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**RWE Renewables UK Dogger Bank
South (West) Limited**

**RWE Renewables UK Dogger Bank
South (East) Limited**

Dogger Bank South Offshore Wind Farms

Environmental Statement

Volume 7

Appendix 12-13 Population Viability Analyses

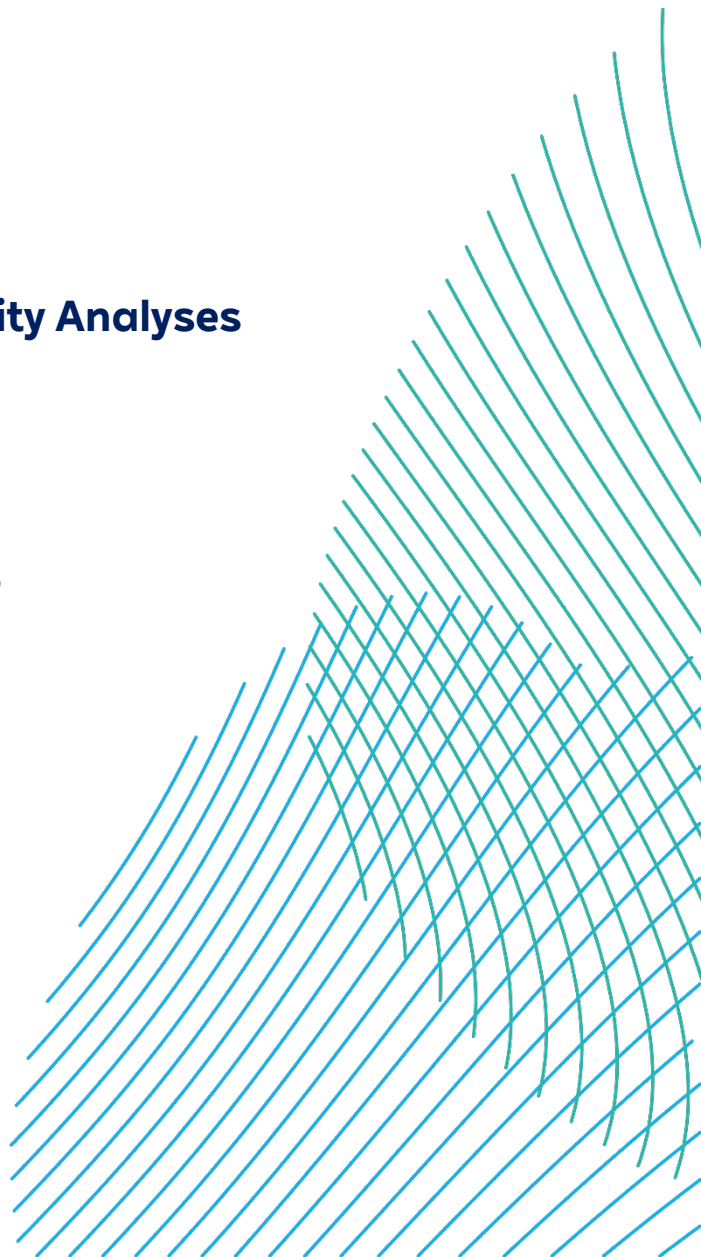
June 2024

Application Reference: 7.12.12.13

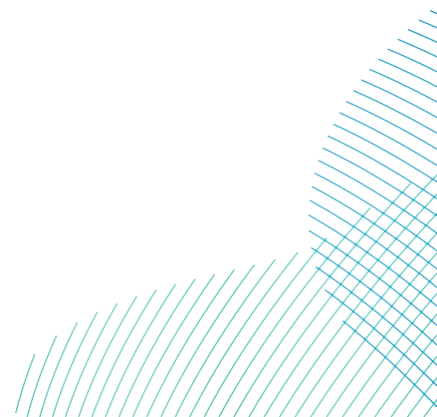
APFP Regulation: 5(2)(a)

Revision: 01

Unrestricted



Company:	RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited	Asset:	Development		
Project:	Dogger Bank South Offshore Wind Farms	Sub Project/Package:	Consents		
Document Title or Description:	Environmental Statement – Appendix 12-13 Population Viability Analyses				
Document Number:	004300153-01	Contractor Reference Number:	PC2340-MAC-OF-ZZ-AX-Z-0101		
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Rev No.	Date	Status/Reason for Issue	Author	Checked by	Approved by
01	June 2024	Final for DCO Application	MacArthur Green	RWE	RWE





MacArthur
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Dogger Bank South Offshore Windfarm

Ornithology Technical Appendix 12-13 Population Viability Analyses

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Document Quality Record

Version	Status	Person Responsible	Date
0.1	Draft	Dr. Shirley Raveh	31/01/2024
0.2	Reviewed	Dr. Mark Trinder	31/01/2024
1	Updated and approval	Dr. Mark Trinder	11/03/2024

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CONTENTS

1	INTRODUCTION	1
2	RESULTS	2

1 INTRODUCTION

1. This Technical Report provides details of Population Viability Analysis (PVA) for the kittiwake breeding population at the Flamborough and Filey Coast SPA.
2. The Natural England commissioned PVA tool (hereafter NEPVA) developed by the Centre for Ecology and Hydrology (CEH; Searle et al. 2019) was used for this analysis. The NEPVA, which is the recommended tool for undertaking seabird PVA in the UK, is written using the R programming language and the scripts are available to download from the project's webpage. The PVA was run using these scripts rather than using the online version of the model.
3. The parameters for the model were derived from counts of breeding adults and productivity data collected at the SPA combined with survival and age at first breeding rates from a review of seabird literature conducted by the British Trust for Ornithology (BTO; Horswill and Robinson, 2015). The latter were used as no studies of survival rates have been conducted at Flamborough and Filey Coast SPA.
4. Outputs are provided as the ratios of the impacted to unimpacted population sizes and impacted to unimpacted population growth rate, respectively referred to as the counterfactual of population size (CPS) and the counterfactual of population growth rate (CPGR). These measures of relative, rather than absolute, effects of additional mortality are preferred because they have been found to be comparatively less sensitive to assumptions about demographic rate values and therefore are considered more robust and reliable.
5. These have been obtained across a range of mortality levels. The inputs and outputs are provided below.

2 RESULTS

Table 1. Inputs: Gannet FFC Annual

Baseline parameters	Settings	Impact parameters	Values
Reference name	GX FFC Annual	Number of scenarios of impact	5
Type	Simulation	Are impacts applied separately to each subpopulation	FALSE
Case studies	None	Are impacts specified separately for immatures	FALSE
Model to use for environmental stochasticity	Beta/Gamma	Are standard errors of impacts available	FALSE
Choose model for density dependence	No density	Should random seeds be matched for impact scenarios	TRUE
Include demographic stochasticity in model	TRUE	Impacts are specified as	Relative
Number of simulations	5000	Years in which impacts are assumed to begin	2027
Random seed	1971	Years in which impacts are assumed to end	2057
Years for burn in	5	Scenario A name	Incomb disp lwr
Species	Northern gannet	Scenario A Impact on productivity rate per pair mean	0
Age at first breeding	5	Scenario A Impact on adult survival rate	0.00232381
Is there an upper constraint on productivity in the model	TRUE	Scenario A Impact on immature survival rate mean	-
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B name	Incomb disp upr
Number of subpopulations	1	Scenario B Impact on productivity rate per pair mean	0
Units for initial population size	breeding.adults	Scenario B Impact on adult survival rate	0.003314286
Are baseline demographic rates specified separately for immatures	TRUE	Scenario B Impact on immature survival rate mean	-
Initial population size	26250	Scenario C name	Incomb crm
Year	2024	Scenario C Impact on productivity rate per pair mean	0
Productivity rate per pair mean	0.823	Scenario C Impact on adult survival rate per pair mean	0.002910476
Productivity rate per pair standard deviation	0.038	Scenario C Impact on immature survival rate mean	-
Adult survival rate Mean	0.919	Scenario D name	In-combination
Adult survival rate standard deviation	0.042	Scenario D Impact on productivity rate per pair mean	0
Immatures survival rates 0 to 1 mean	0.424	Scenario D Impact on adult survival rate	0.005219048
Immatures survival rates 0 to 1 standard deviation	0.045	Scenario D Impact on immature survival rate mean	-
Immatures survival rates 1 to 2 mean	0.829	Scenario E name	Incomb disp.crm
Immatures survival rates 1 to 2 standard deviation	0.026	Scenario E Impact on productivity rate per pair mean	0
Immatures survival rates 2 to 3 mean	0.891	Scenario E Impact on adult survival rate	0.006209524
Immatures survival rates 2 to 3 standard deviation	0.019	Scenario E Impact on immature survival rate mean	-
Immatures survival rates 3 to 4 mean	0.895	Scenario F name	
Immatures survival rates 3 to 4 standard deviation	0.019	Scenario F Impact on productivity rate per pair mean	

Baseline parameters	Settings	Impact parameters	Values
Immatures survival rates 4 to 5 mean	0.919	Scenario F Impact on adult survival rate	
Immatures survival rates 4 to 5 standard deviation	0.042	Scenario F Impact on immature survival rate mean	
Immatures survival rates 5 to 6 mean		Scenario G name	
Immatures survival rates 5 to 6 standard deviation		Scenario G Impact on productivity rate per pair mean	
Units for output	breeding.adults	Scenario G Impact on adult survival rate	
		Scenario G Impact on immature survival rate mean	

Table 2. Outputs: Gannet FFC Annual

Scenario	Impact	Increase in mortality rate	Years since impact	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Incomb disp lwr	61	0.002323810	10	0.9982	0.9982	0.0007	0.9968	0.9997	0.9809	0.9809	0.0081	0.9653	0.9972	43.44	56.44
Incomb disp upr	87	0.003314286	10	0.9975	0.9975	0.0007	0.9961	0.9989	0.9730	0.9730	0.0082	0.9570	0.9890	40.72	59.22
Incomb crm	76	0.002910476	10	0.9978	0.9978	0.0007	0.9964	0.9992	0.9762	0.9764	0.0081	0.9608	0.9923	41.90	58.18
In-combination disp.crm lwr	137	0.005219048	10	0.9961	0.9961	0.0007	0.9947	0.9975	0.9577	0.9578	0.0080	0.9422	0.9736	35.98	64.76
Incomb disp.crm upr	163	0.006209524	10	0.9953	0.9953	0.0007	0.9939	0.9967	0.9499	0.9499	0.0080	0.9341	0.9653	33.26	67.24
Incomb disp lwr	61	0.002323810	20	0.9983	0.9983	0.0005	0.9973	0.9993	0.9650	0.9650	0.0102	0.9456	0.9857	40.58	59.26
Incomb disp upr	87	0.003314286	20	0.9976	0.9976	0.0005	0.9966	0.9985	0.9505	0.9505	0.0102	0.9303	0.9705	37.32	62.86
Incomb crm	76	0.002910476	20	0.9979	0.9979	0.0005	0.9969	0.9988	0.9564	0.9564	0.0101	0.9371	0.9759	38.62	61.20
In-combination disp.crm lwr	137	0.005219048	20	0.9962	0.9962	0.0005	0.9952	0.9972	0.9231	0.9231	0.0099	0.9041	0.9428	30.54	69.96
Incomb disp.crm upr	163	0.006209524	20	0.9955	0.9955	0.0005	0.9945	0.9965	0.9092	0.9092	0.0098	0.8903	0.9286	27.38	73.44
Incomb disp lwr	61	0.002323810	30	0.9983	0.9983	0.0004	0.9976	0.9991	0.9491	0.9492	0.0116	0.9265	0.9723	38.66	61.28
Incomb disp upr	87	0.003314286	30	0.9976	0.9976	0.0004	0.9968	0.9984	0.9286	0.9285	0.0114	0.9063	0.9509	34.18	66.08
Incomb crm	76	0.002910476	30	0.9979	0.9979	0.0004	0.9971	0.9987	0.9368	0.9369	0.0114	0.9153	0.9597	36.44	64.16
In-combination disp.crm lwr	137	0.005219048	30	0.9962	0.9962	0.0004	0.9955	0.9970	0.8896	0.8897	0.0110	0.8685	0.9113	25.74	74.22
Incomb disp.crm upr	163	0.006209524	30	0.9955	0.9955	0.0004	0.9947	0.9963	0.8700	0.8702	0.0108	0.8492	0.8916	22.04	78.00

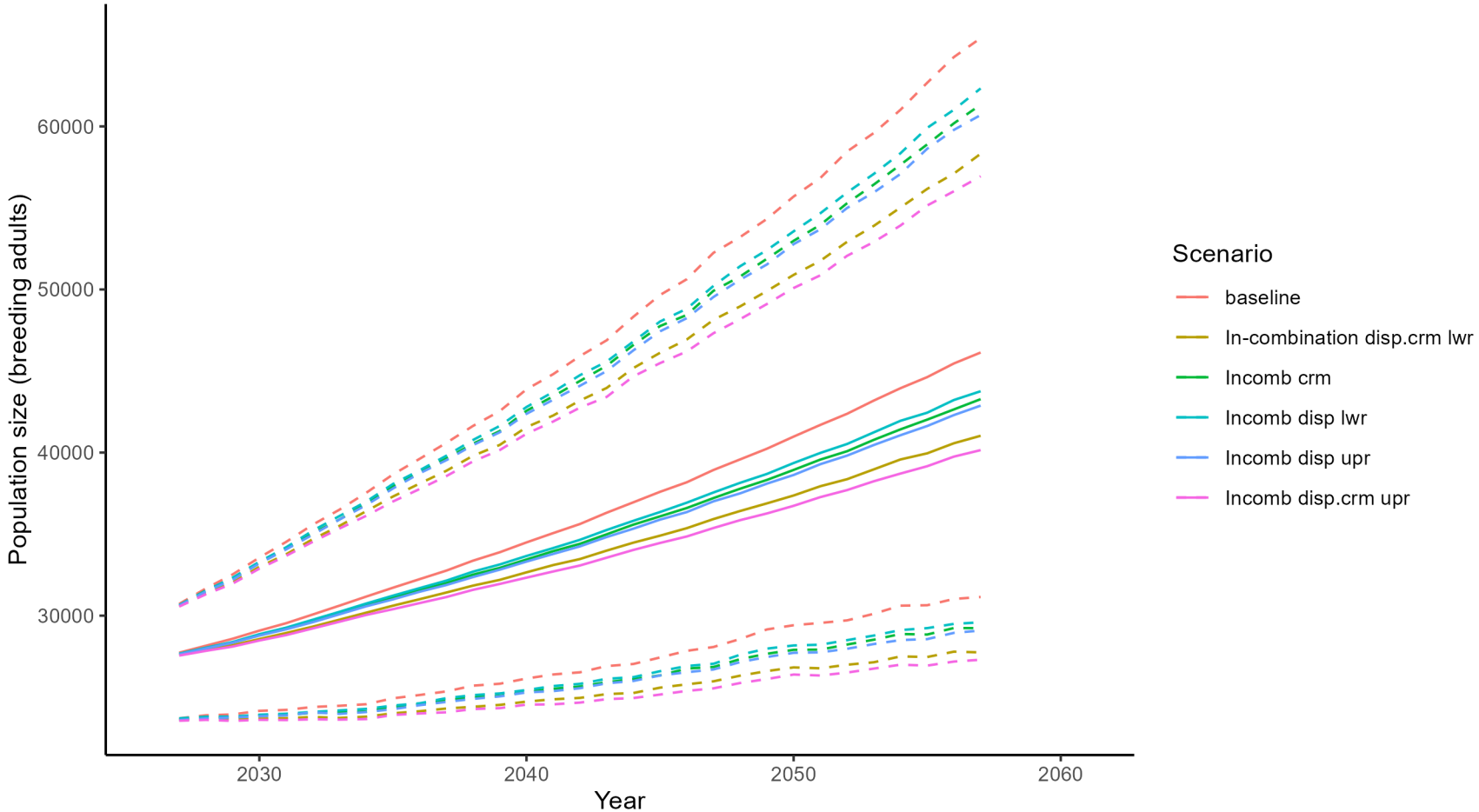


Figure 1.Gannet FFC Annual

Table 3. Inputs: Kittiwake FFC Annual

Baseline parameters	Settings	Impact parameters	Values
Reference name	KI FFC Annual	Number of scenarios of impact	2
Type	Simulation	Are impacts applied separately to each subpopulation	FALSE
Case studies	None	Are impacts specified separately for immatures	FALSE
Model to use for environmental stochasticity	Beta/Gamma	Are standard errors of impacts available	FALSE
Choose model for density dependence	No density	Should random seeds be matched for impact scenarios	TRUE
Include demographic stochasticity in model	TRUE	Impacts are specified as	Relative
Number of simulations	5000	Years in which impacts are assumed to begin	2027
Random seed	1971	Years in which impacts are assumed to end	2057
Years for burn in	5	Scenario A name	Incomb crm lwr
Species	Black-legged	Scenario A Impact on productivity rate per pair mean	0
Age at first breeding	4	Scenario A Impact on adult survival rate	0.003856804
Is there an upper constraint on productivity in the model	TRUE	Scenario A Impact on immature survival rate mean	0
Maximum brood size per pair chicks will be constrained to be no greater than	2	Scenario B name	Incomb crm upr
Number of subpopulations	1	Scenario B Impact on productivity rate per pair mean	0
Units for initial population size	breeding.adults	Scenario B Impact on adult survival rate	0.004768812
Are baseline demographic rates specified separately for immatures	TRUE	Scenario B Impact on immature survival rate mean	-
Initial population size	91008	Scenario C name	
Year	2024	Scenario C Impact on productivity rate per pair mean	
Productivity rate per pair mean	0.737	Scenario C Impact on adult survival rate per pair mean	
Productivity rate per pair standard deviation	0.2015	Scenario C Impact on immature survival rate mean	
Adult survival rate Mean	0.854	Scenario D name	
Adult survival rate standard deviation	0.077	Scenario D Impact on productivity rate per pair mean	
Immatures survival rates 0 to 1 mean	0.79	Scenario D Impact on adult survival rate	
Immatures survival rates 0 to 1 standard deviation	0.077	Scenario D Impact on immature survival rate mean	
Immatures survival rates 1 to 2 mean	0.854	Scenario E name	
Immatures survival rates 1 to 2 standard deviation	0.077	Scenario E Impact on productivity rate per pair mean	
Immatures survival rates 2 to 3 mean	0.854	Scenario E Impact on adult survival rate	
Immatures survival rates 2 to 3 standard deviation	0.077	Scenario E Impact on immature survival rate mean	
Immatures survival rates 3 to 4 mean	0.854	Scenario F name	
Immatures survival rates 3 to 4 standard deviation	0.077	Scenario F Impact on productivity rate per pair mean	
Immatures survival rates 4 to 5 mean		Scenario F Impact on adult survival rate	
Immatures survival rates 4 to 5 standard deviation		Scenario F Impact on immature survival rate mean	
Immatures survival rates 5 to 6 mean		Scenario G name	

Baseline parameters	Settings	Impact parameters	Values
Immatures survival rates 5 to 6 standard deviation		Scenario G Impact on productivity rate per pair mean	
Units for output	breeding.adults	Scenario G Impact on adult survival rate	
		Scenario G Impact on immature survival rate mean	

Table 4. Outputs: Kittiwake FFC Annual

Scenario	Impact	Increase in mortality rate	Years since impact	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Incomb crm lwr	351	0.003856804	10	0.9973	0.9973	0.0005	0.9964	0.9983	0.9708	0.9709	0.0054	0.9604	0.9815	45.00	54.88
Incomb crm upr	434	0.004768812	10	0.9967	0.9967	0.0005	0.9957	0.9976	0.9641	0.9642	0.0054	0.9535	0.9746	43.58	56.08
Incomb crm lwr	351	0.003856804	20	0.9974	0.9974	0.0003	0.9968	0.9980	0.9467	0.9466	0.0066	0.9337	0.9596	43.32	57.10
Incomb crm upr	434	0.004768812	20	0.9968	0.9968	0.0003	0.9961	0.9974	0.9343	0.9344	0.0065	0.9218	0.9474	41.64	58.78
Incomb crm lwr	351	0.003856804	30	0.9974	0.9974	0.0003	0.9969	0.9979	0.9231	0.9231	0.0075	0.9082	0.9377	40.92	58.18
Incomb crm upr	434	0.004768812	30	0.9968	0.9968	0.0003	0.9963	0.9973	0.9057	0.9057	0.0073	0.8913	0.9202	38.72	60.22

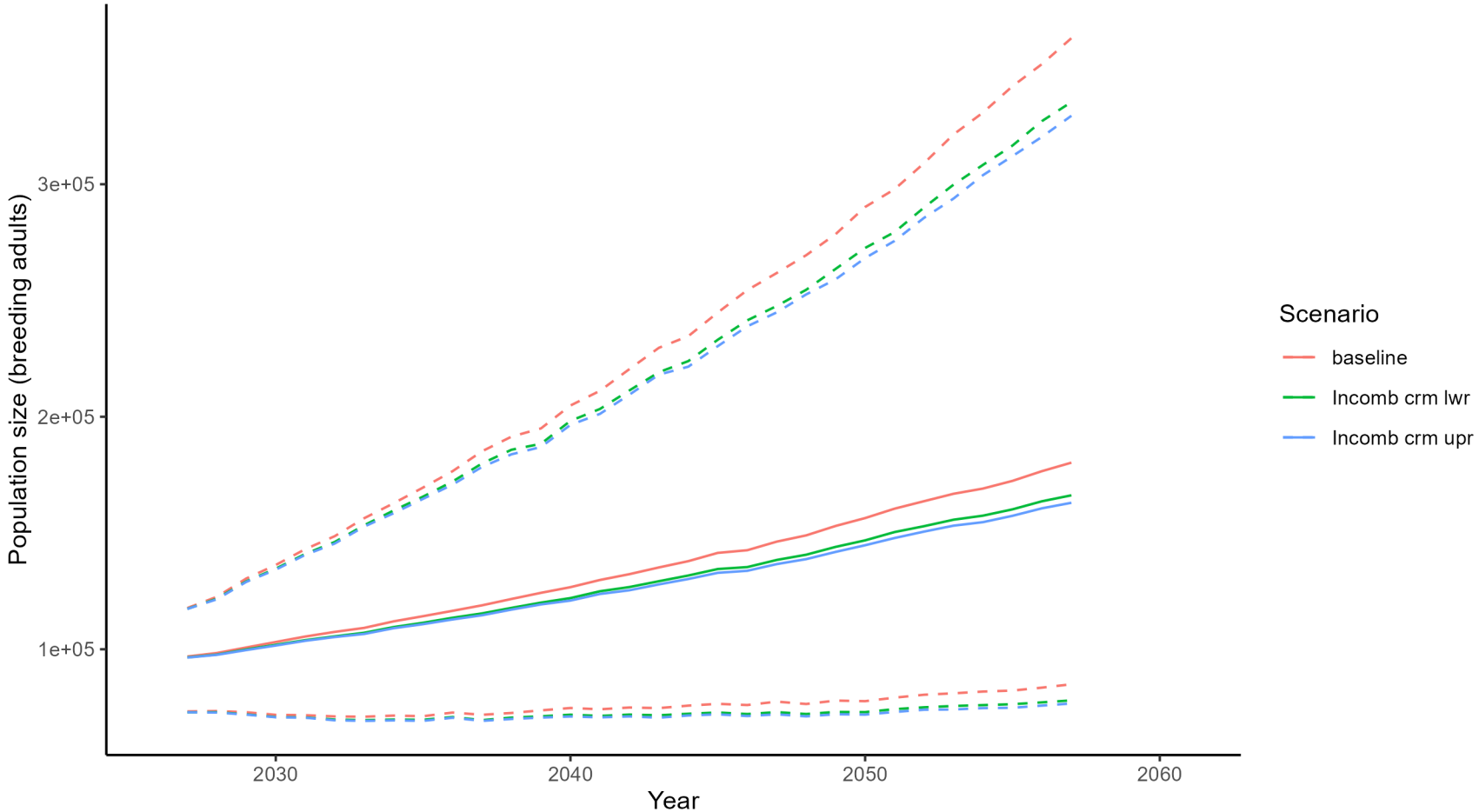


Figure 2. Kittiwake FFC Annual

Table 5. Inputs: Guillemot FFC Annual

Baseline parameters	Settings	Impact parameters	Values
Reference name	GU FFC Annual	Number of scenarios of impact	6
Type	Simulation	Are impacts applied separately to each subpopulation	FALSE
Case studies	None	Are impacts specified separately for immatures	FALSE
Model to use for environmental stochasticity	Beta/Gamma	Are standard errors of impacts available	FALSE
Choose model for density dependence	No density	Should random seeds be matched for impact scenarios	TRUE
Include demographic stochasticity in model	TRUE	Impacts are specified as	Relative
Number of simulations	5000	Years in which impacts are assumed to begin	2027
Random seed	1971	Years in which impacts are assumed to end	2057
Years for burn in	5	Scenario A name	Incomb disp lwr1
Species	Common	Scenario A Impact on productivity rate per pair mean	0
Age at first breeding	6	Scenario A Impact on adult survival rate	0.0007734468
Is there an upper constraint on productivity in the model	TRUE	Scenario A Impact on immature survival rate mean	-
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B name	Incomb disp lwr2
Number of subpopulations	1	Scenario B Impact on productivity rate per pair mean	0
Units for initial population size	breeding.adults	Scenario B Impact on adult survival rate	0.0009334702
Are baseline demographic rates specified separately for immatures	TRUE	Scenario B Impact on immature survival rate mean	-
Initial population size	149978	Scenario C name	Incomb disp
Year	2024	Scenario C Impact on productivity rate per pair mean	0
Productivity rate per pair mean	0.6879	Scenario C Impact on adult survival rate per pair mean	0.001293523
Productivity rate per pair standard deviation	0.0825	Scenario C Impact on immature survival rate mean	-
Adult survival rate Mean	0.94	Scenario D name	Incomb disp
Adult survival rate standard deviation	0.025	Scenario D Impact on productivity rate per pair mean	0
Immatures survival rates 0 to 1 mean	0.56	Scenario D Impact on adult survival rate	0.001560229
Immatures survival rates 0 to 1 standard deviation	0.058	Scenario D Impact on immature survival rate mean	-
Immatures survival rates 1 to 2 mean	0.792	Scenario E name	Incomb disp upr1
Immatures survival rates 1 to 2 standard deviation	0.152	Scenario E Impact on productivity rate per pair mean	0
Immatures survival rates 2 to 3 mean	0.917	Scenario E Impact on adult survival rate	0.01811599
Immatures survival rates 2 to 3 standard deviation	0.098	Scenario E Impact on immature survival rate mean	-
Immatures survival rates 3 to 4 mean	0.938	Scenario F name	Incomb disp upr2
Immatures survival rates 3 to 4 standard deviation	0.107	Scenario F Impact on productivity rate per pair mean	0
Immatures survival rates 4 to 5 mean	0.94	Scenario F Impact on adult survival rate	0.02183654
Immatures survival rates 4 to 5 standard deviation	0.025	Scenario F Impact on immature survival rate mean	
Immatures survival rates 5 to 6 mean	0.94	Scenario G name	

Baseline parameters	Settings	Impact parameters	Values
Immatures survival rates 5 to 6 standard deviation	0.025	Scenario G Impact on productivity rate per pair mean	
Units for output	breeding.adults	Scenario G Impact on adult survival rate	
		Scenario G Impact on immature survival rate mean	

Table 6. Outputs: Guillemot FFC Annual

Scenario	Impact	Increase in mortality rate	Years since impact	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Incomb disp lwr1	116	0.0007734468	10	0.9994	0.9994	0.0002	0.9990	0.9999	0.9940	0.9939	0.0028	0.9885	0.9994	47.38	52.70
Incomb disp lwr2	140	0.0009334702	10	0.9993	0.9993	0.0002	0.9989	0.9998	0.9927	0.9927	0.0027	0.9873	0.9980	46.80	53.48
Incomb disp mid1	194	0.0012935231	10	0.9991	0.9991	0.0002	0.9986	0.9995	0.9899	0.9898	0.0028	0.9845	0.9952	45.70	54.80
Incomb disp mid2	234	0.0015602288	10	0.9989	0.9989	0.0002	0.9984	0.9994	0.9878	0.9878	0.0027	0.9824	0.9932	44.88	55.74
Incomb disp upr1	2,717	0.0181159903	10	0.9871	0.9871	0.0004	0.9863	0.9879	0.8673	0.8673	0.0041	0.8591	0.8752	6.54	93.84
Incomb disp upr2	3,275	0.0218365360	10	0.9845	0.9845	0.0005	0.9836	0.9854	0.8424	0.8423	0.0045	0.8332	0.8510	3.64	96.82
Incomb disp lwr1	116	0.0007734468	20	0.9995	0.9995	0.0002	0.9992	0.9998	0.9890	0.9889	0.0034	0.9823	0.9956	46.44	53.58
Incomb disp lwr2	140	0.0009334702	20	0.9994	0.9994	0.0002	0.9991	0.9997	0.9867	0.9867	0.0033	0.9801	0.9931	46.04	54.14
Incomb disp mid1	194	0.0012935231	20	0.9991	0.9991	0.0002	0.9988	0.9994	0.9815	0.9815	0.0033	0.9751	0.9881	44.44	55.94
Incomb disp mid2	234	0.0015602288	20	0.9989	0.9989	0.0002	0.9986	0.9992	0.9777	0.9777	0.0033	0.9713	0.9843	43.52	56.84
Incomb disp upr1	2,717	0.0181159903	20	0.9877	0.9877	0.0003	0.9871	0.9882	0.7704	0.7704	0.0046	0.7614	0.7792	1.78	98.54
Incomb disp upr2	3,275	0.0218365360	20	0.9851	0.9851	0.0003	0.9845	0.9858	0.7303	0.7303	0.0050	0.7205	0.7400	0.66	99.60
Incomb disp lwr1	116	0.0007734468	30	0.9995	0.9995	0.0001	0.9992	0.9997	0.9839	0.9838	0.0038	0.9763	0.9914	46.08	54.88
Incomb disp lwr2	140	0.0009334702	30	0.9994	0.9994	0.0001	0.9991	0.9996	0.9807	0.9806	0.0037	0.9734	0.9878	45.12	56.12
Incomb disp mid1	194	0.0012935231	30	0.9991	0.9991	0.0001	0.9989	0.9994	0.9732	0.9732	0.0037	0.9660	0.9804	43.24	58.14
Incomb disp mid2	234	0.0015602288	30	0.9989	0.9989	0.0001	0.9987	0.9992	0.9678	0.9678	0.0036	0.9609	0.9751	41.74	59.88
Incomb disp upr1	2,717	0.0181159903	30	0.9878	0.9878	0.0002	0.9874	0.9883	0.6842	0.6842	0.0048	0.6747	0.6935	0.50	99.60
Incomb disp upr2	3,275	0.0218365360	30	0.9854	0.9854	0.0003	0.9849	0.9858	0.6331	0.6331	0.0051	0.6230	0.6430	0.06	99.92

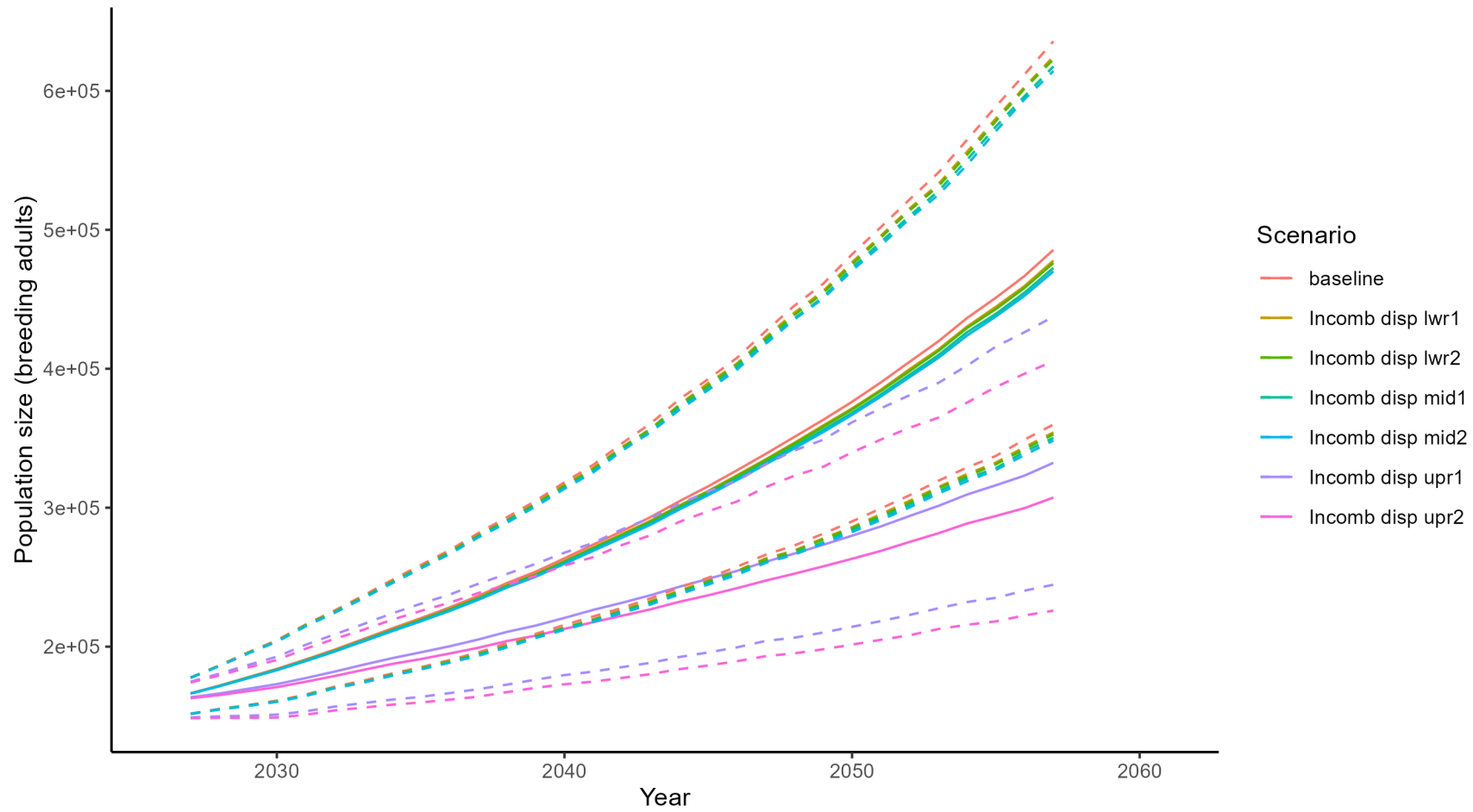


Figure 3. Guillemot FFC Annual

Table 7. Inputs: Razorbill FFC Annual

Baseline parameters	Settings	Impact parameters	Values
Reference name	RA FFC Annual	Number of scenarios of impact	6
Type	Simulation	Are impacts applied separately to each subpopulation	FALSE
Case studies	None	Are impacts specified separately for immatures	FALSE
Model to use for environmental stochasticity	Beta/Gamma	Are standard errors of impacts available	FALSE
Choose model for density dependence	No density	Should random seeds be matched for impact scenarios	TRUE
Include demographic stochasticity in model	TRUE	Impacts are specified as	Relative
Number of simulations	5000	Years in which impacts are assumed to begin	2027
Random seed	1971	Years in which impacts are assumed to end	2057
Years for burn in	5	Scenario A name	Incomb disp lwr1
Species	Razorbill	Scenario A Impact on productivity rate per pair mean	0
Age at first breeding	5	Scenario A Impact on adult survival rate	0.0009780589
Is there an upper constraint on productivity in the model	TRUE	Scenario A Impact on immature survival rate mean	0
Maximum brood size per pair chicks will be constrained to be no greater than	1	Scenario B name	Incomb disp lwr2
Number of subpopulations	1	Scenario B Impact on productivity rate per pair mean	0
Units for initial population size	breeding.adults	Scenario B Impact on adult survival rate	0.001075865
Are baseline demographic rates specified separately for immatures	TRUE	Scenario B Impact on immature survival rate mean	-
Initial population size	30673	Scenario C name	Incomb disp
Year	2022	Scenario C Impact on productivity rate per pair mean	0
Productivity rate per pair mean	0.618	Scenario C Impact on adult survival rate per pair mean	0.001630098
Productivity rate per pair standard deviation	0.085	Scenario C Impact on immature survival rate mean	-
Adult survival rate Mean	0.895	Scenario D name	Incomb disp
Adult survival rate standard deviation	0.067	Scenario D Impact on productivity rate per pair mean	0
Immatures survival rates 0 to 1 mean	0.63	Scenario D Impact on adult survival rate	0.001793108
Immatures survival rates 0 to 1 standard deviation	0.067	Scenario D Impact on immature survival rate mean	-
Immatures survival rates 1 to 2 mean	0.63	Scenario E name	Incomb disp upr1
Immatures survival rates 1 to 2 standard deviation	0.067	Scenario E Impact on productivity rate per pair mean	0
Immatures survival rates 2 to 3 mean	0.895	Scenario E Impact on adult survival rate	0.02265836
Immatures survival rates 2 to 3 standard deviation	0.067	Scenario E Impact on immature survival rate mean	-
Immatures survival rates 3 to 4 mean	0.895	Scenario F name	Incomb disp upr2
Immatures survival rates 3 to 4 standard deviation	0.067	Scenario F Impact on productivity rate per pair mean	0
Immatures survival rates 4 to 5 mean	0.895	Scenario F Impact on adult survival rate	0.02516872
Immatures survival rates 4 to 5 standard deviation	0.067	Scenario F Impact on immature survival rate mean	-
Immatures survival rates 5 to 6 mean		Scenario G name	

Baseline parameters	Settings	Impact parameters	Values
Immatures survival rates 5 to 6 standard deviation		Scenario G Impact on productivity rate per pair mean	
Units for output	breeding.adults	Scenario G Impact on adult survival rate	
		Scenario G Impact on immature survival rate mean	

Table 8. Outputs: Razorbill FFC Annual

Scenario	Impact	Increase in mortality rate	Years since impact	C-PGR					C-PS					50% Quantiles	
				Med.	Mean	SD	LCI	UCI	Med.	Mean	SD	LCI	UCI	Q-UNIMP-50%	Q-IMP-50%
Incomb disp lwr1	30	0.0009780589	10	0.9992	0.9992	0.0009	0.9975	1.0009	0.9915	0.9914	0.0103	0.9711	1.0120	48.70	51.28
Incomb disp lwr2	33	0.0010758648	10	0.9991	0.9991	0.0009	0.9975	1.0009	0.9906	0.9906	0.0104	0.9705	1.0116	48.28	51.64
Incomb disp med1	50	0.0016300981	10	0.9987	0.9987	0.0009	0.9970	1.0004	0.9858	0.9860	0.0103	0.9658	1.0065	47.06	52.00
Incomb disp med2	55	0.0017931079	10	0.9986	0.9986	0.0009	0.9969	1.0003	0.9844	0.9846	0.0104	0.9641	1.0058	46.90	52.50
Incomb disp upr1	695	0.0226583640	10	0.9824	0.9824	0.0010	0.9805	0.9843	0.8227	0.8228	0.0095	0.8044	0.8419	18.92	82.44
Incomb disp upr2	772	0.0251687152	10	0.9805	0.9805	0.0010	0.9785	0.9824	0.8050	0.8050	0.0095	0.7864	0.8240	16.42	84.94
Incomb disp lwr1	30	0.0009780589	20	0.9992	0.9992	0.0006	0.9980	1.0005	0.9842	0.9844	0.0135	0.9578	1.0117	47.88	51.96
Incomb disp lwr2	33	0.0010758648	20	0.9992	0.9992	0.0006	0.9979	1.0004	0.9833	0.9831	0.0136	0.9560	1.0109	47.32	52.10
Incomb disp med1	50	0.0016300981	20	0.9988	0.9988	0.0006	0.9975	1.0000	0.9743	0.9743	0.0135	0.9485	1.0014	46.04	53.62
Incomb disp med2	55	0.0017931079	20	0.9986	0.9986	0.0006	0.9974	0.9999	0.9718	0.9718	0.0135	0.9457	0.9988	45.44	53.90
Incomb disp upr1	695	0.0226583640	20	0.9829	0.9829	0.0007	0.9815	0.9844	0.6969	0.6968	0.0112	0.6751	0.7189	10.28	91.12
Incomb disp upr2	772	0.0251687152	20	0.9811	0.9811	0.0007	0.9796	0.9825	0.6693	0.6693	0.0108	0.6486	0.6910	8.38	93.32
Incomb disp lwr1	30	0.0009780589	30	0.9993	0.9993	0.0005	0.9982	1.0003	0.9772	0.9773	0.0164	0.9458	1.0103	47.10	52.64
Incomb disp lwr2	33	0.0010758648	30	0.9992	0.9992	0.0005	0.9982	1.0002	0.9752	0.9753	0.0164	0.9442	1.0082	46.68	52.98
Incomb disp med1	50	0.0016300981	30	0.9988	0.9988	0.0005	0.9978	0.9998	0.9626	0.9627	0.0162	0.9315	0.9957	45.18	54.48
Incomb disp med2	55	0.0017931079	30	0.9987	0.9986	0.0005	0.9976	0.9997	0.9592	0.9591	0.0163	0.9273	0.9924	44.58	55.40
Incomb disp upr1	695	0.0226583640	30	0.9831	0.9831	0.0006	0.9818	0.9843	0.5900	0.5900	0.0118	0.5666	0.6137	5.74	95.36
Incomb disp upr2	772	0.0251687152	30	0.9813	0.9813	0.0006	0.9800	0.9825	0.5561	0.5563	0.0112	0.5342	0.5784	3.94	96.92

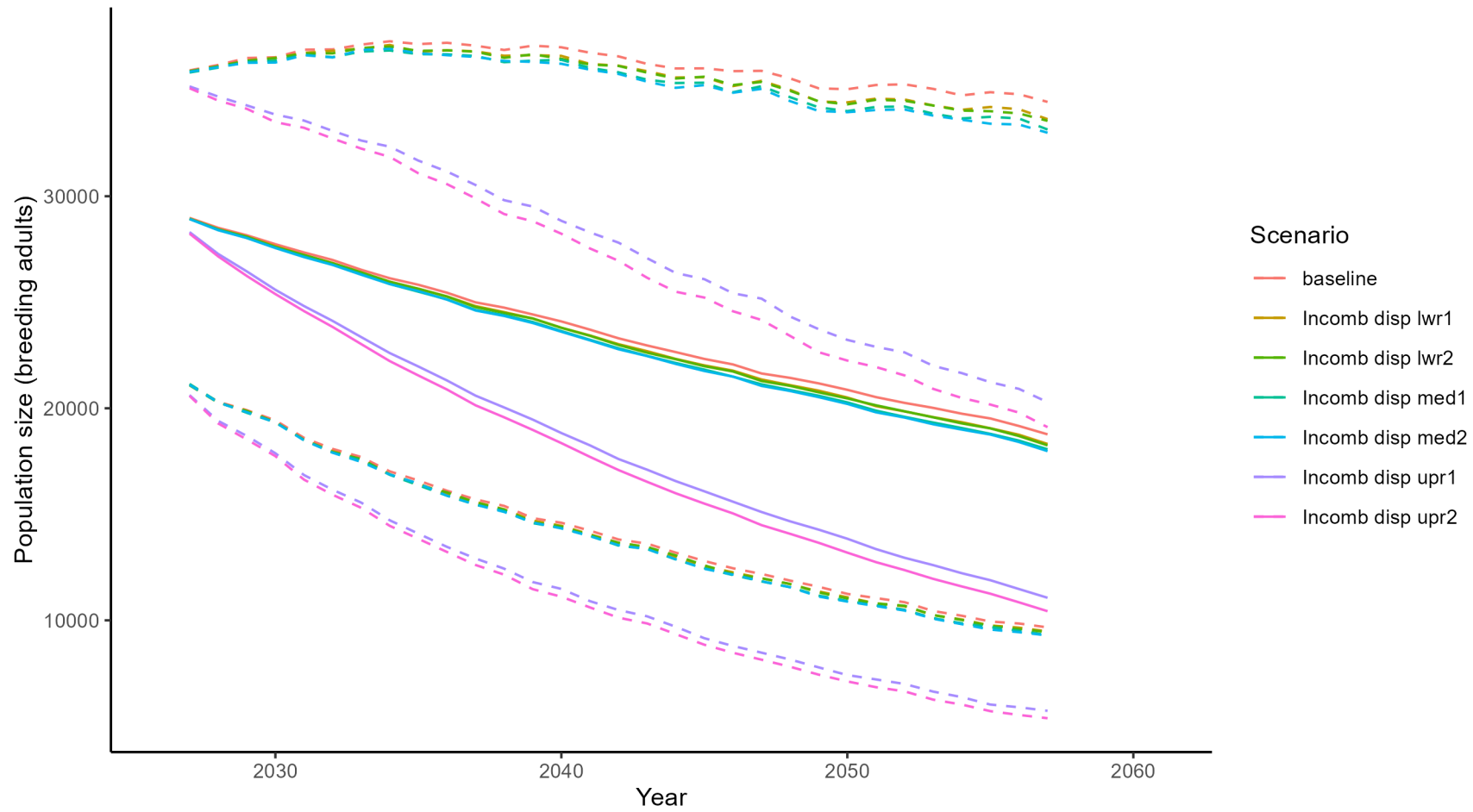


Figure 4. Razorbill FFC Annual