

Input parameters

	Gannet	Kittiwake	Kittiwake	Puffin	Guillemot	Guillemot	Razorbill	Razorbill
	Forth Islands SPA	Forth Islands	Fowlsheugh S	Forth Islands	Forth Islands	Fowlsheugh S	Forth Islands	Fowlsheugh SPA
R	0.698	0.67	0.74	0.65	0.68	0.68	0.56	0.65
Rsd	0.07	0.08	0.08	0.16	0.15	0.15	0.07	0.04
Sad	0.916	0.896	0.835	0.935	0.935	0.93	0.905	0.9
Sadsd	0.004	0.01	0.01	0.007	0.03	0.015	0.05	0.05
S0	0.542	0.79	0.79	0.84	0.542	0.56	0.725	0.725
S0sd	0.01	0.01	0.01	0.015	0.04	0.013	0.05	0.05
S1	0.779	0.79	0.79	0.84	0.782	0.792	0.725	0.725
S1sd	0.01	0.01	0.01	0.015	0.02	0.034	0.05	0.05
S2	0.859	S1 until age of maturation		0.776	0.922	0.917	S1 until age of maturation	
S2sd	0.01			0.015	0.02	0.022		
S3	0.863			0.805	0.9	0.93		
S3sd	0.01			0.015	0.02	0.015		
	S3 until age of maturation			S3 until age of maturation				
initial year of run	2014	2017	2015	2017	2017	2015	2017	2015
breeding pairs in initial year of run	75259	4663	9665	45005	38573	74379	7792	9950
population size in initial year of run	143457	9632	21682	89296	78016	146693	13260	17832
inital year of wind farm	2021	2021	2021	2021	2021	2021	2021	2021
<i>Calculation fraction collision victims</i>								
based on year	2009	2012	2012	2009	2011	2012	2011	2012
number of breeding pairs in that year	55482	3776	9337	50282	29169	60193	4649	7048
population size in that year	105759	7799	20946	99766	58996	118715	7912	12631

Results 50Y GrowthRate

		NNG				F&T2014			F&T 2017			UK		
Populations		Baseline	SWT8.0		SWT8.0		SWT8.0		SWT8.0		SWT8.0		UK + 2014	
			Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (all year) + Displacement (breeding season)	Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (F&T br + UK non-br)	F&T + NNG 2017
Gannet	Forth Islands SPA	1.7189	1.6546					1.0866				1.4226	1.3971	1.0689
Kittiwake	Forth Islands SPA	0.9068	0.8639			x		-0.5529				0.3957	0.5637	0.1225
Kittiwake	Fowlsheugh SPA	-2.2758	-2.3203			x		-2.3306				-2.6604	-2.5747	-2.9173
Puffin	Forth Islands SPA	4.6011		4.5740							4.5174			
Guillemot	Forth Islands SPA	1.8916		1.8778							1.8464			
Guillemot	Fowlsheugh SPA	2.3278		2.3016							2.2826			
Razorbill	Forth Islands SPA	0.0631		-0.0235							-0.1099			
Razorbill	Fowlsheugh SPA	0.9416		0.8710							0.8085			
percentage change median annual growth rate, compar														
			NNG				F&T			F&T 2017			UK	
			SWT8.0		SWT8.0		SWT8.0		SWT8.0		SWT8.0		SWT8.0	
			Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (all year) + Displacement (breeding season)	Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (F&T br + UK non-br)	
Gannet	Forth Islands SPA		-3.7408						-36.7852			-17.2378	-18.7213	-37.8149
Kittiwake	Forth Islands SPA		-4.7309			#VALUE!		-5.6131	-160.9727			-56.3630	-37.8363	-86.4910
Kittiwake	Fowlsheugh SPA		-1.9554			#VALUE!		-2.4079	-48.4709			-16.8996	-13.1338	-28.1879
Puffin	Forth Islands SPA			-0.5890							-1.8191			
Guillemot	Forth Islands SPA			-0.7295							-2.3895			
Guillemot	Fowlsheugh SPA			-1.1255							-1.9417			
Razorbill	Forth Islands SPA			-137.2425							-274.1680			
Razorbill	Fowlsheugh SPA			-7.4979							-14.1355			
Counterfactual Growth Rate														
			SWT8.0				SWT8.0			SWT8.0			SWT8.0	
			Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (all year) + Displacement (breeding season)	Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (F&T br + UK non-br)	
Gannet	Forth Islands SPA		0.9626						0.6321			0.8276	0.8128	0.6219
Kittiwake	Forth Islands SPA		0.9527			#VALUE!		0.9439	-0.6097			0.4364	0.6216	0.1351
Kittiwake	Fowlsheugh SPA		1.0196			#VALUE!		1.0241	1.4847			1.1690	1.1313	1.2819
Puffin	Forth Islands SPA			0.9941							0.9818			
Guillemot	Forth Islands SPA			0.9927							0.9761			
Guillemot	Fowlsheugh SPA			0.9887							0.9806			
Razorbill	Forth Islands SPA			-0.3724							-1.7417			
Razorbill	Fowlsheugh SPA			0.9250							0.8586			
Percentage point change in growth rate														
			SWT8.0				SWT8.0			SWT8.0			SWT8.0	
			Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (all year) + Displacement (breeding season)	Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (all year)	Displacement (all year)	Collision (all year) + Displacement (all year)	Collision (F&T br + UK non-br)	
Gannet	Forth Islands SPA		-0.064						-0.632			-0.296	-0.322	-0.650
Kittiwake	Forth Islands SPA		-0.043			#VALUE!		-0.051	-1.460			-0.511	-0.343	-0.784
Kittiwake	Fowlsheugh SPA		-0.045			#VALUE!		-0.055	-1.103			-1.194	-0.466	-0.642
Puffin	Forth Islands SPA			-0.027							-0.084			
Guillemot	Forth Islands SPA			-0.014							-0.045			
Guillemot	Fowlsheugh SPA			-0.026							-0.045			
Razorbill	Forth Islands SPA			-0.087							-0.173			
Razorbill	Fowlsheugh SPA			-0.071							-0.133			

Overview table

Species	Population	Scenario	Type impact	Start year	Wind farm from year	Period (years)	End year	Initial population (breeding pairs)	Counterfactual growth rate*	Percentage point change in growth rate	Counterfactual population size	50th centile	Adult survival rate	Productivity Rate	End population size (breeding pairs)
									* Counterfactual of growth rate is highly influenced by the initial growth rate and bears little relevance to the change in growth rate on its own.				mean ± SD	mean ± SD	(breeding pairs)
Gannet	Forth Islands SPA	Baseline	No impact	2014	2021	25	2046	75259	1	0	1	50	0.916 ±0.004	0.698 ±0.07	132394
Kittiwake	Forth Islands SPA	Baseline	No impact	2017	2021	25	2046	4663	1	0	1	50	0.896 ±0.01	0.67 ±0.08	6118
Kittiwake	Fowlsheugh SPA	Baseline	No impact	2015	2021	25	2046	9665	1	0	1	50	0.835 ±0.01	0.74 ±0.08	4629
Puffin	Forth Islands SPA	Baseline	No impact	2017	2021	25	2046	45005	1	0	1	50	0.935 ±0.007	0.65 ±0.16	174231
Guillemot	Forth Islands SPA	Baseline	No impact	2017	2021	25	2046	38573	1	0	1	50	0.935 ±0.03	0.68 ±0.15	67234
Guillemot	Fowlsheugh SPA	Baseline	No impact	2015	2021	25	2046	74379	1	0	1	50	0.93 ±0.015	0.68 ±0.15	150711
Razorbill	Forth Islands SPA	Baseline	No impact	2017	2021	25	2046	7792	1	0	1	50	0.905 ±0.05	0.56 ±0.07	7862
Razorbill	Fowlsheugh SPA	Baseline	No impact	2015	2021	25	2046	9950	1	0	1	50	0.9 ±0.05	0.65 ±0.04	13491
Gannet	Forth Islands SPA	NNG	Collisions	2014	2021	25	2046	75259	0.97	-0.06	0.99	39	0.916 ±0.004	0.698 ±0.07	130761
Kittiwake	Forth Islands SPA	NNG	Collisions	2017	2021	25	2046	4663	0.94	-0.05	0.99	41	0.896 ±0.01	0.67 ±0.08	6034
Kittiwake	Fowlsheugh SPA	NNG	Collisions	2015	2021	25	2046	9665	1.02	-0.05	0.99	41	0.835 ±0.01	0.74 ±0.08	4577
Kittiwake	Forth Islands SPA	NNG	Collisions and displacement	2017	2021	25	2046	4663	0.95	-0.05	0.99	43	0.896 ±0.01	0.67 ±0.08	6059
Kittiwake	Fowlsheugh SPA	NNG	Collisions and displacement	2015	2021	25	2046	9665	1.03	-0.06	0.99	39	0.835 ±0.01	0.74 ±0.08	4563
Puffin	Forth Islands SPA	NNG	Displacement	2017	2021	25	2046	45005	1.00	-0.02	0.99	47	0.935 ±0.007	0.65 ±0.16	172875
Guillemot	Forth Islands SPA	NNG	Displacement	2017	2021	25	2046	38573	0.99	-0.02	1.01	52	0.935 ±0.03	0.68 ±0.15	67611
Guillemot	Fowlsheugh SPA	NNG	Displacement	2015	2021	25	2046	74379	1.00	0.00	1.00	49	0.93 ±0.015	0.68 ±0.15	150453
Razorbill	Forth Islands SPA	NNG	Displacement	2017	2021	25	2046	7792	0.13	-0.03	1.00	50	0.905 ±0.05	0.56 ±0.07	7870
Razorbill	Fowlsheugh SPA	NNG	Displacement	2015	2021	25	2046	9950	0.93	-0.06	0.99	48	0.9 ±0.05	0.65 ±0.04	13324
Gannet	Forth Islands SPA	F&T17	Collisions	2014	2021	25	2046	75259	0.83	-0.29	0.93	5	0.916 ±0.004	0.698 ±0.07	123131
Kittiwake	Forth Islands SPA	F&T17	Collisions	2017	2021	25	2046	4663	0.44	-0.51	0.88	1	0.896 ±0.01	0.67 ±0.08	5380
Kittiwake	Fowlsheugh SPA	F&T17	Collisions	2015	2021	25	2046	9665	1.17	-0.38	0.90	6	0.835 ±0.01	0.74 ±0.08	4166
Kittiwake	Forth Islands SPA	F&T17	Collisions and displacement	2017	2021	25	2046	4663	0.31	-0.63	0.85	0	0.896 ±0.01	0.67 ±0.08	5202
Kittiwake	Fowlsheugh SPA	F&T17	Collisions and displacement	2015	2021	25	2046	9665	1.21	-0.47	0.88	3	0.835 ±0.01	0.74 ±0.08	4084
Puffin	Forth Islands SPA	F&T17	Displacement	2017	2021	25	2046	45005	0.98	-0.09	0.97	41	0.935 ±0.007	0.65 ±0.16	169773
Guillemot	Forth Islands SPA	F&T17	Displacement	2017	2021	25	2046	38573	0.97	-0.06	0.99	47	0.935 ±0.03	0.68 ±0.15	66454
Guillemot	Fowlsheugh SPA	F&T17	Displacement	2015	2021	25	2046	74379	0.99	-0.02	0.99	45	0.93 ±0.015	0.68 ±0.15	149071
Razorbill	Forth Islands SPA	F&T17	Displacement	2017	2021	25	2046	7792	-2.61	-0.11	0.96	42	0.905 ±0.05	0.56 ±0.07	7563
Razorbill	Fowlsheugh SPA	F&T17	Displacement	2015	2021	25	2046	9950	0.81	-0.18	0.96	42	0.9 ±0.05	0.65 ±0.04	12923
Gannet	Forth Islands SPA	UK	Collisions	2014	2021	25	2046	75259	0.81	-0.32	0.92	3	0.916 ±0.004	0.698 ±0.07	121977
Kittiwake	Forth Islands SPA	UK	Collisions and displacement	2017	2021	25	2046	4663	0.61	-0.35	0.92	8	0.896 ±0.01	0.67 ±0.08	5603
Kittiwake	Fowlsheugh SPA	UK	Collisions and displacement	2015	2021	25	2046	9665	1.13	-0.30	0.93	13	0.835 ±0.01	0.74 ±0.08	4285
Gannet	Forth Islands SPA	Baseline	No impact	2014	2021	50	2071	75259	1	0	1	50	0.916 ±0.004	0.698 ±0.07	203046
Kittiwake	Forth Islands SPA	Baseline	No impact	2017	2021	50	2071	4663	1	0	1	50	0.896 ±0.01	0.67 ±0.08	7665
Kittiwake	Fowlsheugh SPA	Baseline	No impact	2015	2021	50	2071	9665	1	0	1	50	0.835 ±0.01	0.74 ±0.08	2593
Puffin	Forth Islands SPA	Baseline	No impact	2017	2021	50	2071	45005	1	0	1	50	0.935 ±0.007	0.65 ±0.16	531902
Guillemot	Forth Islands SPA	Baseline	No impact	2017	2021	50	2071	38573	1	0	1	50	0.935 ±0.03	0.68 ±0.15	108366
Guillemot	Fowlsheugh SPA	Baseline	No impact	2015	2021	50	2071	74379	1	0	1	50	0.93 ±0.015	0.68 ±0.15	267057
Razorbill	Forth Islands SPA	Baseline	No impact	2017	2021	50	2071	7792	1	0	1	50	0.905 ±0.05	0.56 ±0.07	8063
Razorbill	Fowlsheugh SPA	Baseline	No impact	2015	2021	50	2071	9950	1	0	1	50	0.9 ±0.05	0.65 ±0.04	16932
Gannet	Forth Islands SPA	NNG	Collisions	2014	2021	50	2071	75259	0.96	-0.06	0.97	30	0.916 ±0.004	0.698 ±0.07	197206
Kittiwake	Forth Islands SPA	NNG	Collisions	2017	2021	50	2071	4663	0.95	-0.04	0.98	42	0.896 ±0.01	0.67 ±0.08	7515
Kittiwake	Fowlsheugh SPA	NNG	Collisions	2015	2021	50	2071	9665	1.02	-0.04	0.98	42	0.835 ±0.01	0.74 ±0.08	2547
Kittiwake	Forth Islands SPA	NNG	Collisions and displacement	2017	2021	50	2071	4663	0.94	-0.05	0.97	38	0.896 ±0.01	0.67 ±0.08	7458
Kittiwake	Fowlsheugh SPA	NNG	Collisions and displacement	2015	2021	50	2071	9665	1.02	-0.05	0.98	40	0.835 ±0.01	0.74 ±0.08	2532
Puffin	Forth Islands SPA	NNG	Displacement	2017	2021	50	2071	45005	0.99	-0.03	0.99	47	0.935 ±0.007	0.65 ±0.16	525558
Guillemot	Forth Islands SPA	NNG	Displacement	2017	2021	50	2071	38573	0.99	-0.01	0.99	47	0.935 ±0.03	0.68 ±0.15	107270
Guillemot	Fowlsheugh SPA	NNG	Displacement	2015	2021	50	2071	74379	0.99	-0.03	0.99	47	0.93 ±0.015	0.68 ±0.15	264113
Razorbill	Forth Islands SPA	NNG	Displacement	2017	2021	50	2071	7792	-0.37	-0.09	0.96	45	0.905 ±0.05	0.56 ±0.07	7749
Razorbill	Fowlsheugh SPA	NNG	Displacement	2015	2021	50	2071	9950	0.93	-0.07	0.97	44	0.9 ±0.05	0.65 ±0.04	16353
Gannet	Forth Islands SPA	F&T17	Collisions	2014	2021	50	2071	75259	0.83	-0.30	0.86	1	0.916 ±0.004	0.698 ±0.07	175208
Kittiwake	Forth Islands SPA	F&T17	Collisions	2017	2021	50	2071	4663	0.44	-0.51	0.77	1	0.896 ±0.01	0.67 ±0.08	5920
Kittiwake	Fowlsheugh SPA	F&T17	Collisions	2015	2021	50	2071	9665	1.17	-0.38	0.82	3	0.835 ±0.01	0.74 ±0.08	2125
Kittiwake	Forth Islands SPA	F&T17	Collisions and displacement	2017	2021	50	2071	4663	0.31	-0.62	0.73	0	0.896 ±0.01	0.67 ±0.08	5593
Kittiwake	Fowlsheugh SPA	F&T17	Collisions and displacement	2015	2021	50	2071	9665	1.20	-0.47	0.79	1	0.835 ±0.01	0.74 ±0.08	2036
Puffin	Forth Islands SPA	F&T17	Displacement	2017	2021	50	2071	45005	0.98	-0.08	0.96	39	0.935 ±0.007	0.65 ±0.16	510482
Guillemot	Forth Islands SPA	F&T17	Displacement	2017	2021	50	2071	38573	0.98	-0.05	0.97	43	0.935 ±0.03	0.68 ±0.15	105244
Guillemot	Fowlsheugh SPA	F&T17	Displacement	2015	2021	50	2071	74379	0.98	-0.05	0.98	45	0.93 ±0.015	0.68 ±0.15	261912
Razorbill	Forth Islands SPA	F&T17	Displacement	2017	2021	50	2071	7792	-1.74	-0.17	0.92	39	0.905 ±0.05	0.56 ±0.07	7428
Razorbill	Fowlsheugh SPA	F&T17	Displacement	2015	2021	50	2071	9950	0.86	-0.13	0.94	41	0.9 ±0.05	0.65 ±0.04	15910
Gannet	Forth Islands SPA	UK	Collisions	2014	2021	50	2071	75259	0.81	-0.32	0.85	1	0.916 ±0.004	0.698 ±0.07	172618
Kittiwake	Forth Islands SPA	UK	Collisions and displacement	2017	2021	50	2071	4663	0.62	-0.34	0.84	4	0.896 ±0.01	0.67 ±0.08	6451
Kittiwake	Fowlsheugh SPA	UK	Collisions and displacement	2015	2021	50	2071	9665	1.13	-0.30	0.86	7	0.835 ±0.01	0.74 ±0.08	2229