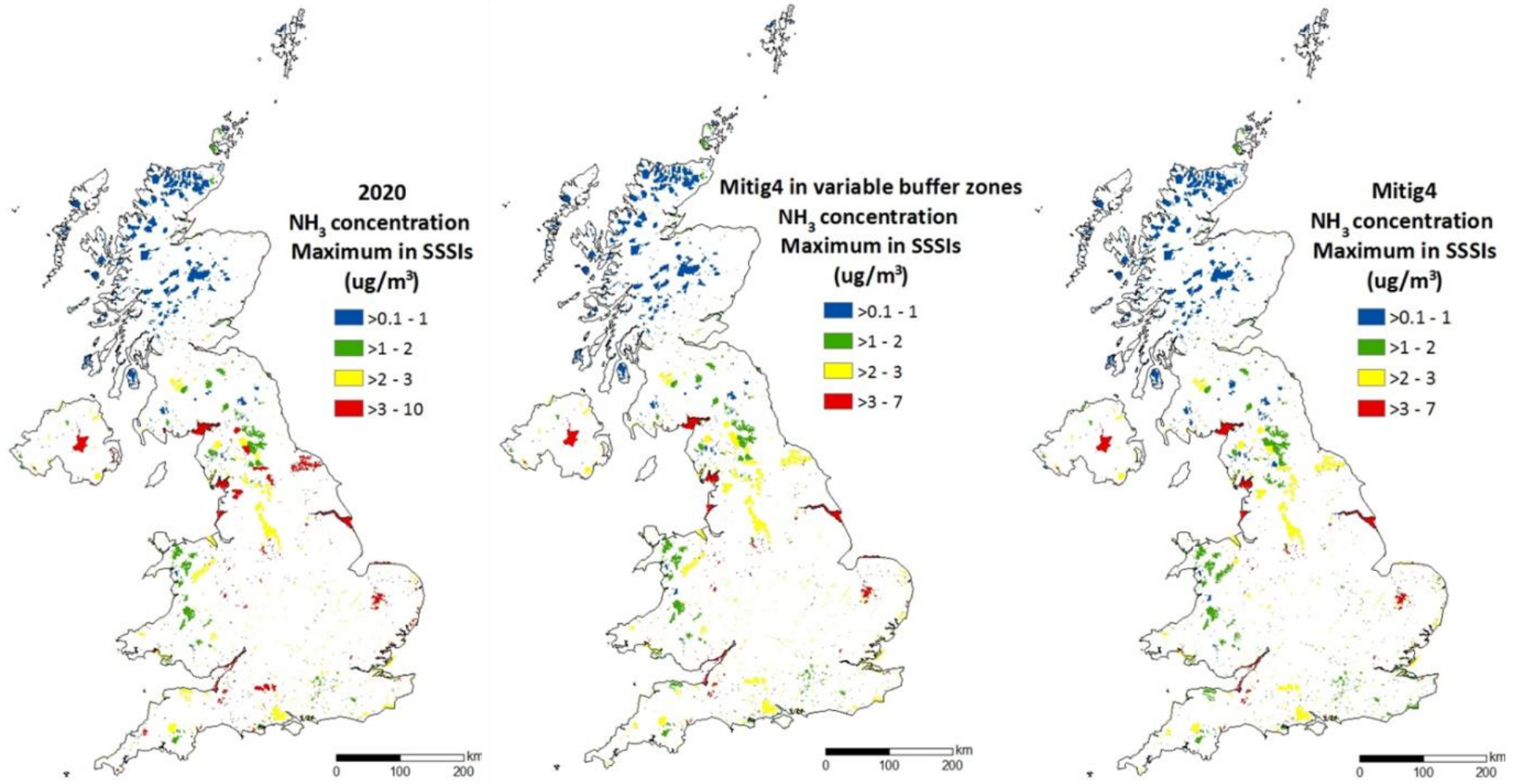

Figure 1: Effects of scenario Mitig4 on 3 µg m^{-3} Critical Level exceedance in SSSIs: Maximum NH_3 concentrations in SSSIs for the 2020 Baseline (left), UK-wide application of Mitig4 (middle) and tailored variable buffer zones around SSSIs with application of Mitig4 (right).

Table 2: Assessment of effectiveness and cost-effectiveness of UK-wide and spatially targeted mitigation scenarios for NH_3 Critical Level exceedance (3 µg m^{-3}), separately for SACs (top) and SSSIs (bottom), showing additional data to Table 6 in the main report, for indicator AWI-2.

Scenario name	Total agric. emission (kt NH_3)	% emission reduction from 2020 baseline	AWI - Additonal SAC area protected km^2 (c.f. 2020)	AWI-2 - Additonal SAC area protected km^2 (c.f. 2020)	AWI - % Additonal SAC area protected km^2 (c.f. 2020)	AWI-2 - % Additonal SAC area protected km^2 (c.f. 2020)	Cost £ Mio (inc. baseline cost)	Cost £ Mio (exc. baseline cost)	AWI - % additonal SAC area protected / £5 M
Baseline2020	218.5	-	-	-	0%		19.8	0.0	-
UK - LowEmSpreading	186.8	15%	1,165	74	26%	40%	57.1	37.3	4%
UK - Mitig1	184.2	16%	1,245	81	28%	44%	71.8	52.0	3%
UK - Mitig2	179.1	18%	2,059	93	46%	50%	82.5	62.7	4%
UK - Mitig3	177.1	19%	2,065	99	47%	53%	100.5	80.7	3%
UK - Mitig4	160.6	26%	3,191	122	72%	66%	104.5	84.7	4%
Current NVZ-Mitig2	193.6	11%	315	44	7%	24%	59.5	39.7	1%
Buffers Mitig4 500 m	215.8	1%	588	45	13%	25%	23.9	4.1	16%
Buffers Mitig4 1km	213.6	2%	759	63	17%	34%	27.1	7.3	12%
Buffers Mitig4 2 km	209.2	4%	1,419	80	32%	43%	33.5	13.7	12%
Buffers Mitig4 5 km	197.6	10%	2,478	104	56%	56%	50.5	30.7	9%
Buffers Mitig4 variable	205.9	6%	1,436	100	32%	54%	38.2	18.4	9%
Max protectability	199.9	9%	4,082	165	92%	89%	n/a	n/a	n/a
Additional Trees	218.5	0%	483	78	11%	42%	0	0	n/a

Scenario name	Total agric. emission (kt NH_3)	% emission reduction from 2020 baseline	AWI - Additonal SSSI area protected km^2 (c.f. 2020)	AWI-2 - Additonal SSSI area protected km^2 (c.f. 2020)	AWI - % Additonal SSSI area protected km^2 (c.f. 2020)	AWI-2 - % Additonal SAC area protected km^2 (c.f. 2020)	Cost £ Mio (inc. baseline cost)	Cost £ Mio (exc. baseline cost)	AWI - % additonal SSSI area protected / £5 M
Baseline2020	218.5	-	-	-	-	-	19.8	0.0	-
UK - LowEmSpreading	186.8	15%	1,674	58	47%	39%	57.1	37.3	6%
UK - Mitig1	184.2	16%	1,719	62	48%	42%	71.8	52.0	5%
UK - Mitig2	179.1	18%	1,790	72	50%	48%	82.5	62.7	4%
UK - Mitig3	177.1	19%	1,807	77	50%	51%	100.5	80.7	3%
UK - Mitig4	160.6	26%	2,063	98	57%	65%	104.5	84.7	3%
Current NVZ-Mitig2	193.6	11%	685	38	19%	25%	59.5	39.7	2%
Buffers Mitig4 500 m	213.4	2%	481	35	13%	24%	23.9	4.1	16%
Buffers Mitig4 1km	208.4	5%	1,186	48	33%	32%	27.1	7.3	23%
Buffers Mitig4 2 km	197.4	10%	1,785	63	50%	42%	33.5	13.7	18%
Buffers Mitig4 5 km	173.5	21%	2,007	80	56%	54%	50.5	30.7	9%
Buffers Mitig4 variable	197.1	10%	1,918	78	53%	52%	38.2	18.4	14%
Max protectability	181.6	17%	3,138	130	87%	87%	-	-	n/a
Additional Trees	218.5	0%	1,128	59	31%	40%	-	0	n/a